Mayor Mallotto
Mayor Pro Tem O'Keefe
Council Member Downs
Council Member Fromberg Edelstein
Council Member Weill

Thursday, December 18, 2025, 1:00 PM
City Council Chamber
69-825 Highway 111
Rancho Mirage, CA 92270

**REGULAR MEETING OF THE RANCHO MIRAGE CITY COUNCIL AND COMMUNITY SERVICES DISTRICT, ENERGY AUTHORITY, HOUSING AUTHORITY, JOINT POWERS FINANCE AUTHORITY, LIBRARY AND OBSERVATORY, AND REDEVELOPMENT SUCCESSOR AGENCY BOARDS**

# AGENDA

## 1. GENERAL

### 1.A. Call to Order

### 1.B. Flag Salute

### 1.C. Roll Call: Downs, Fromberg Edelstein, Weill, O'Keefe, Mallotto

## 2. PRESENTATIONS

### 2.A. Rancho Mirage Chamber of Commerce Business Update

## 3. COUNCIL MEMBER COMMENTS/REPORTS

## 4. CITY MANAGER COMMENTS/REPORTS

## 5. CONSENT CALENDAR (A-G)

### 5.A. Waive Full Reading of Any Ordinance Introduced or Adopted Pursuant to this Agenda

### 5.B. December 4, 2025, Regular City Council Meeting Minutes

— RECOMMENDED ACTION: Approve the December 4, 2025, Regular City Council Meeting Minutes as presented.

**5.C. 2025 Building Code Adoption**

— RECOMMENDED ACTION: 1) Adopt Ordinance No. 1227, 2nd Reading, Amending Chapter 15.02 “Adopted California and Uniform Codes” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Energy Code, 2025 California Historical Building Code, 2025 California Existing Building Code, and 2025 California Green Building Standards Code; 2) Adopt Ordinance No. 1228, 2nd Reading, Amending Chapter 15.04 “California Building Code, 2022 Edition” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Building Code; 3) Adopt Ordinance No. 1229, 2nd Reading, Amending Chapter 15.08 “California Mechanical Code, 2022 Edition and California Plumbing Code, 2022 Edition” and adding Chapter 15.06 “California Plumbing Code, 2025 Edition” to Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Mechanical Code and 2025 California Plumbing Code; 4) Adopt Ordinance No. 1230, 2nd Reading, Amending Chapter 15.10 “California Electrical Code, 2022 Edition” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Electrical Code; 5) Adopt Ordinance No. 1231, 2nd Reading, Amending Chapter 15.14 “California Residential Code, 2022 Edition” to Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Residential Code; and, 6) Adopt Ordinance No. 1232, 2nd Reading, Repealing and Replacing Chapter 15.12 “2022 California Fire Code” and adding Chapter 15.13 “California Wildland-Urban Interface Code ,2025 Edition to Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Fire Code.

**5.D. Final Parcel Map No. 38844 (Skilled Nursing Facility). Location: Bob Hope Drive, Between Gerald Ford Drive and Via Marta**

— RECOMMENDED ACTION: Approve Final Parcel Map No. 38844, subject to final review and approval by the City Manager, in consultation with the City Attorney.

**5.E. Extension of Completion Date for Parcel Map No. 38315 (Palomino Four). Location: Northwest Corner of Palomino Lane and Cypress Lane**

— RECOMMENDED ACTION: Authorize an Amendment to the Subdivision Improvement Agreement, which provides for the extension of the completion date for Parcel Map No. 38315 until December 7, 2026.

**5.F. Contracts**

— RECOMMENDED ACTION: Approve the terms of the contracts as presented and authorize the City Manager to execute the subject contracts.

**5.G. Demands**

— RECOMMENDED ACTION: Approve the demands as presented.

## 6. PUBLIC HEARINGS

**6.A. Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21-0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case Number TPM23-0002 (TPM38768) - Ritz Carlton Rancho Mirage. Applicant: Kam Sang Company on Behalf of Newage Rancho Mirage LLC/ Ritz Carlton. Consideration to Construct the Ritz Carlton Residences which is a Modification to Previously Approved Entitlements Consisting of 106 Condo Units; Event Space and Room for Amenities; Subterranean Parking Structure; and Additional Residential Parking Spaces. Additionally, a Newly Proposed Sky Mesa Recreational Area will Include a Restaurant, Additional Lawn Event Space and Pool Area. The 35.07 Acre Project Site (Excluding Previously Approved Tennis Villas Site (7.96 Acres on APN: 689-330-011)) Occurs Along Frank Sinatra Drive (68900 Frank Sinatra Drive) Approximately 0.85 Miles Southwest of the Intersection with Highway 111 Within the City of Rancho Mirage (APNs: 689-330-026, -028, -031, -032, -034; 689-020-012, -014; & 689-331-001, -018)**

— RECOMMENDED ACTION: 1) Adopt Resolution No. 2025-(Next-in-Order), Approving the Mitigation Monitoring and Reporting Program and Mitigated Negative Declaration (SCH# 2024030267) for the Proposed Project Based on Environmental Assessment Case No. EA21-0002; 2) Adopt Resolution No. 2025-(Next-in-Order), Approving General Plan Zoning Map Amendment (GPZMA21-0001), Tentative Parcel Map Case No. TPM23-0002, & Major Modification Case No. MOD21-0004; and 3) Introduce Ordinance No. (Next-in-Order), 1st Reading, Approving Development Agreement Amendment (DA21-0002).

## 7. ACTION CALENDAR

**7.A. Intention to Annex Territory Comprising 5.04 Acres to Community Facilities District No. 1 in Connection with Tentative Tract Map No. TTM 38447. Location: Southwest Corner of Via Florencia and Via Josefina**

— RECOMMENDED ACTION: Adopt Resolution No. 2025-(Next-in-Order), Declaring the City's Intention to Annex Territory to Community Facilities District No. 1 and to Levy a Special Tax therein for Additional Police and Fire Services, Preliminarily Approve a Map of the Area Proposed to be Annexed, and Schedule a Public Hearing to Consider the Annexation and the Levy of the Special Tax for Annexation No. 203.

## 8. NON-AGENDA PUBLIC COMMENTS

An opportunity for the public to speak on issues not on the agenda for a maximum of three (3) minutes per speaker.

## 9. CLOSED SESSION

**9.A. Closed Session Agenda**

— 1. CONFERENCE WITH LEGAL COUNSEL - EXISTING LITIGATION Pursuant to Government Code Section 54956.9(d)(1). Case name unspecified since disclosure may jeopardize existing settlement negotiations.

**9.B. Recess to Closed Session**

**9.C. Reconvene Open Session**

**9.D. Closed Session Announcements**

## 10. ADJOURNMENT

## PUBLIC NOTICES

**Agenda Materials:** Any staff reports for agenda items considered in open session, as well as agenda materials for open session items provided to a majority of the legislative body(ies) following distribution of the agenda, are available for inspection in the City Clerk's Office at Rancho Mirage City Hall, located at 69-825 Highway 111, Rancho Mirage, CA 92270, during normal business hours.

**Americans with Disabilities Act (ADA):** If you are an individual with a disability and need a reasonable modification or accommodation pursuant to the ADA, please contact the City Clerk's Office at (760) 324-4511 Ext. 488, or via e-mail to CityClerk@RanchoMirageCA.gov, prior to the meeting. Providing notice at least 48 hours in advance of the meeting is suggested, so a determination may be made as to whether the request is feasible.

**Livestream:** This meeting may be viewed via Livestream on the City's website at www.RanchoMirageCA.gov.

**Public Comments:** Written public comments may be submitted to the City Clerk via email to CityClerk@RanchoMirageCA.gov or mail/delivery to ATTN: City Clerk, City of Rancho Mirage, 69-825 Highway 111, Rancho Mirage, CA 92270. Please submit written public comments at least three (3) hours in advance of the meeting to ensure they may be fully considered. Written public comments received during the meeting will be distributed to the legislative body(ies) and made available to the public following the meeting.

Oral public comments/testimony may be provided in person at the meeting during the non-agenda public comment period and during the public comment/testimony period for each agenda item. Public comments are limited to three (3) minutes per speaker. Please fill out a Request to Speak slip prior to the start of the meeting and submit it to the City Clerk. You will be called upon to speak at the appropriate time. Please submit a separate slip for each item on which you wish to speak.

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***Declaration of Posting:*** *I, Kristie Ramos, City Clerk of the City of Rancho Mirage, do hereby declare that the foregoing meeting agenda was posted on the City of Rancho Mirage website at www.RanchoMirageCA.gov, on the Rancho Mirage City Hall bulletin board at 69-825 Highway 111, Rancho Mirage, CA 92270, and at the Rancho Mirage Library & Observatory at 71-100 Highway 111, Rancho Mirage, CA 92270, at least 72 hours in advance of the meeting.*

Kristie Ramos

CITY OF RANCHO MIRAGE CALIFORNIA Incorporated August 3, 1973

*Date Posted: December 12, 2025*

## City Council Staff Report

**December 4, 2025, Regular City Council Meeting Minutes**

| DATE | ITEM # |
|---|---|
| December 18, 2025 | CONSENT CALENDAR - 5B. |
| **Presented To** | **Presented By** |
| Mayor and City Council | Kristie Ramos, City Clerk |

### RECOMMENDED ACTION

Approve December 4, 2025, Regular City Council Meeting Minutes as presented.

**Attachments**

Attachment 1 - Draft 12/04/2025 Regular City Council Meeting Minutes

**ATTACHMENT 1**

Mayor Mallotto
Mayor Pro Tem O'Keefe
Council Member Downs
Council Member Fromberg Edelstein
Council Member Weill

**REGULAR MEETING OF THE RANCHO MIRAGE CITY COUNCIL AND COMMUNITY SERVICES DISTRICT, ENERGY AUTHORITY, HOUSING AUTHORITY, JOINT POWERS FINANCE AUTHORITY, LIBRARY AND OBSERVATORY, AND REDEVELOPMENT SUCCESSOR AGENCY BOARDS**

**69-825 Highway 111, Rancho Mirage, CA 92270**

**Thursday, December 4, 2025, 1:00 PM**

**DRAFT MINUTES**

## 1. GENERAL

### 1.A. Call to Order

Mayor Mallotto called the meeting to order at 1:00 P.M.

### 1.B. Flag Salute

Mayor Pro Tem O'Keefe led the flag salute.

### 1.C. Roll Call: Downs, Fromberg Edelstein, Weill, O'Keefe, Mallotto

All City Council Members were present.

## 2. COUNCIL MEMBER COMMENTS/REPORTS

Council Member Weill spoke of what makes Rancho Mirage such a remarkable city and emphasized the importance of safety and community care ahead of the holiday season.Council

Council Member Downs announced the upcoming Home for the Holidays program provided by the Rancho Mirage Community Cultural Commission.

Mayor Pro Tem O'Keefe provided statistics regarding homelessness and urged everyone to remember those in need during the holiday season.

Mayor Mallotto spoke regarding a regional analysis being conducted by SunLine Transit Agency.

## 3. CITY MANAGER COMMENTS/REPORTS

None.

## 4. CONSENT CALENDAR (A-G)

Isaiah Hagerman, City Manager, presented the Consent Calendar items.

**MOVED/SECONDED BY WEILL/DOWNS TO APPROVE THE CONSENT CALENDAR AS PRESENTED. MOTION CARRIED 5/0.**

**4.A. Waive Full Reading of Any Ordinance Introduced or Adopted Pursuant to this Agenda**

**4.B. November 20, 2025, Regular City Council Meeting Minutes**

— RECOMMENDED ACTION: Approve the November 20, 2025, Regular City Council Meeting Minutes as presented.

**4.C. Annual and Five-Year Development Impact Fee Report**

— RECOMMENDED ACTION: Receive and file the Development Impact Fee Annual and Five-Year Report, and make the findings referenced in the staff report.

**4.D. Annual Comprehensive Financial Report (ACFR) for the Year Ended June 30, 2025, and Other Related Audit Reports**

— RECOMMENDED ACTION: Receive and file the Annual Comprehensive Financial Report (ACFR) for the year ended June 30, 2025, and other related audit reports.

**4.E. Recognized Obligations Payment Schedule (ROPS) and Administrative Budget for Fiscal Year 2026-2027 Pursuant to AB 26x1 and AB 1484**

— RECOMMENDED ACTION: Adopt Resolution No. 2025-SA-(Next-in-Order), Approving and Adopting a Recognized Obligation Payment Schedule and Administrative Budget for Fiscal Year 2026-2027 Pursuant to Assembly Bills 26x1 and 1484. (Resolution No. 2025-SA-02)

**4.F. Contracts**

— RECOMMENDED ACTION: Approve the terms of the contracts as presented and authorize the City Manager to execute the subject contracts.

**4.G. Demands**

— RECOMMENDED ACTION: Approve the demands as presented.

## 5. PUBLIC HEARINGS

**5.A. CONTINUED FROM 11/20/2025 CITY COUNCIL MEETING - Environmental Assessment Case No. EA24-0009, Minor Variance Case No. VAR24-0005, and Tentative Tract Map Case No. TTM24-0003 (TTM 38971) – Applicant: Phillip Fomotor. Consideration of a 16-Lot Residential Subdivision on 19.81 Gross Acres. The Project Requests Approval of a Minor Variance to the Residential Estate (R-E) Minimum Required Lot Size. Located North of the Intersection of Mirage Cove Drive and Peterson Road (APN's: 689-090-003, 689-130-004, -005, -013, -014, -017, -018, & 689-140-022)**

— RECOMMENDED ACTION: 1) Approve the filing of a Mitigated Negative Declaration (SCH# 2025070800) based on Environmental Assessment Case No. EA24-0009; 2) Approve Minor Variance Case No. VAR24-0005; and, 3) Approve Tentative Tract Map Case No. TTM24-0003 (TTM 38971), subject to the Conditions of Approval, and based on the content and Findings in the staff report.

Ben Torres, Planning Manager, presented the staff report.

The following individuals provided public testimony: Vicki Petersen, Janeen Bahr, Jack Swensen, and Murray Bryant.

A discussion ensued.

**MOVED/SECONDED BY WEILL/DOWNS TO: 1) APPROVE THE FILING OF A MITIGATED NEGATIVE DECLARATION (SCH# 2025070800) BASED ON ENVIRONMENTAL ASSESSMENT CASE NO. EA24-0009; 2) APPROVE MINOR VARIANCE CASE NO. VAR24-0005; AND 3) APPROVE TENTATIVE TRACT MAP CASE NO. TTM24-0003 (TTM 38971), SUBJECT TO THE CONDITIONS OF APPROVAL, AND BASED ON THE CONTENT AND FINDINGS IN THE STAFF REPORT. MOTION CARRIED 5/0.**

## 6. ACTION CALENDAR

### 6.A. 2025 Building Code Adoption

— RECOMMENDED ACTION: 1) Introduce Ordinance No. (Next-in-Order), 1st Reading, Amending Chapter 15.02 “Adopted California and Uniform Codes” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Energy Code, 2025 California Historical Building Code, 2025 California Existing Building Code, and 2025 California Green Building Standards Code; 2) Introduce Ordinance No. (Next-in-Order), 1st Reading, Amending Chapter 15.04 “California Building Code, 2022 Edition” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Building Code; 3) Introduce Ordinance No. (Next-in-Order), 1st Reading, Amending Chapter 15.08 “California Mechanical Code, 2022 Edition and California Plumbing Code, 2022 Edition” and adding Chapter 15.06 “California Plumbing Code, 2025 Edition” to Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Mechanical Code and 2025 California Plumbing Code; 4) Introduce Ordinance No. (Next-in-Order), 1st Reading, Amending Chapter 15.10 “California Electrical Code, 2022 Edition” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Electrical Code; 5) Introduce Ordinance No. (Next-in-Order), 1st Reading, Amending Chapter 15.14 “California Residential Code, 2022 Edition” to Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Residential Code; and, 6) Introduce Ordinance No. (Next-in-Order), 1st Reading, Repealing and Replacing Chapter 15.12 “2022 California Fire Code” and adding Chapter 15.13 “California Wildland-Urban Interface Code ,2025 Edition to Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Fire Code.

Mike Stitt, Building Official, presented the staff report.

**MOVED/SECONDED BY DOWNS/FROMBERG EDELSTEIN TO: 1) INTRODUCE ORDINANCE NO. 1227, 1ST READING, AMENDING CHAPTER 15.02 “ADOPTED CALIFORNIA AND UNIFORM CODES” OF TITLE 15 “BUILDINGS AND CONSTRUCTION” OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA ENERGY CODE, 2025 CALIFORNIA HISTORICAL BUILDING CODE, 2025 CALIFORNIA EXISTING BUILDING CODE, AND 2025 CALIFORNIA GREEN BUILDING STANDARDS CODE; 2) INTRODUCE ORDINANCE NO. 1228, 1ST READING, AMENDING CHAPTER 15.04 “CALIFORNIA BUILDING CODE, 2022 EDITION” OF TITLE 15 “BUILDINGS AND CONSTRUCTION” OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA BUILDING CODE; 3) INTRODUCE ORDINANCE NO. 1229, 1ST READING, AMENDING CHAPTER 15.08 “CALIFORNIA MECHANICAL CODE, 2022 EDITION AND CALIFORNIA PLUMBING CODE, 2022 EDITION” AND ADDING CHAPTER 15.06 “CALIFORNIA PLUMBING CODE, 2025 EDITION” TO TITLE 15 “BUILDINGS AND CONSTRUCTION” OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA MECHANICAL CODE AND 2025 CALIFORNIA PLUMBING CODE; 4) INTRODUCE ORDINANCE NO. 1230, 1ST READING, AMENDING CHAPTER 15.10 “CALIFORNIA ELECTRICAL CODE, 2022 EDITION” OF TITLE 15 “BUILDINGS AND CONSTRUCTION” OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA ELECTRICAL CODE; 5) INTRODUCE ORDINANCE NO. 1231, 1ST READING, AMENDING CHAPTER 15.14 “CALIFORNIA RESIDENTIAL CODE, 2022 EDITION” TO TITLE 15 “BUILDINGS AND CONSTRUCTION” OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA RESIDENTIAL CODE; AND 3) INTRODUCE ORDINANCE NO. 1232, 1ST READING, REPEALING AND REPLACING CHAPTER 15.12 “2022 CALIFORNIA FIRE CODE” AND ADDING CHAPTER 15.13 “CALIFORNIA WILDLAND-URBAN INTERFACE CODE ,2025 EDITION TO TITLE 15 “BUILDINGS AND CONSTRUCTION” OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA FIRE CODE. MOTION CARRIED 5/0.**

### 6.B. IID (Imperial Irrigation District) Substation Funding and Reservation of Capacity Agreement

— RECOMMENDED ACTION: 1) Approve the Funding and Reservation of Capacity Agreement for Cook Street Substation, and authorize the City Manager or designee to execute the Agreement, subject to revisions approved by all other parties and approved by the City Manager in consultation with the City Attorney; and, 2) Authorize the City Manager to negotiate and execute an Amendment to the Agreement, reserving up to an additional 5,000kVA of

capacity for the City on terms substantially the same as the Agreement, which is approximately 8% additional capacity at $3.2 million.

Isaiah Hagerman, City Manager, presented the staff report.

A discussion ensued.

**MOVED/SECONDED BY DOWNS/WEILL TO: 1) APPROVE THE FUNDING AND RESERVATION OF CAPACITY AGREEMENT FOR COOK STREET SUBSTATION, AND AUTHORIZE THE CITY MANAGER OR DESIGNEE TO EXECUTE THE AGREEMENT, SUBJECT TO REVISIONS APPROVED BY ALL OTHER PARTIES AND APPROVED BY THE CITY MANAGER IN CONSULTATION WITH THE CITY ATTORNEY; AND 2) AUTHORIZE THE CITY MANAGER TO NEGOTIATE AND EXECUTE AN AMENDMENT TO THE AGREEMENT, RESERVING UP TO AN ADDITIONAL 5,000KVA OF CAPACITY FOR THE CITY ON TERMS SUBSTANTIALLY THE SAME AS THE AGREEMENT, WHICH IS APPROXIMATELY 8% ADDITIONAL CAPACITY AT $3.2 MILLION. MOTION CARRIED 5/0.**

**6.C. Shop Local Rancho Mirage Gift Card Program Proposed Holiday Bonus Campaign**

— RECOMMENDED ACTION: Approve the implementation of the Shop Local Rancho Mirage Gift Card Holiday Bonus Program (running from Friday, December 5, 2025, through Tuesday, February 17, 2026), with the program utilizing a $50,000 bonus fund to offer a 50% matching incentive on gift card purchases.

Gabe Codding, Director of Marketing, presented the staff report.

A discussion ensued.

**MOVED/SECONDED BY FROMBERG EDELSTEIN/O'KEEFE TO APPROVE THE IMPLEMENTATION OF THE SHOP LOCAL RANCHO MIRAGE GIFT CARD HOLIDAY BONUS PROGRAM (RUNNING FROM FRIDAY, DECEMBER 5, 2025, THROUGH TUESDAY, FEBRUARY 17, 2026), WITH THE PROGRAM UTILIZING A $50,000 BONUS FUND TO OFFER A 50% MATCHING INCENTIVE ON GIFT CARD PURCHASES. MOTION CARRIED 5/0.**

## 7. NON-AGENDA PUBLIC COMMENTS

The following individuals provided non-agenda public comments: Susan Ragsdale, Alex Cruz, Patrick Lowry, and Wally Melendez.

## 8. CLOSED SESSION

**8.A. Closed Session Agenda**

— 1. CONFERENCE WITH LEGAL COUNSEL - EXISITING LITIGATION Pursuant to Government Code Section 54956.9(d) (1). Case Name: Ricky Martinez v. City of Rancho Mirage. Case No.: CVPS2503449.

— 2. CONFERENCE WITH LEGAL COUNSEL - EXISTING LITIGATION Pursuant to Government Code Section 54956.9(d)(1). Case name unspecified since disclosure may jeopardize existing settlement negotiations.

Colin Kirkpatrick, City Attorney, announced that the City Council would recess to Closed Session to confer with legal counsel regarding two existing litigation items, pursuant to Government Code Section 54956.9(d)(1); the first being case name Ricky Martinez v. City of Rancho Mirage with Case No.: CVPS2503449, and the second having an unspecified case name since disclosure may jeopardize existing settlement negotiations.

**8.B. Recess to Closed Session**

Mayor Mallotto recessed the meeting to Closed Session at 2:11 P.M.

**8.C. Reconvene Open Session**

Mayor Mallotto reconvened the meeting at 2:54 P.M.

**8.D. Closed Session Announcements**

Colin Kirkpatrick, City Attorney, announced that no reportable action was taken during Closed Session.

## 9. ADJOURNMENT

Mayor Mallotto adjourned the meeting at 2:54 P.M.

*Date Approved by City Council:*

**City Council Staff Report**

**2025 Building Code Adoption**

| DATE | ITEM # |
|---|---|
| December 18, 2025 | CONSENT CALENDAR - 5C. |
| **Presented To** | **Presented By** |
| Mayor and City Council | Kristie Ramos, City Clerk |

## RECOMMENDED ACTION

1) Adopt Ordinance No. 1227, 2nd Reading, Amending Chapter 15.02 “Adopted California and Uniform Codes” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Energy Code, 2025 California Historical Building Code, 2025 California Existing Building Code, and 2025 California Green Building Standards Code;

2) Adopt Ordinance No. 1228, 2nd Reading, Amending Chapter 15.04 “California Building Code, 2022 Edition” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Building Code;

3) Adopt Ordinance No. 1229, 2nd Reading, Amending Chapter 15.08 “California Mechanical Code, 2022 Edition and California Plumbing Code, 2022 Edition” and adding Chapter 15.06 “California Plumbing Code, 2025 Edition” to Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Mechanical Code and 2025 California Plumbing Code;

4) Adopt Ordinance No. 1230, 2nd Reading, Amending Chapter 15.10 “California Electrical Code, 2022 Edition” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Electrical Code;

5) Adopt Ordinance No. 1231, 2nd Reading, Amending Chapter 15.14 “California Residential Code, 2022 Edition” to Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Residential Code; and

6) Adopt Ordinance No. 1232, 2nd Reading, Repealing and Replacing Chapter 15.12 “2022 California Fire Code” and adding Chapter 15.13 “California Wildland-Urban Interface Code ,2025 Edition to Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code to Adopt the 2025 California Fire Code.

## DISCUSSION

Ordinance Nos. 1227, 1228, 1229, 1230, 1231, and 1232 were introduced (1st reading) on December 4, 2025.

**Attachments**

Attachment 1 - Draft Ordinance No. 1227 (Amending 15 02)
Attachment 2 - Draft Ordinance No. 1228 (Amending 15 04)
Attachment 3 - Draft Ordinance No. 1229 (Amending 15 08)
Attachment 4 - Draft Ordinance No. 1230 (Amending 15 10)
Attachment 5 - Draft Ordinance No. 1231 (Amending 15 14)
Attachment 6 - Draft Ordinance No. 1232 (Fire Code)

**ATTACHMENT 1**

# ORDINANCE NO. 1227

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, AMENDING CHAPTER 15.02 "ADOPTED CALIFORNIA AND UNIFORM CODES" OF TITLE 15 "BUILDINGS AND CONSTRUCTION" OF THE RANCHO MIRAGE MUNICIPAL CODE ADOPTING THE 2025 CALIFORNIA ENERGY CODE, 2025 CALIFORNIA HISTORICAL BUILDING CODE, 2025 CALIFORNIA EXISTING BUILDING CODE, AND 2025 CALIFORNIA GREEN BUILDING STANDARDS CODE**

**WHEREAS**, the City of Rancho Mirage ("City") is a charter city and recognized for certain purposes as a political subdivision of the State of California; and

**WHEREAS**, the State of California approved the 2025 edition of the California Building Standards Code (BSC), which is published in Title 24 of the California Code of Regulations and is based on the latest national and international model building codes; and

**WHEREAS**, the BSC shall become effective on January 1, 2026; and

**WHEREAS**, Government Code section 50022.2 and Health and Safety Code 17922 authorize the City to enact ordinances adopting said codes by reference; and

**WHEREAS**, in order to protect the public health, safety and welfare and to remain up-to-date with current state regulations, the City wishes to adopt the 2025 editions of the California Energy Code, set forth in Part 6 of the BSC, California Historical Building Code, set forth in Part 8 of the BSC, California Existing Building Code, set forth in Part 10 of the BSC, and California Green Building Standards Code, set forth in Part 11 of the BSC, without any local amendments.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES ORDAIN AS FOLLOWS:**

## Section 1. RECITALS

That the above recitals are true and correct and are incorporated as though fully set forth herein.

## Section 2. AMENDMENT TO CHAPTER 15.02 OF TITLE 15 OF THE RANCHO MIRAGE MUNICIPAL CODE

That Chapter 15.02 ("Adopted California and Uniform Codes") of Title 15 ("Buildings and Construction") of the Rancho Mirage Municipal Code is hereby amended to read entirely as follows:

Chapter 15.02 ADOPTED CALIFORNIA AND UNIFORM CODES

15.02.010 Codes of ***2025*** Edition of the California Building Standards Code adopted without local amendments.

The following codes of the 2025 Edition of the California Building Standards Code shall be applicable within the city, without local amendments:

A. ***2025*** California Energy Code as set forth in Part 6 of Title 24 of the California Code of Regulations.

B. ***2025*** California Historical Building Code as set forth in Part 8 of Title 24 of the California Code of Regulations.

C. ***2025*** California Existing Building Code as set forth in Part 10 of Title 24 of the California Code of Regulations.

D. ***2025*** California Green Building Standards Code as set forth in Part 11 of Title 24 of the California Code of Regulations.

15.02.020 Codes of ***2025*** Edition of the California Building Standards Code adopted with local amendments and/or appendices.

The following codes of the 2025 Edition of the California Building Standards Code shall be applicable within the city, subject to certain local amendments and/or appendices, as follows:

A. ***2025*** California Building Code subject to the amendments and appendices set forth in Chapter 15.04.

B. ***2025*** California Mechanical Code and 2025 California Plumbing Code subject to the amendments and appendices set forth in Chapter 15.06 & 15.08.

C. ***2025*** California Electrical Code subject to the amendments and appendices set forth in Chapter 15.10.

D. ***2025*** California Fire Code subject to the amendments and appendices set forth in Chapter 15.12.

E. ***2025*** California Residential Code subject to amendments and appendices set forth in Chapter 15.14.

**Section 3. SEVERABILITY**

That the City Council declares that, should any provision, section, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this ordinance as hereby adopted

shall remain in full force and effect.

**Section 4. REPEAL OF CONFLICTING PROVISIONS**

That all the provisions of the Rancho Mirage Municipal Code as heretofore adopted by the City of Rancho Mirage that are in conflict with the provisions of this ordinance are hereby repealed.

**Section 5. EFFECTIVE DATE**

That this ordinance shall take effect on January 1, 2026.

**Section 6. CITY ATTORNEY REVIEW**

That the City Attorney prepared and framed this ordinance pursuant to Section 1.04.010 of the Rancho Mirage Municipal Code and finds that the City Council has the authority to adopt this ordinance, that the ordinance is constitutionally valid and that the ordinance is consistent with the general powers and purposes of the City as set forth in Section 1.04.031 of the Rancho Mirage Municipal Code.

**Section 7. NECESSARY ACTIONS**

That the Development Services Director or designee is authorized to take any and all further actions necessary to effectuate the adoption of this Ordinance and implementation of the adopted codes.

**Section 8. CERTIFICATION**

That the City Clerk shall certify to the passage of this ordinance and shall cause the same to be published according to law.

[REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK]

The foregoing Ordinance was approved and adopted at a meeting of the City Council held on _____, 2025, by the following vote:

Ayes:
Noes:
Abstain:
Absent:

_____
Lynn Mallotto, Mayor

**ATTEST:**

_____
Kristie Ramos, City Clerk

**APPROVED AS TO FORM:**

_____
Colin Kirkpatrick, City Attorney

**ATTACHMENT 2**

# ORDINANCE NO. 1228

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, AMENDING CHAPTER 15.04 "CALIFORNIA BUILDING CODE, 2022 EDITION" OF TITLE 15 "BUILDINGS AND CONSTRUCTION" OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA BUILDING CODE**

**WHEREAS**, the City of Rancho Mirage ("City") is a charter city and a political subdivision of the State of California; and

**WHEREAS,** the State of California adopted and approved the 2025 edition of the California Building Standards Code (BSC), which is published in Title 24 of the California Code of Regulations and includes the 2022 California Building Code which is based on the latest national and international model building codes; and

**WHEREAS,** the BSC shall become effective on January 1, 2026; and

**WHEREAS,** the City wishes to adopt the 2025 edition of the California Building Code, as set forth in Part 2 of the BSC, along with local administrative amendments; and

**WHEREAS**, Government Code section 50022.2 and Health and Safety Code 17922 authorize the City to enact ordinances adopting the BSC by reference; and

**WHEREAS,** pursuant to California Health & Safety Code sections 17958.7 and 18941.5(b), the City is permitted to adopt amendments to the BSC provided the amendments are more restrictive than the State-adopted standards and are supported by findings of the City Council that the amendments are necessary due to local climatic, topographical or geological conditions; and

**WHEREAS**, the City Council considered adoption of, and amendments to, the 2025 California Building Code, as set forth in Part 2 of the BSC, which amendments were proposed by the City's Building Official as more stringent than the standards established by the BSC and reasonably necessary to protect the health, welfare and safety of the citizens of Rancho Mirage because of local climatic and geological conditions; and

**WHEREAS**, as detailed in Section 2 of this Ordinance, the City Council finds that the amendments recommended by the Building Official are reasonably necessary to protect the health, safety and welfare of the citizens of Rancho Mirage because of local climatic, topographical, and geological conditions.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES ORDAIN AS FOLLOWS:**

**Section 1. RECITALS**

That the above recitals are true and correct and are incorporated as though fully set forth herein.

**Section 2. FINDINGS**

That the City Council hereby adopts the following findings:

I. Climatic Conditions:

A. The City of Rancho Mirage located in Riverside County is located in Southern California and covers a vast and varied geographic area. The base climate in western Riverside County consists of semi-arid Mediterranean weather patterns. Eastern Riverside County is a desert area with Mohave Desert temperatures and weather patterns. Those two primary areas are divided by the San Bernardino Mountain Range. Both areas outside of the mountain terrain annually experience extended periods of high temperatures with little or no precipitation. Hot, dry winds, which may reach speeds of 70 M.P.H. or greater, are common to the area. Examples are: Santa Ana/ Foehn winds, afternoon surface-heating generated winds, and prevailing desert winds.

These climatic conditions cause extreme drying of vegetation and common building materials. Frequent periods of drought and low humidity add to the fire danger. This predisposes the area to large destructive fires (conflagration) which necessitates rapid identification, locating and extinguishment of all fires in the smallest stage possible. In addition to directly damaging or destroying buildings, these fires are also prone to disrupt utility services throughout the County. Obstacles generated by a strong wind, such as fallen trees, street lights and utility poles, will greatly impact the response time to reach an incident scene. During these winds, the inability to use aerial type firefighting apparatus would further decrease our ability to stop fires in large buildings and place rescue personnel at increased risk of injury.

B. Although Riverside County and the City of Rancho Mirage occasionally experience periods of significant drought, the County can also experience periods of substantial rainfall. Annual rainfall varying from three (3) inches in Blythe to over thirty three (33) inches in Pine Cove. When Riverside County does experience heavy rain, or rain over a period of days or weeks, many areas of the County are subject to flooding. Runoff from rain drains either naturally into rivers, washes, and creeks or into flood control facilities. Flash flooding is also a common problem, especially in the Coachella Valley and the easterly portions of the County. Flash flooding is typically associated with short duration, high intensity precipitation events often associated with summer thunderstorms. Such events can occur even during a drought.

C. Water demand in densely populated Southern California far exceeds the quantity supplied by natural precipitation; and although the population continues to grow, the already-taxed water supply does not. California is projected to increase in population by nearly 10 million over the next quarter of a century with 50 percent of that growth centered in Southern California. Due to storage capacities and consumption, and a limited amount of rainfall future water allocation is not fully dependable. This necessitates the need for additional and on-site fire protection features. It would also leave tall buildings vulnerable to uncontrolled fires due to a lack of available water and an inability to pump sufficient quantities of available water to floors in a fire.

D. These dry climatic conditions and winds contribute to the rapid spread of even small fires originating in high-density housing or vegetation. These fires spread very quickly and create a need for increased levels of fire protection. The added protection of fire sprinkler systems and other fire protection features such as identification and notification will supplement normal fire department response by providing immediate protection for the building occupants and by containing and controlling the fire spread to the area of origin. Fire sprinkler systems will also reduce the use of water for firefighting by as much as 50 to 75 percent.

## Section 3. AMENDMENT TO CHAPTER 15.04 OF TITLE 15 OF THE RANCHO MIRAGE MUNICIPAL CODE

Chapter 15.04 “California Building Code, 2022 Edition” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code is hereby amended to read entirely as follows:

Chapter 15.04 CALIFORNIA BUILDING CODE, 2025 EDITION
15.04.010 California Building Code adopted with amendments.

A. Except for the local amendments set forth herein, there is adopted by reference the California Building Code 2025 Edition, which is published by the California Building Standards Commission as Part 2 of Title 24 of the California Code of Regulations. A copy of the Code together with the local amendments is on file with the division of building and safety.

B. The California Building Code, 2025 Edition (hereinafter “Building Code”) shall be the building code for the city and said Code together with the adopted appendices and the amendments set forth in this chapter shall regulate and govern the conditions and maintenance of all property, buildings and structures within the city by providing the standards for supplied utilities and facilities and other physical things and conditions essential to ensure that structures are safe, sanitary and fit for occupation and use and providing for the condemnation and demolition of buildings and structures that are unfit for

human occupancy and use, and the issuance of permits and collection of permit fees.

15.04.020 Modifications, amendments and deletions to the Building Code.

1.Section 903.2 of the California Fire Code is deleted in its entirety and replaced with the following:

**903.2 Where Required.**

1. In all new buildings and structures which are 3,600 square feet or greater, an approved automatic sprinkler system shall be provided regardless of occupancy classification. Where the Sections 903.2.1 – 903.2.21 of the California Fire Code require more restrictive requirements than those listed below, the more restrictive requirement shall take precedence.
2. All existing buildings, except for one- and two-family dwellings, shall be retrofitted with automatic fire sprinklers when a structure exceeds 3,600 square feet and changes are made to the building including any of the following: change of use/occupancy, removal of an existing fire wall as defined by the California Building Code, or additions of 50% or more are made to the original building area and the resulting square footage exceeds 5,000 square feet.
3. One- and two-family dwellings shall have an automatic fire sprinkler system regardless of square footage in accordance with the California Residential Code. Fire sprinkler systems shall be installed in mobile homes, manufactured homes and multifamily manufactured homes with two dwelling units in accordance with Title 25 of the California Code of Regulations.

**Exception:** Unless required elsewhere in this code or the California Building Code, automatic fire sprinkler systems shall not be required for the following:

1. Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have an automatic sprinkler system by Section 1207 for energy storage systems and standby engines, provided that those spaces or areas are equipped throughout with an automatic smoke detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with Section 707 of the California Building Code or not less than 2-hour horizontal assemblies constructed in accordance with Section 711 of the California Building Code, or both.
2. Detached Group U occupancies used for agricultural purposes.
3. Detached non-combustible equestrian arena shade canopies that are open on all sides and used for riding only - no commercial, assembly or storage uses.
4. Non-combustible fueling station canopies not exceeding 10,000 square

feet when separated from other buildings by a distance of not less than 50 feet.

5. Detached fabric or non-combustible shade structures that are open on all sides and used to shade playground equipment, temporary storage of vehicles and dining areas with no cooking.

6. Where determined by the Fire Chief that no major life safety hazard exists, and the fuel load does not pose a significant threat to firefighter safety or to other structures or property, automatic fire sprinklers may be exempted.

The following exceptions in the California Fire Code shall not be allowed:

a. Exceptions in Section 903.2.3.
b. Exception 2 in Section 903.2.11.3.

**15.04.030 Adoption, modifications, amendments and deletions to Chapter 1 of the Building Code.**

A. Except as otherwise provided in this Chapter, the California Building Code, Title 24, California Code of Regulations, Part 2, Volume 1, Chapter 1, Division II, "Scope and Administration," including any and all amendments thereto that may hereafter be made and adopted by the State of California, is hereby adopted as the Administrative Code of the City. This administrative chapter shall apply to all codes listed in this title.

~~1. Section 101.1 is deleted in its entirety.~~

~~2. Section 101.5 is added to define the term "Holiday" and shall read as follows:~~

~~3~~***1***. Section 102.2 is amended to read as follows:

**102.2 Other laws.** The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law. In the event of discrepancies between this Chapter ***15.04 of the Rancho Mirage Municipal Code*** and Chapter 1, General Code Provision, the ~~latter~~ former shall take precedence**.**

4***2***. Section 103.1 is amended to read as follows:

**103.1 Creation of enforcement agency.** There is established within the City, a division of the Administrative Services Department to be known as the "Building and Safety Division", ***whose function includes the implementation, administration and enforcement of the***

***provisions of this code***, which shall be under the administrative and operational control of the City Building Official hereinafter referred to as the building official.

~~6. Section 105.5 is amended to read as follows:~~

~~105.5 Expiration. Every permit issued shall become invalid unless the work on the site authorized by such permit is commenced within 180 days after its issuance, or if the work authorized on the site by such permit is suspended or abandoned for a period of 180 days after the time the work is commenced. The building official is authorized to grant, in writing, one or more extensions of time, for periods not more than180 days each. The extension shall be requested in writing and justifiable cause demonstrated.~~

~~Exception: For residential occupancies a permit shall remain valid for the purposes of this part if the work on the site authorized by that permit is commenced within 12 months after its issuance, unless the permittee has abandoned the work authorized by the permit.~~

~~76. Section 109.1 is amended to read as follows:~~

~~109.1 Payment of fees. On buildings, structures, electrical, gas, mechanical, and plumbing systems or alterations requiring a permit under this Building Code, a fee for each permit shall be paid as required, in accordance with the fees set forth in the City of Rancho Mirage Master Fee Schedule. Building Permit Fee Table 3A of the California Building Code, 1991 Edition, a copy of which is on file with the Division of Building and Safety.~~

***~~4~~8~~5~~*** Section ~~113.4~~ ***113.5*** is added to provide for the filing of appeals and shall read as follows:

***~~113.4~~ 113.5*** Filing of appeals. All appeals shall be made in writing and shall specify the order, decision or determination made by the building official which is being appealed and wherein the building official erred in making the order, decision or determination. The appeal shall be accompanied by a fee as established by the City Council. If, after reviewing the information submitted, the building official determines the appeal does not merit a change in his or her order, decision, or determination, the building official shall schedule a hearing by the Appeals Board and the appellant shall be notified in writing of the date and time of the hearing.

~~9~~***~~5~~7*** Section 114 is amended to read as follows:

**Section 114 VIOLATIONS.**

**114.1 Unlawful acts.** It shall be unlawful for any person, firm, or corporation to erect, construct, alter, extend, repair, move, remove, demolish or occupy any building, structure or equipment regulated by this code, or to cause the same to be done, in conflict with or in violation of any provisions of this code. It shall be unlawful for any person to erect, construct, alter or repair a building or structure in violation of the approved construction documents or directive of the building official or of a permit or certificate issued under the provisions of this code.

~~1~~**~~14.2~~ 114.5 Public nuisance; Abatement.** Any violation of this Building Code, including the adopted appendices, is a public nuisance and may be abated in accordance with Title 14 of the City's Municipal Code.

**114.~~3~~ 6 Penalties.** Any person who violates a provision of this Building Code, including the adopted appendices, or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this Building Code shall be ***subject to penalties as prescribed by law, including but not limited to,*** guilty of an infraction violation, and the violator shall be subject to the provisions set forth in Chapter 14.100 (Infractions) of the City's Municipal Code, including, but not limited to, the imposition of any and all civil and criminal penalties set forth therein.

***6***~~9~~. Section 116 is amended to ***add 116.1.1 (Unlawful Acts)*** ~~read~~ as follows:

**Section 116 UNSAFE STRUCTURES AND EQUIPMENT.**

~~**116.1 Conditions.** Structures or existing equipment that are or hereafter become unsafe, unsanitary or deficient because of inadequate means of egress facilities, inadequate light and ventilation, or which constitute a fire hazard, or are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance shall be deemed an unsafe condition.~~

116.1.1 Unlawful acts. It shall be unlawful for any person, firm, or corporation to maintain as unsafe structures or equipment regulated by this code, or cause the same to be done in conflict with or in violation of any provisions of this code.

7~~11~~***910***. Section 117 is added to limit the hours of construction work and shall read as follows:

**Section 117 HOURS OF WORK.**

**117.1. Restricted hours; Construction work.** Except as otherwise provided herein, no person other than the person actually occupying any buildings to be altered, repaired or improved, shall be engaged or employed, nor shall any person cause any other person to be engaged or employed in any work of construction, erection, alteration, repair, addition to or improvement of any building, structure, road or improvement to realty, between the hours of seven p.m. of each day and seven a.m. of the next succeeding day or on Sundays and holidays, without written permission of the Building Official being first obtained. The Building Official may grant permission to work during those periods under appropriate circumstances after first having determined that such work will not unduly or unreasonably interfere with the peaceful enjoyment of property adjacent to such work.

117.2 Restricted hours; Landscape maintenance. Within gated communities, shopping centers, commercial centers, vacant residential or commercial parcels, or developed residential or commercial parcels, landscape activities such as leaf blowing, tree trimming, re-seeding, or mowing of grass as associated with the re-seeding process and any other landscaping activities which generate unusual noise, are prohibited between the hours of ~~seven~~ ***six*** p.m. of each day and seven a.m. of the next succeeding day or on Sundays or on holidays.

117.3 Restricted hours; Golf courses. In order to assure the excellence and readiness of golf courses within the City, mowing and green preparation of golf courses is permitted between 5:30 a.m. and 7 p.m., seven days per week and during all seasons of the year.

8 ~~12~~***1011***. Section 118 is added to require removal and disposal of trash and debris at building sites and shall read as follows:

Section 118 REMOVAL AND DISPOSAL OF TRASH AND DEBRIS.

118.1 Required removal. Any person to whom a building permit has been issued shall keep the building site free and clear of trash and debris. As used in this section, trash and debris shall include papers, cartons, bottles, cans, garbage, roofing materials, plaster, concrete and other substances that may accumulate as a result of construction activities.

118.2 Container. A trash container shall be located on every construction site and shall remain in place until construction is completed. The container shall be adequate in size to store the trash and debris generated on the building site until it can be removed.

118.3 Disposal. Trash and debris shall be removed from the site and transported to a legally established dump site either by the City's refuse contractor or the permittee.

***15.04.035 Amendments to Chapter 2 of the Building Code.***

***A. Except as otherwise provided in this Chapter, the California Building Code, Title 24, California Code of Regulations, Part 2, Volume 1, Chapter 2, Division II, "Definitions," including any and all amendments thereto that may hereafter be made and adopted by the State of California, is hereby adopted as the Administrative Code of the City. This administrative chapter shall apply to all codes listed in this title.***

***Section 202 is amended to define the term "Holiday" and shall read as follows:***

***"Holiday" as used in the Building Code shall mean New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas.***

~~**15.04.040 Adoption of other appendices of the Building Code without amendments**.~~

~~There is adopted by reference and without amendment, the following appendices to the Building Code:~~

~~Appendix I: Patio Covers.~~

## Section 4. TABLE OF FINDINGS SUPPORTING SPECIFIC AMENDMENTS TO 2025 CALIFORNIA BUILDING CODE

California Health and Safety Code Sections 17958.7 and 18941.5 require that each local amendment to the ***2025*** California Building Code be expressly marked and identified as to the local finding upon which it is based. In accordance with the foregoing requirement, the following table sets forth the ***2025*** California Building Code sections that have been modified and the associated local climatic, geological and/or topographical findings described in section 2 of this Ordinance which support the modification.

| 2025 BUILDING CODE SECTION | TITLE/SUBJECT | FINDINGS |
|---|---|---|
| **903.2** | **Where required** | |
| | | I |
| | | I |
| | | I |
| | | I |
| | | I |
| | | I |
| | | I |
| | | I |
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| | | I |
| | | I |
| 102.2 | Other laws | Administrative |
| 103.1 | Creation of enforcement agency | Administrative |
| 105.2 | Work exempt from permit | Administrative |
| 113.5 | Filing of appeals | Administrative |
| 114 | Violations | Administrative |
| 116 | Unsafe structures and equipment | Administrative |
| 117 | Hours of work | Administrative |
| 118 | Removal and disposal of trash and debris | Administrative |
| 202 | Holidays | Administrative |

## Section 5. SEVERABILITY

That the City Council declares that, should any provision, section, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this ordinance as hereby adopted shall remain in full force and effect.

**Section 6. REPEAL OF CONFLICTING PROVISIONS**

That all the provisions of the Rancho Mirage Municipal Code as heretofore adopted by the City of Rancho Mirage that are in conflict with the provisions of this ordinance are hereby repealed.

**Section 7. EFFECTIVE DATE**

That this ordinance shall take effect on January 1, 2026.

**Section 8. CITY ATTORNEY REVIEW**

That the City Attorney prepared and framed this ordinance pursuant to Section 1.04.010 of the Rancho Mirage Municipal Code and finds that the City Council has the authority to adopt this ordinance, that the ordinance is constitutionally valid and that the ordinance is consistent with the general powers and purposes of the City as set forth in Section 1.04.031 of the Rancho Mirage Municipal Code.

**Section 9. NECESSARY ACTIONS**

That the Development Services Director or designee is authorized to take any and all further actions necessary to effectuate the adoption of this Ordinance and implementation of the adopted codes.

**Section 10. CERTIFICATION**

That the City Clerk shall certify to the passage of this ordinance and shall cause the same to be published according to law.

[REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK]

The foregoing Ordinance was approved and adopted at a meeting of the City Council held on _____, 2025, by the following vote:

Ayes:
Noes:
Abstain:
Absent:

_____
Lynn Mallotto, Mayor

**ATTEST:**

_____
Kristie Ramos, City Clerk

**APPROVED AS TO FORM:**

_____
Colin Kirkpatrick, City Attorney

**ATTACHMENT 3**

# ORDINANCE NO. 1229

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, AMENDING CHAPTER 15.08 "CALIFORNIA MECHANICAL CODE, 2019 EDITION; CALIFORNIA PLUMBING CODE, 2022 EDITION" AND ADDING CHAPTER 15.06 "CLAIFORNIA PLUMBING CODE, 2022 EDITION" TO TITLE 15 "BUILDINGS AND CONSTRUCTION" OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA MECHANICAL CODE AND 2025 CALIFORNIA PLUMBING CODE**

**WHEREAS**, the City of Rancho Mirage ("City") is a charter city and recognized for certain purposes as a political subdivision of the State of California; and

**WHEREAS,** the State of California adopted and approved the 2025 edition of the California Building Standards Code (BSC), which is published in Title 24 of the California Code of Regulations and which is based on the latest national and international model building codes; and

**WHEREAS,** the BSC will become effective on January 1, 2026; and

**WHEREAS,** the City wishes to adopt the 2025 edition of the California Mechanical Code, as set forth in Part 4 of the BSC, and California Plumbing Code, as set forth in Part 5 of the BSC, along with local administrative amendments; and

**WHEREAS**, Government Code section 50022.2 and Health and Safety Code 17922 authorize the City to enact ordinances adopting said codes by reference; and

**WHEREAS,** pursuant to California Health & Safety Code sections 17958.7 and 18941.5(b), the City is permitted to adopt amendments to the BSC provided the amendments are more restrictive than the State-adopted standards and are supported by findings of the City Council that the amendments are necessary due to local climatic, topographical or geological conditions; and

**WHEREAS**, the City's Building Official has not proposed any substantive amendments to either the 2025 California Mechanical Code or the 2025 California Plumbing Code, which are more stringent than the standards established by the BSC; and

**WHEREAS**, the City Council finds that the local amendments to the 2025 California Mechanical Code, as set forth in Part 4 of the BSC, and the 2025 California Plumbing Code, as set forth in Part 5 of the BSC, are administrative in nature and do not set standards more restrictive than the State-adopted standards.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES ORDAIN AS FOLLOWS:**

**Section 1. RECITALS**

That the above recitals are true and correct and are incorporated as though fully set forth herein.

**Section 2. AMENDMENT TO CHAPTER 15.08 OF TITLE 15 OF THE RANCHO MIRAGE MUNICIPAL CODE**

Chapter 15.08 ("California Mechanical Code, 2022 Edition; California Plumbing Code, 2022 Edition") of Title 15 ("Buildings and Construction") of the Rancho Mirage Municipal Code is hereby amended to separate the Plumbing and Mechanical Code into separate chapters, and shall read entirely as follows:

Chapter 15.08 CALIFORNIA MECHANICAL CODE, ***2025***

**15.08.010 California Mechanical Code adopted.**

A. There is adopted by reference the California Mechanical Code, ***2025*** Edition, which is published by the California Building Standards Commission as Part 4 of Title 24 of the California Code of Regulations. A copy of the Code together with the local amendments is on file with the division of building and safety.

B. The California Mechanical Code, ***2025*** Edition (hereinafter "Mechanical Code") shall be the mechanical code for the city and said Code together with the adopted appendices and the additions, deletions and amendments set forth in this chapter shall regulate and govern the requirements for the installation and maintenance of heating, ventilating, cooling, and refrigeration systems within the city as well as the issuance of permits and the collection of permit fees.

**15.08.020 Modifications, amendments and deletions to Chapter 1, Division II Administration of the Mechanical Code.**

A. There is adopted by reference and with the following additions, deletions and amendments Chapter 1, Division II Administration, which is a part of the Mechanical Code:

1. Section 101.6 is added ***in its entirety*** to provide for the filing of appeals and shall read as follows:

**101.6 Filing of appeals.** All appeals shall be made in writing and shall specify the order, decision or determination made by the building official which is being appealed and wherein the building official erred in making the order, decision or determination. The appeal shall be accompanied by a fee as established by the City Council. If, after reviewing the information submitted, the building official determines the appeal does not merit a change in his or her order, decision, or determination, the building official shall schedule a hearing by the Appeals Board and the appellant shall be notified in writing of the date and time of the hearing.

2. ***Section 104.5 is amended to read as follows:***

***104.5 Fees. On buildings, structures, and mechanical systems or alterations requiring a permit under this code, a fee for each permit shall be paid as required, in accordance with the fees set forth in the City of Rancho Mirage Master Fee Schedule.***

3. Section 106.1 is amended to read as follows:

**Section 106.1 VIOLATIONS.**

**106.1 Unlawful acts.** It shall be unlawful for any person, firm, or corporation to erect, construct, alter, extend, repair, move, improve, remove, convert or demolish, equip, use or maintain mechanical systems or equipment regulated by this Mechanical Code or cause or permit the same to be done in violation of this code. It shall be unlawful for any person to erect, construct, alter or repair a mechanical system in violation of the approved construction documents or directive of the building official or of a permit or certificate issued under the provisions of this code.

**106.1.1 Public nuisance; Abatement.** Any violation of this Mechanical Code, including the adopted appendices, is a public nuisance and may be abated in accordance with Title 14 of the City's Municipal Code.

4. Section 106.3 is amended to read as follows:

**106.3 Penalties.** Any person who violates a provision of this Mechanical Code, including the adopted appendices, or fails to comply with any of the requirements thereof or who erects, constructs, alters, extends, repairs, moves, improves, removes, converts or demolishes, equips, uses or maintains mechanical systems or equipment in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this code shall be guilty of an infraction violation, and the violator shall be subject to the provisions set forth in Chapter 14.100 (Infractions) of the City's Municipal Code, including, but not limited to, the imposition of any and all civil and criminal penalties set forth therein.

**15.08.030 Adoption of other appendices of the Mechanical Code without amendments.**

There is adopted by reference and without amendment, the following appendices to the Mechanical Code:

Appendix B: Procedures to be Followed to Place Gas Equipment in Operation.

Appendix C: Installation and Testing of Oil (Liquid) Fuel-Fired Equipment.

~~Distribution.~~

**Section 3. ADDING CHAPTER 15.06 TO TITLE 15 OF THE RANCHO MIRAGE MUNICIPAL CODE**

Chapter 15.06 ("California Plumbing Code, 2025 Edition") is hereby added to Title 15 ("Buildings and Construction") of the Rancho Mirage Municipal Code, to read entirely as follows (the Plumbing Code is hereby made a separate Chapter of the Municipal Code, and while the Chapter is entirely new, a blackline version is provided to reflect changes proposed to the Plumbing Code previously incorporated in Chapter 15.08):

Chapter 15.06 CALIFORNIA PLUMBING CODE, ***2025*** EDITION

**15.08.040 California Plumbing Code adopted.**

A. There is adopted by reference the California Plumbing Code, ***2025*** Edition, which is published by the California Building Standards Commission as Part 5 of Title 24 of the California Code of Regulations. A copy of the Code together with the local amendments is on file with the division of building and safety.

B. The California Plumbing Code, 2025 Edition (hereinafter "Plumbing Code") shall be the plumbing code for the city and said Code together with the additions, deletions and amendments set forth in this chapter shall regulate and govern the requirements for the installation and maintenance of plumbing and the issuance of permits and collection of permit fees.

**15.08.050 Modifications, amendments and deletions to Chapter 1, Division II Administration of the Plumbing Code.**

A. There is adopted by reference and with the following additions, deletions and amendments, Chapter 1, Division II Administration, which is a part of the Plumbing Code:

1. Section ~~107.3~~ ***107.2*** is added to provide for the filing of appeals and shall read as follows:

**107.2 Filing of appeals.** All appeals shall be made in writing and shall specify the order, decision or determination made by the building official which is being appealed and wherein the building official erred in making the order, decision or determination. The appeal shall be accompanied by a fee as established by the City Council. If, after reviewing the information submitted, the building official determines the appeal does not merit a change in his or her order, decision, or determination, the building official shall schedule a hearing by the Appeals Board and the appellant shall be notified in writing of the date and time of the hearing.

2. Section 106.1 is amended to read as follows:

~~106.1 Violations.~~

**106.1 Unlawful acts.** It shall be unlawful for any person, firm, or corporation to erect, construct, alter, extend, repair, move, improve, remove, convert or demolish, equip, use or maintain plumbing systems or equipment regulated by this Plumbing Code or cause or permit the same to be done in violation of this code. It shall be unlawful for any person to erect, construct, alter or repair plumbing in violation of the approved construction documents or directive of the building official or of a permit or certificate issued under the provisions of this code.

**106.1.1 Public nuisance; Abatement.** Any violation of this Plumbing Code, including the adopted appendices, is a public nuisance and may be abated in accordance with Title 14 of the City's Municipal Code.

3. Section 106.3 is amended to read as follows:

**106.3 Penalties.** Any person who violates a provision of this Plumbing Code, including the adopted appendices, or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs plumbing in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this Code shall be guilty of an infraction violation, and the violator shall be subject to the provisions set forth in Chapter 14.100 (Infractions) of the City's Municipal Code, including, but not limited to, the imposition of any and all civil and criminal penalties set forth therein.

4. Section 104.5 is amended to read as follows:

**104.5 Permit fees.** On buildings, structures, and plumbing systems or alterations requiring a permit under this code, a fee for each permit shall be paid as required, in accordance with the fees set forth in the City of Rancho Mirage Master Fee Schedule.

**15.08.060 Adoption of other appendices of the Plumbing Code without amendments.**

There is adopted by reference and without amendment, the following appendices to the Plumbing Code:

Appendix A: Recommended Rules for Sizing the Water Supply System.

Appendix B: Explanatory Notes on Combination Waste and Vent Systems.

Appendix D: Sizing Storm Water Drainage Systems.

Appendix H: Private Sewage Disposal Systems.

Appendix I: Installation Standards ~~for PEX Tubing Systems for Hot- and Cold-Water~~

~~Distribution~~.

**Section 4. SEVERABILITY**

That the City Council declares that, should any provision, section, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this ordinance as hereby adopted shall remain in full force and effect.

**Section 4. REPEAL OF CONFLICTING PROVISIONS**

That all the provisions of the Rancho Mirage Municipal Code as heretofore adopted by the City of Rancho Mirage that are in conflict with the provisions of this ordinance are hereby repealed.

**Section 5. EFFECTIVE DATE**

That this ordinance shall take effect on January 1, 2026.

**Section 6. CITY ATTORNEY REVIEW**

That the City Attorney prepared and framed this ordinance pursuant to Section 1.04.010 of the Rancho Mirage Municipal Code and finds that the City Council has the authority to adopt this ordinance, that the ordinance is constitutionally valid and that the ordinance is consistent with the general powers and purposes of the City as set forth in Section 1.04.031 of the Rancho Mirage Municipal Code.

**Section 7. NECESSARY ACTIONS**

That the Development Services Director or designee is authorized to take any and all further actions necessary to effectuate the adoption of this Ordinance and implementation of the adopted codes.

**Section 8. CERTIFICATION**

That the City Clerk shall certify to the passage of this ordinance and shall cause the same to be published according to law.

The foregoing Ordinance was approved and adopted at a meeting of the City Council held on _____, 2025, by the following vote:

Ayes:
Noes:
Abstain:
Absent:

_____
Lynn Mallotto, Mayor

**ATTEST:**

_____
Kristie Ramos, City Clerk

**APPROVED AS TO FORM:**

_____
Colin Kirkpatrick, City Attorney

**ATTACHMENT 4**

# ORDINANCE NO. 1230

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, AMENDING CHAPTER 15.10 "CALIFORNIA ELECTRICAL CODE, 2022 EDITION" OF TITLE 15 "BUILDINGS AND CONSTRUCTION" OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA ELECTRICAL CODE**

**WHEREAS**, the City of Rancho Mirage ("City") is a charter city and recognized for certain purposes as a political subdivision of the State of California; and

**WHEREAS,** the State of California adopted and approved the 2025 edition of the California Building Standards Code (BSC), which is published in Title 24 of the California Code of Regulations and includes the 2025 California Electrical Code, and which is based on the latest national and international model building codes; and

**WHEREAS,** the BSC shall become effective on or after January 1, 2026; and

**WHEREAS,** the City wishes to adopt the 2025 edition of the California Electrical Code, as set forth in Part 3 of the BSC, along with certain local administrative amendments; and

**WHEREAS**, Government Code section 50022.2 and Health and Safety Code 17922 authorize the City to enact ordinances adopting the California Electrical Code by reference; and

**WHEREAS,** pursuant to California Health & Safety Code sections 17958.7 and 18941.5(b), the City is permitted to adopt amendments to the BSC provided that amendments that are more restrictive than the State-adopted standards are supported by findings of the City Council that the amendments are necessary due to local climatic, topographical or geological conditions; and

**WHEREAS**, the City's Building Official has not proposed any substantive amendments to the 2025 California Electrical Code, as set forth in Part 3 of the BSC, which are more stringent than the standards established by the BSC; and

**WHEREAS**, the City Council finds that adoption of, and amendments to, the 2025 California Electrical Code, as set forth in Part 3 of the BSC, are administrative in nature and do not set standards more restrictive than the State-adopted standards.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES ORDAIN AS FOLLOWS:**

## Section 1. RECITALS

That the above recitals are true and correct and are incorporated as though fully set

forth herein.

**Section 2. AMENDMENT OF CHAPTER 15.10 OF TITLE 15 OF THE RANCHO MIRAGE MUNICIPAL CODE**

That Chapter 15.10 ("California Electrical Code, 2022 Edition") of Title 15 ("Buildings and Construction") of the Rancho Mirage Municipal Code is hereby amended to read entirely as follows:

Chapter 15.10 CALIFORNIA ELECTRICAL CODE, ***2025*** EDITION

15.10.010 California Electrical Code adopted with amendments.

A. Except for the local amendments set forth herein, there is adopted by reference the California Electrical Code, ***2025*** Edition, which is published by the California Building Standards Commission as Part 3 of Title 24 of the California Code of Regulations. A copy of the Code together with the local amendments is on file with the division of building and safety.

B. The California Electrical Code, ***2025*** Edition (hereinafter "Electrical Code") shall be the electrical code for the city of Rancho Mirage and said Code together with the adopted appendices and the amendments set forth in this chapter shall regulate and govern the design, construction, reconstruction, installation, quality of materials, location, operation, and maintenance or use of electrical equipment, wiring and systems within the city as well as the issuance of permits and the collection of permit fees.

15.10.030 Adoption, modifications, amendments and deletions to Annex H of the Electrical Code.

A. There is adopted by reference and with the following additions, deletions and amendments, Annex H (Administration and Enforcement), which is a part of the Electrical Code.

1. Section 80.3 is amended to read as follows:

**80.3 Purpose.** The purpose of this article shall be to provide requirements for administration and enforcement of this Electrical Code.

2. Section 80.5 is deleted.

3. Section 80.7 is deleted.

4. Section 80.9 is deleted.

5. Section 80.13 is amended to read as follows:

**80.13 Authority.** There is established within the City, a division of the Administrative Services Department to be known as the “Building and Safety Division” which shall be under the administrative and operational control of the City Building Official hereinafter referred to as the building official. Where used in this article, the term authority shall be construed to mean the City Building Official. This code shall be administered and enforced by the City Building Official as follows:

Subsections 1 through 16 of this section remain the same.

Subsection (17) is added to Section 80.13, and shall read as follows:

(17) A written application shall be submitted for a proposed alternate material or method of construction together with a fee established by the City Council. The details of any action granting an alternate material or method of construction shall be noted in the files of the Building and Safety Division.

6. Section 80.15 is amended to read as follows:

**80.15 Electrical Board.** The electrical board shall be the Appeals Board established under the provisions of Section 113 of the General Provisions of the Building Code, and any amendments adopted thereto, hereinafter designated as the “Board.”

**80.15.G Appeals.** The administration of appeals under this code shall be governed by the provisions of Section 89.108.8 of the General Code Provisions of this Electrical Code together with Section 113 of the Administration Provisions of the Building Code, and any amendments adopted thereto.

7. Section 80.19 is amended to read as follows:

**80.19 Permits.** The administration of permits under this code shall be governed by Section 89.108.4 of the General Code Provisions of this Electrical Code, together with Sections 104.3, 104.4, 104.4.1, 104.5, 105.3, 105.2.2 and 105.2.3 of the Administration Provisions of the Mechanical Code, and any amendments adopted thereto. When necessary, provisions specifically pertaining to mechanical systems are deleted, and provisions which refer to mechanical systems which can be made applicable to electrical systems and connections are hereby amended accordingly.

8. Section 80.23 is amended to read as follows:

**80.23 Violations.**

**80.23.A.1 Unlawful acts.** It shall be unlawful for any person, firm, or corporation to erect, construct, alter, extend, repair, move, remove, demolish or occupy any building, structure or equipment regulated by this Electrical Code, or to cause the same to be done, in conflict with or in violation of any provisions of this code. It shall be unlawful for any person to erect, construct, alter or repair a building or structure in violation of the approved construction documents or directive of the building official or of a permit or certificate issued under the provisions of this code.

**80.23.A.2 Public nuisance; Abatement.** Any violation of this Electrical Code, including the adopted appendices, is a public nuisance and may be abated in accordance with Title 14 of the City's Municipal Code.

**80.23.B Penalties.** Any person who violates a provision of this Electrical Code, including the adopted appendices, or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this code shall be guilty of an infraction violation, and the violator shall be subject to the provisions set forth in Chapter 14.100 (Infractions) of the City's Municipal Code, including, but not limited to, the imposition of any and all civil and criminal penalties set forth therein.

9. Section 80.27 is deleted.

10. Section 80.29 is deleted.

11. Section 80.33 is deleted.

12. Section 80.35 is deleted.

13. Section 80.37 is added to provide for fees, and shall read as follows:

**80.37 Fees.**

**80.37.1 Payment of fees.** On buildings, structures, and electrical systems or alterations requiring a permit under this Electrical Code, a fee for each permit shall be paid as required, in accordance with the fees set forth in the City of Rancho Mirage Master Fee Schedule, a copy of which is on file with the Division of Building and Safety.

**80.37.2 Fee refunds.** The administrative provisions for the refunding of fees paid under this code shall be governed by subsection 104.5.3 of the Administration provisions of the Mechanical Code, with the adopted amendments thereto. When necessary, provisions specifically pertaining to mechanical systems are deleted, and provisions which refer to mechanical systems which can be made applicable to electrical systems and connections are hereby amended accordingly.

14. Section 80.39 is added to provide for inspections, and shall read as follows:

**80.39 Inspections.** The administration of inspections under this code shall be governed by subsection 89.108.4.4 of the General Code Provisions of this Electrical Code together with Section 105.4 of the Administration Provisions of the Mechanical Code, and any adopted amendments thereto. When necessary, provisions specifically pertaining to mechanical systems are deleted, and provisions which refer to mechanical systems which can be made applicable to electrical systems and connections are hereby amended accordingly.

15. Section 80.41 is added to provide for connection approvals, and shall read as follows:

**80.41 Connection approval.** The administration of connection approvals under this code shall be governed by Section 101.4 of the Administration provisions of the Mechanical Code, with the adopted amendments thereto. When necessary, provisions specifically pertaining to mechanical systems are deleted, and provisions which refer to mechanical systems which can be made applicable to electrical systems and connections are hereby amended accordingly.

16. Section 80.43 is added to provide for enforcement authority, and shall read as follows:

**80.43 Enforcement Authority.**

**80.43.1 Right of entry.** The right to make entry onto property under this code shall be governed by Section 89.108.5 of the General Code Provisions of this Electrical Code and subsection 103.4 of the Administration Provisions of the Mechanical Code, and any adopted amendments thereto.

**80.43.2 Stop orders.** Authority for stop orders under this code shall be governed by subsection 106.4 of the Administration provisions of the Mechanical Code, and any adopted amendments thereto.

**80.43.3 Authority to disconnect utilities in emergencies.** Authority to disconnect utilities in emergencies under this code shall be governed by subsection 106.5 of the Administration provisions of the Mechanical Code, and any adopted amendments thereto.

**80.43.4 Authority to condemn equipment.** Authority to condemn equipment under this code shall be governed by subsection 106.6 of the Administration provisions of the Mechanical Code, and any adopted amendments thereto.

15.10.040 Adoption of other annex chapters of the Electrical Code without amendments.

There is adopted by reference and without amendment, the following annex chapters to the Electrical Code:

Annex A: Product Safety Standards.

Annex B: Application Information for Ampacity Calculations.

Annex C: Conduit and Tubing Fill Tables for Conductors and Fixture Wires of the Same Size.

Annex D: Examples.

Annex E: Types of Construction.

**Section 3. SEVERABILITY**

That the City Council declares that, should any provision, section, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this ordinance as hereby adopted shall remain in full force and effect.

**Section 4. REPEAL OF CONFLICTING PROVISIONS**

That all the provisions of the Rancho Mirage Municipal Code as heretofore adopted by the City of Rancho Mirage that are in conflict with the provisions of this ordinance are hereby repealed.

**Section 5. EFFECTIVE DATE**

That this ordinance shall take effect January 1, 2026.

**Section 6. CITY ATTORNEY REVIEW**

That the City Attorney prepared and framed this ordinance pursuant to Section 1.04.010 of the Rancho Mirage Municipal Code and finds that the City Council has the authority to adopt this ordinance, that the ordinance is constitutionally valid and that the ordinance is consistent with the general powers and purposes of the City as set forth in Section 1.04.031 of the RMMC.

**Section 7. NECESSARY ACTIONS**

That the Development Services Director or designee is authorized to take any and all further actions necessary to effectuate the adoption of this Ordinance and implementation of the adopted codes.

**Section 8. CERTIFICATION**

That the City Clerk shall certify to the passage of this ordinance and shall cause the same to be published according to law.

[REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK]

The foregoing Ordinance was approved and adopted at a meeting of the City Council held on _____, 2025, by the following vote:

Ayes:
Noes:
Abstain:
Absent:

_____
Lynn Mallotto, Mayor

**ATTEST:**

_____
Kristie Ramos, City Clerk

**APPROVED AS TO FORM:**

_____
Colin Kirkpatrick, City Attorney

**ATTACHMENT 5**

# ORDINANCE NO. 1231

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, AMENDING CHAPTER 15.14 "CALIFORNIA RESIDENTIAL CODE, 2025 EDITION" TO TITLE 15 "BUILDINGS AND CONSTRUCTION" OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA RESIDENTIAL CODE**

**WHEREAS**, the City of Rancho Mirage ("City") is a charter city and recognized for certain purposes as a political subdivision of the State of California; and

**WHEREAS,** the State of California adopted and approved the 2025 edition of the California Building Standards Code ("BSC"), which is published in Title 24 of the California Code of Regulations and includes the 2025 California Residential Code which is based on the latest national and international model building codes; and

**WHEREAS,** the BSC shall become effective on January 1, 2026; and

**WHEREAS,** the City wishes to adopt the 2025 edition of the California Residential Code, as set forth in Part 2.5 of the BSC, along with certain local administrative amendments as set forth herein; and

**WHEREAS**, Government Code section 50022.2 and Health and Safety Code 17922 authorize the City to enact ordinances adopting the Residential Code by reference; and

**WHEREAS,** pursuant to California Health & Safety Code sections 17958.7 and 18941.5(b), the City is permitted to adopt amendments to the BSC provided that amendments that are more restrictive than the State-adopted standards are supported by findings of the City Council that the amendments are necessary due to local climatic, topographical or geological conditions; and

**WHEREAS,** the City's Building Official has not proposed any substantive amendments to the 2025 California Residential Code which are more stringent than the standards established by the BSC; and

**WHEREAS**, the City Council finds that the local amendments to the 2025 California Residential Code recommended by the Building Official are administrative in nature and do not set standards more restrictive than the State-adopted standards.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES ORDAIN AS FOLLOWS:**

## Section 1. RECITALS

That the above recitals are true and correct and are incorporated as though fully set forth herein.

## **Section 2. AMENDING CHAPTER 15.14 (CALIFORNIA RESIDENTIAL CODE, 2022 EDITION) OF TITLE 15 (BUILDINGS AND CONSTRUCTION) OF THE RANCHO MIRAGE MUNICIPAL CODE**

Chapter 15.14 “California Residential Code, 2022 Edition” of Title 15 “Buildings and Construction” of the Rancho Mirage Municipal Code is hereby amended to read entirely as follows:

Chapter 15.14 CALIFORNIA RESIDENTIAL CODE, ~~2019~~ ***2025*** EDITION

15.14.010 California Residential Code adopted with amendments.

A. Except for the local amendments set forth herein, there is adopted by reference the California Residential Code ***2025*** Edition, which is published by the California Building Standards Commission as Part 2.5 of Title 24 of the California Code of Regulations. A copy of the Code together with the local amendments is on file with the division of building and safety.

B. The California Residential Code, ***2025*** Edition (hereinafter “Residential Code”) shall be the residential code for the city and said Residential Code together with the adopted appendices and the amendments set forth in this chapter shall regulate and govern the conditions and maintenance of every detached one- and two-family dwelling and townhouse not more than three stories above plane grade in height with a separate means of egress and structures accessory thereto.

15.14.020 Modifications, amendments and deletions to the Residential Code.

~~1. Section R105.5 is amended to read as follows:~~

~~R105.5 Expiration. Every permit shall remain valid for the purposes of this part if the work on the site authorized by that permit is commenced within 12 months after its issuance, unless the permittee has abandoned the work authorized by the permit.~~

~~A permittee may request an extension of a permit. The building official may grant, in writing, one or more extensions of time for periods of not more than 180 days per extension. The permittee shall request an extension pursuant to this subdivision in writing and demonstrate justifiable cause for the extension.~~

A. Section R113 is amended to read as follows:

R113.4 Violation Penalties

Any person who violates a provision of this Residential Code or fails to comply with any of the requirements thereof or who erects, constructs, alters or repair a building or structure in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this Residential Code, ~~**shall be guilty of**~~ shall be guilty of an infraction violation, and the violator shall be subject to the provisions set forth in Chapter 14.100 (Infractions) of the City's Municipal Code, including, but not limited to, the imposition of any and all civil and criminal penalties set forth therein.

**Section 3. SEVERABILITY**

That the City Council declares that, should any provision, section, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this ordinance as hereby adopted shall remain in full force and effect.

**Section 4. REPEAL OF CONFLICTING PROVISIONS**

That all the provisions of the Rancho Mirage Municipal Code as heretofore adopted by the City of Rancho Mirage that are in conflict with the provisions of this ordinance are hereby repealed.

**Section 5. EFFECTIVE DATE**

That this ordinance shall take effect on January 1, 2026.

**Section 6. CITY ATTORNEY REVIEW**

That the City Attorney prepared and framed this ordinance pursuant to Section 1.04.010 of the Rancho Mirage Municipal Code and finds that the City Council has the authority to adopt this ordinance, that the ordinance is constitutionally valid and that the ordinance is consistent with the general powers and purposes of the City as set forth in Section 1.04.031 of the Rancho Mirage Municipal Code.

**Section 7. NECESSARY ACTIONS**

That the Development Services Director or designee is authorized to take any and all further actions necessary to effectuate the adoption of this Ordinance and implementation of the adopted codes.

**Section 8. CERTIFICATION**

That the City Clerk shall certify to the passage of this ordinance and shall cause the same to be published according to law.

The foregoing Ordinance was approved and adopted at a meeting of the City Council held on _____, 2025, by the following vote:

Ayes:
Noes:
Abstain:
Absent:

_____
Lynn Mallotto, Mayor

**ATTEST:**

_____
Kristie Ramos, City Clerk

**APPROVED AS TO FORM:**

_____
Colin Kirkpatrick, City Attorney

**ATTACHMENT 6**

# ORDINANCE NO. 1232

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA REPEALING AND REPLACING CHAPTER 15.12 (CALIFORNIA FIRE CODE, 2022 EDITION), AND ADDING CHAPTER 15.13 (CALIFORNIA WILDLAND-URBAN INTERFACE CODE, 2025 EDITION) TO TITLE 15 (BUILDINGS AND CONSTRUCTION) OF THE RANCHO MIRAGE MUNICIPAL CODE TO ADOPT THE 2025 CALIFORNIA FIRE CODE AND 2025 CALIFORNIA WILDLAND-URBAN INTERFACE CODE**

**WHEREAS**, the City of Rancho Mirage ("City") is a charter city and recognized for certain purposes as a political subdivision of the State of California; and

**WHEREAS,** the State of California recently adopted and approved the 2025 edition of the California Building Standards Code (BSC), which is published in Title 24 of the California Code of Regulations and which is based on the latest national and international model building codes; and

**WHEREAS**, the BSC will become effective on January 1, 2026; and

**WHEREAS**, the 2025 California Fire Code and California Wildland-Urban Interface Code are included within the BSC and published as Part 9 and Part 7, respectively, of Title 24 of the California Code of Regulations; and

**WHEREAS**, California Government Code section 50022.2 and Health and Safety Code 17922 authorize the City to adopt this ordinance adopting the Fire Code and California Wildland-Urban Interface Code by reference; and

**WHEREAS,** pursuant to California Health & Safety Code sections 17958.7 and 18941.5(b), the City is permitted to adopt amendments to the BSC provided the amendments are more restrictive than the State-adopted standards and are supported by findings of the City Council that the amendments are necessary due to local climatic, topographic or geological conditions; and

**WHEREAS**, the City Council adopted this Ordinance at a duly noticed public meeting to adopt the 2025 California Fire Code set forth as Part 9 of the BSC, and California Wildland-Urban Interface Code as set forth in Part 7 of BSC, and local amendments, which were proposed by the City's Fire Officials and deemed more stringent than the standards adopted by the BSC and reasonably necessary to protect the health, safety and welfare of the citizens of Rancho Mirage because of local climatic, topographic or geological conditions; and

**WHEREAS**, as detailed in Section 2 of this Ordinance, the City Council finds that the amendments recommended by the City's Fire Officials are reasonably necessary to protect the health, safety and welfare of the residents of the City of Rancho Mirage because of local climatic, topographic or geological conditions.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES ORDAIN AS FOLLOWS:**

**Section 1. RECITALS**

That the above recitals are true and correct and are incorporated as though fully set forth herein.

**Section 2. FINDINGS**

That Changes and modifications to the California Building Standards Code adopted by the City of Rancho Mirage, as recommended by the Building Official, the Development Services Director, and the Riverside County Fire Marshal are hereby found to be reasonably necessary due to the following general findings of local conditions:

I. Climatic Conditions:
   A. Rancho Mirage has an arid desert climate with rainfall averaging just over three inches annually, reducing the moisture content of combustible materials. Frequent periods of drought and low humidity contribute to the probability of a year-round fire season.
   B. For nearly four months each year, average daily high temperatures in Rancho Mirage reach 100 degrees or higher, reducing the amount of added heat required to bring combustible materials to their ignition point.
   C. Rancho Mirage is subject to hot, dry winds that further dry combustible materials, adding to the intensity of fires and their potential to spread rapidly. During the summer months the dry winds and existing vegetation mix to create a hazardous fuel condition which has resulted in large loss in vegetation and structure fires. Severe “Santa Ana” winds frequently occur and can move a fire quickly throughout areas of the City. Multiple shifting wind patterns throughout the canyon areas add to the difficulty in suppressing fires.
   D. High winds cause failures of electrical supply and telephone communication, reducing the reliability of water supply pumps and timely emergency notification.
   E. Because of weather patterns, water is a scarce commodity in desert environments, and Rancho Mirage and its neighboring areas draw more water from the underground aquifer than is replenished naturally. As a result, the area is dependent upon imported water to reduce the effects of over-drafting from the aquifer. Limited storage capacities, high consumption, and droughts reduce the dependability of future water allocations. Scarcity of water necessitates reducing the need for large volumes of water for firefighting efforts by early suppression through the installation of fire sprinklers in buildings that would otherwise be exempt from sprinkler requirements.
   F. Under desert conditions, aluminum wiring is more likely than copper to fail mechanically. Aluminum is more reactive than copper to ambient temperature changes as well as normal heating produced from the flow of electricity. It expands and contracts when subjected to heating and cooling, respectively,

more so than copper does. Compared to copper, its lower electrical conductivity generates more heat. Aluminum is also more brittle than copper and is more likely to break or crimp. Arcing can occur if a wire breaks or crimps, causing very high temperatures inside concealed building spaces. Aluminum is more likely to corrode (i.e., oxidize) than copper. When excessive corrosion occurs, it increases the resistance in the circuit and causes overheating. All of these mechanisms of failure increase the risks of fire associated with the use of aluminum wire.

II. Topographical Conditions:
   A. Riverside County is separated from Los Angeles to the west and Phoenix to the east by mountainous terrain, isolating it from media broadcasts of news and emergency information originating from major metropolitan areas.
   B. Major roadways, highways, and flood control channels create barriers that increase Fire Department response times. Undulating terrain incorporated into large country clubs also increases these response times.
   C. Streets designed for limited residential traffic and streets designed as storm drains impede emergency vehicle access and evacuation routes.

III. Geological Conditions:
   A. Rancho Mirage is situated near several significant sources capable of producing moderate to large earthquakes, including the San Andreas, Garnet Hill, Banning, Eureka Peak, Burnt Mountain, Pinto Mountain, San Gorgonio Pass, and San Jacinto Faults.
   B. Faults near Rancho Mirage are capable of producing earthquakes of Magnitude 7.8 or greater, accompanied by intense shaking, liquefaction, and permanent ground displacement, increasing the risk of property damage, or personal injury or death, caused by the failure of structures, necessitating the permitting and inspection of structures that would otherwise be exempt from permit requirements.
   C. Seismic activity within the area occurs yearly. As a result, existing structures and planned new development are subject to serious risks, including fire and collapse, disruption of the water supply for firefighting purposes, and isolation from emergency response as a result of bridge, overpass, road damage and debris.
   D. Severe ground shaking during a seismic event increases the probability that above- ground structures will fail. The inherent danger to the public is increased when power lines are installed above ground because of the danger from falling or fallen power poles and the possibility of contacting live power lines.

IV. Other Conditions:
   A. Additional amendments are found to be either administrative or procedural in nature or concern themselves with subjects not covered in the California Building Standards Code. These changes include provisions making the

California Building Standards Code compatible with other codes enforced by the City.

**2025 California Fire Code (CFC) Amendments**

California Health and Safety Code Sections 17958.7 and 18941.5 require that the modification or change be expressly marked and identified as to which each finding refers. Therefore, the City Council finds that the following table sets forth the 2025 California Fire Code sections that have been modified and the associated local climatic, geological and/or topographical conditions described above supporting the modification.

| 2025 FIRE CODE SECTION | TITLE/SUBJECT | FINDINGS I, II, III |
|---|---|---|
| 101.1 | Title | Administrative |
| 101.4 | Severability | Administrative |
| 102.5 | Application of the residential code | I, II & III |
| 102.13.1 | Application of the California Wildland-Urban Interface Code | Administrative |
| 104.1.1 | Authority of the Fire Chief and Fire Department | Administrative |
| 104.2 | Determination of Compliance | Administrative |
| 104.8 and 104.8.1 | Liability | Administrative |
| 104.12 | Authority of the Fire Chief to close hazardous fire areas | Administrative |
| 108.2 | Fees | Administrative |
| 108.7 | Cost Recovery | Administrative |
| 112.1 | Board of Appeals established | Administrative |
| 113.4 | Violation and Penalties | Administrative |
| 202 | Fire Chief | Administrative |
| 308.1.7 | Sky Lanterns and similar devices | I, II & III |
| 503.1.2.1 | Remoteness | I, II, & III |
| 503.2.1 | Dimensions | Administrative |
| 503.2.2 | Authority | Administrative |
| 503.6.1 | Automatic opener | Administrative |
| 503.7 | Loading areas and passenger drop-offs | Administrative |
| 507.5.7 | Fire hydrant size and outlets | I & III |
| 507.5.8 | Fire hydrant street marker | I, II & III |
| 508.1 | Fire command center – General | I, II & III |
| 508.1.1 | Fire command center – Location and access | I, II & III |
| 508.1.3 | Fire command center - Size | I, II & III |
| 509.2.1 | Minimum clearances | I & III |
| 608.11.1.2 | Manual operation | II & III |
| 903.2 | Where required (automatic sprinkler systems) | I, II & III |
| 903.3.5.3 | Hydraulically calculated systems | I & II |
| 904.2.2.1 | Activation of the Fire Alarm System | I, II & III |
| 3206.4.2 | General Fire Protection and Life Safety Features | Administrative |

| 2025 FIRE CODE SECTION | TITLE/SUBJECT | FINDINGS I, II, III |
|---|---|---|
| 4107 | Mobile Food Preparation Vehicles | I, II & III |
| 4107.1 | Mobile Food Preparation Vehicles - General | I, II & III |
| 4107.2 | Maintenance | I, II & III |
| 4107.2.1 | Exhaust system | I, II & III |
| 4107.2.2 | Fire protection systems and devices | I, II & III |
| 4107.2.3 | Fuel gas systems | I, II & III |
| 5608.1.2 | Fireworks Display – Application for Permit | Administrative |
| 5608.2 | Fallout Area | I, II & III |
| B103.2.1 | Wildland-Urban Interface Area Subdivisions | I, II & III |
| Table B105.2 | Buildings other than one- or two-family dwellings | I, II & III |
| C103.1 | Fire hydrant location | I, II & III |

**2025 CFC Local Amendment Justification/Statement of Reason**

Building Standards Law allows local amendments in accordance with the following:

For purposes of this subdivision, a city may make reasonably necessary modifications to the requirements, adopted pursuant to Health and Safety Code Section 17958, 17958.5, 17958.5, 17958.7, and 18941.5, contained in the provisions of the code and regulations on the basis of local conditions.

CFC Chapter 1 – Scope and Administration:

Section 101.1: This section is carried over from the existing Ordinance. This section identifies the “Rancho Mirage Fire Code”

Section 101.4: This section is carried over from the existing Ordinance. This section resolves any conflict with the fire code provisions. v maintains its own severability clause and does not adopt the fire code text.

Section 102.5: This section is carried over from the existing Ordinance. The scope and application of the fire code needs to be expanded to apply to the fire sprinkler systems for accessory structures constructed under the 2025 California Residential Code (CRC) which are permitted to exceed 3,600 square feet in area. This existing modification maintains the applicability of the 2025 California Fire Code (CFC) Section 903.2 amendment to those accessory structures greater than or equal to 3,600 square feet in area. This has no change in intent for Ordinance and maintains the protection offered.

Section 102.13.1: New section added to Section 102.13 to clarify Where a conflict exists between the provisions of the Rancho Mirage Fire Code and the California Wildland-Urban Interface Code, the provisions of the Fire Code shall apply.

Section 104.1.1: This section is carried over from the existing Ordinance. It is imperative that enforcement capability be disseminated to other law enforcement entities within the Rancho

Mirage area because of its vast topography and diversity. This gives the Riverside County Fire Department greater enforcement capabilities due to the presence of these other agencies across the County of Riverside and City of Rancho Mirage.

Section 104.2: New amendment to Section 104.2 to clarify that “Guidelines” may be created to render interpretations of the Fire Code and shall be enforceable as part of the code.

Section 104.8 and 104.8.1: This section is carried over from the existing Ordinance to resolve any conflict between state law and the fire code provisions.

Section 104.12: This section is carried over from the existing Ordinance and grants authority to the Fire Chief, in cooperation with the City Council, to close hazardous fire areas.

Section 108.2: This section is carried over from the previous Ordinance and relocated to the fees section of the Fire Code Section 108.2. This amendment is necessary to identify that fees are in accordance with Rancho Mirage fee schedules.

Section 108.7: This section is carried over from the previous Ordinance and relocated to the fees section of the fire code. Language has been updated to be more consistent throughout the services of the Riverside County Fire Department. This section is maintained in accordance with California Health and Safety Code 13009 and 13009.1, and Government Code 53150, et seq. for cost recovery.

Section 112.1: This section is carried over from the existing Ordinance to identify the board of appeals and additional criteria for clarification and implementation. The existing modifications to this section are consistent with California Health and Safety Code 17920.5 where no board of appeals exists. This section provides for the ability to create a Board of Appeals as needed.

Section 113.4: This section is carried over from the existing Ordinance section 112.4 and relocated to this section to resolve any conflict with the fire code provisions. The Ordinance requires punishments and penalties for violations to be in accordance with Health and Safety Code Sections 17995 through 17995.5.

CFC Chapter 2 – Definitions:

Fire Chief: This definition is carried over from the previous Ordinance. This definition was added to designate that this term means the Fire Chief of Riverside County whenever the wording appears in the California Fire Code or this Ordinance. This is to distinguish obligatory authority to the Fire Chief or any of the designated representatives for fire prevention measures and declarations in enforcing this Ordinance.

CFC Chapter 3 - General Requirements

Section 308.1.7: This section is carried over from previous Ordinance. This section is amended to prohibit sky lanterns and similar devices. The California State Fire Marshal's

office issued Information Bulletin 12-005 indicating that there is a serious fire and safety hazard associated with sky lanterns, which include the potential to start an unintended fire on or off the property from which they are released. They are known to travel significant distances from the point of release. The National Association of State Fire Marshals Resolution 2013-3 recommends imposing State level bans on their sale and use. Multiple fires have been reported to be linked to the use of sky lanterns including, but not limited to, a recycling plant fire in Smethwick, England which caused approx. $9M in damage and a wildfire in Shell Beach on the mountain above Pirates Code in San Luis Obispo County, CA. This is similar to the existing amendment by Orange County Fire Authority.

CFC Chapter 5 – Fire Service Features

Section 503.1.2.1: This is a new section added to be consistent with the operational needs where two points of fire access are required as identified in the Riverside County Fire Department – Commercial Access Guidelines and is consistent with Appendix D of the International Fire Code.

Section 503.2.1: This section is carried over from the previous Ordinance. This correlation of the fire code is necessary for minimum fire apparatus access widths for firefighter operations and consistency throughout Rancho Mirage. This modification has no change in regulatory effect.

Section 503.2.2: This section is carried over from the previous Ordinance. This section is enhanced to specify who has the authority to designate Fire Lanes/Fire Apparatus Access Roads and modify minimum widths.

Section 503.6.1: This section is carried over from the previous Ordinance. This section provides fire department and other emergency responders with rapid access to facilities with motorized gates. Underwriters Laboratory (UL) determined that fires today are more dangerous and pose more risks than in the past. Fire propagation is faster, and time to flashover, escape times and collapse times are all shorter" (UL Fire Safety Journal Issue 1). Placing our first responders on scene sooner or without disruption will provide for greater occupant and firefighter safety and assist in property protection and medical emergencies.

Section 503.7: This section is carried over from the previous Ordinance. This section provides additional width for apparatus access roads where utilized for loading/unloading or passenger drop off/pick up to prevent interference with operational access needs.

Section 507.5.7: This section is carried over from the previous Ordinance. This section provides for the size and quantities of outlets for residential standard, super hydrant standard, and super hydrant enhanced fire hydrants and that they shall be required as determined by the Fire Code Official.

Section 507.5.8: This section is carried over from the previous Ordinance. The section provides direct references to Riverside County Fire Department Guidelines for specific requirements for the installation of blue reflective markers for fire hydrants.

Sections 508.1, 508.1.1, and 508.1.3: These sections are carried over from the previous Ordinance. These sections have been amended to require fire command centers for structures larger than 300,000 square feet in size. To put into context, the Fire Command Center would be triggered when the buildings are approximately 2.5 times the typical Costco Warehouse store and approximately two times the size of a typical Walmart Supercenter. Large structures of this size pose numerous challenges to emergency responders due to the large amounts of fuel loads from the storage, manufacturing and/or processing of flammable/combustible commodities and other processes within the building. Challenges include wide distribution of smoke throughout the structure, difficulty for firefighters to locate and reach the fire and difficulty in search and evacuation of the public, employees and firefighters. These structures typically require numerous fire protection, early suppression and detection systems that may include, but are not limited to, fire pumps, multiple fire sprinkler systems, advanced fire alarm systems, smoke control systems, and refrigeration gas detection system(s). During a fire, the incident commander must have the ability to readily identify the status of the various suppression and detection systems and have access to other building information details that may include, but are not limited to, building floor plans, high-pile/rack storage details, smoke control/ventilation systems, fire sprinkler zoning details, mechanical refrigeration equipment and piping details, and hazardous materials data sheets along with quantities and storage/use locations. A fire command center provides a centralized location for the incident commander to review details about the building and the incident and to effectively coordinate emergency responders and suppression activities with increased efficiency and speed. The Riverside County Fire Department has experienced several incidents in buildings with and without Fire Command Centers. Incident Commanders found that having detailed information on built in fire protection systems and controls, building schematics and hazardous materials storage plans were vital towards mitigating the event. When this information was not available, firefighting personnel were forced to operate upon assumptions and much less information. In addition, this increased efficiency and speed results in facilities returning to operation more expeditiously after incidents or false alarms thereby reducing loss of revenue for the business.

Section 509.2.1: This section is carried over from the previous Ordinance. This section encompasses other exterior fire protection water supply appliances such as Fire Department connections, and other exterior fire protection system control valves, or any other exterior fire protection system component that may require immediate access.

CFC Chapter 6 – Building Services and Systems

Section 608.11.1.2: This section is carried over from the previous Ordinance. This section specifies the location of manual crossover valves when manual operation is required by the Fire Code Official. The amendment specifies that the manual valves shall be located in an approved location immediately outside of the machinery room, in a secure metal box or equivalent and marked as Emergency Controls. This is to ensure that the valves are in readily accessible location(s) for access during an emergency.

CFC Chapter 9 – Fire Protection and Life Safety Systems

Section 903.2: This section is carried over from the previous Ordinance with modification. Modifications have been made to provide certain exemptions including, but not limited to, fueling canopies and agricultural and greenhouse Group U structures constructed in accordance with the California Building Code and specific shade structures. An additional sprinkler requirement has been added to include changes in use to existing structures greater than 3,600 sq. ft., and additions to existing structures where the new square footage is greater than 3,600 sq. ft.

The existing amendment provides a base square footage requirement for all new commercial, industrial, and residential occupancies other than one- and two-family dwellings. Though the amendment includes a reference to the requirement for one- and two-family dwellings, the authority for residential fire sprinkler requirements for these occupancies resides in Title 24, Part 2.5 [2025 California Residential Code].

Automatic sprinkler systems have been successfully used to protect industrial and commercial buildings and their occupants for more than 100 years. Historically the place which has offered the least amount of fire protection to occupants was and still is their own home. This was brought to light in 1973 by the Report of the National Commission on Fire Prevention and Control, America Burning. At the time of the report approximately 8,000 people died in structure fires every year in the United States. Nine out of ten of those victims died in their home.

However, the U.S. Fire Administration report “Fire in the United States 2004–2013 17th edition” reflects that nonresidential fire losses are costly. “National estimates of nonresidential building fires and losses, from 2004 to 2013, annually accounted for only 7 percent of fires, 2 percent of deaths, and 8 percent of injuries. These properties, however, accounted for a disproportionately large annual dollar loss, 21 percent. Trends in nonresidential buildings showed a 14 percent decrease in fires, a 9 percent increase in deaths, a 7 percent increase in injuries, and a 10 percent decrease in dollar loss from 2004 to 2013.”

The same report concluded “…that, overall, the fire problem in the U.S. continues to improve. Ten-year fire loss rates are down. It is likely that several factors continue to contribute to these trends…” which includes; "fire sprinklers, which quickly combat incipient fires, especially in nonresidential and multifamily buildings, and fire codes, which have been strengthened.” Furthermore, the report reflects that the nonresidential building category includes industrial and commercial properties, institutions (such as hospitals, nursing homes and prisons), educational establishments (from preschool through university), mobile properties, and storage properties. On average, about 89 percent of nonresidential structure fires, 88 percent of deaths, 91 percent of injuries, and 92 percent of dollar losses reported to National Fire Incident Reporting System from 2004 to 2013 occurred in nonresidential buildings.

Aside from firefighter and explosion fatalities, there has never been a multiple loss of life in a fully sprinklered building due to fire or smoke. All fire protection features have a reliability

factor. Walls and shafts can be breached by means of poke-throughs and building alterations. Exit doors can be blocked or locked.

The California Residential Code requires that all one and two family dwellings be protected by sprinklers. It is still imperative, based on the geographical, topographical, climatic diversity of Rancho Mirage, to continue to protect all structures greater than 3,600 sq. ft. by fire sprinklers, to ensure faster fire suppression/control to those occupancies that would not normally be required to be protected which would exhaust a number resources including water which climatically is so precious to our environment as a whole. It will provide for less run off into ground water due to suppression activities and less pollutants into the environment. It will reduce the risk of a structure fire extending outside of the structure and potentially igniting a wildland fire.

Mobile homes are a part of the American landscape. In 2007 alone, more than 95,000 manufactured homes were shipped nationwide. Manufactured housing also accounts for approximately 10 percent of the single-family structures in the United States. The National Fire Protection Association reports in 2007-2011, 11,400 structure fires per year were reported in manufactured homes, with associated losses of; 206 civilian deaths, 434 civilian injuries, and $179 million in direct damage per year nationally. Despite the fact that we drive by them, respond to medical calls in them, and sometimes live in them, we often overlook mobile homes when it comes to training and pre-fire planning. However, as the deaths of two firefighters in Craigsville, West Virginia, showed, mobile homes can pose significant, and sometimes deadly, challenges. The burning mobile home is a less-than-stable platform, making search and possible rescue of occupants even more dangerous. The exterior walls are not as structurally sound when compared with those of most site-built homes. The narrow halls complicate search. The roof burns through more quickly than a typical residential roof and is not safe for firefighters. Mobile home fires can quickly grow out of control, because there's not as much wallboard and drywall, and there are fewer walls to keep the fire from spreading. If the first-due engine pulls up and the mobile home is burning from end to end, the firefighting strategy has already been decided. The fire must be knocked down in order to move in. If the home is in a mobile home park, again, protecting exposures is vital. Radiant heat can ignite the homes nearby. Fire sprinklers can prevent the flashover from occurring and in many cases put the fire out and save valuable resources in the process, such as water, personnel, and environmental cleanup, limited displacement into City and County shelter(s), and less inconvenience to the family. The mobile home, because of its construction, requires fast water.

The record for automatic fire sprinklers is based on the simple fact that there has never been a multiple death of building occupants from a fire developing in a building protected by an automatic fire sprinkler system properly installed and maintained in accordance with nationally recognized standards (NFPA 13, 13D, 13R, and NFPA 25).

AWWA Research Foundation has published the following report: Impact of Fire Flow on Distribution System Water Quality, Design, and Operation. This report concludes the following:

“Water-efficient fire suppression technologies exist that use less water than conventional standards. In particular, the universal application of automatic sprinkler systems provides the most proven method for reducing loss of life and property due to fire, while at the same time providing faster response to the fire and requiring significantly less water than conventional fire-fighting techniques. It is recommended that the universal application of automatic fire sprinklers be adopted by local jurisdictions.”

Consider the benefits: a single firefighter using a normal 1-1/2” fire hose can be applying between 175-400 gallons of water per minute when attempting to extinguish a fire. On the other hand, a single fire sprinkler will be flowing only 18- to 40- gallons of water per minute. This means that over a 5-minute period, the following quantities of water are used:

Fire-fighter with 1-1/2” hose:
175 gpm x 5 minutes = 875 gallons of water
400 gpm x 5 minutes = 2,000 gallons of water
Fire sprinkler system:
18 gpm x 5 minutes = 90 gallons of water
40 gpm x 5 minutes = 200 gallons of water

Section 903.3.5.3: This section is carried over from the previous Ordinance. The section limits all hydraulically calculated fire sprinkler systems to not exceed 90% of the water supply capacity. The 10% buffer in hydraulic calculation is a common engineering business practice that gives some flexibility to account for system water pressures that may decrease as additional demands are placed on the water system from additional construction or as the system ages.

Section 904.2.2.1: This is a new section added to the Fire Code to require that all new hood and duct commercial kitchen extinguishing systems are monitored by a central station or remote supervising station to ensure that the fire department is notified and able to respond to a fire.

CFC Chapter 32 – High-Piled Combustible Storage

Section 3206.4.2: This section is carried over from the previous Ordinance and relocated to the automatic sprinkler section within Chapter 32 of the Fire Code. By requiring client leased or occupant owned warehouses to have a technical report completed by a registered engineer, it will minimize problems concerning commodity and sprinkler protection. By having an engineer complete a technical report for the proposed or existing building it will provide greater certainty that adequate protection for the commodities that are proposed will be sufficient. By not having adequate sprinkler protection, it could be detrimental to the building and could also cause loss of life in the event of a fire. Geographically this can be a significant problem due to the seismic activity that Rancho Mirage experiences. The Engineer can assess the adequate protection for the correct commodity classifications, ensure the correct seismic provisions are in place for the type of system to be installed, and provide a professional assurance to a very volatile type of occupancy. It takes a vast number of resources to extinguish a fire of this type. By adding this requirement, it will ensure an

added level of safety. Modifications have been made to provide clarification that certain reference documents are not required.

CFC Chapter 49 - Requirements for Wildland-Urban Interface Fire Areas

Section 4904.2.1: This section has been deleted and is covered by the provisions of the California Wildland-Urban Interface Code as adopted and amended.

CFC Chapter 41 – Temporary Heating and Cooking Operations

Section 4107: A new Section 4107, including Sections 4107.1 through 4107.2.3 is added to the Fire Code to provide the fire department with the authority to inspect Mobile Food Preparation Vehicles during special events. This section was removed from the CFC due to conflict in regulations, however HCD agrees that there would be an expectation for fire marshals to have jurisdiction over safety inspections (especially for fire protection equipment and systems' inspections, testing and maintenance), for participating SPCM MFF during special events requiring CFC 105.6 operational permits (such as Carnivals and Fairs, Exhibits and Trade Shows, or local codified "Special Events" …). See BSC TP-106 (Rev. 10/20) Initial Statement of Reasons June 21, 2021 Rulemaking File SFM 06/21 – Part 9 – 2021 Triennial Code Cycle.

CFC Chapter 56 – Explosives and Fireworks

Section 5608.1.2: This amendment is carried over from the previous Ordinance. It establishes a requirement for Pyrotechnic Operators to submit a complete application for a proposed public/private firework show, far enough in advance to allow Fire and City staff to review, approve and provide community notification.

Section 5608.2: A new Section 5608.2 is added to the Fire Code to establish a minimum required radius of the fallout area for aerial shells to be 100 ft/in. (22 m/25 mm) of the internal mortar diameter of the largest aerial shell to be fired, unless otherwise approved. This is necessary due to the climatic wind conditions within Rancho Mirage.

CFC Appendix B – Fire-Flow Requirements for Buildings

Section B103.2.1: A new Section B103.2.1 is added to the Fire Code to establish the minimum fire flow for any new subdivision or tract constructed within a Wildland-Urban Interface Area to be 1,500 gallons per minute to ensure that adequate fire-flow is provided.

Table B105.2 of Appendix B: This amendment is carried over from the previous Ordinance. This allows the fire department to still have adequate fire flow mitigation with sprinkler protection and not jeopardize main distribution systems by inadequately under sizing them and have costly upgrades for future projects. With the geographical diversity that Rancho Mirage has it is important that this requirement be added to ensure adequate water in the event of a fire.

CFC Appendix C – Fire Hydrant Locations and Distribution

Section C103.1 of Appendix C: This provision is carried over from the previous Ordinance. This provision is to clarify the additional location of fire hydrants to be at intersections. This requirement has been standard policy within Rancho Mirage and Riverside County.

**2025 California Wildland-Urban Interface Code (CWUIC) Amendments**

That California Health and Safety Code Sections 17958.7 and 18941.5 require that the modification or change be expressly marked and identified as to which each finding refers. Therefore, the City Council finds that the following table sets forth the 2025 California Wildland-Urban Interface Code sections that have been modified and the associated local climatic, geological and/or topographical conditions described above supporting the modification.

| 2025 CWUIC CODE SECTION | TITLE/SUBJECT | FINDINGS I, II, III |
|---|---|---|
| 102.4.1.1 | Application of the California Wildland-Urban Interface Code | Administrative |
| 104.1.1 | Authority of the Fire Chief and Fire Department | Administrative |
| 104.2 | Determination of Compliance | Administrative |
| 104.8 and 104.8.1 | Liability | Administrative |
| 105.2 | Permits Required | Administrative |
| 108.2 | Schedule of Permit fees | Administrative |
| 108.7 | Cost Recovery | Administrative |
| 109.3.7 | Violation and Penalties | Administrative |
| 202 | Fire Chief | Administrative |
| 302.1.1 | Designation of Fire Hazard Severity Zones. | Administrative |
| 501.1 | Scope | I, II, & III |
| 602.1 | General | I, II, & III |
| 602.3.2 | Final Fire Protection Plan | I, II, & III |
| 603.1 | General | I, II, & III |
| 603.3 | Landscape and Fuel Modification plans | I, II, & III |
| 603.3.1 | Contents | I, II, & III |
| 604.1 | General | I, II, & III |
| 604.3 | Requirements | I, II, & III |
| 604.3.1 | Retroactivity | I, II, & III |
| 604.6 | Clearance of brush, vegetative growth, and combustible material from improved parcels | I, II, & III |
| 604.7 | Clearance of fuels or vegetative growth from structures | I, II, & III |
| 604.7.1 | Structures | I, II, & III |
| 604.7.2 | Timing for New Buildings and additions to Existing Buildings | I, II, & III |
| 604.7.3 | Photovoltaic Systems | I, II, & III |

| 2025 CWUIC CODE SECTION | TITLE/SUBJECT | FINDINGS I, II, III |
|---|---|---|
| 604.8 | Defensible Space clearance zones and requirements | I, II, & III |
| 604.8.1 | Requirements | I, II, & III |
| 604.8.2 | Zone 0 purpose and location | I, II, & III |
| 604.8.2.1 | Non-Combustible Zone 0 for New Buildings, additions to Existing Buildings, and new or replacement landscape | I, II, & III |
| 604.8.2.2 | Additional requirements in Zone 0 | I, II, & III |
| 604.8.2.3 | Zone 0 requirements for Existing Buildings | I, II, & III |
| 604.8.2.3.1 | Zone 0 restrictions | I, II, & III |
| 604.8.3 | Zone 1 purpose and location | I, II, & III |
| 604.8.3.1 | Requirements and allowable items | I, II, & III |
| 604.8.4 | Zone 2 purpose and location | I, II, & III |
| 604.8.4.1 | Requirements and allowable items | I, II, & III |
| 604.8.4.2 | Spacing | I, II, & III |
| 604.8.5 | General requirements for Zone 0, 1, and 2 | I, II, & III |
| 604.8.5.1 | Dead and dying vegetation | I, II, & III |
| 604.8.5.2 | Mulch and wood chips within Zones 1 and 2 | I, II, & III |
| 604.8.5.3 | Firewood | I, II, & III |
| 604.8.5.4 | Clearance from chimney, stovepipe | I, II, & III |
| 604.8.5.5 | Trees | I, II, & III |
| 604.8.5.5.1 | Tree spacing | I, II, & III |
| 604.8.5.5.2 | Ground clearance of trees | I, II, & III |
| 604.8.5.5.3 | Ground cover under tree canopy | I, II, & III |
| 604.8.5.6 | Continuous tree canopies | I, II, & III |
| 604.8.5.6.1 | New Structures | I, II, & III |
| 604.8.5.6.2 | Existing Structures | I, II, & III |
| 604.8.5.7 | Grasses | I, II, & III |
| 604.9 | Fire protection equipment and utilities | I, II, & III |
| 604.10 | Planting vegetation under or adjacent to energized electrical lines | I, II, & III |
| 604.11 | Fencing | I, II, & III |
| 604.11.1 | Scope | I, II, & III |
| 604.11.2 | New Fencing | I, II, & III |
| 604.11.3 | Existing Fencing | I, II, & III |
| 607.1 | General | I, II, & III |
| 607.1.1 | Combustible Materials | I, II, & III |
| 607.2 | Storage for off-site use | I, II, & III |
| 608.1.1 | Restricted development setbacks | I, II, & III |
| 608.2 | General | I, II, & III |
| 608.2.1 | Setback reduction | I, II, & III |
| 609.2.7.1 | Greenbelts | I, II, & III |
| 609.2.7.2 | Access to Greenbelts | I, II, & III |

| 2025 CWUIC CODE SECTION | TITLE/SUBJECT | FINDINGS I, II, III |
|---|---|---|
| A102.1 | General | I, II, & III |
| A105.1 | General | I, II, & III |
| A105.4 | Combustible Materials | I, II, & III |

## 2025 CWUIC Local Amendment Justification/Statement of Reason

Building Standards Law allows local amendments in accordance with the following:

For purposes of this subdivision, a city may make reasonably necessary modifications to the requirements, adopted pursuant to the Health and Safety Code Section 17958, 17958.5, 17958.7, and 18941.5, contained in the provisions of the code and regulations on the basis of local conditions.

CWUIC Chapter 1 – Administration:

Section 102.4.1.1: A new section added to the CWUIC to clarify that where a conflict exists between the provisions of the Riverside County Fire Code and the California Wildland-Urban Interface Code, the more restrictive provisions shall apply.

Section 104.1.1: Similar to the existing Ordinance amendment to the Fire Code, this section ensures that enforcement capability be disseminated to other law enforcement entities within the Riverside County area because of its vast topography and diversity. This gives the Riverside County Fire Department greater enforcement capabilities due to the presence of these other agencies across the County of Riverside and City of Rancho Mirage.

Section 104.2: New amendment to Section 104.2 to clarify that “Guidelines” may be created to render interpretations of the Wildland-Urban Interface Code and shall be enforceable as part of the code.

Section 104.8 and 104.8.1: This amended section is the same as in the Fire Code carried over from the existing Ordinance to resolve any conflict between state law and the fire code provisions.

Section 105.2: This new amendment to CWUIC Section 105.2 adds an additional permit item for “Landscape and Fuel Modification Zones.”

Section 108.2: This amended section is similar to the previous Ordinance for the Fire Code. This amendment is necessary to identify that fees are in accordance with Rancho Mirage fee schedule.

Section 108.7: This new section is similar to the previous Ordinance for the fire code. This section is maintained in accordance with the Health and Safety Code 13009 and 13009.1, and Government Code 53150, et seq. for cost recovery.

Section 109.3.7: This amended section is similar to the previous Ordinance for the fire code provisions. Ordinance requires punishments and penalties for violations to be in accordance with Health and Safety Code Sections 17995 through 17995.5.

CWUIC Chapter 2 – Definitions:

Section 202: This new amendment is similar to the previous Ordinance for the Fire Code. This definition was added to designate that this term means the Fire Chief of Riverside County whenever the wording appears in the California Fire Code or this Ordinance. This is to distinguish obligatory authority to the Fire Chief or any of the designated representatives for fire prevention measures and declarations in enforcing this Ordinance.

CWUIC Chapter 3 – Wildland-Urban Interface Areas:

Section 302.1.1: New amendment designating the Fire Hazard Severity Zones. The Rancho Mirage City Council has adopted the recommendations of the State Fire Marshal made pursuant to Government Code section 51178 and designated those areas within Rancho Mirage as moderate, high, and very high fire hazard severity zones as shown on the Local Responsibility Area Fire Hazard Severity Zones Maps published by the Office of the State Fire Marshal. The Maps have been adopted by Rancho Mirage as required by statute.

CWUIC Chapter 5 – Special Building Construction Requirements:

Section 501.1: A new amendment clarifying that for the purpose of the special building construction requirements in Chapter 5, a wildland-urban interface area shall be defined as a geographical area identified by the state as a “Fire Hazard Severity Zone” in accordance with the Public Resources Code Sections 4201 through 4204 and Government Code Sections 51175 through 51189, and other areas designated by the enforcing agency to be at a significant risk from wildfires, and shall include those areas designated as moderate, high, and very high fire hazard severity zones based on recommendations from the State Fire Marshal pursuant to Government Code Section 51178. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

CWUIC Chapter 6 – Fire Protection Requirements:

Section 602.1: A new amendment to Section 602.1 to clarify when a Fire Protection Plan is required. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 602.3.2: A new amendment to Section 602.3.2 to clarify the items required in a Final Fire Protection Plan. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 603.1: A new amendment to Section 603.1 to include a reference to replacement landscaping. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 603.3: A new amendment to Section 603.1 to require Landscape and Fuel Modification Plans for any project in a Wildland-Urban Interface Area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 603.3.1: A new amendment to Section 603.3.1 adding the requirement for the delineation of the 5-foot (1524 mm) (Zone 0), 30-foot (9144 mm) (Zone 1) and 100-foot (30 480 mm) (Zone 2) fuel management zones from all structures as part of the landscape plans. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.1: A new amendment to Section 604.1 to delete references to State Responsibility Areas (SRA) to include the defensible space requirements within the local responsibility area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.3: A new amendment to Section 604.3 to include a reference to Appendix A of the CWUIC and Riverside County Fire Department Guidelines. *Additionally, Item 4 was updated to correctly reflect the applicable CCR section as the base code was observed to have a misprint.

Section 604.3.1: A new Section 604.3.1 is added to the CWUIC to add a requirement that when required, by the Fire Code Official, or State Law, existing Defensible Space/Fuel Modification Zones (FMZ) shall require retrofitting, including thinning and/or removal of plants, trees, and vegetation, to meet this Code or State Law. Upon notification by the Fire Code Official, and when approved, work to bring an existing Defensible Space and FMZ into compliance with this Code, may be done over a two to four (2-4) year period as determined by the Fire Code Official. A compliance plan prepared by the property owner may be requested for review and approval by the Fire Code Official. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.6: A new Section 604.6 is added to the CWUIC requiring that all improved parcels declared a Public Nuisance shall be cleared entirely of combustible material. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.7: A new Section 604.7 is added to the CWUIC to require clearance of fuels or vegetative growth from structures. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.7.1: A new Section 604.7.1 is added to the CWUIC to specify the requirements for clearance of vegetation around structures located in a Fire Hazard Severity Zone. This

amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.7.2: A new Section 604.7.2 is added to the CWUIC to provide a timeline for the clearance of fuels or vegetative growth from structures. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.7.3: A new Section 604.7.3 is added to the CWUIC to delineate the vegetation clearance requirements around freestanding photovoltaic systems in the wildland-urban interface area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8: A new Section 604.8 is added to the CWUIC to indicate the three defensible space zones. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.1: A new Section 604.8.1 is added to the CWUIC to indicate the code sections for the defensible space requirements. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.2: A new Section 604.8.2 is added to the CWUIC to clarify the purpose and location of Zone 0. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.2.1: A new Section 604.8.2.1 is added to the CWUIC to delineate the Zone 0 requirements for all new buildings, additions to existing buildings, installation of new landscape, and refurbishment of existing landscape areas. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.2.2: A new Section 604.8.2.2 is added to the CWUIC to clarify the vegetation and landscape requirements in Zone 0. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.2.3: A new section heading 604.8.2.3 is added to the CWUIC for the Zone 0 requirements for existing buildings. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.2.3.1: A new Section 604.8.2.3.1 is added to the CWUIC to clarify the Zone 0 requirements applicable to existing buildings with landscape installed prior to January 1, 2026. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.3: A new Section 604.8.3 is added to the CWUIC to indicate the purpose and location of Zone 1. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.3.1: A new Section 604.8.3.1 is added to the CWUIC to indicate the requirements and allowable vegetation in Zone 1. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.4: A new Section 604.8.4 is added to the CWUIC to indicate the purpose and location of Zone 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.4.1: A new Section 604.8.4.1 is added to the CWUIC to indicate the requirements and allowable vegetation in Zone 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.4.2: A new Section 604.8.4.2 is added to the CWUIC to indicate the spacing requirements for trees and vegetation in Zone 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5: A new section heading 604.8.5 is added to the CWUIC for the general requirements for Zone 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.1: A new Section 604.8.5.1 is added to the CWUIC requiring the removal of all dead or dying grass, plants, shrubs, trees, branches, leaves, weeds, and tree needles within Zone 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.2: A new Section 604.8.5.2 is added to the CWUIC requiring the use of combustible mulch and wood chips shall be in accordance with the requirements of Riverside County Fire Department Guidelines within Zones 1 and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.3: A new Section 604.8.5.3 is added to the CWUIC indicating the requirements for firewood within Zones 0, 1, and 2 are found in Section 607 of the code. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.4: A new Section 604.8.5.4 is added to the CWUIC requiring that any portion of a tree or shrub that extends within 10 feet horizontally or vertically of a chimney outlet or stovepipe outlet shall be removed within Zones 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.5: A new Section 604.8.5.5 is added to the CWUIC requiring that new trees shall be planted and maintained so that the tree's drip line at maturity is a minimum of 10 feet from any combustible structure within Zones 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.5.1: A new Section 604.8.5.5.1 is added to the CWUIC requiring the

horizontal distance between crowns of new trees and crowns of adjacent trees shall not be less than 20 feet in Zone 1 and not less than 10 feet in Zone 2 and separation distance may be increased for slopes exceeding 20 percent with the required spacing measured between trees at maturity. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.5.2: A new Section 604.8.5.5.2 is added to the CWUIC addressing the ground clearance requirements for trees within Zones 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.5.3: A new Section 604.8.5.5.3 is added to the CWUIC addressing the ground cover under tree canopies within Zones 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.6: A new section heading 604.8.5.6 is added to the CWUIC to address continuous tree canopies within Zone 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.6.1: A new Section 604.8.5.6.1 is added to the CWUIC prohibiting continuous tree canopies adjacent to new structures within Zones 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.6.2: A new Section 604.8.5.6.2 is added to the CWUIC to address the requirements for continuous tree canopies adjacent to existing structures within Zones 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.8.5.7: A new Section 604.8.5.7 is added to the CWUIC requiring that natural or annual grasses shall be mowed to a maximum height of 4-inch stubble with clippings removed within Zones 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.9: A new Section 604.9 is added to the CWUIC addressing defensible space requirements around communication site towers and their support buildings; required fire protection water supplies, including water tanks, water supply pumps, and pump houses; and any other utility structure as required by the Fire Code Official within a wildland-urban interface area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.10: A new Section 604.10 is added to the CWUIC prohibiting vegetation planted under or adjacent to energized power lines that, at maturity, will grow within 10 feet of the energized conductors within a wildland-urban interface area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.11: A new section heading 604.11 is added to the CWUIC to address fencing requirements within a wildland-urban interface area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.11.1: A new Section 604.11.1 is added to the CWUIC to address fencing requirements within Zone 0 in a wildland-urban interface area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.11.2: A new Section 604.11.2 is added to the CWUIC to require new fencing and gates to be constructed of a non-combustible material in a wildland-urban interface area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 604.11.3: A new Section 604.11.3 is added to the CWUIC to allow fencing installed prior to January 1, 2026 in a wildland-urban interface area to remain, except the entire fencing not parallel and within 5 feet of the building, including gates within the fencing, shall be constructed of a non-combustible material when any portion of the existing fencing within 5 feet is replaced. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 607.1: A new amendment to Section 607.1 of the CWUIC to prohibit the storage of firewood within Zone 0. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 607.1.1: A new Section 607.1.1 is added to the CWUIC requiring combustible materials, other than vegetation, stored within Zones 1 and 2 shall not be stored so as to pose a hazard to any building and that piles shall not exceed 100 square feet of area and a maximum height of 10 feet and shall be separated by a minimum of 20-foot clear area when located within a wildland-urban interface area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 607.2: A new amendment to Section 607.2 of the CWUIC to prohibit the storage of firewood and combustible materials not for consumption on the premises within Zones 0, 1, and 2. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 608.1.1: A new Section 608.1.1 is added to the CWUIC with restricted development setbacks for new structures and additions to existing structures located less than 100 feet from any protected habitat within a wildland-urban interface area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 608.2: A new amendment to Section 608.2 of the CWUIC expanding the applicability of the required 30-foot setback to new tract and parcel maps, new buildings, and additions to existing buildings within a wildland-urban interface area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 608.2.1: A new amendment to Section 608.2.1 of the CWUIC deleting the exception of complying with the special building construction requirements as a setback reduction within a wildland-urban interface area, since the structures would already be subject to those requirements. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 609.2.7.1: A new amendment to Section 608.2.7.1 of the CWUIC addressing the approval of greenbelt locations within a wildland-urban interface area. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section 609.2.7.2: A new amendment to Section 608.2.7.2 of the CWUIC addressing the access points to proposed greenbelt locations for subdivisions and other developments within a wildland-urban interface area to allow for on-going maintenance and firefighter access. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

CWUIC Appendix A – General Requirements:

Section A102.1: A new amendment to Section A102.1 of the CWUIC adding a reference for vegetation control to Chapter 6 of the Wildland-Urban Interface Code. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section A105.1: A new amendment to Section A105.1 of the CWUIC adding a reference for the storage and use of materials to Chapter 6 of the Wildland-Urban Interface Code. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

Section A105.4: A new amendment to Section A105.4 of the CWUIC adding a reference for the outside storage and use of combustible materials to the applicable fire code sections. This amendment is necessary due to climatic, topographical, and geological conditions in Rancho Mirage.

**Section 3. REPEAL AND REPLACEMENT OF CHAPTER 15.12 OF TITLE 15 OF THE RANCHO MIRAGE MUNICIPAL CODE**

That Chapter 15.12 ("California Fire Code, 2019 Edition") of Title 15 ("Buildings and Construction") of the Rancho Mirage Municipal Code is hereby repealed and replaced with new Chapter 15.12 ("California Fire Code, 2022 Edition") to read in its entirety as follows:

**Chapter 15.12**
**California Fire Code, ~~2022~~ *2025* Edition.**

**§ 15.12.010 ~~California Fire Code adopted with amendments~~ Adoption by reference.**

A. Except as stated in this section or as amended in Section ~~8.08.020 of this chapter~~ 15.12.020; all of the provisions and appendices of the ~~2022~~2025 California Fire Code, inclusive of all of the inclusions and exclusions set forth in each chapter's matrix, are hereby adopted and shall apply to the ~~unincorporated areas of Riverside County~~ City of Rancho Mirage. In addition, the following provisions that are excluded in the ~~2022~~2025 California Fire Code are hereby adopted – Chapter 1, Division II of the California Fire Code is hereby adopted, (except that Sections 103.2 and ~~111.3~~112.3 are not adopted); and Chapters 3, 25, and Sections ~~403.11,~~ 503, 510.2, 1103.2 and 5707, of the California Fire Code published by the California Building Standards Commission are adopted for the purpose of establishing the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises, and to provide safety to firefighters and emergency responders during emergency operations within the city.

B. Each and all of the regulations, provisions, conditions and terms therein, on file with the building official, are referenced and made a part hereof as if fully set out in this chapter, except as otherwise provided in this chapter.

## § 15.12.020 Amendments to the California Fire Code.

A. Scope and ~~General Requirements~~ Administration.

1) Section 101.1 of the California Fire Code is amended as follows:
101.1 Title. These regulations shall be known as the Rancho Mirage Fire Code, hereinafter referred to as "this code."

2) Section 101.4 of the California Fire Code is deleted in its entirety and replaced with the following:
**101.4 Severability.** If any provision, clause, sentence or paragraph of this code or the application thereof to any person or circumstances shall be held invalid, such invalidity shall not affect the other provisions of this code which can be given effect without the invalid provision or application, and to this end, the provisions of this code are hereby declared to be severable.

B. Applicability.

1) Section 102.5 of the California Fire Code is amended as follows:
**102.5 Application of Residential Code.** Where structures are designed and constructed in accordance with the California Residential Code, the provisions of this code shall apply as follows:

1. Construction and design provisions of this code pertaining to the exterior of the structure shall apply including, but not limited to, premises identification, fire apparatus access and water supplies. Where interior or exterior systems or devices are installed, construction permits required by Section ~~105.5~~105.6 of this code shall apply.
2. Administrative, operational and maintenance provisions of this code shall apply.

3. Automatic fire sprinkler system requirements of this code shall apply to detached accessory buildings 3,600 square feet or greater in accordance with Section 903.2. The provisions contained in Section 903.2.18 of the California Fire Code or Section ~~R309.6~~ R317.5.1 of the California Residential Code may be used for the design of the automatic fire sprinkler system for detached private garages.

2) A new Section 102.13.1 is added to Section 102.13 of the California Fire Code to read as follows:

**102.13.1 Application of the California Wildland-Urban Interface Code.** Where a conflict exists between the adopted provisions of the California Fire Code and the California Wildland-Urban Interface Code, the more restrictive provisions shall apply.

C. Duties and Powers of the Fire Code Official

1) A new Section 104.1.1 is added to Section 104.1 of the California Fire Code to read as follows:

**104.1.1 Authority of the Fire Chief and Fire Department.**

1. The Fire Chief, Chief Deputy, or their designee, is authorized and directed to enforce all applicable State fire laws and provisions of this code and to perform such duties as directed by the City Council.
2. The Fire Chief, Chief Deputy, or their designee, is authorized to administer, interpret and enforce this code. Under the Fire Chief, Chief Deputy, or their designee's, direction, the Riverside County Fire Department is authorized to enforce ordinances of City of Rancho Mirage pertaining to the following:
   2.1. The prevention of fires.
   2.2. The suppression or extinguishment of dangerous or hazardous fires.
   2.3. The storage, use and handling of hazardous materials.
   2.4. The installation and maintenance of automatic, manual and other private fire alarm systems and fire extinguishing equipment.
   2.5. The maintenance and regulation of fire escapes.
   2.6. The maintenance of fire protection and the elimination of fire hazards on land, in buildings, structures and other property, including those under construction.
   2.7. The maintenance of means of egress.
   2.8. The investigation of the cause, origin and circumstances of fire and unauthorized releases of hazardous materials.
3. The following persons are hereby authorized to interpret and enforce the provisions of this code and to make arrests and issue citations as authorized by law:
   3.1. The Unit Chief, Peace Officers and Public Officers of the California Department of Forestry and Fire Protection.
   3.2. The Fire Chief, Peace Officers and Public Officers of the Riverside County Fire Department.
   3.3. The Riverside County Sheriff and any deputy sheriff.

3.4. The Police Chief and any police officer of any city served by the Riverside County Fire Department.
3.5. Officers of the California Highway Patrol.
3.6. Code Officers of the City of Rancho Mirage.
3.7. Peace Officers of the California Department of Parks and Recreation.
3.8. The law enforcement officer of the Federal Bureau of Land Management.

2) Section 104.2 of the California Fire Code is deleted and replaced with the following:

**104.2 Determination of compliance.** The fire code official shall have the authority to determine compliance with this code, to render interpretations of this code and to develop policies, procedures, guidelines, standards, and information bulletins in order to clarify the application of its provisions. Such interpretations, policies, procedures:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.
3. Shall be enforceable as part of this code.

3) Sections ~~104.7~~ 104.8 and ~~104.7.1~~ 104.8.1 of the California Fire Code are deleted in their entirety and replaced with the following:

**~~104.7~~ 104.8 Liability.** Any liability against Riverside County and City of Rancho Mirage or any officer or employee for damages resulting from the discharge of their duties shall be as provided by law.

4) A new Section 104.13 is added to Section 104 of the California Fire Code to read as follows:

**~~104.13~~ 104.12 Authority of the Fire Chief to Close Hazardous Fire Areas.** Except upon National Forest Land, the Fire Chief is authorized to determine and announce the closure of any hazardous fire area or portion thereof. Any closure by the Fire Chief for a period of more than fifteen (15) calendar days must be approved by the Riverside County Board of Supervisors and/or the City Council within fifteen (15) calendar days of the Fire Chief's original order of closure. Upon such closure, no person shall go in or be upon any hazardous fire area, except upon the public roadways and inhabited areas. During such closure, the Fire Chief shall erect and maintain at all entrances to the closed area sufficient signs giving notice of closure. This section shall not prohibit residents or owners of private property within any closed area, or their invitees, from going in or being upon their lands. This section shall not apply to any entry, in the course of duty, by a peace officer, duly authorized public officer or fire department personnel. For the purpose of this section, "hazardous fire area" shall mean public or private land that is covered with grass, grain, brush or forest and situated in a location that makes suppression difficult resulting in great damage. Such areas are designated on Hazardous Fire Area maps filed with the office of the Fire Chief.

D. Fees.

1) Section ~~107.2~~ 108.2 of the California Fire Code is deleted in its entirety and replaced with the following:
**~~107.2~~ 108.2 Schedule of Permit Fees.** Fees for services and permits shall be as set forth in the City of Rancho Mirage Fee Schedule.

2) A new Section ~~107.7~~ 108.7 is added to Section ~~107~~ 108 of the California Fire Code to read as follows:
**~~107.7~~ 108.7 Cost Recovery.** ~~Fire suppression, investigation, rescue or emergency medical costs are recoverable in accordance with Health and Safety Code Sections 13009 and 13009.1, as may be amended from time to time. Additionally, any person who negligently, intentionally or in violation of law causes an emergency response, including, but not limited to, a traffic accident, spill of toxic or flammable fluids or chemicals is liable for the costs of securing such emergency, including those costs pursuant to Government Code Section 53150, et seq., as may be amended from time to time. Any expense incurred by the Riverside County Fire Department for securing such emergency shall constitute a debt of such person and shall be collectable by Riverside County in the same manner as in the case of an obligation under contract, express or implied.~~ Pursuant to California Health and Safety Code sections 11374.5(b)(1 ), 13009 et seq., 25259.4, 25515(a), 25540(a), 25541 (a), California Government Code sections 53150 et seq, and all other provisions of law, all costs incurred by the Riverside County Fire Department for the inspection and enforcement of any provision of these Codes, the investigation of any fire, explosion or other hazardous condition, the suppression of fire, the response to a traffic collision or accident, the containment and/or mitigation of a hazardous materials release, and any rescue or rendering of medical or physical aid or assistance, may be charged to any responsible party, any person who violates these Codes or any person who, due to a negligent or unlawful act or omission, is responsible for or requires or causes the emergency response of Riverside County Fire Department. Any expense incurred by the Riverside County Fire Department for such an emergency response shall constitute a debt of such person and shall be collectible by the County and City of Rancho Mirage in the same manner as in the case of an obligation under contract, express or implied. These provisions shall be applied uniformly against all such persons in violation of a Penal Code, Vehicle Code, Health and Safety Code or other state law statutory violation; only a county or city official (as applicable) shall have authority to reduce or cancel the debt obligation arising from the incident.

E. Means of Appeals.

1) Section ~~111.1~~ 112.1 of the California Fire Code is deleted in its entirety and replaced with the following:
**~~111.1~~ 112.1 Board of Appeals Established.** The Board of Appeals shall be the City Manager. If he or she determines an outside board is needed, he or she shall designate an outside hearing officer to hear the appeal. The Fire Chief and Chief Deputy shall be notified of any appeal and the Fire Chief, Chief Deputy or their designee(s) shall be in attendance at the appeal hearing. Depending on the subject of the appeal, specialized expertise may be solicited, at the expense of

the applicant, for the purpose of providing input to the Appeals Board.

F. Violations.

1) Section ~~112.4~~ 113.4 of the California Fire Code is deleted in its entirety and replaced with the following:

**~~112.4~~ 113.4 Violations and Penalties.** It shall be unlawful for any person, firm, corporation or association of persons to violate any provision of this ordinance, or to violate the provisions of any permit granted pursuant to this Code or ordinance. Punishments and penalties for violations shall be in accordance with Title 4 of the City of Rancho Mirage Municipal Code, Fee Schedule and California Health and Safety Code Sections 17995 through 17995.5.

G. Definitions.

1) Section 202, definition of "Fire Chief" in the California Fire Code is deleted in its entirety and replaced with the following:

**FIRE CHIEF.** The Fire Chief of Riverside County or the Fire Chief's designee.

H. Open Flames.

1) Section ~~308.1.6.3~~ 308.1.7 of the California Fire Code is deleted in its entirety and replaced with the following:

**~~308.1.6.3~~ 308.1.7 Sky Lanterns or Similar Devices.** A person shall not release or cause to be released a sky lantern or similar device.

I. Fire Apparatus Access Roads.

1) A new Section 503.1.2.1 is added to Section 503.1.2 of the California Fire Code to read as follows:

**503.1.2.1 Remoteness.** Unless otherwise approved, where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

2) Section 503.2.1 of the California Fire Code is deleted in its entirety and replaced with the following:

**503.2.1 Dimensions.** Fire apparatus access roads shall have an unobstructed width of not less than 24 feet (7,315 mm), exclusive of shoulders, except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4,115 mm). For additional requirements or alternatives see Riverside County Fire Department Standards and Policies, as may be amended from time to time.

3) Section 503.2.2 of the California Fire Code is deleted in its entirety and replaced with the following:

**503.2.2 Authority.** The fire code official shall be the only authority authorized to designate fire apparatus access roads and fire lanes and to modify the minimum fire lane access widths for fire or rescue operations.

4) A new Section 503.6.1 is added to Section 503.6 of the California Fire Code to read as follows:

**503.6.1 Automatic Opener.** New motorized gates shall be provided with means to be automatically opened remotely by emergency vehicle in accordance with Riverside County Fire Department standards and Policies, as may be amended from time to time.

**Exception:** Gates serving individual one- and two-family dwelling parcels.

5) A new Section 503.7 is added to Section 503 of the California Fire Code to read as follows:

**503.7 Loading Areas and Passenger Drop-Off Areas.** On private properties, where fire apparatus access roads are utilized for loading or unloading or utilized for passenger drop-off or pick-up, an additional eight (8) feet of width shall be added to the minimum required width for the fire apparatus access road.

J. Fire Protection Water Supplies.

1) A new Section 507.5.7 is added to Section 507 of the California Fire Code to read as follows:

**507.5.7 Fire Hydrant Size and Outlets.** As determined by the fire code official, fire hydrant sizes and outlets shall be based on the following:

1. Residential Standard – one (1) four (4) inch outlet and one (1) two and one-half (2 ½) inch outlet.
2. Super Hydrant Standard – one (1) four (4) inch outlet and two (2) two and one-half (2 ½) inch outlet.
3. Super Hydrant Enhanced – two (2) four (4) inch outlet and one (1) two and one-half (2 ½) inch outlet.

2) A new Section 507.5.8 is added to Section 507 of the California Fire Code to read as follows:

**507.5.8 Fire Hydrant Street Marker.** Fire hydrant locations shall be visually indicated in accordance with Riverside County Fire Department ~~Technical Policy 06-11~~ Guidelines, as may be amended from time to time. Any hydrant marker damaged or removed during the course of street construction or repair shall be immediately replaced by the contractor, developer or person responsible for removal or damage.

K. Fire Command Center.

1) Section 508.1 of the California Fire Code is deleted in its entirety and replaced with the following:

**508.1 General.** Where required by other sections of this code and in all buildings classified as high-rise buildings by the California Building Code, in buildings greater than 300,000 square feet in area and in Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access, a fire command center for fire department operations shall be provided and comply with Sections 508.1.1 through ~~508.1.7~~ 508.1.8.

2) Section 508.1.1 of the California Fire Code is deleted in its entirety and replaced with the following:

**508.1.1 Location and Access.** The fire command center shall be located adjacent to the main lobby and shall be accessible from fire department vehicular access or as approved by the fire code official. The room shall have direct access from the building exterior at the lowest level of fire department access.

3) Section 508.1.3 of the California Fire Code is deleted in its entirety and replaced with the following:

**508.1.3 Size.** The fire command center shall be not less than 0.015 percent of the total building area of the facility served or 200 square feet (19 m2) in area, whichever is greater. The room shall have ~~, with~~ a minimum dimension of 0.7 times the square root of the room area or 10 feet (3048 mm), whichever is greater.

Where a fire command center is solely required because a building is greater than 300,000 square feet (27 870 m2), the fire command center shall have a minimum size of 96 square feet (9 m2) with a minimum dimension of 8 feet (2438 mm) where approved by the fire code official.

L. Fire Protection and Utility Equipment Identification and Location.

1) Section 509.2.1 is added to section 509.2 of the California Fire Code is added to read as follows:

**509.2.1 Minimum Clearances.** A 3-foot (914 mm) clear space shall be maintained around the circumference of exterior fire protection system control valves, or any other exterior fire protection system component that may require immediate access, except as otherwise required or approved.

M. Mechanical Refrigeration.

1) Section 608.11.1.2 of the California Fire Code is deleted in its entirety and replaced with the following:

**608.11.1.2 Manual Operation.** When required by the fire code official, automatic crossover valves shall be capable of manual operation. The manual valves shall be located in an approved location immediately outside of the machinery room in a secure metal box or equivalent and marked as Emergency Controls.

N. Automatic Sprinkler Systems.

1) Section 903.2 of the California Fire Code is deleted in its entirety and replaced with the following:

**903.2 Where Required.** ~~In all new buildings and structures which are 3,000 square feet or greater, an approved automatic sprinkler system shall be provided regardless of occupancy classification. Where the Sections 903.2.1—903.2.21 of the California Fire Code require more restrictive requirements than those listed below, the more restrictive requirement shall take precedence.~~

1. In all new buildings and structures which are 3,600 square feet or greater, an approved automatic sprinkler system shall be provided regardless of occupancy classification. Where the Sections 903.2.1 – 903.2.21 of the California Fire Code require more restrictive requirements than those listed below, the more restrictive requirement shall take precedence.
2. All existing buildings, except for one- and two-family dwellings, shall be retrofitted with automatic fire sprinklers when a structure exceeds 3,600 square feet and changes are made to the building including any of the following: change of use/occupancy, removal of an existing fire wall as defined by the California Building Code, or additions of 50% or more are made to the original building area and the resulting square footage exceeds 5,000 square feet.
3. One- and two-family dwellings shall have an automatic fire sprinkler system regardless of square footage in accordance with the California Residential Code. Fire sprinkler systems shall be installed in mobile homes, manufactured

homes and multifamily manufactured homes with two dwelling units in accordance with Title 25 of the California Code of Regulations.

**Exception:** Unless required elsewhere in this code or the California Building Code, automatic fire sprinkler systems shall not be required for the following:

1. Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have an automatic sprinkler system by Section 1207 for energy storage systems and standby engines, provided that those spaces or areas are equipped throughout with an automatic smoke detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with Section 707 of the California Building Code or not less than 2-hour horizontal assemblies constructed in accordance with Section 711 of the California Building Code, or both.
2. Detached Group U occupancies used for agricultural purposes.
3. Detached non-combustible equestrian arena shade canopies that are open on all sides and used for riding only - no commercial, assembly or storage uses.
4. Non-combustible fueling station canopies not exceeding 10,000 square feet when separated from other buildings by a distance of not less than 50 feet.
5. Detached fabric or non-combustible shade structures that are open on all sides and used to shade playground equipment, temporary storage of vehicles and dining areas with no cooking.
6. Where determined by the Fire Chief that no major life safety hazard exists, and the fuel load does not pose a significant threat to firefighter safety or to other structures or property, automatic fire sprinklers may be exempted.

~~One- and two-family dwellings shall have an automatic fire sprinkler system regardless of square footage in accordance with the California Residential Code. Fire sprinkler systems shall be installed in mobile homes, manufactured homes and multifamily manufactured homes with two dwelling units in accordance with Title 25 of the California Code of Regulations.~~

The following exceptions in the California Fire Code shall not be allowed:

a. Exceptions in Section 903.2.3.
b. Exception 2 in Section 903.2.11.3.

2) A new Section 903.3.5.3 is added to Section 903 of the California Fire Code to read as follows:

**903.3.5.3 Hydraulically Calculated Systems.** The design of hydraulically calculated fire sprinkler systems shall not exceed 90% of the water supply capacity.

O. COMMERCIAL HOOD AND DUCT SYSTEMS.

1) A new Section 904.2.2.1 is added to Section 904.2.2 of the California Fire Code to read as follows:

**904.2.2.1 Activation of the Fire Alarm System.** Where a fire alarm signaling system, or a Dedicated Function Fire Alarm System is serving the occupancy where the extinguishing system is located, the actuation of the automatic fire-

extinguishing system shall actuate the fire alarm signaling system in accordance with the requirements of NFPA 72. If a fire alarm signaling system, or a Dedicated Function Fire Alarm System is not present, one will be required to be installed to provide monitoring for the automatic fire -extinguishing system.

P. ~~Designation of High-Piled Storage Areas.~~ HIGH-PILED STORAGE - GENERAL FIRE PROTECTION AND LIFE SAFETY FEATURES

1) A new Section 3206.4.2 is added to Section ~~3204.2~~ 3206.4 of the California Fire Code to read as follows:

**~~3204.2.1~~ 3206.4.2 Minimum Requirements for Client Leased or Occupant Owned Warehouses.** Designs of an automatic sprinkler system for client leased or occupant owned buildings containing high pile storage shall be based on the requirements of NFPA 13. Unless otherwise approved, a Professional Engineer, Licensed in the State of California, ~~The responsible fire protection engineer~~ shall perform a survey of the building to determine commodity classification, storage configuration, building height and other information related to the development of an appropriate sprinkler system design. The fire protection engineer shall also make reasonable efforts to meet with the building owner or operator to understand seasonal or customer related fluctuations to the stored commodities, storage height, and configuration. The sprinkler design shall be based on the most demanding requirements determined through the onsite survey and discussions with the building owner or operator. The technical report shall describe the basis for determining the commodity and sprinkler design selection, how the commodities will be isolated or separated, and include references to the design document(s). If a specific fire test is used as the basis of design, a copy of the fire test report shall be provided at the time of plan review.

Q. MOBILE FOOD PREPARATION VEHICLES.

1) A new Section 4107 is added to Chapter 41 of the California Fire Code to read as follows:

**4107 MOBILE FOOD PREPARATION VEHICLES.**

2) New Sections 4107.1 through 4107.2.3 are added to Section 4107 of the California Fire Code to read as follows:

**4107.1 General.** Mobile food preparation vehicles that are equipped with appliances that produce smoke or grease-laden vapors shall comply with this section.

**4107.2 Maintenance.** Maintenance of systems on mobile food preparation vehicles shall be in accordance with Sections 4107.2.1 through 4107.2.3.

**4107.2.1 Exhaust system.** The exhaust system, including hood, grease-removal devices, fans, ducts and other appurtenances, shall be inspected and cleaned in accordance with Section 606.3.

**4107.2.2 Fire protection systems and devices.** Fire protection systems and devices shall be maintained in accordance with Section 901.6.

**4107.2.3 Fuel gas systems.** LP-gas containers installed on the vehicle and fuel-gas piping systems shall be inspected annually by an approved

inspection agency or a company that is registered with the U.S. Department of Transportation to requalify LP-gas cylinders, to ensure that system components are free from damage, suitable for the intended service and not subject to leaking. CNG containers shall be inspected every 3 years in a qualified service facility. CNG containers shall not be used past their expiration date as listed on the manufacturer's container label. Upon satisfactory inspection, the approved inspection agency shall affix a tag on the fuel gas system or within the vehicle indicating the name of the inspection agency and the date of satisfactory inspection.

R. ~~Fire Hazard Severity Zones.~~

1) ~~A new Section 4904.2.1 is added to Section 4904 of the California Fire Code to read as follows:~~

**~~4904.2.1 High Fire Hazard Severity Zone Maps.~~** ~~In accordance with Government Code Sections 51175 through 51189, Very High Fire Hazard Severity Zones (VHFHSZ), located in the Local Responsibility Areas (LRA), are designated as shown on the most recently published VHFHSZ IN LRA map, as recommended and published by the Director of the California Department of Forestry and Fire Protection (CAL FIRE), which may be revised from time to time. The most recent VHFHSZ IN LRA map is on file at the office of the Fire Chief, which supersedes other maps previously adopted designating high fire hazard areas.~~

S. FIREWORKS DISPLAY.

1) Section 5608.1.2 is added to Section 5608 of the California Fire Code to read as follows:

**5608.1.2 Additional local regulations.** Use and prohibitions of fireworks shall be additionally compliant with Rancho Mirage Municipal code Chapter 8.38.

2) A new Section 5608.2 is added to Section 5608 of the California Fire Code to read as follows:

**5608.2 Fallout Area.** For aerial shells, the minimum required radius of the fallout area shall be 100 ft/in. (22 m/25 mm) of the internal mortar diameter of the largest aerial shell to be fired, unless otherwise approved.

T. Appendix B.

1) A new Section B103.2.1 is added to Section B103.2 of the California Fire Code to read as follows:

**B103.2.1 Wildland-Urban Interface Area Subdivisions.** The minimum fire flow for any new subdivision or tract constructed within a Wildland-Urban Interface Area shall be 1,500 gallons per minute.

2) Table B105.2 of the California Fire Code is amended as follows:

**TABLE B105.2**

REQUIRED FIRE-FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

| AUTOMATIC SPRINKLER SYSTEM | MINIMUM FIRE-FLOW *(gallons per minute)* | FLOW DURATION *(hours)* |
|---|---|---|

| | | |
|---|---|---|
| *(Design Standard)* | | |
| No automatic sprinkler system | Value in Table B105.1(2) | Duration in Table B105.1(2) |
| Section 903.3.1.1 of the California Fire Code | 50% of the value in Table B105.1(2)[a] | Duration in Table B105.1(2) at the reduced flow rate |
| Section 903.3.1.2 of the California Fire Code | 50% of the value in Table B105.1(2)[b] | Duration in Table B105.1(2) at the reduced flow rate |

For SI: 1 gallon per minute = 3.785 L/m.

[a] The reduced fire-flow shall be not less than 1,000 gallons per minute.

[b] The reduced fire-flow shall be not less than 1,500 gallons per minute.

U. Appendix C.

1) Section C103.1 of the California Fire Code is deleted in its entirety and replaced with the following:

**C103.1 Hydrant Spacing.** Fire apparatus access roads and public streets providing required access to buildings in accordance with Section 503 of the International Fire Code shall be provided with one or more fire hydrants, as determined by Section C102.1. Where more than one fire hydrant is required, the distance between required fire hydrants shall be in accordance with Sections C103.2 and C103.3. Fire hydrants shall be provided at street intersections.

## Section 5. ADDING CHAPTER 15.13 (CALIFORNIA WILDLAND-URBAN INTERFACE CODE, 2025 EDITION) TO TITLE 15 (BUILDINGS AND CONSTRUCTION) TO THE RANCHO MIRAGE MUNICIPAL CODE, ADOPTING THE 2025 CALIFORNIA WILDLAND-URBAN INTERFACE CODE

That Chapter 15.13 (California Wildland-Urban Interface Code, 2025 Edition) is hereby added to the Rancho Mirage Municipal Code, as follows:

### § 15.13.000. Adoption by reference.

Except as stated in this Section or as amended below in § 15.13.010 of this Ordinance, all of the provisions and appendices of the 2025 California Wildland-Urban Interface Code, inclusive of all of the inclusions and exclusions set for in each chapter's matrix, are hereby adopted and shall apply to the City of Rancho Mirage. In addition, the following provisions that are excluded in the 2025 California Wildland-Urban Interface Code – Chapter 1, Division II of the California Wildland-Urban Interface Code is hereby adopted, except that Sections 103.2 and 112.3 are not adopted, and sections A101 through A102.2, A102.4, A104, A105.1, A105.4 through A105.4.2, A106 through A106.2 and A107 through A107.5 are adopted.

**§ 15.13.010. Amendments and Additions.**

AMENDMENTS TO THE CALIFORNIA WILDLAND-URBAN INTERFACE CODE:

**A. APPLICABILITY,**

1) A new Section 102.4.1.1 is added to Section 102.4.1 of the California Wildland-Urban Interface Code to read as follows:

**102.4.1.1 Application of the California Wildland-Urban Interface Code.** Where a conflict exists between the provisions of the California Fire Code and the California Wildland-Urban Interface Code, the more restrictive provisions shall apply.

**B. DUTIES AND POWERS OF THE CODE OFFICIAL.**

1) A new Section 104.l.l is added to Section 104.1 of the California Wildland-Urban Interface Code to read as follows:

**104.1.1 Authority of the Fire Chief, Chief Deputy, and Fire Department.**

1. The Fire Chief, Chief Deputy, or their designee is authorized and directed to enforce all applicable State fire laws and provisions of this code and to perform such duties as directed by the Rancho Mirage City Council.
2. The Fire Chief, Chief Deputy, or their designee is authorized to administer, interpret and enforce this code. Under the Fire Chief, Chief Deputy, or their designee's direction, the Riverside County Fire Department is authorized to enforce City of Rancho Mirage ordinances pertaining to the following:
   - 2.1. The prevention of fires.
   - 2.2. The suppression or extinguishment of dangerous or hazardous fires.
   - 2.3. The storage, use and handling of hazardous materials.
   - 2.4. The installation and maintenance of automatic, manual and other private fire alarm systems and fire extinguishing equipment.
   - 2.5. The maintenance and regulation of fire escapes.
   - 2.6. The maintenance of fire protection and the elimination of fire hazards on land, in buildings, structures and other property, including those under construction.
   - 2.7. The maintenance of means of egress.
   - 2.8. The investigation of the cause, origin and circumstances of fire and unauthorized releases of hazardous materials.

3. The following persons are hereby authorized to interpret and enforce the provisions of this code and to make arrests and issue citations as authorized by law:
    3.1. The Unit Chief, Peace Officers and Public Officers of the California Department of Forestry and Fire Protection.
    3.2. The Fire Chief, Peace Officers and Public Officers of the Riverside County Fire Department.
    3.3. The Riverside County Sheriff and any deputy sheriff.
    3.4. The Police Chief and any police officer of any city served by the Riverside County Fire Department.
    3.5. Officers of the California Highway Patrol.
    3.6. Code Compliance Officers of the City of Rancho Mirage.
    3.7. Peace Officers of the California Department of Parks and Recreation.
    3.8. The law enforcement officer of the Federal Bureau of Land Management.

2) Section 104.2 of the California Wildland-Urban Interface Code is deleted and replaced with the following:

**104.2 Determination of compliance.** The fire code official shall have the authority to determine compliance with this code, to render interpretations of this code and to develop policies, procedures, guidelines, standards, and information bulletins in order to clarify the application of its provisions. Such interpretations, policies, procedures:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.
3. Shall be enforceable as part of this code.

3) Sections 104.8 and 104.8.1 of the California Wildland-Urban Interface Code are deleted in their entirety and replaced with the following:

**104.8 Liability.** Any liability against Riverside County and City of Rancho Mirage or any officer or employee for damages resulting from the discharge of their duties shall be as provided by law.

**C. PERMITS.**

1) Section 105.2 of the California Wildland-Urban Interface Code is deleted in it's entirety and replaced with the following:

**105.2 Permits Required.** Unless otherwise exempted, buildings or structures regulated by this code shall not be erected, constructed, altered, repaired, moved, removed, converted, demolished or changed in use or occupancy unless a separate permit for each building or structure has first been obtained from the code official.

For buildings or structures erected for temporary uses, see Section A108.3.

Where required by the code official, a permit shall be obtained for the following activities, operations, practices or functions within a wildland-urban interface area:

1. Automobile wrecking yard.
2. Candles and open flames in assembly areas.
3. Explosives or blasting agents.
4. Fireworks.
5. Flammable or combustible liquids.
6. Hazardous materials.
7. Liquefied petroleum gases.
8. Landscape and fuel modification zones.
9. Lumberyards.
10. Motor vehicle fuel-dispensing stations.
11. Open burning.
12. Pallet Yards.
13. Pyrotechnical special effects material.
14. Tents, canopies and temporary membrane structures.
15. Tire storage.
16. Welding and cutting operations.

**D. FEES.**

1) Section 108.2 of the California Wildland-Urban Interface Code is deleted in its entirety and replaced with the following:

**108.2 Schedule of permit fees.** Fees for services and permits shall be as set forth by fee resolution of the City Council.

2) A new Section 108.7 is added to Section 108 of the California Wildland-Urban Interface Code to read as follows:

**108.7 Cost recovery.** Pursuant to California Health and Safety Code sections 11374.5(b)(1 ), 13009 et seq., 25259.4, 25515(a), 25540(a), 25541 (a), California Government Code sections 53150 et seq, and all other provisions of law, all costs incurred by the Riverside County Fire Department for the inspection and enforcement of any provision of these Codes, the investigation of any fire, explosion or other hazardous condition, the suppression of fire, the response to a traffic collision or accident, the containment and/or mitigation of a hazardous materials release, and any rescue or rendering of medical or physical aid or assistance, may be charged to any responsible party, any person who violates these Codes or any person who, due to a negligent or unlawful act or omission, is responsible for or requires or causes the emergency response of Riverside County Fire Department. Any expense incurred by the Riverside County Fire Department for such an emergency response shall constitute a debt of such person and shall be collectible by the County and City of Rancho Mirage in the same manner as in the case of an obligation under contract, express or implied. These provisions shall be applied uniformly against all such persons in violation of a Penal Code, Vehicle Code, Health and Safety Code or other state law statutory violation; only a county and/or city official shall have authority to reduce or cancel the debt obligation arising from the incident.

**E. INSPECTION AND ENFORCEMENT**

1) Section 109.3.7 of the California Wildland-Urban Interface Code is deleted in its entirety and replaced with the following:

**109.3.7 Violation and penalties.** It shall be unlawful for any person, firm, corporation or association of persons to violate any provision of this code, or to violate the provisions of any permit granted pursuant to this code. Punishments and penalties for violations shall be in accordance with California Health and Safety Code Sections 17995 through 17995.5 and Government Code Section 51185.

**F. DEFINITIONS.**

1) Section 202, definition of "Fire Chief" in the California Wildland-Urban Interface Code is deleted in its entirety and replaced with the following:

**FIRE CHIEF.** The Fire Chief of Riverside County or the Fire Chief's designee.

## G. WILDLAND-URBAN INTERFACE AREA DESIGNATIONS.

1) Section 302.1.1 is added to Section 302.1 of the California Wildland-Urban Interface Code to read as follows:

**302.1.1 Designation of Fire Hazard Severity Zones.** The Rancho Mirage Council has adopted the recommendations of the State Fire Marshal made pursuant to Government Code section 51178 and designated those areas within the City as moderate, high, and very high fire hazard severity zones as shown on the Local Responsibility Area Fire Hazard Severity Zones Maps published by the Office of the State Fire Marshal.

## H. SPECIAL BUILDING CONSTRUCTION REGULATIONS.

1) Section 501.1 of the California Wildland-Urban Interface shall be amended as follows:

**501.1 Scope.** Buildings and structures *in a wildland-urban interface area* shall be constructed in accordance with the *California Building Code* and this code. For the purpose of this Chapter, a wildland-urban interface area shall be defined as a geographical area identified by the state as a "Fire Hazard Severity Zone" in accordance with the Public Resources Code Sections 4201 through 4204 and Government Code Sections 51175 through 51189, and other areas designated by the enforcing agency to be at a significant risk from wildfires, and shall include those areas designated as moderate, high, and very high fire hazard severity zones based on recommendations from the State Fire Marshal pursuant to Government Code Section 51178.

**Exceptions:**

1. Group U accessory structures not exceeding 120 square feet (11 $m^2$) in floor area where located not less than 50 feet (15 240 mm) from applicable buildings.
2. Group U agricultural buildings not less than 50 feet (15 240 mm) from applicable buildings.

## I. FIRE PROTECTION PLANS.

1) Section 602.1 of the California Wildland-Urban Interface Code is amended as follows:

**602.1 General.** A fire protection plan shall be submitted to the Fire Code Official for any proposed subdivision of land or building project. The fire protection plan shall be prepared to determine the acceptability of fire protection and life safety measures designed to mitigate wildfire hazards presented for the property under consideration.

The fire protection plan shall be prepared by a registered design professional, qualified landscape architect, qualified fire safety specialist or similar specialist acceptable to the code official and shall analyze the wildfire risk of the building, project, premises or region to recommend necessary changes.

Submittal of a preliminary fire protection plan shall be required prior to the submission of a final fire protection plan.

**Exception:** A single-family dwelling (Group R-3 Occupancy) when located on an existing legal parcel.

2) Section 602.3.2 of the California Wildland-Urban Interface Code is amended as follows:

**602.3.2 Final Fire Protection Plan.** Final fire protection plan shall include items listed in Section 602.3.1 and the following:

1. A map identifying all proposed plants in the fuel modification zones with a legend that includes a symbol for each proposed plant species. The plan shall include specific information on each species proposed, including but not limited to:
   1.1. The plant life-form;
   1.2. The scientific and common name; and
   1.3. The expected height and width for mature growth.
2. Identification of irrigated and non-irrigated zones.
3. Requirements for vegetation reduction around emergency access and evacuation routes.
4. Identification of existing vegetation proposed to remain.

5. Identification of points of access for equipment and personnel to maintain vegetation in common areas.
6. Methods and timetables for controlling, changing, or modifying areas on the property.
7. Legally binding statements regarding community responsibility for maintenance of fuel modification zones.
8. Legally binding statements to be included in covenants, conditions and restrictions regarding property owner responsibilities for vegetation maintenance.

**J. VEGETATION PLAN.**

1) Section 603.1 of the California Wildland-Urban Interface Code is amended as follows:

**603.1 General.** Planting of vegetation for new and replacement landscaping shall be selected to reduce vegetation in proximity to a structure and to maintain vegetation as it matures.

2) Section 603.3 of the California Wildland-Urban Interface Code is amended as follows:

**603.3 Landscape and Fuel Modification plans.** Landscape and Fuel Modification plans shall be submitted for any project located in a WUI area. The landscape and Fuel Modification plan shall include development and maintenance requirements for the vegetation management zone adjacent to structures and roadways, and to provide significant fire hazard reduction benefits for public and firefighting safety.

3) Section 603.3.1 of the California Wildland-Urban Interface Code is amended as follows:

**603.3.1 Contents.** Landscape plans shall contain the following:

1. Delineation of the 5-foot (1524 mm) (Zone 0), 30-foot (9144 mm) (Zone 1) and 100-foot (30 480 mm) (Zone 2) fuel management zones from all structures.
2. Identification of existing vegetation to remain and proposed new vegetation.
3. Identification of irrigated areas.

4. A plant legend with both botanical and common names, and identification of all plant material symbols.
5. Identification of ground coverings within the 30-foot (9144 mm) zone.

**K. MAINTENANCE OF DEFENSIBLE SPACE.**

1) Section 604.1 of the California Wildland-Urban Interface Code is amended as follows:

**604.1 General.** Vegetation and fuels shall be managed to reduce the severity of potential exterior wildfire exposure to buildings and to reduce the risk of fire spreading to buildings as required by applicable laws and regulations.

2) Section 604.3 of the California Wildland-Urban Interface Code is amended as follows:

**604.3 Requirements.** Vegetation and fuels around all buildings and structures shall be maintained in accordance with the following laws and regulations:

1. Public Resources Code, Section 4291.
2. California Code of Regulations, Title 14, Division 1.5, Chapter 7, Subchapter 3, Article 3, Section 1299.03.
3. California Government Code, Section 51182.
4. California Code of Regulations, Title 19, Division 1, Chapter 1, Subchapter 1, Article 3, Section 3.07.
5. The requirements of the California Wildland-Urban Interface Code and Riverside County Fire Department Guidelines.

3) Section 604.3.1 is added to Section 604.3 of the California Wildland-Urban Interface Code to read as follows:

**604.3.1 Retroactivity.** When required by the Fire Code Official, or State Law, existing Defensible Space/Fuel Modification Zones (FMZ) shall require retrofitting, including thinning and/or removal of plants, trees, and vegetation, to meet this code or State Law. Upon notification by the Fire Code Official, and when approved, work to bring an existing Defensible Space and FMZ into compliance with this code, may be done over a two to four (2-4) year period as determined by the Fire Code Official. A compliance plan prepared by the property owner may be requested for review and approval by the Fire Code Official.

4) Section 604.6 is added to the California Wildland-Urban Interface Code to read as follows:

**604.6 Clearance of brush, vegetative growth, and combustible material from improved parcels.** All improved parcels declared a Public Nuisance shall be cleared entirely of combustible material. If the Fire Code Official determines this impractical, the provisions of Section 604.7 may be used.

5) Section 604.7 is added to the California Wildland-Urban Interface Code to read as follows:

**604.7 Clearance of fuels or vegetative growth from structures.** Clearance of fuels and vegetative growth from structures shall be per sections 604.7.1 through 604.7.4 of this code.

6) Section 604.7.1 is added to the California Wildland-Urban Interface Code to read as follows:

**604.7.1 Structures.** Any person owning, leasing, controlling, operating, or maintaining any building or structure in, upon, or adjoining any FHSZ, governed by this section, and any person owning, leasing, or controlling any land adjacent to such buildings, shall at all times maintain around and adjacent to such building, an effective firebreak made by removing and clearing away, all combustible material on their property for a distance not less than 100 feet from all portions of the building.

Distances may be increased by the Fire Code Official due to a site-specific analysis based on local conditions and when required, based on a Fire Protection Plan. This section shall not apply to single specimens or stands of protected species of trees, Ornamental Landscape or similar plants used in landscaping and ground covers, that are well-pruned, maintained, and spaced, and do not form a means of rapidly transmitting fire from other nearby vegetation to a structure or from a structure to other nearby vegetation or to interrupt the advance of embers toward a structure.

7) Section 604.7.2 is added to the California Wildland-Urban Interface Code to read as follows:

**604.7.2 Timing for new buildings and additions to existing buildings.** The

provisions of Section 604.7 shall be completed prior to vertical construction of any New Building or addition to an Existing Building.

8) Section 604.7.3 is added to the California Wildland-Urban Interface Code to read as follows:

**604.7.3 Photovoltaic Systems.** The clearance requirements around freestanding photovoltaic systems and equipment shall comply with the following:

1. A minimum 10-foot clearance for clusters of panels not exceeding 1,500 square feet of combined panel area.
2. A minimum of 30-foot clearance for clusters of panels greater than 1,500 square feet of combined panel area.
3. Clusters shall be separated by a minimum of 20 feet.
4. Panels and clusters shall be not located within 30 feet of any Building subject to clearance requirements of Section 604 unless the clearance requirements of Section 604 are provided as measured from the perimeter of the panel or cluster.

9) Section 604.8 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8 Defensible Space clearance zones and requirements.** The required 100-foot Defensible Space clearance is identified in three (3) distinct zones: Zone 0, 1, and 2.

10) Section 604.8.1 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.1 Requirements.** Defensible Space shall be in accordance with the requirements of Appendix A of this code, Riverside County Fire Department Guidelines and the specific requirements for each zone listed in Sections 604.8.2 through 604.8.5.

11) Section 604.8.2 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.2 Zone 0 purpose and location.** Zone 0 reduces the likelihood of structure ignition by reducing the potential for direct ignition of the structure from flame contact, by embers that accumulate at the base of a wall, and/or indirect ignitions

when embers ignite vegetation, vegetative debris, or other combustible materials located close to the structure that result in either a radiant heat and/or a direct flame contact exposure to the structure.

Zone 0 is the horizontal area within the first five (5) feet around the structure, including stairs, balconies, attached or adjacent decks, and outbuildings. Zone 0 is measured from the edge of a structure, attached or adjacent decks, patio covers, balconies, and floor projections above-grade. Zone 0 also includes the area on the roof of a building, and underneath and on top of attached decks, patio covers, balconies, and stair landings.

**Advisory Notice:** Riverside County Fire Department has local Zone 0 requirements currently in effect for new Buildings and additions to existing Buildings. New State regulations for Zone 0 are currently under development by the State Board of Forestry and Fire Protection. Any State regulation more restrictive than this code shall apply. This may require thinning and/or removal of plants, trees, and vegetation to meet State Law and regulations.

12) Section 604.8.2.1 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.2.1 Non-Combustible Zone 0 for New Buildings, additions to Existing Buildings, and new or replacement landscape.** Fuels, including Combustible Materials and vegetation, are prohibited in Zone 0 for all New Buildings, additions to Existing Buildings, installation of new landscape, and refurbishment of existing landscape areas.

The application date of Section 604.8.2.1 shall be the later application date when any of the following occur:

1. Fire Department Clearance for a New Building or addition to an Existing Building.
2. Building permit for a New Building or addition to an Existing Building.
3. Landscape plans submitted for Riverside County Fire Department review.
4. Replacement of landscape when landscape plans are not required.

13) Section 604.8.2.2 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.2.2 Additional requirements in Zone 0.**

1. New and existing tree canopies are prohibited within 10 feet of New Buildings, including the addition portion to Existing Buildings.

   **Exception:** Existing protected oak trees shall be trimmed to provide a minimum 5-foot clearance above the roof and 5 feet to the side of any New Building, or the addition portion to an Existing Building.
2. Landscaped roofs are prohibited.
3. Vegetation underneath decks is prohibited.
4. Other Combustible Materials underneath any deck, not part of the deck structure itself, shall be removed.
5. Artificial or synthetic grass is prohibited within Zone 0.
6. Vines and climbing plants are not allowed on structures, including decks, patio/shade structures, and any fences within 5 feet of a Building.
7. Combustible mulch and wood chips are prohibited.
8. Firewood is prohibited.
9. All fencing and gates shall be non-combustible. See Section 604.11.

14) Section 604.8.2.3 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.2.3 Zone 0 requirements for Existing Buildings.**

15) Section 604.8.2.3.1 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.2.3.1 Zone 0 restrictions.** The following requirements apply within Zone 0 for all Existing Buildings with landscape installed prior to January 1, 2026:

1. No combustible landscape mulch or wood chips.
2. No firewood.
3. No vegetation underneath decks.
4. Other Combustible Materials underneath any deck, not part of the deck structure itself, shall be removed.
5. Roofs and gutters on Buildings shall be maintained free of any leaves, needles, or other vegetative Combustible Materials.

6. The vertical clearance distance for trees and vegetation above any roof shall be not less than 3 feet.
7. A minimum 3-foot clearance of trees and vegetation shall be provided to the side and above any eave or roof projection from the exterior wall of a Building. A minimum 3-foot clearance of trees and vegetation shall be provided below any eave or roof projection. This requirement also applies to any patio cover or other Building projections.
8. New trees are not allowed.
9. New or replacement landscaping shall comply with Sections 604.8.1, 604.8.2.1, and 604.8.2.2.

16) Section 604.8.3 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.3 Zone 1 purpose and location.** Zone 1 reduces the likelihood of fire burning directly to the structure. This is accomplished by modifying Fuels and creating a discontinuity between planting groups that limits the pathways for fire to burn to the structure and reduces the potential for near-to-building ember generation and radiant heat exposures. An additional purpose of this zone is to provide a defendable area for fire personnel to stage and take direct action.

Zone 1 is the area within 5-30 feet of structures and decks, with slopes not greater than 20 percent; 5-50 feet from Buildings and decks, when slopes are greater than 20 percent.

17) Section 604.8.3.1 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.3.1 Requirements and allowable items.** This is a minimal planting zone which includes very limited trees of a fire-smart type with additional spacing provided. Plants and other vegetation shall be in accordance with Appendix A of this code and Riverside County Fire Department Guidelines.

18) Section 604.8.4 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.4 Zone 2 purpose and location.** Zone 2 is designed to reduce the potential behavior of an oncoming fire in such a way as to drop an approaching fire from

the crown of trees to the ground, reducing the flame heights, and the potential for ember generation and radiant heat exposure to structures. Additional benefits of the Zone 2 include facilitating direct defense actions and improving the function of Zones 0 and 1.

Zone 2 is the area from the outer edge of Zone 1 to 100 feet from structures and decks.

19) Section 604.8.4.1 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.4.1 Requirements and allowable items.** Plants and other vegetation shall be in accordance with Appendix A of this code and Riverside County Fire Department Guidelines.

20) Section 604.8.4.2 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.4.2 Spacing.** Spacing of vegetation and trees at the outer edge of Zone 2 shall be based upon the height of the vegetation within Zone 2 or the adjacent area beyond the 100-foot zone, whichever provides for the greater spacing. This may require clearance outside the 100-foot zone or setting back vegetation and trees within Zone 2 away from the 100-foot line.

21) Section 604.8.5 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5 General requirements for Zone 0, 1, and 2.**

22) Section 604.8.5.1 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.1 Dead and dying vegetation.** All dead or dying grass, plants, shrubs, trees, branches, leaves, weeds, and tree needles shall be removed.

23) Section 604.8.5.2 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.2 Mulch and wood chips within Zones 1 and 2.** Use of combustible Mulch and wood chips shall be in accordance with the requirements Riverside County Fire Department Guidelines.

24) Section 604.8.5.3 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.3 Firewood.** See Section 607.

25) Section 604.8.5.4 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.4 Clearance from chimney, stovepipe.** Any portion of a tree or shrub that extends within 10 feet horizontally or vertically of a chimney outlet or stovepipe outlet shall be removed.

26) Section 604.8.5.5 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.5 Trees.** New trees shall be planted and maintained so that the tree's drip line at maturity is a minimum of 10 feet from any combustible structure.

27) Section 604.8.5.5.1 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.5.1 Tree spacing.** The horizontal distance between crowns of new trees and crowns of adjacent trees shall not be less than 20 feet in Zone 1 and not less than 10 feet in Zone 2. Separation distance may be increased for slopes exceeding 20 percent. Required spacing is measured between trees at maturity.

28) Section 604.8.5.5.2 is added to the California Wildland-Urban Interface Code to read as follows:

29) **604.8.5.5.2 Ground clearance of trees.** Trees exceeding 6 feet in height shall be limbed up from the ground 6 feet or 1/3 the height of the tree, whichever is less.

**Exception:** Fruit trees when approved by the Fire Code Official.

30) Section 604.8.5.5.3 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.5.3 Ground cover under tree canopy.** When approved ground cover and shrubs are located underneath trees, the vertical clearance to the lowest branch of the tree canopy shall not be less than three times the height of the ground cover or shrub under or adjacent to the tree. The horizontal clearance shall be 3 feet from the trunk of the tree.

31) Section 604.8.5.6 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.6 Continuous tree canopies.**

32) Section 604.8.5.6.1 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.6.1 New Structures.** Continuous tree canopies are not allowed. Tree spacing shall be in accordance with Riverside County Fire Department Guidelines.

33) Section 604.8.5.6.2 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.6.2 Existing Structures.** Continuous tree canopies may be allowed as determined by the Fire Code Official but will require the complete removal of any understory and smaller trees to meet requirements for a shaded fuel zone. Any remaining trees shall be limbed up a minimum of 12 feet from the ground or 1/3 the tree height, whichever is less. The intent is to not allow a crown (canopy) fire to spread unchecked to a structure and to bring any crown fire down to the ground level prior to Zone 1.

34) Section 604.8.5.7 is added to the California Wildland-Urban Interface Code to read as follows:

**604.8.5.7 Grasses.** Natural or annual grasses shall be mowed to a maximum height of 4-inch stubble with clippings removed.

35) Section 604.9 is added to the California Wildland-Urban Interface Code to read as follows:

**604.9 Fire protection equipment and utilities.** The clearance requirements of Sections 604.7 and 604.8 shall apply to communication site towers and their support Buildings; required fire protection water supplies, including water tanks, water supply pumps, and pump houses; and any other utility Structure as required by the Fire Code Official. The Fire Code Official may consider a reduced distance, not less than 30 feet, for communication site towers, water tanks, and Structures with no interior space, based upon a site risk assessment. Also see Appendix A.

36) Section 604.10 is added to the California Wildland-Urban Interface Code to read as follows:

**604.10 Planting vegetation under or adjacent to energized electrical lines.** No vegetation shall be planted under or adjacent to energized power lines that, at maturity, will grow within 10 feet of the energized conductors.

37) Section 604.11 is added to the California Wildland-Urban Interface Code to read as follows:

**604.11 Fencing.**

38) Section 604.11.1 is added to the California Wildland-Urban Interface Code to read as follows:

**604.11.1 Scope.** This section only applies to fences, including gates within the fencing, within 5 feet of Building(s), including Decks, (Zone 0) that are in an applicable Fire Hazard Severity Zone req by Chapter 6 of this code.

39) Section 604.11.2 is added to the California Wildland-Urban Interface Code to read as follows:

**604.11.2 New fencing.** New fencing and gates shall be constructed of a non-combustible material.

40) Section 604.11.3 is added to the California Wildland-Urban Interface Code to read as follows:

**604.11.3 Existing fencing.** Fencing installed prior to January 1, 2026, may remain.

**Exception:** The entire fencing not parallel and within 5 feet of the Building, including gates within the fencing, shall be constructed of a non-combustible material when any portion of the existing fencing within 5 feet is being replaced. Fencing beyond 5 feet from the Building is not required to be replaced with non-combustible material.

## L. STORAGE OF FIREWOOD AND COMBUSTIBLE MATERIALS.

1) Section 607.1 of the California Wildland-Urban Interface Code is amended to read as follows:

**607.1 General.** Firewood and combustible materials shall not be stored in unenclosed spaces beneath Buildings or Structures, or on Decks or under eaves,

canopies, or other projections or overhangs. Firewood piles shall be located 30 feet (9144 mm) or more from structures unless completely covered by a fire-resistant material. Exposed wood piles located within the defensible space shall have a minimum clearance of 10 feet (3048 mm) down to bare mineral soil in all directions. Firewood shall not be stored within Zone 0.

2) Section 607.1.1 of the California Wildland-Urban Interface Code is amended to read as follows:

**607.1.1 Combustible Materials.** Combustible Materials, other than vegetation, stored within Zones 1 and 2 shall not be stored so as to pose a hazard to any Building. Piles shall not exceed 100 square feet of area and a maximum height of 10 feet. Piles shall be separated by a minimum of 20-foot clear area.

3) Section 607.2 of the California Wildland-Urban Interface Code is amended to read as follows:

**607.2 Storage for off-site use.** Firewood and Combustible Materials not for consumption on the premises shall not be stored within Zones 0, 1, and 2. See Appendix A for storage requirements.

## M. BUILDING SITING AND SETBACKS

1) Section 608.1.1 is added to the California Wildland-Urban Interface Code to read as follows:

**608.1.1 Restricted development setbacks.** New Structures and additions to existing Structures shall not be constructed less than 100 feet from any protected habitat, whether on the same or adjacent Parcels, where the 100-foot Defensible Space required under Section 604.7 cannot be provided, unless an alternate method of construction and protection is provided that can ensure the safety of the Structure and emergency responders as approved by the Fire Code Official. Protected habitat includes lands restricted from brush clearance or modification due to Federal or State listed endangered species. Protected habitat does not include sensitive habitat areas.

2) Section 608.2 of the California Wildland-Urban Interface Code is amended to read as follows:

**608.2 General.** All parcels shall provide a minimum 30-foot (9144 mm) setback for all buildings from property lines and the center of a road, except as provided for in Section 608.2.1. [CCR T14 §1276.00(a)] This section applies to new Tract and Parcel maps, new Buildings, and additions to Existing Buildings.

3. Section 608.2.1 of the California Wildland-Urban Interface Code is amended to read as follows:

**608.2.1 Setback reduction.** A reduction in the minimum setback shall be based upon practical reasons, which may include but are not limited to, parcel dimensions or size; topographic limitations; Development density requirements or other Development patterns that promote low-carbon emission outcomes; sensitive habitat or other site constraints, and shall provide for an alternative method to reduce structure-to-structure ignition by incorporating a combination of features such as, but not limited to:

1. Non-combustible block walls or fences; or
2. Non-combustible material extending 5 feet (1524 mm) horizontally from the furthest extent of the building; or
3. Hardscape landscaping; or
4. A reduction of exposed windows on the side of the structure with setback less than 30 feet (9144 mm). [CCR T14 §1276.01]

**N. RIDGELINES, FUEL BREAKS, AND GREENBELTS.**

1. Section 609.2.7.1 is added to the California Wildland-Urban Interface Code to read as follows:

**609.2.7.1 Greenbelts.** Subdivisions and other developments, which propose Greenbelts as a part of the development plan, shall locate the Greenbelts strategically, as a separation between wildland fuels and Structures. The locations shall be approved by the inspection authority.

2. Section 609.2.7.2 is added to the California Wildland-Urban Interface Code to read as follows:

**609.2.7.2 Access to Greenbelts.** A minimum of one (1) access point shall be provided to new Greenbelts at an approved location to allow for on-going maintenance and firefighter access. Additional access points shall be provided when required by the Fire Code Official.

**O. APPENDIX A**

**1)** Section A102.1 of the California Wildland-Urban Interface Code is amended to read as follows:

**A102.1 General.** Vegetation control shall comply with Sections A102.2 through A102.4 and with Chapter 6.

**2)** Section A105.1 of the California Wildland-Urban Interface Code is amended to read as follows:

**A105.1 General.** In addition to the requirements of the California Fire Code, California Wildland-Urban Interface Code Chapter 6, and the Rancho Mirage Municipal code - storage and use of the materials shall be in accordance with Sections A105.2 through A105.4.2.

**3)** Section A105.4 of the California Wildland-Urban Interface Code is amended to read as follows:

**A105.4 Combustible Materials.** Outside storage of Combustible Materials such as, but not limited to, wood, rubber tires, building materials, or paper products shall comply with the other applicable sections of this code and this section. Storage of pallets shall be in accordance with California Fire Code, Section 2810. Storage and processing of wood chips, hogged materials, fines, Compost, Compostable Material, Mulch, solid biomass, raw product, and combustible yard waste and recycle material shall be in accordance with California Fire Code, Section 2808.

## Section 6. SEVERABILITY

That the City Council declares that, should any provision, section, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this ordinance as hereby adopted shall remain in full force and effect.

**Section 6. REPEAL OF CONFLICTING PROVISIONS**

That all the provisions of the Rancho Mirage Municipal Code as heretofore adopted by the City of Rancho Mirage that are in conflict with the provisions of this ordinance are hereby repealed.

**Section 7. EFFECTIVE DATE**

That this ordinance shall take effect on January 1, 2026.

**Section 8. CITY ATTORNEY REVIEW**

That the City Attorney prepared and framed this ordinance pursuant to Section 1.04.010 of the Rancho Mirage Municipal Code and finds that the City Council has the authority to adopt this ordinance, that the ordinance is constitutionally valid and that the ordinance is consistent with the general powers and purposes of the City as set forth in Section 1.04.031 of the RMMC.

**Section 9. NECESSARY ACTIONS**

That the Fire Chief or designee is authorized to take any and all further actions necessary to effectuate the adoption of this Ordinance and implementation of the adopted codes.

**Section 10. CERTIFICATION**

That the City Clerk shall certify to the passage of this ordinance and shall cause the same to be published according to law.

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

The foregoing Ordinance was approved and adopted at a meeting of the City Council held on _____, 2025, by the following vote:

Ayes:
Noes:
Abstain:
Absent:

_____
Lynn Mallotto, Mayor

**ATTEST:**

_____
Kristie Ramos, City Clerk

**APPROVED AS TO FORM:**

_____
Colin Kirkpatrick, City Attorney

**City Council Staff Report**

**Final Parcel Map No. 38844 (Skilled Nursing Facility). Location: Bob Hope Drive, Between Gerald Ford Drive and Via Marta**

| DATE | ITEM # |
|---|---|
| December 18, 2025 | CONSENT CALENDAR - 5D. |
| **Presented To** | **Presented By** |
| Mayor and City Council | Jeff Benson, Management Analyst |

## RECOMMENDED ACTION

Approve Final Parcel Map No. 38844, subject to final review and approval by the City Manager, in consultation with the City Attorney.

## DISCUSSION

Parcel Map No. 38844 proposes to subdivide an existing 5.61-acre property into two parcels to construct a Skilled Nursing Facility project site and a future medical office building. The developer proposes to construct a one-story, 42,526 square foot (46 bed) skilled nursing facility to provide 24-hour care, as well as a proposed 5,000 – 10,000 square foot medical office building.

A Parcel Merger was recorded on the project site in 2004, combining two parcels into a single parcel. This Final Subdivision Map subdivides the property into two separate lots.

The project site is in the western half of Section 30, along Bob Hope Drive, between Gerald Ford Drive and Via Marta. Proposed construction includes onsite grading, parking lot improvements, storm drain, and utility work, and offsite street improvements.

The Final Map is consistent with the Conditions of Approval and has been checked for accuracy. Attached is a Vicinity Map that shows the parcel location as described.

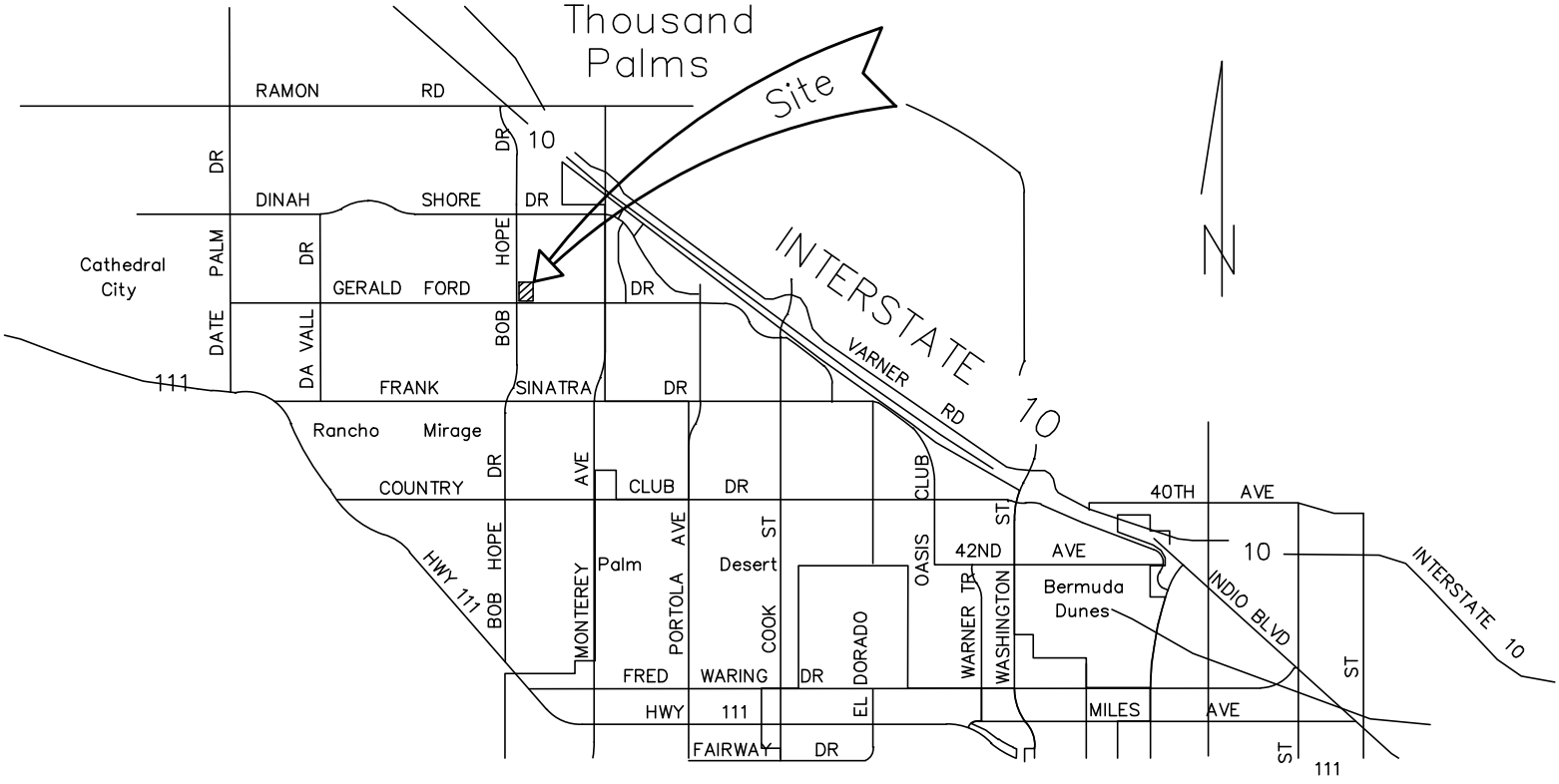
Staff recommends that the City Council approve Final Parcel Map No. 38844 and direct the City Engineer and City Clerk to sign and record the Map, subject to final review and approval by the City Attorney. The Final Subdivision Map will not record until all requirements of the Municipal Code have been satisfied.

**Attachments**

Attachment 1 - Vicinity Map

Attachment 2 - Parcel Map

**ATTACHMENT 1**




# VICINITY MAP

NO SCALE

IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA.

# PARCEL MAP NO. 38844

BEING A SUBDIVISION OF A PORTION OF THE SOUTHWEST QUARTER OF SECTION 30, T. 4 S., R. 6 E., S.B.M.

Michael Baker
INTERNATIONAL

JULY, 2025

RECORDER'S STATEMENT

FILED THIS _____ DAY OF _____, 20__.
AT _____.M. IN BOOK _____ OF MAPS,
AT PAGE _____, AT THE REQUEST OF
THE CITY CLERK OF THE CITY OF RANCHO MIRAGE
NO._____
FEE_____
PETER ALDANA, ASSESSOR-
COUNTY CLERK-RECORDER

BY: _____, DEPUTY

SUBDIVISION GUARANTEE BY:
CHICAGO TITLE COMPANY

## OWNER'S STATEMENT

WE HEREBY STATE THAT WE ARE THE OWNERS OF THE LAND INCLUDED WITHIN THE SUBDIVISION SHOWN HEREON; THAT WE ARE THE ONLY PERSONS WHOSE CONSENT IS NECESSARY TO PASS A CLEAR TITLE TO SAID LAND; THAT WE CONSENT TO THE MAKING AND RECORDING OF THIS SUBDIVISION MAP AS SHOWN WITHIN THE DISTINCTIVE BORDER LINE.

THE REAL PROPERTY DESCRIBED BELOW IS DEDICATED TO THE CITY OF RANCHO MIRAGE AS AN EASEMENT FOR PUBLIC PURPOSES: LOT "A" VIA MARTA. THE DEDICATION IS FOR STREET AND PUBLIC UTILITY PURPOSES.

## OWNER

NEW AHC HOLDINGS, LLC

_____
NAME: NATHAN OXNAM
TITLE: PRESIDENT

## NOTARY ACKNOWLEDGEMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY, OR VALIDITY OF THAT DOCUMENT.

STATE OF CALIFORNIA )SS.
COUNTY OF _____)

ON THIS _____ DAY OF _____, 20__ BEFORE ME,_____, A NOTARY PUBLIC, PERSONALLY APPEARED _____ AND__ _____ WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES) AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY(IES) UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND AND OFFICIAL SEAL MY PRINCIPAL PLACE OF BUSINESS

IS IN _____ COUNTY.

_____
NOTARY PUBLIC IN AND FOR SAID STATE
MY COMMISSION EXPIRES _____
MY COMMISSION NUMBER _____

## TAX COLLECTOR'S CERTIFICATE

I HEREBY CERTIFY THAT ACCORDING TO THE RECORDS OF THIS OFFICE, AS OF THIS DATE, THERE ARE NO LIENS AGAINST THE PROPERTY SHOWN ON THE WITHIN MAP FOR UNPAID STATE, COUNTY, MUNICIPAL OR LOCAL TAXES OR SPECIAL ASSESSMENTS COLLECTED AS TAXES, EXCEPT TAXES OR SPECIAL ASSESSMENTS COLLECTED AS TAXES, NOW A LIEN BUT NOT YET PAYABLE, WHICH ARE ESTIMATED TO BE

$_____.

DATED: _____, 20__.

MATTHEW JENNINGS, COUNTY TAX COLLECTOR

BY: _____, DEPUTY

## TAX BOND CERTIFICATE

I HEREBY CERTIFY THAT A BOND IN THE SUM OF $_____ HAS BEEN EXECUTED AND FILED WITH THE BOARD OF SUPERVISORS OF THE COUNTY OF RIVERSIDE, CALIFORNIA, CONDITIONED UPON THE PAYMENT OF ALL TAXES, STATE, COUNTY, MUNICIPAL, OR LOCAL, AND ALL SPECIAL ASSESSMENTS COLLECTED AS TAXES, WHICH AT THE TIME OF THE FILING OF THIS MAP WITH THE COUNTY RECORDER ARE A LIEN AGAINST SAID PROPERTY BUT NOT YET PAYABLE AND SAID BOND HAS BEEN DULY APPROVED BY SAID BOARD OF SUPERVISORS.

DATED: _____, 20__.

CASH TAX BOND
MATTHEW JENNINGS
COUNTY TAX COLLECTOR

BY: _____
DEPUTY

## SURVEYOR'S STATEMENT

THIS MAP WAS PREPARED BY ME OR UNDER MY DIRECTION AND IS BASED ON A FIELD SURVEY IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCE AT THE REQUEST OF NEW AHC HOLDINGS, LLC, IN AUGUST OF 2024. I HEREBY STATE THAT ALL MONUMENTS ARE OF THE CHARACTER AND OCCUPY THE POSITIONS INDICATED, OR THAT THEY WILL BE SET IN THOSE POSITIONS IN ACCORDANCE WITH THE TERMS OF THE MONUMENT AGREEMENT FOR THE MAP AND THAT THE MONUMENTS ARE, OR WILL BE, SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED, AND THIS FINAL MAP SUBSTANTIALLY CONFORMS TO THE CONDITIONALLY APPROVED TENTATIVE MAP. THIS SURVEY IS TRUE AND COMPLETE AS SHOWN.

_____ _____, 20__
CHRISTOPHER L. ALBERTS, L.S. 8508

PROFESSIONAL LAND SURVEYOR
CHRISTOPHER L. ALBERTS
LS No. 8508
STATE OF CALIFORNIA

## CITY ENGINEER'S STATEMENT

I, STEPHAN LONGORIA, CITY ENGINEER OF THE CITY OF RANCHO MIRAGE, STATE OF CALIFORNIA, STATE THAT I HAVE EXAMINED THIS MAP AND HAVE FOUND IT TO BE SUBSTANTIALLY IN CONFORMANCE WITH THE TENTATIVE MAP AND ANY APPROVED ALTERATIONS THEREOF; THAT ALL PROVISIONS OF THE SUBDIVISION MAP ACT, AND ANY ORDINANCES APPLICABLE AT THE TIME OF APPROVAL OF THE TENTATIVE MAP HAVE BEEN COMPLIED WITH.

_____ _____
STEPHAN LONGORIA, R.C.E. 74782 DATED
CITY ENGINEER

REGISTERED PROFESSIONAL ENGINEER
STEPHAN LONGORIA
NO. C 74782
CIVIL
STATE OF CALIFORNIA

## CITY SURVEYOR'S STATEMENT

No. 8207

I HEREBY STATE THAT I HAVE EXAMINED THIS MAP AND HAVE FOUND THAT IT CONFORMS WITH MAPPING PROVISIONS OF THE SUBDIVISION MAP ACT AND I AM SATISFIED SAID MAP IS TECHNICALLY CORRECT.

_____ _____
JAY S. FAHRION, P.L.S. 8207 DATED
ACTING CITY SURVEYOR

PROFESSIONAL LAND SURVEYOR
JAY S. FAHRION
No. 8207
STATE OF CALIFORNIA

## SIGNATURE OMISSIONS

PURSUANT TO SECTION 66436 OF THE SUBDIVISION MAP ACT, THE SIGNATURES OF THE FOLLOWING OWNERS OF EASEMENTS AND/OR OTHER INTERESTS HAVE BEEN OMITTED:

A RIGHT-OF-WAY FOR DITCHES AND CANALS AS RESERVED BY THE UNITED STATES OF AMERICA IN THE PATENT RECORDED AUGUST 31, 1956 IN BOOK 1965, PAGE 353 OF OFFICIAL RECORDS.

## CITY CLERK'S STATEMENT

I, KRISTIE RAMOS, CITY CLERK AND EX-OFFICIO CLERK OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, STATE OF CALIFORNIA, HEREBY STATE THAT SAID CITY COUNCIL AT ITS REGULAR MEETING HELD ON THE _____ DAY OF _____, 20____ DULY APPROVED THE WITHIN PARCEL MAP NO. 38844 AND ACCEPTS ON BEHALF OF THE PUBLIC THE EASEMENT OFFERED FOR PUBLIC PURPOSES LOT "A" VIA MARTA.

BY: _____ _____ DATED: _____
KRISTIE RAMOS, CITY CLERK AND
EX-OFFICIO CLERK OF THE CITY COUNCIL
CITY OF RANCHO MIRAGE

IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA.

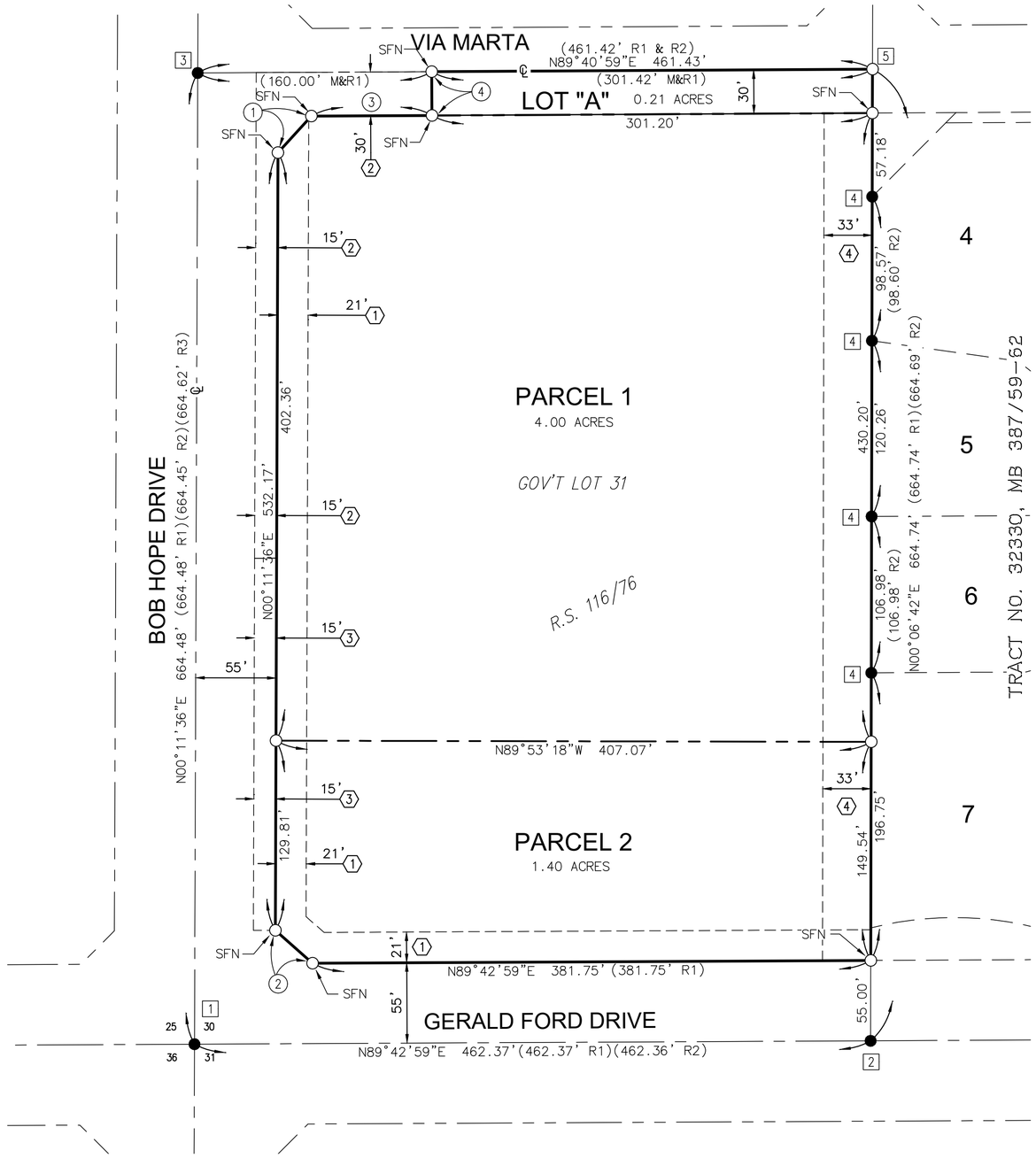


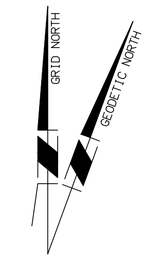
# PARCEL MAP NO. 38844

BEING A SUBDIVISION OF A PORTION OF THE SOUTHWEST QUARTER OF SECTION 30, T. 4 S., R. 6 E., S.B.M.

Michael Baker
INTERNATIONAL

JULY, 2025

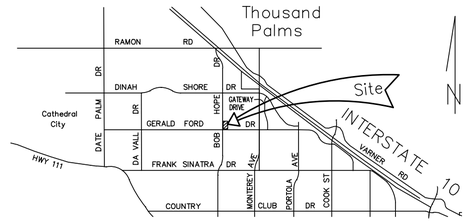



CONVERGENCE ANGLE AT
POINT 1 = -00°05'08.56"

60 30 0 60 120 180

SCALE: 1"=60'




## VICINITY MAP

NTS

| LINE TABLE | | |
|---|---|---|
| NO | BEARING | LENGTH |
| 1 | N42°31'43"E | 33.82' |
| 2 | N48°38'43"W | 33.93' |
| 3 | N89°40'59"E | 82.49' |
| 4 | N00°19'01"W | 30.00' |

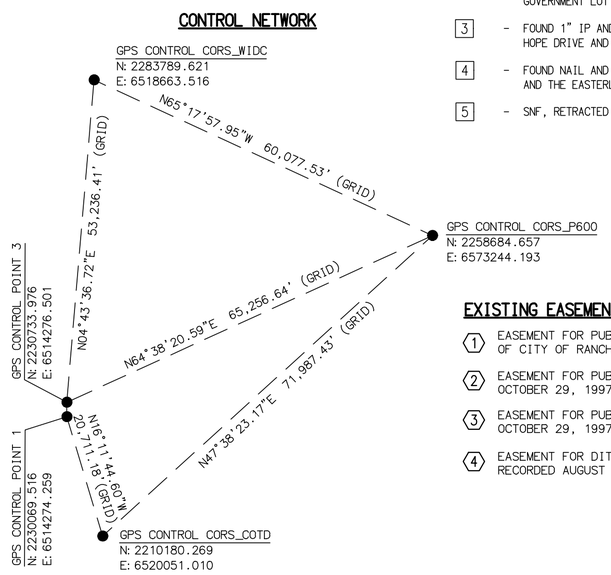
## BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM, CCS83, ZONE 6, BASED LOCALLY ON THE CONTROL STATIONS "WIDC", "P600", AND "COTD" NAD 83 (NSRS2011) EPOCH 2010.00 AS SHOWN HEREON. ALL BEARINGS SHOWN ON THIS MAP ARE GRID. QUOTED BEARINGS AND DISTANCES FROM REFERENCE MAPS OR DEEDS ARE AS SHOWN PER THAT RECORD REFERENCE. ALL DISTANCES SHOWN ARE GROUND DISTANCES UNLESS SPECIFIED OTHERWISE. GRID DISTANCE, MAY BE OBTAINED BY MULTIPLYING THE GROUND DISTANCE BY A COMBINATION FACTOR OF 0.99997571. CALCULATIONS ARE MADE AT POINT 1 WITH COORDINATES OF: N: 2230069.5161, E: 6514274.2596, USING AN ELEVATION OF 308.372

## SURVEYORS NOTES:

1. THIS MAP CONTAINS 2 NUMBERED PARCELS AND 1 LETTERED LOT AND 5.61 ACRES.
2. (R) INDICATES RADIAL BEARING AS NOTED.
3. SFN INDICATES SEARCHED, FOUND NOTHING.
4. CALC'D INDICATES DATA CALCULATED FROM RECORD DOCUMENT AS NOTED.
5. ALL MONUMENTS SHOWN AS SET WILL BE SET IN ACCORDANCE WITH THE MONUMENT AGREEMENT FOR THIS MAP.
6. DENOTES RECORD DATA PER REFERENCES BELOW:
   - M&R~ MEASURED AND RECORD DATA
   - (~) RECORD DATA AS NOTED
   - R1 RECORD DATA PER RS 116/76
   - R2 RECORD DATA PER MB 387/59-62
   - R3 RECORD DATA PER PARCEL MAP NO. 30677 P.M.B. 208/82-83
7. DENOTES SET MONUMENTS AS NOTED BELOW:
   - ○ INDICATES SET 2" TYPE "C" MONUMENT WITH BRASS TAG "LS 8508", IN GROUND, FLUSH, PER CITY OF RANCHO MIRAGE STD. NO. 611.
8. DENOTES FOUND MONUMENTS AS NOTED BELOW:
   - ● INDICATES FOUND MONUMENT AS NOTED AND REFERENCED HEREON:
   - [1] – FOUND 2-1/2" BRASS DISK STAMPED "US GENERAL LAND OFFICE SURVEY 1942" IN MONUMENT WELL, ACCEPTED AS CENTERLINE INTERSECTION AND AS THE SOUTHWEST CORNER OF SECTION 30 PER R1.
   - [2] – FOUND 1" IP AND PLASTIC PLUG STAMPED "PLS 8010" IN DIRT, DOWN 1.0', ACCEPTED AS THE SOUTHEAST CORNER OF GOVERNMENT LOT 31 PER R2.
   - [3] – FOUND 1" IP AND TAG STAMPED "RCE 30238" IN DIRT, FLUSH, ACCEPTED AS THE CENTERLINE INTERSECTION OF BOB HOPE DRIVE AND VIA MARTA PER R3.
   - [4] – FOUND NAIL AND TAG STAMPED "PLS 8010" ON TOP OF WALL, FLUSH, ACCEPTED AS INTERSECTION OF PROPERTY CORNER AND THE EASTERLY LINE OF GOVERNMENT LOT 31 PER R2.
   - [5] – SNF, RETRACTED POSITION BY INTERSECTION.

## CONTROL NETWORK




## EXISTING EASEMENT NOTES

1. EASEMENT FOR PUBLIC ACCESS ONTO AND ALONG CONCRETE PATHWAYS AND INCIDENTAL PURPOSES, IN FAVOR OF CITY OF RANCHO MIRAGE, RECORDED JULY 22, 2015 AS INSTRUMENT NO. 2015-0323860, O.R.
2. EASEMENT FOR PUBLIC STREET AND UTILITY PURPOSES, IN FAVOR OF CITY OF RANCHO MIRAGE, RECORDED OCTOBER 29, 1997 AS INSTRUMENT NO. 1997-393045, O.R.
3. EASEMENT FOR PUBLIC STREET AND UTILITY PURPOSES, IN FAVOR OF CITY OF RANCHO MIRAGE, RECORDED OCTOBER 29, 1997 AS INSTRUMENT NO. 1997-393046, O.R.
4. EASEMENT FOR DITCHES AND CANALS AS RESERVED BY THE UNITED STATES OF AMERICA IN THE PATENT RECORDED AUGUST 31, 1956 AS BOOK 1965, PAGE 353, O.R.

# City Council Staff Report

**Extension of Completion Date for Parcel Map No. 38315 (Palomino Four). Location: Northwest Corner of Palomino Lane and Cypress Lane**

| DATE | ITEM # |
|---|---|
| December 18, 2025 | CONSENT CALENDAR - 5E. |
| **Presented To** | **Presented By** |
| Mayor and City Council | Jeff Benson, Management Analyst |

## RECOMMENDED ACTION

Authorize an Amendment to the Subdivision Improvement Agreement, which provides for the extension of the completion date for Parcel Map No. 38315 until December 7, 2026.

## DISCUSSION

Parcel Map No. 38315 subdivided an existing 1.03-acre rectangular parcel into four single-family residential parcels on the northwest corner of Palomino Lane and Cypress Lane. The Final Parcel Map for the project was approved by the City Council on December 7, 2023. The agreement that the developer entered into with the City required that all improvements be completed no later than two years from approval date, which was December 7, 2025.

The Developer has requested that the City extend the contract term to provide sufficient time to complete the remaining onsite and offsite improvements and has requested an extension of the required completion date until December 7, 2026.

Staff recommends that the City Council approve the extension of the completion date to December 7, 2026.

**Attachments**

Attachment 1 - Vicinity Map

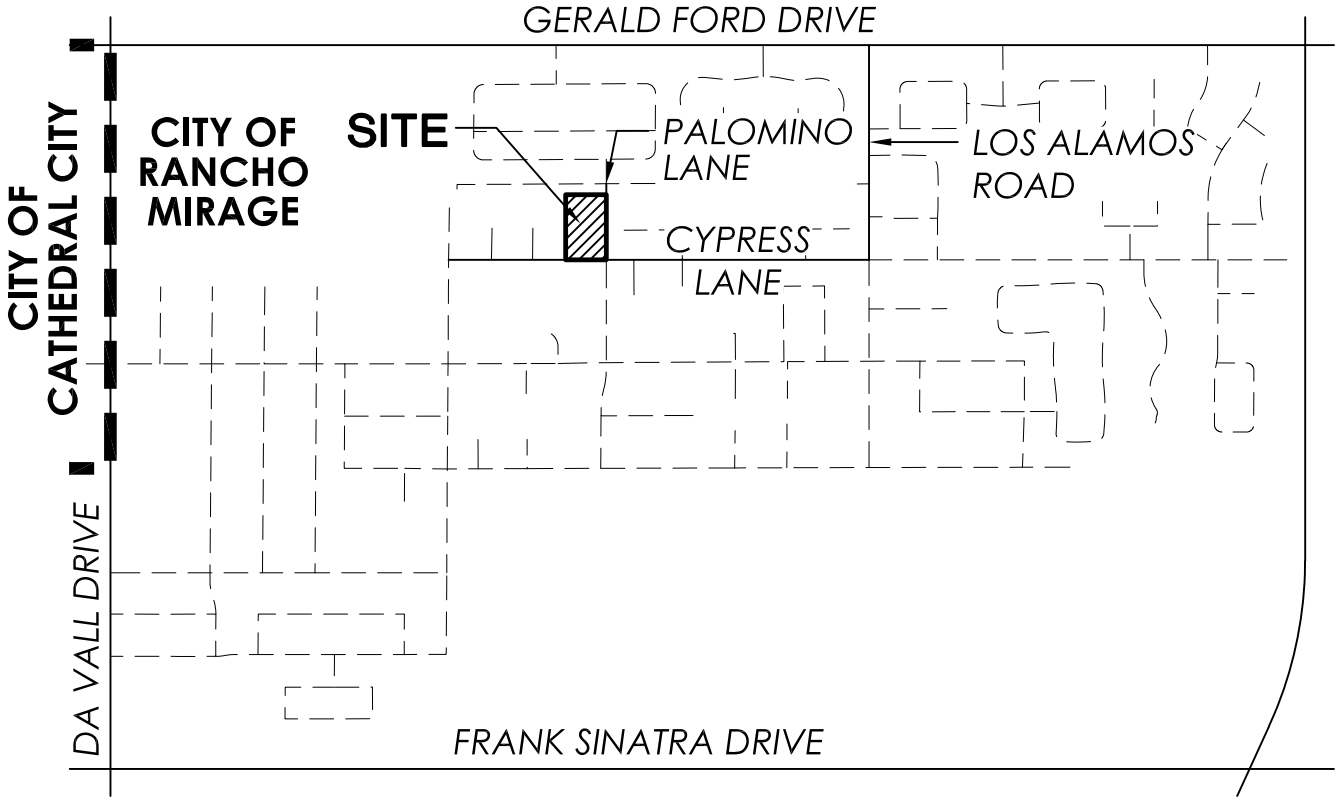
Attachment 2 - Subdivision Improvement Agreement

Attachment 3 - Extension Form & Supporting Documentation

Attachment 4 - Amended Subdivision Improvement Agreement

**ATTACHMENT 1**

# PARCEL MAP NO. 38315




NORTH

## VICINITY MAP

N.T.S.

**MSA CONSULTING**, INC.
> PLANNING > CIVIL ENGINEERING > LAND SURVEYING
34200 BOB HOPE DRIVE, RANCHO MIRAGE, CA 92270
760.320.9811 **MSACONSULTINGINC.COM**

J.N. 2763

**ATTACHMENT 2**

## SUBDIVISION IMPROVEMENT AGREEMENT

## (PM38315)

This agreement ("Agreement") is made and entered into as of December 7, 2023, by and between the CITY OF RANCHO MIRAGE, a municipal corporation (**"CITY"**) and PALOMINO FOUR, LLC, a California limited liability company **("DEVELOPER")**, with respect to the following:

A. DEVELOPER shall construct the following public improvements ("work") for the above-referenced property: **grading, water improvements, landscaping, and retaining walls, associated with this development, all as described on Schedule A hereto.**

B. CITY-approved plans and specifications for the construction of the work, which are incorporated herein by reference and prepared by: MSA Consulting, Inc., are identified as: **Parcel Map 38315** (Title as appears on plans).

C. The following are attached hereto and made a part hereof: **Schedule A, Schedule B, Schedule C.**

**1. IMPROVEMENTS:** For valuable consideration, DEVELOPER agrees to do, or cause to be done, at DEVELOPER'S expense and without any cost or liability to CITY, all of the work described herein by the date specified in Schedule A. DEVELOPER warrants that all of the materials supplied and work to be done will be of good quality and workmanship. Said work shall be in strict conformity with the plans and specifications of the work, the standard specifications and drawings for public improvements adopted by CITY and this Agreement. DEVELOPER shall furnish all transportation, equipment, labor, services, permits, utilities and all other items necessary to complete the work. DEVELOPER shall pay all claims, demands and liability arising out of, or resulting from or in connection with, the performance of the work as provided for in this Agreement. DEVELOPER shall furnish accurate "as constructed" plans. In addition, DEVELOPER shall, within thirty (30) days of acceptance of the work, set all final monuments in place for acceptance. DEVELOPER'S obligations herein are not limited by any cost estimates nor will any estimate be a measure of damages.

CITY in its sole discretion and without liability to CITY, City Council members, CITY'S engineer and their consultants, and each of their officials, directors, officers, employees and agents, may require changes, alterations, or additions to the plans and specifications which do not exceed ten percent (10%) of the original CITY-approved cost estimate of the work for the reasons set forth herein. Changes, alterations or additions in addition to said ten percent (10%) limitation may be made if to correct errors or omissions in the approved plans and specification and for unforeseen conditions such as but not limited to rock excavation, unstable soil conditions or high water tables requiring dewatering.

**2. INSURANCE**: DEVELOPER shall not commence or continue to perform any work unless DEVELOPER has in full force and effect all insurance required hereunder with companies satisfactory to CITY. To be acceptable, insurers must be authorized to do business, and have an agent for service of process, in California, and have an "A" policyholder's rating and a financial rating of at least Class V, in accordance with the current Best's Ratings. All insurance policies shall be maintained at DEVELOPER's expense until the work is accepted by CITY and provide for coverage of all causes of action or disputes

arising out of acts in performance of the construction of the work herein, whether said causes or disputes are filed or brought to the attention of CITY before or after the termination of this contract.

Concurrent with execution of this Agreement, DEVELOPER shall provide certificate(s) of insurance and endorsements, satisfactory to CITY, or otherwise provide proof of insurance as approved by the City Attorney, certifying that DEVELOPER has and will maintain for the Agreement period, full worker's compensation insurance coverage as required by State laws, for all persons who are or may be employed in carrying out the work. This provision shall not apply if DEVELOPER has no employees performing work under this Agreement. If DEVELOPER has no employees for the purposes of this Agreement, DEVELOPER shall sign the Certificate of Exemption from Worker's Compensation Insurance, attached hereto as Schedule "C."

Concurrent with execution of this Agreement, DEVELOPER shall provide to CITY certificate(s) of insurance and endorsements, satisfactory to CITY, or otherwise provide proof of insurance as approved by the City Attorney, certifying that DEVELOPER has general liability and commercial vehicle liability insurance coverage naming CITY, City Council members, CITY'S engineer, and their consultants, officials, directors, officers, agents and employees, as additional insureds for both bodily injury and property damage in a single limit of not less than that specified in Schedule A. DEVELOPER shall ensure that the most current certificates of insurance and endorsements shall be delivered to and maintained by the CITY at all times. The requirements set forth in this paragraph shall survive expiration or sooner termination of this Agreement.

General liability and commercial vehicle liability insurance coverage shall include each of the following types of insurance as required by CITY to carry out this Agreement:

A. General Liability
   1. Comprehensive Form
   2. Premises-Operations
   3. Explosion and Collapse Hazard
   4. Underground Hazard
   5. Products/Operations Competed
   6. Contractual Insurance
   7. Broad Form Property Damage Including Completed Operations
   8. Independent Contractors
   9. Personal Injury

B. Automobile Liability
   1. Comprehensive Form, Including Loading and Unloading
   2. Owned
   3. Hired

Concurrent with execution of any agreements between DEVELOPER and any subcontractors retained by DEVELOPER to perform any work required of DEVELOPER hereunder, and in any event prior to DEVELOPER authorizing any subcontractors to perform any such work or to even conduct any preliminary activities at the location of where the work is to be completed in preparation for or in anticipation of such work, DEVELOPER shall collect certificates of insurance and endorsements from all such subcontractors evidencing proof that all subcontractors have procured and will maintain all the insurance coverages required of DEVELOPER under this Agreement, and name as additional insureds the parties to this Agreement. DEVELOPER agrees to monitor and review all such coverage and assumes all responsibility for ensuring that such coverage is provided in conformity with the requirements of this Section.

In addition to naming the CITY, City Council members, CITY'S engineer, and their consultants, officials, directors, officers, agents and employees, as additional insureds, as set forth above, the certificates of insurance and endorsements, including those provided by any subcontractor, provided either on forms required by the CITY or as otherwise approved by the City Attorney, shall bear the following endorsements: (1) each policy required herein must be endorsed to provide that the policy shall not be cancelled or non-renewed by or reduced in coverage or limits (except by paid claims) unless the insurer has provided the CITY with thirty (30) days prior written notice of cancellation; (2) the carriers of all required insurance policies must waive all rights of subrogation against the CITY and its officers, employees, servants, volunteers, agents and independent contractors; and (3) except for worker's compensation insurance, if any, all insurance policies required to be provided by DEVELOPER must be endorsed to provide that the policies shall apply on a primary and noncontributing basis in relation to any insurance or self-insurance, primary or excess, maintained or available to the CITY, and its officers, employees, servants, volunteers, agents and independent contractors.

DEVELOPER shall be responsible for payment of any deductibles contained in any insurance policies required hereunder and shall also be responsible for payment of any self-insured retentions. In the event DEVELOPER maintains insurance with broader coverage and/or limits of liability greater than those required herein, CITY requires and shall be entitled to the broader coverage and/or higher limits of liability maintained by DEVELOPER. Any insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to CITY. The fact that insurance is obtained by DEVELOPER shall not be deemed to release or diminish the liability of DEVELOPER, including, without limitation, liability under the indemnity provisions of this Agreement. The duty to indemnify and hold the CITY harmless shall apply to all claims and liability regardless of whether any insurance policies are applicable. The policy limits do not act as a limitation upon the amount of indemnification to be provided by DEVELOPER. Approval or purchase of any insurance contracts or policies shall in no way relieve from liability nor limit the liability of DEVELOPER, its principals, officers, agents, employees, persons under the supervision of DEVELOPER, vendors, suppliers, invitees, sub-contractors, or anyone employed directly or indirectly by any of them. Without limiting the generality of the forgoing, DEVELOPER agrees and acknowledges that if it fails to obtain all of the insurance required in this Agreement in accordance with the requirements herein, or to obtain and ensure that the coverage required herein is maintained by any subcontractors or others involved in any way with the Project, DEVELOPER shall be responsible for any losses, claims, suits, damages, defense obligations, or liability of any kind or nature attributable to the CITY or its officers, employees, servants, volunteers, agents and independent contractors; and all performance under this Agreement shall be discontinued immediately until notice is received by CITY that the required insurance has been restored to

full force and effect and that the premiums therefor have been paid for a period satisfactory to CITY. Any failure to maintain the required insurance, including insurance required of any subcontractors or others involved in any way with the Project, shall be sufficient cause for CITY to terminate this Agreement.

All insurance certificates executed in connection with this Agreement, whether issued as DEVELOPER or any of DEVELOPER's subcontractors as the named insured, shall be signed under penalty of perjury under the laws of the State of California that all the information contained in the insurance certificates is true and correct, and such representation shall be made knowingly based on independent investigation and verification.

Nothing contained in these insurance requirements shall limit the liability of DEVELOPER or DEVELOPER'S sureties. Review and acceptance of insurance certificates shall not constitute any representation by CITY or its representatives that any required insurance has been issued.

3. **DEVELOPER'S LIABILITY**: DEVELOPER shall, at DEVELOPER'S sole cost and expense, be solely and completely responsible for all matters affecting the design, prosecution, progress and completion of the work (both on and off the job site). DEVELOPER shall be responsible for observing all laws. DEVELOPER shall provide for public convenience and safety of workers, including DEVELOPER'S workers, if any, and those of DEVELOPER'S subcontractors, suppliers and others contributing to the work. DEVELOPER shall protect CITY property and property rights of others, including the location, maintenance and replacement of utilities, whether shown on the plans or not. DEVELOPER shall give prior notification to utility owners. DEVELOPER shall notify Underground Service Alert at 1-800-422-4133 at least 48 hours prior to start of construction. DEVELOPER shall protect against and prevent drainage from storm runoff. DEVELOPER shall not interfere with easements, rights-of-way and encroachment permits. Nothing in this Agreement, the specifications, or other contract documents, or CITY'S approval of the plans and specifications or inspection of the work is intended to include CITY'S review, inspection, acknowledgment of or responsibility for any such matters. CITY, City Council members, CITY'S engineer, and their consultants and each of their officials, directors, officers, employees and agents shall have absolutely no responsibility or liability for the above.

4. **DEVELOPER'S INDEMNIFICATION:** DEVELOPER shall defend, indemnify and hold harmless CITY, City Council members, CITY'S engineer and their consultants and each of their officials, directors, officers, agents and employees from and against all liability, claims, damages, losses, expenses and other costs, including costs of defense and attorneys' fees arising out of or resulting from or in connection with the design or construction of the work, both on and off the job site, and during and after completion, except for any such claim arising out of the sole or active negligence or willful misconduct of the CITY, its officers, agents, employees or volunteers. The indemnity provided above relates to liability, claims, damages, losses, expenses and other costs: (1) attributable to bodily injury, sickness, disease or death, or to injury to or destruction of property (other than the work itself), including the loss of use resulting therefrom, and (2) caused in whole or, or subject to the remainder of this paragraph, in part by any act or omission of DEVELOPER, DEVELOPER'S engineer, any subcontractor, any supplier, anyone directly or indirectly employed by any of them or anyone for whose acts or omissions any of them may be liable. If any liability, claims, damages, losses, expenses and other costs are caused in part by any act or omission (active, passive or comparative negligence included) of a party indemnified hereunder, DEVELOPER's indemnification obligations hereunder shall only extend to the proportionate

share of such liability, claims, damages, losses, expenses and other costs caused by any act or omission of DEVELOPER, DEVELOPER'S engineer, any subcontractor, any supplier, anyone directly or indirectly employed by any of them or anyone for whose acts or omissions any of them may be liable. The indemnification and agreement to hold harmless provided for hereunder shall extend to damages to or taking of property resulting from the design or construction of said improvements or the diversion of waters or from the design or construction or maintenance of drainage systems, streets and other improvements. Acceptance of these improvements by CITY shall not constitute an assumption by CITY of any responsibility for such damage or taking.

As to any and all claims which fall within the indemnification provided for hereunder against the indemnified parties by any employee of DEVELOPER, any contractor, any subcontractor, any supplier, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnity obligations hereunder shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the DEVELOPER, subcontractor, supplier or other person under workers' compensation acts, disability benefit acts or other employee acts.

DEVELOPER shall also defend, indemnify and hold harmless CITY, City Council members, CITY'S engineer, and their consultants, and each of their officials, directors, officers, employees and agents from and against all losses, expenses, damages (including damages to the work itself), attorneys' fees and other costs, including costs of defense, which any of them may incur both during and after completion with respect to any latent deficiency in the design, specifications, surveying, planning, supervision, observation of or construction of the work referred to herein or any injury to a person or property, real or personal, as a result of any such latent defect or portions of the work which CITY reasonably suspects may also be defective by reason of such latent defects in the work performed by DEVELOPER or DEVELOPER'S subcontractors, or suppliers or designed by their representatives, except for any such claims arising out of the sole or active negligence or willful misconduct of the CITY, its officers, agents, employees or volunteers. Provisions of this paragraph shall remain in effect ten (10) years following acceptance of improvements by the CITY. Nothing contained herein shall limit CITY'S remedies pursuant to Code of Civil Procedure, Section 337.15.

The indemnity provisions contained in this Section shall survive expiration or sooner termination of this Agreement.

**5. SECURITY:** With the execution of this Agreement, DEVELOPER shall furnish and deliver to CITY, at no expense to CITY, a payment security and a performance security. Each shall be in the amount of CITY-approved estimate specified in Schedule A. Bonds shall be furnished by surety companies satisfactory to CITY, on the forms provided by CITY. No alterations or substitution of said forms shall be allowed except on approval of City Attorney. To be acceptable, surety companies must be authorized to do business in, and have an agent for, service of process in California, be on the accredited list of the United States Treasury Department, and/or have an "A" policyholder's rating and a financial rating of Class V, or better, in accordance with the current Best's Rating. The bonds shall be limited to amounts acceptable to the Treasury Department.

None of the following shall in any way affect the obligations of any surety. Each surety waives notice thereof: (a) any change, extension of time, alteration or additions to the terms of the Agreement, or the work to be performed, or the plans and specifications therefor; (b) any matters unknown to surety which might affect surety's risk, except that CITY shall advise surety

upon request of the following: (1) any written claims it receives from unpaid subcontractors or suppliers, (2) any written orders received from other public authorities charging violations of laws, ordinances or regulations, and (3) failure of DEVELOPER to comply with any written notice to correct defective work. The obligations of DEVELOPER shall not be limited by the amount of such bonds.

6. **TYPES/AMOUNT OF SECURITY:** If specified in Schedule A, in lieu of payment and performance bonds, DEVELOPER may furnish CITY either cash, a Letter of Credit, or an Agreement of Deposit or other security satisfactory to City Attorney as security for performance (see Schedule B). Said security shall be in an amount not less than 100% of the cost estimate and, in addition, for payment of those furnishing materials, labor or equipment in an amount not less than 50% of the cost estimate. Said security agreements shall be on forms furnished by CITY. No alterations or substitution of said forms shall be allowed. The obligations of DEVELOPER shall not be limited by the amount of the security required. No interest shall be paid DEVELOPER on any cash deposit made pursuant to this paragraph.

7. **COSTS AND DEPOSITS**: DEVELOPER agrees to pay CITY, on demand, the full amount of all of CITY'S costs incurred before, within or after acceptance in connection with the work and this Agreement. These costs include but are not limited to plan checking, inspection, materials furnished, attorneys' fees incurred in connection with preparing and negotiating this Agreement, and all other expenses, including engineers' and attorneys' fees of CITY, directly attributable to the work and this Agreement. These costs shall include a reasonable amount for CITY'S overhead in connection therewith, plus any applicable fees of CITY. CITY'S costs shall include the cost of inspecting and restoring other portions of the work both during and after acceptance which CITY reasonably suspects may also be defective by reason of known defects in the work or other work performed by DEVELOPER or DEVELOPER'S contractors, subcontractors, or suppliers or designed by their representatives. DEVELOPER shall deposit with the CITY, concurrently with the execution of this Agreement, such sums as the CITY established as deposits set forth in Schedule A. Should the actual expenses be in excess of the deposit set forth in Schedule A, DEVELOPER shall pay the amount of such excess on demand. Should the actual expenses be less than the estimated deposit in Schedule A, CITY shall refund the difference, without interest, to DEVELOPER within ninety (90) days of acceptance of work. CITY may terminate its activity herein if DEVELOPER fails to make additional deposits on demand. Said deposit is not a trust fund and said deposit may be co- mingled with other similar deposits.

8. **PARTIAL UTILIZATION:** Until all work has been completed and accepted by CITY and all other public authorities having jurisdiction, DEVELOPER shall be responsible for the care and maintenance of, or any damage to, the work.

When the work or any portion of it is sufficiently complete to be utilized or placed into service, CITY shall have the right, upon written notification to DEVELOPER, to utilize or allow the utilization of such portions of the work and to place or cause the placement of the operable portions into service. With this notice and commencement of utilization or operation by CITY or any other third party, DEVELOPER shall be relieved of the duty of maintaining the portions so utilized or placed into operation. However, such use and operation shall not relieve DEVELOPER of the full responsibility for completing the work in its entirety, for making good any defective work or materials, for protecting the work from damage by DEVELOPER, DEVELOPER'S engineer, any subcontractor, any supplier, anyone directly or indirectly employed by any of them or anyone for whose acts or omissions any of them may be liable, and for being responsible for damage to the work by DEVELOPER, DEVELOPER'S engineer, any subcontractor, any

supplier, anyone directly or indirectly employed by any of them or anyone for whose acts or omissions any of them may be liable. Nor shall such action by CITY be deemed completion and acceptance. Further, such action shall not relieve DEVELOPER or DEVELOPER'S sureties and insurers of the provisions hereof relating to indemnity and guarantees.

9. **ACCEPTANCE OF PUBLIC IMPROVEMENTS**: Acceptance of any public improvements constituting any of the work shall be by action of the City Engineer. Neither the acceptance nor any prior inspections or failure to inspect shall constitute a waiver by CITY of any defects in the work. From and after acceptance, the public improvements constituting any of the work shall be owned, operated and maintained by CITY. As a condition to acceptance, DEVELOPER and DEVELOPER'S contractor shall certify to CITY in writing that all of the public improvements constituting any of the work have been performed in strict conformity with the Agreement and that all costs have been paid or supplied to CITY security, satisfactory to CITY, guaranteeing such performance.

DEVELOPER shall be required to maintain the payment bond in its full amount for up to 6 months after CITY acceptance of the work. The payment bond shall secure payment to the contractor, sub- contractors, and to persons renting equipment or furnishing labor or materials. Following the 6 month period, the payment bond may either be released or reduced to an amount no less than any claims on which an action has been filed and notice given to the CITY in writing.

In addition to DEVELOPER'S other obligations under the Agreement DEVELOPER warrants all work and materials to be good quality and fit for the purpose and intended use. DEVELOPER shall also repair, replace and restore any and all such work which may prove defective in workmanship and/or materials without expense whatsoever to CITY; ordinary wear and tear and unusual abuse or neglect excepted. DEVELOPER shall also repair, replace and restore any other work which is displaced in correcting defective work as well as other portions of the work which CITY by reason of such defects reasonably suspects may also be defective. DEVELOPER shall provide a bond or other security satisfactory to CITY for a period of one (1) year to secure a portion of the obligations in this Section 9. Said bond or other security shall be in an amount satisfactory to CITY but in no case less than 15% of cost of the onsite and offsite work referred to on Schedule A. Said bond or other security shall in no way limit the time within which CITY may bring action for breach of this warrant (CCP 337) or action for latent defects (CCP 337.15) nor the amount of such claim or judgment.

In the event of a failure to commence with the compliance of above-mentioned conditions in this Section 9 within seven (7) calendar days after being notified in writing or failure to diligently pursue such compliance to completion, CITY is hereby authorized to proceed to have the defects repaired and made good at the expense of DEVELOPER, who hereby agrees to pay the cost and charges therefor immediately on demand.

If, in the opinion of CITY, nonconforming work creates a dangerous condition or requires immediate correction or repair to prevent further loss to CITY or to prevent interruption of operations, CITY shall attempt to give the DEVELOPER notice. If DEVELOPER cannot be contacted or does not comply with CITY'S request for correction within a reasonable time as determined by CITY, CITY may proceed to make such correction or provide such repair. The costs of such correction or repair shall be charged against DEVELOPER, who agrees to make payment for said costs upon demand.

Corrective action by CITY shall not relieve DEVELOPER or DEVELOPER'S sureties or insurers of the guarantees and indemnities of this Agreement.

This paragraph does not in any way limit CITY'S remedies pursuant to Code of Civil Procedure, Section 337 and 337.15, or the guarantee on any items for which a longer guarantee is expressly specified or on any items for which a manufacturer or supplier gives a longer guarantee period. DEVELOPER agrees to act as a co-guarantor with such manufacturer or supplier and shall furnish CITY all appropriate and available guarantee or warranty certificates upon completion of the work. No manufacturer's guarantee period shall in any way limit the liability of DEVELOPER or DEVELOPER'S sureties and insurers under the indemnity or insurance provisions of this Agreement.

**10. EASEMENTS AND FEE INTERESTS**: DEVELOPER shall, at DEVELOPER'S sole cost and expense, furnish CITY with appropriate easements and fee title as may be requested by CITY to required facilities sites for the entire work, free and clear of all liens, encumbrances, restrictions and covenants other than current real property taxes then a lien but not yet payable. At DEVELOPER'S cost and expense, DEVELOPER shall furnish CITY with an acceptable title insurance policy insuring CITY has title as above required with an endorsement insuring CITY against mechanics' lien claims arising out of the performance of the work. Easements shall be in standard form acceptable to CITY, shall be not less than the width CITY determines necessary to maintain the work, and shall be executed and delivered to CITY concurrent with execution of this Agreement. Easements shall be recorded prior to CITY accepting the work or furnishing services to any portions of the property under development (other than those as may be delivered under a temporary service agreement with DEVELOPER).

**11. DEVELOPER AND AGENTS**: DEVELOPER shall be as fully responsible to CITY for the acts and omissions in respect of the work of DEVELOPER'S subcontractors and of the persons directly or indirectly employed by DEVELOPER'S subcontractors as DEVELOPER is for the acts and omissions of persons directly or indirectly employed by DEVELOPER. To that end, DEVELOPER shall take such steps as are reasonably necessary to ensure that its subcontractors do not take any steps in relation to the work which would cause DEVELOPER to be in breach of this Agreement and to ensure that such subcontractors shall take such steps as are reasonably necessary to ensure that they do not take any steps in relation to the work which would cause DEVELOPER to be in breach of this Agreement. To that end, DEVELOPER shall bind every subcontractor to be bound by the terms of this Agreement, as applicable and appropriate. Nothing contained in the Agreement shall create any contractual relationship between any of DEVELOPER'S subcontractors and CITY.

Consent is hereby given DEVELOPER to have the work performed by the California licensed Class A Contractor(s) named in Schedule A. DEVELOPER or DEVELOPER'S contractor may satisfy the requirements of this section by having, in lieu of said Class A license, an appropriate alternate license as determined by CITY.

**12. DEFAULT BY DEVELOPER**: If DEVELOPER refuses or fails to prosecute the work or any separable part thereof with such diligence as will ensure its completion within the time specified herein, or any written extension thereof, or fails to complete such work within such time, or if DEVELOPER should be adjudged a bankrupt, make a general assignment for the benefit of creditors, or if a receiver should be appointed on account of DEVELOPER'S insolvency, or if DEVELOPER or any of their subcontractors violate any of the provisions of this Agreement, or if DEVELOPER fails to make prompt payment for materials

or labor, or if DEVELOPER disregards laws, ordinances, or instructions of CITY, then CITY may thereafter serve written notice upon the DEVELOPER and DEVELOPER'S surety of its intention to declare this Agreement in default. Said notice shall contain the reasons for such intention to declare a default. Unless, within ten (10) days after the service of such notice, such violations shall cease and satisfactory arrangements for the corrections thereof be made (or in the case of any violation that would require more than ten (10) days to correct, DEVELOPER having commenced reasonably diligent steps towards correction within such ten (10) day period), this Agreement shall upon the expiration of said time be in default.

Upon this Agreement being in default as provided for herein, CITY shall serve written notice thereof upon the surety and DEVELOPER, and the surety shall have the right to take over and perform this Agreement. If the surety does not, within fifteen (15) days after the serving upon it of a notice of this Agreement being in default, give CITY written notice of its intention to take over and perform this Agreement or does not commence performance thereof within thirty (30) days from the date of CITY'S notice, CITY may take over the work and prosecute the same to the extent of completion it deems necessary by contract or by any other method it may deem advisable for the account and at the expense of DEVELOPER, and the surety shall be liable to CITY for any cost or other damage occasioned CITY thereby. In such event CITY may, without liability for so doing, take possession of, and utilize in completing such work, such materials, appliances, plants, and other property belonging to DEVELOPER that may be on the site of the work and be necessary therefor. Should surety fail to take over and diligently perform the Agreement upon DEVELOPER being in default under this Agreement, surety agrees to promptly on demand deposit with CITY such amount as CITY may reasonably estimate as the cost of completing all of DEVELOPER'S obligations. For any such work the CITY elects to complete by furnishing its own employees, materials, tools, and equipment, CITY shall receive reasonable compensation therefor, including costs of supervision and overhead.

In the event that DEVELOPER is in default under this Agreement, CITY may, at its option, elect not to complete any or all of the work and may elect not to accept any of the work already completed. If CITY elects not to accept any of the work, then all CITY'S obligations under this Agreement to DEVELOPER and the lands to be served shall terminate. CITY'S obligations to DEVELOPER and the lands to be served shall continue to the extent of any acceptance, subject to CITY'S right to offset any sums due the CITY.

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to CITY.

**13. DELAY BY DEVELOPER**: If the work is suspended or otherwise not continuously prosecuted for any cause whatsoever, within or without the time for completion, DEVELOPER shall, at DEVELOPER'S sole cost and expense, remove and replace all or any portion of the work already completed and inspected which CITY, in its sole discretion, determines is or can be damaged as a result of being in place while the work is suspended or otherwise not continuously being prosecuted.

**14. ATTORNEYS' FEES AND COSTS**: Should CITY engage an attorney to enforce any provision of this Agreement or to defend any claim brought by anyone arising out of the failure of DEVELOPER to perform any of DEVELOPER'S obligations under this Agreement, DEVELOPER shall pay all of CITY'S attorneys' fees incurred in connection therewith, with or without suit, whether or not said attorneys are in the regular employ of the CITY.

**15.** **REIMBURSEMENT**: Provided DEVELOPER has fully complied with all the terms of this Agreement, CITY shall, without interest, reimburse DEVELOPER to the extent set forth on a separate Reimbursement Schedule. DEVELOPER accepts as the amount and conditions governing DEVELOPER'S entitlement to reimbursement and refund under CITY'S existing rules, regulations, ordinances and policies. If no amount is specified in Schedule A, DEVELOPER is to receive no reimbursement from CITY.

**16.** **FUTURE CHARGES**: Nothing in this Agreement shall relieve DEVELOPER or DEVELOPER'S successors or assigns of any obligation to pay any connection, installation, expansion or other fees, charges, or other expenses, including operation and maintenance expenses, required under any present or future established ordinances, rules, regulations and policies of CITY.

**17.** **ASSIGNMENT**: The performance of the Agreement may not be assigned except upon the written consent of CITY. Consent will not be given to any proposed assignment which would relieve DEVELOPER, or DEVELOPER'S sureties of their responsibilities under the Agreement unless CITY finds that assignee can perform this Agreement and provide security comparable to that provided by DEVELOPER.

**18.** **NOTICE**: All notices required hereunder shall be deemed served or given upon the earlier of actual receipt or deposit in the U.S. Postal Service, first class postage prepaid, addressed to DEVELOPER at the address set forth below, to the surety at the address in the security instrument, and to CITY at 69-825 Highway 111, Rancho Mirage, California 92270.

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**CITY OF RANCHO MIRAGE**
**SUBDIVISION IMPROVEMENT AGREEMENT SIGNATURE REQUIREMENTS**

(Limited Partnership / General Partnership / Corporation)

1. **WHERE PRINCIPAL IS A LIMITED PARTNERSHIP**

A. General Partner shall execute on behalf of the limited partnership.

B. General Partner shall furnish City of Rancho Mirage a copy of the recorded Certificate of Limited Partnership to authenticate the authority of the General Partner to sign on behalf of the limited partnership.

2. **WHERE PRINCIPAL IS A GENERAL PARTNERSHIP**

A. General Partner shall execute on behalf of general partnership.

B. General Partner shall furnish City of Rancho Mirage a copy of the General Partnership Agreement authenticating that the General Partner who signs the document has authority to do so.

3. **WHERE PRINCIPAL IS A CORPORATION**

A. Officer or officers shall execute on behalf of corporation.

B. Officers shall furnish City of Rancho Mirage a copy of a corporate resolution indicating that the officer or officers who sign the document are the officers of the corporation and authorized to bind the corporation to contract. Corporation requires two signatures.

For example, John Doe may sign on behalf of either partner-ship or the corporation as the General Partner and/or president thereof, but then, in addition, John Doe is required to sign the document individually as an individual obligor.

4. **WHERE PRINCIPAL IS A LIMITED LIABILITY COMPANY (LLC)**

A. Agreement may be executed as follows:

1. By any member, unless the articles of organization or operating agreement provide otherwise;

2. By any manager; if LLC is manager-managed, unless the articles of organization or operating agreement provide otherwise; or

3. By any officer, if the operating agreement provides for the appointment of officers, unless the articles of organization or operating agreement provide otherwise.

B. The individual(s) executing the agreement shall provide certified copies of the LLC's articles of organization and operating agreement.

By: Steve Downs
(Authorized Representative of CITY)
~~Richard W. Kite~~, Mayor
Steve Downs

Approved as to form:

By:
For Steven B. Quintanilla, City Attorney
Daniel Torres Deputy City Attorney

ATTEST:

By: Kristie Ramos

Kristie Ramos, City Clerk

(SEAL IF CORPORATION)

By: Eric Smith

By: ERIC SMITH

Address: 73838 Van Gogh Dr.
Palm Desert CA 92211

Telephone No. (760) 534-1879

By: _____

Address: _____

_____

Telephone: _____

By: _____

Address: _____

_____

Telephone No. _____

(SIGNATURES MUST BE NOTARIZED)

(Seal: Partnership/Corporation)

DEVELOPER: Eric Smith

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On September 19, 2023 before me, Diana Diaz, Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Eric Smith
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Diana Diaz
*Signature of Notary Public*

DIANA DIAZ
Notary Public - California
Riverside County
Commission # 2367039
My Comm. Expires Jul 21, 2025

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

Signer's Name: _____
☐ Corporate Officer — Title(s): _____
☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator
☐ Other: _____
Signer Is Representing: _____

Signer's Name: _____
☐ Corporate Officer — Title(s): _____
☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator
☐ Other: _____
Signer Is Representing: _____

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**SCHEDULE A**
**SUBDIVISION IMPROVEMENT AGREEMENT**

This schedule is attached to and made a part of the Subdivision Improvement Agreement between CITY and DEVELOPER for the above-referenced property.

1. Completion Date: December 7, 2025

2. General Liability

| | |
|---|---|
| $2,000,000 | Each Occurrence (Includes Bodily Injury and Property Damage) |
| $1,000 | Medical Expense |
| $1,000,000 | Personal & Advertising Injury |
| $2,000,000 | General Aggregate |
| $2,000,000 | Products-Completed/Operations Aggregate |

Automobile Liability

| | |
|---|---|
| Combined Single Limit | $1,000,000 each accident, $2,000,000 Aggregate |
| Workers Compensation | Statutory |

3. Approved Security Amounts:
(To be posted prior to acceptance of improvements)

| | |
|---|---|
| Grading Bond (Total Security minus Cash Deposit) | $ 44,395.00 |
| Performance (On-site) (100%) | $ 29,440.00 |
| Payment (On-site) (50%) | $ N/A |
| Performance (Off-site) (100%) | $ 14,720.00 |
| Payment (Off-site) (50%) | $ N/A |

4. Bond Substitute Acceptable: Yes No

5. Deposit/Fee Amount — See attachment to this schedule

6. Warranty/Performance (15%)
Security Amount: ..... $ 4,416.00
(To be in place at acceptance of work)

7. Contractor(s):

**CLASS A**

| Name and Address | License No. | Phase of Work |
|---|---|---|

Reimbursement: $**N/A**

(If an amount is specified, see separate schedule.)

( ) Initials of CITY REPRESENTATIVE

( ) Initials of DEVELOPER or
( ) DEVELOPER REPRESENTATIVE

DEVELOPER Palomino Four, LLC.
By: Eric Smith, Member

Date 9/19/23

## ATTACHMENT TO SCHEDULE A
## OF SUBDIVISION IMPROVEMENT AGREEMENT

Applicable fees/deposits payable by DEVELOPER prior to or concurrent with this agreement are as follows:

**FEES NONREFUNDABLE**

| | |
|---|---|
| Plan Check Fee (Final Map, Grading, Hydrology, Offsite Street Improvement Plan) | $ 5,397.00 |
| Inspection Fees (Grading Improvements, Offsite Improvements, Permit Issuance) | $ 788.00 |
| Parkland Fees | $ 1,645.80 |
| CFD Annex Fee | $ 3,228.00 |
| Permit Issuance Fees | $ 242.00 |
| TOTAL NONREFUNDABLE FEES | $ 25,922.80 |

**FEES REFUNDABLE**

| | |
|---|---|
| Cash Grading Deposit | $ 11,098.00 |
| Dust Control Deposit | $ 2,060.00 |
| TOTAL REFUNDABLE DEPOSITS | $ 13,158.00 |

In accordance with Section 7 of this agreement, costs incurred by CITY in excess of deposit shall be billed to DEVELOPER; if less, CITY will refund.

(RK) Initials of CITY REPRESENTATIVE

(ES) Initials of DEVELOPER
( ) DEVEOPER REPRESENTATIVE

DEVELOPER Palomino Four, LLC.
Eric Smith, Member

Date 9/19/23

## ATTACHMENT TO SCHEDULE A
## OF SUBDIVISION IMPROVEMENTAGREEMENT

**SECURITY CALCULATIONS**

**PM 38315 (Palomino Four)**

**Estimates for Bonding Purposes**

| | | |
|---|---|---|
| Onsite Improvements | | |
| Water Improvements | $ | 25,600.00 |
| (+) 15% contingency | $ | 3,840.00 |
| **Total Performance Bond (onsite improvements)** | **$** | **29,440.00** |
| Offsite Improvements | | |
| N/A | | |
| Payment Bond = 50% of Performance Bond | | |
| **Total Payment Bond (onsite improvements)** | **$** | **14,720.00** |
| **Total Payment Bond (offsite improvements)** | **$** | **N/A** |
| **Warranty Bond = 15% of Performance Bond** | **$** | **4,416.00** |
| **Monumentation Bond** | **$** | **2,000.00** |
| Inspection Fees | | |
| Onsite Inspection Fees Due [3% of Water Backfill & Compaction Subtotal of $1,024.00] | $ | 30.72 |
| Offsite Inspection Fees Due [$120 + 4% (first $50,000 of Onsite Improvements Subtotal) + 3% (remaining balance)] | $ | N/A |
| Grading Inspection Fee (1.03 acres) | $ | 788.00 |
| **Total Inspection Fees** | **$** | **818.72** |

BOND NO.: 4447114
BOND FEE: $250.00

**SCHEDULE B**
**BOND**

**PERFORMANCE SECURITY**

**SURVEY OF MONUMENTS**

**Map No. 38315**

(*California Government Code §§ 66499* and *66499.1*)

**WHEREAS**, the City Council of the City of Rancho Mirage, a municipal corporation and political subdivision of the State of California ("City") and Palomino Four, LLC ("Principal"), a California limited liability company, have entered into an agreement pursuant to California Government Code Section 66462 whereby Principal agrees to install and complete certain designated improvements, which said agreement, dated December 7, 2023 and identified as Subdivision Improvement Agreement PM38315 ("Agreement"), is hereby incorporated by this reference as though set forth at length, and have agreed pursuant to Section 66499 of the Government Code to execute this bond to secure the performance of the following obligation:

> Principal hereby agrees to install survey monuments in accordance with any terms and conditions set forth in the Agreement, permit and the requirements and specifications of all applicable laws and ordinances. Said installation shall be completed on or before December 7, 2025, or as otherwise provided by any lawful extension of time granted by the City Council.

**WHEREAS**, we, the Principal and Markel Insurance Company, as surety ("Surety"), are held and firmly bound unto the City, in the penal sum of **Two Thousand U.S. Dollars and Zero Cents ($2,000.00)** lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

**WHEREAS,** should Principal fail to install survey monuments in accordance with any terms and conditions set forth in the Agreement, permit and the requirements and specifications of all applicable laws and ordinances and/or should Principal fail to complete said installation of survey monuments within the time period prescribed therein or otherwise provided by any lawful extension of time granted by the City Council, the City may, at its option, cause all required work to be done in the manner required herein, and the parties executing this bond shall be firmly bound for the payment of all necessary costs therefore.

**NOW, THEREFORE**, we, the Principal and Surety, are held and firmly bound unto the City, in the penal sum of **Two Thousand U.S. Dollars and Zero Cents ($2,000.00)** lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

The condition of this obligation is such that if the above bounded Principal, his or its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by, and well and truly keep and perform the foregoing work, on his or their part, to be kept and performed at the time and in the manner specified above, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the City, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect, at least until the time City accepts the work required to be performed by Principal under the Agreement, notwithstanding whether or not Principal should abandon its obligations under the Agreement without having commenced construction of any improvements and whether such abandonment arises from foreclosure upon Principal's property or otherwise.

As part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by the City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the work to be performed hereunder or the specifications accompanying the same shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the scope of work to be performed or to the specifications.

**[THIS PORTION OF PAGE INTENTIONALLY LEFT BLANK]**

**IN WITNESS WHEREOF**, this instrument has been duly executed by Principal and Surety named herein, on November 1, 2023.

**APPROVED AS TO CONTENT:**

Signature

Ryan Stendell, Public Works Director
Name, Title

Rancho Mirage, CA
City

**APPROVED AS TO FORM:**

Signature

Daniel Trevino, Deputy City Attorney
Name, Title

City of Rancho Mirage.
City

**PRINCIPAL**

Palomino Four, LLC
Company

73838 Van Gogh Dr., Palm Desert, CA 92211
Address

Eric Smith
Signature

ERIC SMITH
Name

MANAGER
Title

**SURETY**

Markel Insurance Company
Company

4521 Highwood Pkwy, Glen Allen, VA 23060
Address

Diane M Nielsen
Signature

Diane M Nielsen
Name

Attorney in Fact
Title

***Note: Principal and Surety's signatures must be notarized, and 2 originals must be executed.***

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On November 17, 2023 before me, Diana Diaz, Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Eric Smith
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

DIANA DIAZ
Notary Public - California
Riverside County
Commission # 2367039
My Comm. Expires Jul 21, 2025

Signature Diana Diaz
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

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**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

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State of California )
County of Riverside )

On 11/1/23 before me, Luis Garcia, Notary Public
*Date* *Here Insert Name and Title of the Officer*

personally appeared Diane M Nielsen
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

LUIS GARCIA
Notary Public - California
Riverside County
Commission # 2384062
My Comm. Expires Nov 21, 2025

Signature _____
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

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Document Date: _____ Number of Pages: _____
Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

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POA# 510734

# JOINT LIMITED POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That SureTec Insurance Company, a Corporation duly organized and existing under the laws of the State of Texas and having its principal office in the County of Harris, Texas and Markel Insurance Company (the "Company"), a corporation duly organized and existing under the laws of the state of Illinois, and having its principal administrative office in Glen Allen, Virginia, does by these presents make, constitute and appoint:

Diane M. Nielsen, Mathew S. Costello, Salvador Sandoval

Their true and lawful agent(s) and attorney(s)-in-fact, each in their separate capacity if more than one is named above, to make, execute, seal and deliver for and on their own behalf, individually as a surety or jointly, as co-sureties, and as their act and deed any and all bonds and other undertaking in suretyship provided, however, that the penal sum of any one such instrument executed hereunder shall not exceed the sum of:

Five Million and 00/100 Dollars ($5,000,000.00)

This Power of Attorney is granted and is signed and sealed under and by the authority of the following Resolutions adopted by the Board of Directors of SureTec Insurance Company and Markel Insurance Company:

"RESOLVED, That the President, any Senior Vice President, Vice President, Assistant Vice President, Secretary, Assistant Secretary, Treasurer or Assistant Treasurer and each of them hereby is authorized to execute powers of attorney, and such authority can be executed by use of facsimile signature, which may be attested or acknowledged by any officer or attorney, of the company, qualifying the attorney or attorneys named in the given power of attorney, to execute in behalf of, and acknowledge as the act and deed of the SureTec Insurance Company and Markel Insurance Company, as the case may be, all bond undertakings and contracts of suretyship, and to affix the corporate seal thereto."

IN WITNESS WHEREOF, Markel Insurance Company and SureTec Insurance Company have caused their official seal to be hereunto affixed and these presents to be signed by their duly authorized officers on the 27th day of January , 2023 .

SureTec Insurance Company

By: _____
Michael C. Keimig, President

SURETEC INSURANCE COMPANY

MARKEL INSURANCE COMPANY CORPORATE SEAL ILLINOIS

Markel Insurance Company

By: _____
Lindey Jennings, Vice President

State of Texas
County of Harris:

On this 27th day of January , 2023 A. D., before me, a Notary Public of the State of Texas, in and for the County of Harris, duly commissioned and qualified, came THE ABOVE OFFICERS OF THE COMPANIES, to me personally known to be the individuals and officers described in, who executed the preceding instrument, and they acknowledged the execution of same, and being by me duly sworn, disposed and said that they are the officers of the said companies aforesaid, and that the seals affixed to the proceeding instrument are the Corporate Seals of said Companies, and the said Corporate Seals and their signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of the said companies, and that Resolutions adopted by the Board of Directors of said Companies referred to in the preceding instrument is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand, and affixed my Official Seal at the County of Harris, the day and year first above written.

JULIE E. MCCLARY
Notary Public State of Texas
Commission # 12947680-5
Commission Expires March 29, 2026

By: _____
Julie E. McClary, Notary Public
My commission expires 3/29/2026

We, the undersigned Officers of SureTec Insurance Company and Markel Insurance Company do herby certify that the original POWER OF ATTORNEY of which the foregoing is a full, true and correct copy is still in full force and effect and has not been revoked.

IN WITNESS WHEREOF, we have hereunto set our hands, and affixed the Seals of said Companies, on the 1st day of November , 2023 .

SureTec Insurance Company

By: _____
M. Brent Beaty, Assistant Secretary

Markel Insurance Company

By: _____
Andrew Marquis, Assistant Secretary

Any Instrument Issued in excess of the penalty stated above is totally void and without any validity. 510734
For verification of the authority of this Power you may call (713)812-0800 on any business day between 8:30 AM and 5:00 PM CST.

BOND NO.: 4447115
BOND FEE: $1,110.00

**BOND**

**PERFORMANCE SECURITY**

**GRADING**

**Map No. 38315**

(California Government Code §§ *66499* and *66499.1*)

**WHEREAS**, the City Council of the City of Rancho Mirage, a municipal corporation and political subdivision of the State of California ("City") and Palomino Four, LLC (hereinafter "Principal"), a California limited liability company, have entered into an agreement pursuant to California Government Code Section 66462 whereby Principal agrees to install and complete certain designated improvements, which said agreement, dated December 7, 2023, and identified as Subdivision Improvement Agreement PM38315 ("Agreement"), is hereby incorporated by this reference as though set forth at length, and have agreed pursuant to Section 66499 of the Government Code to execute this bond to secure the performance of the following obligation:

> Principal hereby agrees to conduct its grading activities in accordance with the plans and specifications prepared by William A. Enos, registered Civil Engineer, the terms and conditions set forth in the grading permit issued by the Office of the Civil Engineer of the City, and all applicable laws and ordinances.

**WHEREAS**, we, the Principal and Markel Insurance Company, as surety ("Surety"), are held and firmly bound unto the City, in the penal sum of **Forty Four Thousand Three Hundred Ninety Five U.S. Dollars and Zero Cents ($44,395.00)** lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

**WHEREAS,** should Principal fail to conduct its grading activities in accordance with the plans and specifications prepared by William A. Enos, registered Civil Engineer, the terms and conditions set forth in the grading permit issued by the Office of the Civil Engineer of the City, the Agreement, and all applicable laws and ordinances, the City may, at its option, cause all required work to be done in the manner required herein and the parties executing this bond shall be firmly bound for the payment of all necessary costs therefor.

NOW THEREFORE, we, the Principal and Surety, are held and firmly bound unto the City, in the penal sum of **Forty Four Thousand Three Hundred Ninety Five U.S. Dollars and Zero Cents ($44,395.00)** lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

The condition of this obligation is such that if the above bounded principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and

well and truly keep and perform the foregoing activity, on his or their part, to be kept and performed at the time and in the manner specified above, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the City, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect, at least until the time City accepts the work required to be performed by Principal under the Agreement, notwithstanding whether or not Principal should abandon its obligations under the Agreement without having commenced construction of any improvements and whether such abandonment arises from foreclosure upon Principal's property or otherwise.

As part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by the City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the work to be performed hereunder or the specifications accompanying the same, or any matters unknown to Surety which might affect Surety's risk, shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the scope of the work to be performed or to the specifications.

**[THIS PORTION OF PAGE INTENTIONALLY LEFT BLANK]**

**IN WITNESS WHEREOF**, this instrument has been duly executed by Principal and Surety named herein, on November 1, , 2023.

**APPROVED AS TO CONTENT:**

Signature

Ryan Stendell, Public Works Director

Name, Title

Rancho Mirage, CA

City

**PRINCIPAL**

Palomino Four, LLC

Company

73838 Van Gogh Dr., Palm Desert, CA 92211

Address

Eric Smith

Signature

ERIC SMITH

Name

MANAGER

Title

**APPROVED AS TO FORM:**

Signature

Daniel Terrell, Deputy City Attorney

Name, Title

Rancho Mirage.

City

**SURETY**

Markel Insurance Company

Company

4521 Highwood Pkwy, Glen Allen, VA 23060

Address

Signature

Diane M Nielsen

Name

Attorney in Fact

Title

***Note: Principal and Surety's signatures must be notarized, and 2 originals must be executed.***

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On November 17, 2023 before me, Diana Diaz, Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Eric Smith
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

DIANA DIAZ
Notary Public - California
Riverside County
Commission # 2367039
My Comm. Expires Jul 21, 2025

Signature Diana Diaz
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

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**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On 11/1/23 before me, Luis Garcia, Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Diane M Nielsen
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

LUIS GARCIA
Notary Public - California
Riverside County
Commission # 2384062
My Comm. Expires Nov 21, 2025

Signature _____
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____
Document Date: _____ Number of Pages: _____
Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

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POA# 510734

# JOINT LIMITED POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That SureTec Insurance Company, a Corporation duly organized and existing under the laws of the State of Texas and having its principal office in the County of Harris, Texas and Markel Insurance Company (the "Company"), a corporation duly organized and existing under the laws of the state of Illinois, and having its principal administrative office in Glen Allen, Virginia, does by these presents make, constitute and appoint:

Diane M. Nielsen, Mathew S. Costello, Salvador Sandoval

Their true and lawful agent(s) and attorney(s)-in-fact, each in their separate capacity if more than one is named above, to make, execute, seal and deliver for and on their own behalf, individually as a surety or jointly, as co-sureties, and as their act and deed any and all bonds and other undertaking in suretyship provided, however, that the penal sum of any one such instrument executed hereunder shall not exceed the sum of:

Five Million and 00/100 Dollars ($5,000,000.00)

This Power of Attorney is granted and is signed and sealed under and by the authority of the following Resolutions adopted by the Board of Directors of SureTec Insurance Company and Markel Insurance Company:

"RESOLVED, That the President, any Senior Vice President, Vice President, Assistant Vice President, Secretary, Assistant Secretary, Treasurer or Assistant Treasurer and each of them hereby is authorized to execute powers of attorney, and such authority can be executed by use of facsimile signature, which may be attested or acknowledged by any officer or attorney, of the company, qualifying the attorney or attorneys named in the given power of attorney, to execute in behalf of, and acknowledge as the act and deed of the SureTec Insurance Company and Markel Insurance Company, as the case may be, all bond undertakings and contracts of suretyship, and to affix the corporate seal thereto."

IN WITNESS WHEREOF, Markel Insurance Company and SureTec Insurance Company have caused their official seal to be hereunto affixed and these presents to be signed by their duly authorized officers on the 27th day of January , 2023 .

SureTec Insurance Company

By: _____
Michael C. Keimig, President

SURETEC INSURANCE COMPANY HOUSTON TEXAS

MARKEL INSURANCE CORPORATE COMPANY SEAL ILLINOIS

Markel Insurance Company

By: _____
Lindey Jennings, Vice President

State of Texas
County of Harris:

On this 27th day of January , 2023 A. D., before me, a Notary Public of the State of Texas, in and for the County of Harris, duly commissioned and qualified, came THE ABOVE OFFICERS OF THE COMPANIES, to me personally known to be the individuals and officers described in, who executed the preceding instrument, and they acknowledged the execution of same, and being by me duly sworn, disposed and said that they are the officers of the said companies aforesaid, and that the seals affixed to the proceeding instrument are the Corporate Seals of said Companies, and the said Corporate Seals and their signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of the said companies, and that Resolutions adopted by the Board of Directors of said Companies referred to in the preceding instrument is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand, and affixed my Official Seal at the County of Harris, the day and year first above written.

JULIE E. MCCLARY
Notary Public State of Texas
Commission # 12947680-5
Commission Expires March 29, 2026

By: _____
Julie E. McClary, Notary Public
My commission expires 3/29/2026

We, the undersigned Officers of SureTec Insurance Company and Markel Insurance Company do herby certify that the original POWER OF ATTORNEY of which the foregoing is a full, true and correct copy is still in full force and effect and has not been revoked.

IN WITNESS WHEREOF, we have hereunto set our hands, and affixed the Seals of said Companies, on the 1st day of November , 2023 .

SureTec Insurance Company

By: _____
M. Brent Beaty, Assistant Secretary

Markel Insurance Company

By: _____
Andrew Marquis, Assistant Secretary

Any Instrument Issued in excess of the penalty stated above is totally void and without any validity. 510734
For verification of the authority of this Power you may call (713)812-0800 on any business day between 8:30 AM and 5:00 PM CST.

**BOND NO.:**4447116
**BOND FEE:** $736.00

**BOND**

**PERFORMANCE SECURITY**

**SUBDIVISION IMPROVEMENTS (ON-SITE)**

**Map No. 38315**

(*California Government Code §§ 66499* and *66499.1*)

**WHEREAS**, the City Council of the City of Rancho Mirage, a municipal corporation and political subdivision of the State of California ("City") and Palomino Four, LLC, a California limited liability company ("Principal"), have entered into an agreement pursuant to California Government Code Section 66462 whereby Principal agrees to install and complete certain designated improvements, which said agreement, dated December 7, 2023, and identified as Subdivision Improvement Agreement PM38315 ("Agreement"), is hereby incorporated by this reference as though set forth at length; and

**WHEREAS**, under the terms of said Agreement, Principal is required before commencing performance of the work, to file a good and sufficient bond for the faithful performance of said Agreement; and

**WHEREAS**, Markel Insurance Company ("Surety") is a Virginia and duly licensed to conduct general surety business in the State of California.

**NOW, THEREFORE**, we, Principal and Surety, are held firmly bound unto the City in the performance of the aforesaid Agreement in the penal sum of **Twenty Nine Thousand Four Hundred Forty U.S. Dollars and Zero Cents ($29,440.00)** lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

The condition of this obligation is such that if Principal, its heirs, executors, administrators, successors, or assigns, shall in all things to and abide by, and well and truly keep and perform the covenants, conditions and provisions in the said Agreement and any alteration thereof made as therein provides, on his or her part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the City, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect at least until the time City accepts the work required to be performed by Principal under the Agreement, notwithstanding whether or not Principal should abandon its obligations under the Agreement without having commenced construction of any improvements and whether such abandonment arises from foreclosure upon Principal's property or otherwise.

As part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by the City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of said Agreement or the work to be performed thereunder or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Agreement or to the work or to the specifications.

**[THIS PORTION OF PAGE LEFT INTENTIONALLY BLANK]**

**IN WITNESS WHEREOF**, this instrument has been duly executed by Principal and Surety named herein, on November 1, , 2023.

**APPROVED AS TO CONTENT:**

Signature

Ryan Stendell, Public Works Director
Name, Title

Rancho Mirage, CA
City

**APPROVED AS TO FORM:**

Signature

Daniel Torres, Deputy City Attorney
Name, Title

Rancho Mirage
City

**PRINCIPAL**

Palomino Four, LLC
Company

73838 Van Gogh Dr., Palm Desert, CA 92211
Address

Eric Smith
Signature

ERIC SMITH
Name

MANAGER
Title

**SURETY**

Markel Insurance Company
Company

4521 Highwood Pkwy, Glen Allen, VA 23060
Address

Diane M Nielsen
Signature

Diane M Nielsen
Name

Attorney in Fact
Title

***Note: Principal and Surety's signatures must be notarized, and 2 originals must be executed.***

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On November 17, 2023 before me, Diana Diaz, Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Eric Smith
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

DIANA DIAZ
Notary Public - California
Riverside County
Commission # 2367039
My Comm. Expires Jul 21, 2025

Signature Diana Diaz
*Signature of Notary Public*

*Place Notary Seal Above*

***OPTIONAL***

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

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**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On 11/1/23 before me, Luis Garcia, Notary Public
*Date* *Here Insert Name and Title of the Officer*

personally appeared Diane M Nielsen
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

LUIS GARCIA
Notary Public - California
Riverside County
Commission # 2384062
My Comm. Expires Nov 21, 2025

Signature _____
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____
Document Date: _____ Number of Pages: _____
Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

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POA# 510734

# JOINT LIMITED POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That SureTec Insurance Company, a Corporation duly organized and existing under the laws of the State of Texas and having its principal office in the County of Harris, Texas and Markel Insurance Company (the "Company"), a corporation duly organized and existing under the laws of the state of Illinois, and having its principal administrative office in Glen Allen, Virginia, does by these presents make, constitute and appoint:

Diane M. Nielsen, Mathew S. Costello, Salvador Sandoval

Their true and lawful agent(s) and attorney(s)-in-fact, each in their separate capacity if more than one is named above, to make, execute, seal and deliver for and on their own behalf, individually as a surety or jointly, as co-sureties, and as their act and deed any and all bonds and other undertaking in suretyship provided, however, that the penal sum of any one such instrument executed hereunder shall not exceed the sum of:

Five Million and 00/100 Dollars ($5,000,000.00)

This Power of Attorney is granted and is signed and sealed under and by the authority of the following Resolutions adopted by the Board of Directors of SureTec Insurance Company and Markel Insurance Company:

"RESOLVED, That the President, any Senior Vice President, Vice President, Assistant Vice President, Secretary, Assistant Secretary, Treasurer or Assistant Treasurer and each of them hereby is authorized to execute powers of attorney, and such authority can be executed by use of facsimile signature, which may be attested or acknowledged by any officer or attorney, of the company, qualifying the attorney or attorneys named in the given power of attorney, to execute in behalf of, and acknowledge as the act and deed of the SureTec Insurance Company and Markel Insurance Company, as the case may be, all bond undertakings and contracts of suretyship, and to affix the corporate seal thereto."

IN WITNESS WHEREOF, Markel Insurance Company and SureTec Insurance Company have caused their official seal to be hereunto affixed and these presents to be signed by their duly authorized officers on the 27th day of January , 2023 .

SureTec Insurance Company

By: _____
Michael C. Keimig, President

SURETEC INSURANCE COMPANY — HOUSTON, TEXAS

MARKEL INSURANCE COMPANY — CORPORATE SEAL — ILLINOIS

Markel Insurance Company

By: _____
Lindey Jennings, Vice President

State of Texas
County of Harris:

On this 27th day of January , 2023 A. D., before me, a Notary Public of the State of Texas, in and for the County of Harris, duly commissioned and qualified, came THE ABOVE OFFICERS OF THE COMPANIES, to me personally known to be the individuals and officers described in, who executed the preceding instrument, and they acknowledged the execution of same, and being by me duly sworn, disposed and said that they are the officers of the said companies aforesaid, and that the seals affixed to the proceeding instrument are the Corporate Seals of said Companies, and the said Corporate Seals and their signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of the said companies, and that Resolutions adopted by the Board of Directors of said Companies referred to in the preceding instrument is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand, and affixed my Official Seal at the County of Harris, the day and year first above written.

JULIE E. MCCLARY
Notary Public State of Texas
Commission # 12947680-5
Commission Expires March 29, 2026

By: _____
Julie E. McClary, Notary Public
My commission expires 3/29/2026

We, the undersigned Officers of SureTec Insurance Company and Markel Insurance Company do herby certify that the original POWER OF ATTORNEY of which the foregoing is a full, true and correct copy is still in full force and effect and has not been revoked.

IN WITNESS WHEREOF, we have hereunto set our hands, and affixed the Seals of said Companies, on the 1st day of November , 2023 .

SureTec Insurance Company

By: _____
M. Brent Beaty, Assistant Secretary

Markel Insurance Company

By: _____
Andrew Marquis, Assistant Secretary

Any Instrument Issued in excess of the penalty stated above is totally void and without any validity. 510734
For verification of the authority of this Power you may call (713)812-0800 on any business day between 8:30 AM and 5:00 PM CST.

BOND NO.: 4447117
BOND FEE: $368.00

# BOND

## PERFORMANCE SECURITY

## SUBDIVISION IMPROVEMENTS (OFF-SITE)

## Map No. 38315

(*California Government Code §§ 66499 and 66499.1*)

**WHEREAS**, the City Council of the City of Rancho Mirage, a municipal corporation and political subdivision of the State of California ("City") and Palomino Four, LLC, a California limited liability company ("Principal"), have entered into an agreement pursuant to California Government Code Section 66462 whereby Principal agrees to install and complete certain designated improvements, which said agreement, dated December 7, 2023 and identified as Subdivision Improvement Agreement PM38315 ("Agreement"), is hereby incorporated by this reference as though set forth at length; and

**WHEREAS**, under the terms of said Agreement, Principal is required before commencing performance of the work, to file a good and sufficient bond for the faithful performance of said Agreement; and

**WHEREAS**, Markel Insurance Company ("Surety") is a Virginia Company and duly licensed to conduct general surety business in the State of California.

**NOW, THEREFORE**, we, Principal and Surety, are held firmly bound unto the City in the performance of the aforesaid Agreement in the penal sum of **Fourteen Thousand Seven Hundred Twenty U.S. Dollars and Zero Cents ($14,720.00)** lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

The condition of this obligation is such that if Principal, its heirs, executors, administrators, successors, or assigns, shall in all things to and abide by, and well and truly keep and perform the covenants, conditions and provisions in the said Agreement and any alteration thereof made as therein provides, on his or her part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the City, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect at least until the time City accepts the work required to be performed by Principal under the Agreement, notwithstanding whether or not Principal should abandon its obligations under the Agreement without having commenced construction of any improvements and whether such abandonment arises from foreclosure upon Principal's property or otherwise.

As part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by the City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of said Agreement or the work to be performed thereunder or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Agreement or to the work or to the specifications.

**[THIS PORTION OF PAGE LEFT INTENTIONALLY BLANK]**

**IN WITNESS WHEREOF**, this instrument has been duly executed by Principal and Surety named herein, on November 1, , 2023

**APPROVED AS TO CONTENT:**

Signature

Ryan Stendell, Public Works Director

Name, Title

Rancho Mirage, CA

City

**PRINCIPAL**

Palomino Four, LLC

Company

73838 Van Gogh Dr., Palm Desert, CA 92211

Address

Eric Smith

Signature

ERIC SMITH

Name

MANAGER

Title

**APPROVED AS TO FORM:**

Signature

Daniel Trevino, Deputy City Attorney

Name, Title

Rancho Mirage

City

**SURETY**

Markel Insurance Company

Company

4521 Highwood Pkwy, Glen Allen, VA 23060

Address

Signature

Diane M Nielsen

Name

Attorney in Fact

Title

***Note: Principal and Surety's signatures must be notarized, and 2 originals must be executed.***

SUBDIVISION DOCUMENTS\Bond - Subdivision Improvements Off-Site (10.06.09).doc

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On November 17, 2023 before me, Diana Diaz, Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Eric Smith
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

DIANA DIAZ
Notary Public - California
Riverside County
Commission # 2367039
My Comm. Expires Jul 21, 2025

Signature Diana Diaz
*Signature of Notary Public*

*Place Notary Seal Above*

***OPTIONAL***

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

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**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On 11/1/23 before me, Luis Garcia, Notary Public
*Date* *Here Insert Name and Title of the Officer*

personally appeared Diane M Nielsen
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

LUIS GARCIA
Notary Public - California
Riverside County
Commission # 2384062
My Comm. Expires Nov 21, 2025

Signature _____
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**
Title or Type of Document: _____
Document Date: _____ Number of Pages: _____
Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

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POA# 510734

# JOINT LIMITED POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That SureTec Insurance Company, a Corporation duly organized and existing under the laws of the State of Texas and having its principal office in the County of Harris, Texas and Markel Insurance Company (the "Company"), a corporation duly organized and existing under the laws of the state of Illinois, and having its principal administrative office in Glen Allen, Virginia, does by these presents make, constitute and appoint:

Diane M. Nielsen, Mathew S. Costello, Salvador Sandoval

Their true and lawful agent(s) and attorney(s)-in-fact, each in their separate capacity if more than one is named above, to make, execute, seal and deliver for and on their own behalf, individually as a surety or jointly, as co-sureties, and as their act and deed any and all bonds and other undertaking in suretyship provided, however, that the penal sum of any one such instrument executed hereunder shall not exceed the sum of:

Five Million and 00/100 Dollars ($5,000,000.00)

This Power of Attorney is granted and is signed and sealed under and by the authority of the following Resolutions adopted by the Board of Directors of SureTec Insurance Company and Markel Insurance Company:

"RESOLVED, That the President, any Senior Vice President, Vice President, Assistant Vice President, Secretary, Assistant Secretary, Treasurer or Assistant Treasurer and each of them hereby is authorized to execute powers of attorney, and such authority can be executed by use of facsimile signature, which may be attested or acknowledged by any officer or attorney, of the company, qualifying the attorney or attorneys named in the given power of attorney, to execute in behalf of, and acknowledge as the act and deed of the SureTec Insurance Company and Markel Insurance Company, as the case may be, all bond undertakings and contracts of suretyship, and to affix the corporate seal thereto."

IN WITNESS WHEREOF, Markel Insurance Company and SureTec Insurance Company have caused their official seal to be hereunto affixed and these presents to be signed by their duly authorized officers on the 27th day of January , 2023 .

SureTec Insurance Company

By: _____
Michael C. Keimig, President

SURETEC INSURANCE COMPANY HOUSTON TEXAS

MARKEL INSURANCE COMPANY CORPORATE SEAL ILLINOIS

Markel Insurance Company

By: _____
Lindey Jennings, Vice President

State of Texas
County of Harris:

On this 27th day of January , 2023 A. D., before me, a Notary Public of the State of Texas, in and for the County of Harris, duly commissioned and qualified, came THE ABOVE OFFICERS OF THE COMPANIES, to me personally known to be the individuals and officers described in, who executed the preceding instrument, and they acknowledged the execution of same, and being by me duly sworn, disposed and said that they are the officers of the said companies aforesaid, and that the seals affixed to the proceeding instrument are the Corporate Seals of said Companies, and the said Corporate Seals and their signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of the said companies, and that Resolutions adopted by the Board of Directors of said Companies referred to in the preceding instrument is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand, and affixed my Official Seal at the County of Harris, the day and year first above written.

JULIE E. MCCLARY
Notary Public State of Texas
Commission # 12947680-5
Commission Expires March 29, 2026

By: _____
Julie E. McClary, Notary Public
My commission expires 3/29/2026

We, the undersigned Officers of SureTec Insurance Company and Markel Insurance Company do herby certify that the original POWER OF ATTORNEY of which the foregoing is a full, true and correct copy is still in full force and effect and has not been revoked.

IN WITNESS WHEREOF, we have hereunto set our hands, and affixed the Seals of said Companies, on the 1st day of November , 2023 .

SureTec Insurance Company

By: _____
M. Brent Beaty, Assistant Secretary

Markel Insurance Company

By: _____
Andrew Marquis, Assistant Secretary

Any Instrument Issued in excess of the penalty stated above is totally void and without any validity. 510734
For verification of the authority of this Power you may call (713)812-0800 on any business day between 8:30 AM and 5:00 PM CST.

BOND NO. : 4447118
BOND FEE : $250.00

# BOND

## PERFORMANCE SECURITY

## GUARANTEE REPAIR AND MAINTENANCE OF ALL IMPROVEMENTS

**Map No. 38315**

(*California Government Code* §§ *66499* and *66499.1*)

**WHEREAS**, the City Council of the City of Rancho Mirage, a municipal corporation and political subdivision of the State of California (hereinafter "City"), and Palomino Four, LLC (hereinafter "Principal"), a California limited liability company, have entered into an agreement pursuant to California Government Code Section 66462 whereby Principal agrees to install and complete certain designated improvements, which said agreement, dated December 7, 2023 and identified as Subdivision Improvement Agreement PM38315 ("Agreement"), is hereby incorporated by this reference as though set forth at length, and have agreed pursuant to Section 66499 of the Government Code to execute this bond to secure the performance of the following obligation:

> Principal hereby agrees to guarantee the material and workmanship relative to the installation of all improvements in and adjoining subject property against all defects and to promptly perform work and supply material as required by the City which are needed to repair or replace such defective work and material.

**WHEREAS**, we, the Principal and Markel Insurance Company, as surety ("Surety"), are held and firmly bound unto the City, in the penal sum of **Four Thousand Four Hundred Sixteen U.S. Dollars and Zero Cents ($4,416.00)** lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

**WHEREAS,** should Principal fail to promptly repair and replace materials or work required to be done by it and in accordance with the Agreement and all applicable laws and ordinances and/or should Principal fail to complete said repair and replacement work within the time allowed by the City, the City may, at its option, cause all required work to be done in the manner required herein and the parties executing this bond shall be firmly bound for the payment of all necessary costs therefore.

NOW THEREFORE, we, the Principal and Surety, are held and firmly bound unto the City, in the penal sum of **Four Thousand Four Hundred Sixteen U.S. Dollars and Zero Cents ($4,416.00)** lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents. Surety shall guarantee replacement and repair of improvements for a period of one (1) year following final acceptance of said improvements.

The condition of this obligation is such that if the above bounded Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the foregoing activity, on his or their part, to be kept and performed at the time and in the manner specified above, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the City, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect, at least until the time City accepts the work required to be performed by Principal under the Agreement, notwithstanding whether or not Principal should abandon its obligations under the Agreement without having commenced construction of any improvements and whether such abandonment arises from foreclosure upon Principal's property or otherwise.

As part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by the City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the work to be performed hereunder or the specifications accompanying the same shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the scope of the work to be performed or to the specifications.

**[THE REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK]**

**IN WITNESS WHEREOF**, this instrument has been duly executed by the Principal and Surety above named, on November 1, 2023.

**APPROVED AS TO CONTENT:**

Signature

Ryan Stendell, Public Works Director
Name, Title

Rancho Mirage, CA
City

**PRINCIPAL**

Palomino Four, LLC
Company

73838 Van Gogh Dr., Palm Desert, CA 92211
Address

Eric Smith
Signature

ERIC SMITH
Name

MANAGER
Title

**APPROVED AS TO FORM:**

Signature

Daniel Trevino Deputy City Attorney
Name, Title

Rancho Mirage
City

**SURETY**

Markel Insurance Company
Company

4521 Highwood Pkwy, Glen Allen, VA 23060
Address

Diane M Nielsen
Signature

Diane M Nielsen
Name

Attorney in Fact
Title

***Note: Principal and Surety's signatures must be notarized and 2 originals must be executed.***

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On November 17, 2023 before me, Diana Diaz, Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Eric Smith
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

DIANA DIAZ
Notary Public - California
Riverside County
Commission # 2367039
My Comm. Expires Jul 21, 2025

Signature Diana Diaz
*Signature of Notary Public*

*Place Notary Seal Above*

***OPTIONAL***

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

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**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On 11/1/23 before me, Luis Garcia, Notary Public
*Date* *Here Insert Name and Title of the Officer*

personally appeared Diane M Nielsen
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

LUIS GARCIA
Notary Public - California
Riverside County
Commission # 2384062
My Comm. Expires Nov 21, 2025

Signature _____
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____
Document Date: _____ Number of Pages: _____
Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

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POA# 510734

# JOINT LIMITED POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That SureTec Insurance Company, a Corporation duly organized and existing under the laws of the State of Texas and having its principal office in the County of Harris, Texas and Markel Insurance Company (the "Company"), a corporation duly organized and existing under the laws of the state of Illinois, and having its principal administrative office in Glen Allen, Virginia, does by these presents make, constitute and appoint:

Diane M. Nielsen, Mathew S. Costello, Salvador Sandoval

Their true and lawful agent(s) and attorney(s)-in-fact, each in their separate capacity if more than one is named above, to make, execute, seal and deliver for and on their own behalf, individually as a surety or jointly, as co-sureties, and as their act and deed any and all bonds and other undertaking in suretyship provided, however, that the penal sum of any one such instrument executed hereunder shall not exceed the sum of:

Five Million and 00/100 Dollars ($5,000,000.00)

This Power of Attorney is granted and is signed and sealed under and by the authority of the following Resolutions adopted by the Board of Directors of SureTec Insurance Company and Markel Insurance Company:

"RESOLVED, That the President, any Senior Vice President, Vice President, Assistant Vice President, Secretary, Assistant Secretary, Treasurer or Assistant Treasurer and each of them hereby is authorized to execute powers of attorney, and such authority can be executed by use of facsimile signature, which may be attested or acknowledged by any officer or attorney, of the company, qualifying the attorney or attorneys named in the given power of attorney, to execute in behalf of, and acknowledge as the act and deed of the SureTec Insurance Company and Markel Insurance Company, as the case may be, all bond undertakings and contracts of suretyship, and to affix the corporate seal thereto."

IN WITNESS WHEREOF, Markel Insurance Company and SureTec Insurance Company have caused their official seal to be hereunto affixed and these presents to be signed by their duly authorized officers on the 27th day of January , 2023 .

SureTec Insurance Company

By: _____
Michael C. Keimig, President

SURETEC INSURANCE COMPANY TEXAS

MARKEL INSURANCE COMPANY CORPORATE SEAL ILLINOIS

Markel Insurance Company

By: _____
Lindey Jenning, Vice President

State of Texas
County of Harris:

On this 27th day of January , 2023 A. D., before me, a Notary Public of the State of Texas, in and for the County of Harris, duly commissioned and qualified, came THE ABOVE OFFICERS OF THE COMPANIES, to me personally known to be the individuals and officers described in, who executed the preceding instrument, and they acknowledged the execution of same, and being by me duly sworn, disposed and said that they are the officers of the said companies aforesaid, and that the seals affixed to the proceeding instrument are the Corporate Seals of said Companies, and the said Corporate Seals and their signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of the said companies, and that Resolutions adopted by the Board of Directors of said Companies referred to in the preceding instrument is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand, and affixed my Official Seal at the County of Harris, the day and year first above written.

JULIE E. MCCLARY
Notary Public State of Texas
Commission # 12947680-5
Commission Expires March 29, 2026

By: _____
Julie E. McClary, Notary Public
My commission expires 3/29/2026

We, the undersigned Officers of SureTec Insurance Company and Markel Insurance Company do herby certify that the original POWER OF ATTORNEY of which the foregoing is a full, true and correct copy is still in full force and effect and has not been revoked.

IN WITNESS WHEREOF, we have hereunto set our hands, and affixed the Seals of said Companies, on the 1st day of November , 2023 .

SureTec Insurance Company

By: _____
M. Brent Beaty, Assistant Secretary

Markel Insurance Company

By: _____
Andrew Marquis, Assistant Secretary

Any Instrument Issued in excess of the penalty stated above is totally void and without any validity. 510734
For verification of the authority of this Power you may call (713)812-0800 on any business day between 8:30 AM and 5:00 PM CST.

## CERTIFICATION OF ACCURATE INSURANCE INFORMATION

I certify (or declare) under the penalty of perjury under the laws of the State of California that all the information contained in the insurance certificate attached hereto is true and correct, and that I make such representation knowingly based on my own independent investigation and verification of the information stated therein. Furthermore, I acknowledge and agree that communicating or conveying information in a written instrument to the City of Rancho Mirage or to any officer, employee or agent thereof for the purpose of obtaining any ministerial or discretionary permit, entitlement, license or privilege that I know is false or misleading is a misdemeanor punishable by fine up to one thousand dollars ($1,000) and/or up to six (6) months in jail, and in addition, shall render such permit, entitlement, license or privilege null and void. Rancho Mirage, Cal., Municipal Code §§9.12.010-9.12.020, 14.110.100.

9/19/23 Eric Smith

(Date) (Signature)

**ATTACHMENT 3**

# Standard Agreement for Subdivision Improvements
# Extension Request Form

Date: December 5, 2025

The following Tract/Parcel(s) numbers that are listed below will soon exceed the completion date according to the Standard Agreement executed on December 7, 2023.

PM 38315 (Palomino Four)

To avoid the Standard Agreement from being in default and risking the **loss of securities**, an extension must be requested thirty (30) days prior to the expiration date, according to the Rancho Mirage Municipal Code, Title 16.20.110, Completion of Improvements. Please **submit a detailed construction completion schedule** for the improvements along with this form, to justify the extension, **within 15 days** from the date above. Your request will be reviewed and, if valid, will be presented to the City Council for consideration. There will be a $500.00 administrative fee associated with the processing of the extension.

---

*Please complete the following information:*

**Name/Phone No.:** PALOMINO FOUR LLC (760) 534-1879

**Tract Number(s):** PM 38315

**Owner(s):** Eric SMITH / BYRON SMITH

**Original Completion Date:** November 30 2025

**New Completion Date Requested:** December 7, 2026

**Brief Reason for Extension:** Delayed due to CVWD taking 15+ months to release water plans, further delayed waiting for CVWD to install a cross (8inch stub out) for water line extension.

---

*Please send this form with supporting documentation to:*

CITY OF RANCHO MIRAGE
69-825 HIGHWAY 111
RANCHO MIRAGE, CA 92270
ATTN: JEFF BENSON

**December 5, 2025**

# PALOMINO FOUR LLC

## WATER LINE EXTENSION – REMAINING CONSTRUCTION SCHEDULE

- SITE PREPARATION: **COMPLETED**
  - Performed utility locates (Dig Alert) and marked existing underground infrastructure
  - Established construction access
  - Executed traffic control plan
- WATER LINE STAKING: **COMPLETED**
- CVWD INSTALL CROSS AND 8 INCH STUB OUT: **COMPLETED**
- TRENCHING
  - Grinded and Potholed where utilities cross **(COMPLETED)**
  - Excavating trench along designated water line route per plan underway
- PIPE INSTALLATION **(WEEK OF 12/8/25)**
  - Lay water main pipe section by section
  - Install service stubs to each of the four lots
  - Install fire hydrant
- BACKFILLING **(WEEK OF 1/5/26)**
  - Place initial backfill and compaction to grade
- TESTING **(WEEK OF 1/19/26)**
  - Pressure test the main line
  - Chlorinate and flush the line
- SURFACE RESTORATION **(WEEK OF 2/2/26)**
  - Restore pavement and affected curbing
- FINAL INSPECTION AND CLOSE-OUT **(WEEK OF 3/2/26)**
  - Pass CVWD inspection

**ATTACHMENT 4**

# AMENDMENT OF SUBDIVISION IMPROVEMENT AGREEMENT

## [PARCEL MAP 38315]

This Amendment of Subdivision Improvement Agreement ("Amendment") is entered into as of December 18, 2025, by and between the City of Rancho Mirage ("City"), a municipal corporation located in Riverside County, California, and Palomino Four, LLC ("Developer").

## RECITALS

**WHEREAS**, City and Developer previously entered into that certain Subdivision Improvement Agreement dated December 7, 2023 ("Agreement"), for Developer's construction of public improvements ("Improvements") upon the real property located in the City of Rancho Mirage, California, as more particularly described in Exhibit "A" attached hereto and incorporated herein by this reference; and

**WHEREAS**, Schedule "A" of the Agreement provided that Developer must complete construction of the Improvements by no later than December 7, 2025 ("Completion Date"); and

**WHEREAS**, pursuant to Section 16.20.110 of the Rancho Mirage Municipal Code ("City Code"), Developer has requested that City grant an extension of the Completion Date to December 7, 2026, as set forth in the documentation attached hereto and incorporated herein by this reference as Exhibit "B"; and

**WHEREAS**, pursuant to Section 66462(c) of the California Government Code and Section 16.20.090 of the City Code, Developer executed various security instruments ("Security Instruments") in connection with the Agreement to ensure completion of construction of the Improvements and to ensure payment to laborers and suppliers of materials; and

**WHEREAS**, the parties acknowledge that City would not approve this Amendment without assurances that the Security Instruments are still in effect and will remain in effect until City accepts the Improvements; and

**WHEREAS**, this Amendment was approved by the City Council during its meeting of December 18, 2025.

**NOW THEREFORE, in consideration of the covenants, conditions and promises contained herein, the parties agree as follows:**

## AGREEMENT

1. Recitals. The Recitals set forth above are hereby incorporated into this Amendment by this reference as though fully set forth herein.

2. Schedule "A." Item 1 of Schedule "A" of the Agreement is hereby amended to reflect a Completion Date of December 7, 2026.

3. Attorney's Fees. In the event any action, suit or proceeding is brought for the enforcement of, or the declaration of any right or obligation pursuant to this Amendment or as a result of any alleged breach of any provision of this Amendment, the prevailing party in such suit or proceeding shall be entitled to recover its costs and expenses, including reasonable attorney's fees, and any judgment or decree rendered in such a proceeding shall include an award thereof.

4. Counterparts. This Amendment may be executed in several counterparts, each of which shall be deemed to be an original and shall constitute one and the same instrument and shall become binding upon the parties when at least a copy hereof shall have been signed by the parties hereto.

5. Conflicts. In the event there exists any conflicts between the terms of this Amendment and the Agreement, the terms of this Amendment shall be superseding.

6. Remaining Provisions. All other remaining terms and conditions of the Agreement shall remain unchanged.

[THE REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, City and Developer have executed this Amendment on the date set forth herein above.

CITY OF RANCHO MIRAGE

By:_____
Lynn Mallotto, Mayor

Palomino Four, LLC

By:_____

APPROVED AS TO CONTENT:

_____
Stephan Longoria, City Engineer

ATTEST:

_____
Kristie Ramos, City Clerk

APPROVED AS TO FORM:

_____
Colin D. Kirkpatrick, City Attorney

**EXHIBIT “A”**

**SUBDIVISION IMPROVEMENT AGREEMENT**

**SEE ATTACHED**

**EXHIBIT “B”**

**EXTENSION FORM AND SUPPORTING DOCUMENTATION**

**SEE ATTACHED**

# City Council Staff Report

**Contracts**

| DATE | ITEM # |
|---|---|
| December 18, 2025 | CONSENT CALENDAR - 5F. |
| **Presented To** | **Presented By** |
| Mayor and City Council | Kofi Antobam, Director of Administrative Services |

## RECOMMENDED ACTION

Approve the terms of the contracts as presented and authorize the City Manager to execute the subject contracts.

## DISCUSSION

Attached hereto is a contracts list that staff is requesting the City Council to approve. These are contracts for Fiscal Year 2025-2026 for services for which costs and terms were negotiated.

**Attachments**

Attachment 1 - Contract List

# ATTACHMENT 1

## Contracts List

| # | Name | Terms | Scope | Effective Date | Expiration Date | Compensation | Sole Source Yes/No | Department | Staff |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Savant Solutions | 3 Years | Cybersecurity Operations and Technology Planning. | 12/29/2025 | 12/30/2028 | $149,340.00 | No | Information Services | Jason Jaurigue |
| 2 | GlassBox Technology | 1 Year | Amendment - Barracuda Firewall and Email Protection Service Agreement. | 12/1/2025 | 12/1/2026 | $76,468.92 | No | Information Services | Jason Jaurigue |
| 3 | Complete Paperless Solutions (CPS) | 1 Year | Laserfiche Records Management Platform Annual Support and Maintenance Agreement. | 11/08/2025 | 11/07/2026 | $58,030.00 | No | Information Services | Jason Jaurigue |

CITY OF RANCHO MIRAGE ©

**CONTRACT SUMMARY**

**FROM:** Jason Jaurigue, Director of Information Services

**DATE:** December 18, 2025

**SUBJECT:** Savant Solution Cybersecurity Darktrace

---

## Background:

The City has relied on Savant Solutions for several years to support cybersecurity operations and technology planning. As attacks targeting government agencies continue to grow in complexity, the City requires tools capable of detecting and responding to threats in real time.

Darktrace is an AI-driven cybersecurity platform that provides advanced threat detection, rapid response assistance, and expert guidance during security incidents. Savant Solutions evaluated the City's current environment and recommended expanding our security program with Darktrace to strengthen overall protection.

Staff recommends entering into contract for a three-year agreement with Savant Solution totals $49,780 per year. This investment aligns with the City's commitment to maintaining a robust security posture and safeguarding critical infrastructure.

## Fiscal Impact:

This item is budgeted for the 2025/2026 fiscal year. The contract consists of a 3-year term for a total cost of $ 149,340.00

| Term Number | Invoice Date | Invoice Amount | Term Start Date | Term End Date |
|---|---|---|---|---|
| 1 | December 29,2025 | $49,780 | December 29,2025 | December 29,2026 |
| 2 | December 29,2026 | $49,780 | December 29,2026 | December 29,2027 |
| 3 | December 29,2027 | $49,780 | December 29,2027 | December 29,2028 |

# SAVANT SOLUTIONS

Your Trusted IT Advisor

1030 G St.
Sacramento, CA 95814
(916) 836-8182
sales@savantsolutions.net

## Quote# JJ-091625-2

Date: 11/12/25
Terms: NET30
FOB: Destination
Valid for: 30 days
Shipping: Ground

**Bill To**

City of Rancho Mirage
Attn: Accounts Payable
71-100 Hwy. 111
Rancho Mirage, CA 92270
Phone: (760) 324•4511

**Ship To**

City of Rancho Mirage
Attn: Jason Jaurigue
69825 Hwy. 111
Rancho Mirage, CA 92270
Phone: (760) 324•4511

| Line # | Part No. | Description | Qty | Unit Price | Ext. Price |
|---|---|---|---|---|---|
| 1 | DT-NET-ID-MDR-IR-REC | Darktrace - Network, Identity, MDR, Incident Readiness & Recovery (1-Year) | 1 | $49,780.00 | $49,780.00 |

Notes: 3-Year Term - Year 2: $49,780 - Year 3: $49,780

| | | |
|---|---|---|
| Subtotal: | | $49,780.00 |
| Tax: 7.75% | | $0.00 |
| Credit: | | $0.00 |
| Shipping: | | $0.00 |
| Total: | | $49,780.00 |

**Thank you for giving Savant Solutions the opportunity to support you!**
**Each order helps supports a non-profit in need.**

www.SavantSolutions.net

This file has been converted from its original format for security purposes. Please use C8F42C2C29EFB as a reference when contacting the Security Team.

CITY OF RANCHO MIRAGE ©

**CONTRACT SUMMARY**

**FROM:** Jason Jaurigue, Director of Information Services

**DATE:** December 18, 2025

**SUBJECT:** Glass Box Technology for Annual Maintenance of Firewall and Email Protection Services

---

**Background:**

The City's current annual maintenance agreement is with Glass Box Technology for Barracuda Firewall and Email Protection services. The Barracuda firewall is a critical component of the City's network security infrastructure, monitoring incoming and outgoing traffic and applying predefined security rules to allow or block specific activity. It serves as the City's primary defense mechanism, acting as a secure barrier between our internal network and the internet.

Additionally, the Email Protection software offers robust safeguards against a wide range of threats, including spam, ransomware, spear phishing, business email compromise, and account takeovers. This solution has been instrumental in preserving the integrity and security of the City's email communications.

To ensure continued access to technical support, software updates, and product enhancements, staff recommends approval of an amendment to extend the maintenance agreement for one year at a cost of $76,468.92. Renewing this agreement will ensure that our firewall and email protection systems remain fully supported and up to date.

**Fiscal Impact:**

This item is budgeted for the fiscal year 2025/26, and the amendment is for a one-year term at a total cost of $76,468.92

**CONTRACT SUMMARY**

**FROM:** Jason Jaurigue, Director of Information Services

**DATE:** December 18, 2025

**SUBJECT:** Laserfiche Annual Maintenance Agreement.

---

**Background:**

Laserfiche is the City's citywide records management platform, utilized for electronic document storage, retrieval, and management across all departments. Complete Paperless Solutions (CPS) is the City's chosen vendor for Laserfiche, providing software licensing, maintenance, and support services.

The proposed agreement will extend the City's current support and maintenance contract with CPS for one additional year. The total cost of the agreement is $58,030 that includes:

- Technical Support: Access to CPS technical support for troubleshooting and resolving issues.
- Software Upgrades: Regular updates to ensure the system remains up-to-date with new features, security patches, and performance enhancements.
- Product Enhancements/Integration: Access to improvements and enhancements that increase functionality and usability.

CPS has provided reliable support and maintenance for Laserfiche, ensuring the platform operates effectively to meet the City's needs for records management. Continuing this agreement will ensure uninterrupted service and ongoing improvements to the system.

**Fiscal Impact:**

Funds are budgeted for Laserfiche for Fiscal Year 2025/26 in the amount of $58,030

**City Council Staff Report**

**Demands**

| DATE | ITEM # |
|---|---|
| December 18, 2025 | CONSENT CALENDAR - 5G. |
| **Presented To** | **Presented By** |
| Mayor and City Council | Kofi Antobam, Director of Administrative Services |

## RECOMMENDED ACTION

Approve the demands as presented.

**Attachments**

Attachment 1 - Demands

**ATTACHMENT 1**

CITY OF RANCHO MIRAGE

We hereby accept as files checks issued thru December 12, 2025:

City Funds **$ 1,881,157.34**

ordered paid as stated below.

Date: December 18, 2025 _____

Mayor

DEMANDS\GEN

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | INVOICE DTL DESC | | | | |
| 9289 | 12/05/2025 | EFT | 3318 | ALEXANDRIA SANCHEZ | 81437 | 12/01/2025 | | 12052025 | 25.66 |
| Invoice: 81437 | | | | | | MILEAGE REIMBURSEMENT 11/2025 | | | |
| | | | | 25.66 107 7800 | | MILEAGE | | | |
| | | | | | | CHECK | 9289 TOTAL: | | 25.66 |
| 9290 | 12/05/2025 | EFT | 1650 | AQUA-SERV ENGINEERS, INC | 126965 | 11/30/2025 | 20260002 | 12052025 | 615.00 |
| Invoice: 126965 | | | | | | CH & LIB COOLING TOWER TREATMENT 11/2025 | | | |
| | | | | 307.50 10133300 7612 | | MAINTENANCE | | | |
| | | | | 307.50 24281000 7612 | | MAINTENANCE | | | |
| | | | | | | CHECK | 9290 TOTAL: | | 615.00 |
| 9291 | 12/05/2025 | EFT | 333 | BECK OIL INC | 190078 | 11/18/2025 | | 12052025 | 603.82 |
| Invoice: 190078 | | | | | | FUEL PE 11/18/2025 | | | |
| | | | | 182.22 10133000 7623 | | VEHICLE FUEL | | | |
| | | | | 49.00 10151000 7623 | | VEHICLE FUEL | | | |
| | | | | 223.56 10132000 7623 | | VEHICLE FUEL | | | |
| | | | | 149.04 10141000 7623 | | VEHICLE FUEL | | | |
| | | | | BECK OIL INC | 190854 | 11/25/2025 | | 12052025 | 797.80 |
| Invoice: 190854 | | | | | | FUEL PE 11/25/25 | | | |
| | | | | 69.20 10132000 7623 | | VEHICLE FUEL | | | |
| | | | | 210.41 10133000 7623 | | VEHICLE FUEL | | | |
| | | | | 17.30 21800000 7623 | | VEHICLE FUEL | | | |
| | | | | 318.23 10132000 7623 | | VEHICLE FUEL | | | |
| | | | | 132.36 10141000 7623 | | VEHICLE FUEL | | | |
| | | | | 50.30 10123000 7623 | | VEHICLE FUEL | | | |
| | | | | | | CHECK | 9291 TOTAL: | | 1,401.62 |
| 9292 | 12/05/2025 | EFT | 2508 | RIVER SCOOPS, INC | 505 | 12/01/2025 | | 12052025 | 800.00 |
| Invoice: 505 | | | | | | 2026 HOLIDAY EVENTS | | | |
| | | | | 800.00 10157000 7872 | | PUBLIC RELATIONS | | | |
| | | | | | | CHECK | 9292 TOTAL: | | 800.00 |
| 9293 | 12/05/2025 | EFT | 584 | BLACKBAUD | INV-0000492994 | 12/01/2025 | | 12052025 | 600.00 |
| Invoice: INV-0000492994 | | | | | | BLACKBAUD PAYMENT ENABLEMENT FEE PE 12/31/2026 | | | |
| | | | | 600.00 243 7639 | | COMPUTER MAINTENANCE | | | |
| | | | | | | CHECK | 9293 TOTAL: | | 600.00 |
| 9294 | 12/05/2025 | EFT | 1065 | COACHELLA VALLEY SYMPHONY | WC-2026 | 09/28/2025 | 20260132 | 12052025 | 50,000.00 |
| Invoice: WC-2026 | | | | | | CV SYMPHONY EVENTS FOR 2025-2026 SEASON | | | |
| | | | | 50,000.00 10172000 7494 | | AMPHITHEATER PROGRAMMING | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK | 9294 | TOTAL: | 50,000.00 |
| 9295 | 12/05/2025 | EFT | 2314 | CREATIVE LIGHTING & ELECTRICAL , | 4155743 | 11/28/2025 | 20260016 | 12052025 | 388.00 |
| Invoice: 4155743 | | | | | | LIGHTING MAINTENANCE 11/2025 | | | |
| | | | | | 388.00 21892000 7612 | MAINTENANCE | | | |
| | | | | CREATIVE LIGHTING & ELECTRICAL , | 4155744 | 11/28/2025 | 20260016 | 12052025 | 302.00 |
| Invoice: 4155744 | | | | | | LIGHTING MAINTENANCE 11/2025 | | | |
| | | | | | 302.00 10133300 7612 | MAINTENANCE | | | |
| | | | | CREATIVE LIGHTING & ELECTRICAL , | 4155746 | 11/28/2025 | 20260016 | 12052025 | 85.00 |
| Invoice: 4155746 | | | | | | LIGHTING MAINTENANCE 11/2025 | | | |
| | | | | | 85.00 21891000 7612 | MAINTENANCE | | | |
| | | | | CREATIVE LIGHTING & ELECTRICAL , | 4155747 | 11/28/2025 | 20260016 | 12052025 | 269.50 |
| Invoice: 4155747 | | | | | | LIGHTING MAINTENANCE 11/2025 | | | |
| | | | | | 269.50 24281000 7612 | MAINTENANCE | | | |
| | | | | | | CHECK | 9295 | TOTAL: | 1,044.50 |
| 9296 | 12/05/2025 | EFT | 665 | DEB LEN PRODUCTIONS | 011526 | 11/15/2025 | | 12052025 | 924.85 |
| Invoice: 011526 | | | | | | 2026 RMWF EXPENSE REIMBURSEMENT | | | |
| | | | | | 924.85 244 8700 | MISC EXPENDITURE | | | |
| | | | | | | CHECK | 9296 | TOTAL: | 924.85 |
| 9297 | 12/05/2025 | EFT | 3024 | CALIFORNIA DEPARTMENT OF HEALTH C | 1-2026 | 12/02/2025 | | 12052025 | 59,668.78 |
| Invoice: 1-2026 | | | | | | PP-GEMT IGT TRNSFR - 1/4 CY 2026 (NPI 1457885089) | | | |
| | | | | | 59,668.78 21500000 7853 | GEMT QUALITY ASSURANCE FEE | | | |
| | | | | | | CHECK | 9297 | TOTAL: | 59,668.78 |
| 9298 | 12/05/2025 | EFT | 2794 | DOCUSIGN, INC | 111100582581 | 10/22/2025 | | 12052025 | 2,999.20 |
| Invoice: 111100582581 | | | | | | DOCUSIGN SERVICES PE 10/14/2026 | | | |
| | | | | | 2,999.20 10156000 7639 | COMPUTER MAINTENANCE | | | |
| | | | | | | CHECK | 9298 | TOTAL: | 2,999.20 |
| 9299 | 12/05/2025 | EFT | 1716 | GRAINGER | 9722082113 | 11/24/2025 | | 12052025 | 838.82 |
| Invoice: 9722082113 | | | | | | PUMP FOR WATER HEATER | | | |
| | | | | | 838.82 24281000 8004 | REPAIR & MAINT SUPPLIES | | | |
| | | | | | | CHECK | 9299 | TOTAL: | 838.82 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| 9300 | 12/05/2025 | EFT | 2738 | HR GREEN PACIFIC INC | 195601 | 11/21/2025 | 20260044 | 12052025 | 17,283.90 |
| Invoice: 195601 | | | | | | PLAN REVIEW SERVICES 10/2025 | | | |
| | | | | 17,283.90 | 10131000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 9300 TOTAL: | | 17,283.90 |
| 9301 | 12/05/2025 | EFT | 3017 | IAN LASLEY | 81365 | 10/18/2025 | | 12052025 | 86.87 |
| Invoice: 81365 | | | | | | REIMBURSE - SUPPLIES FOR EMPLOYEE EVENT | | | |
| | | | | 86.87 | 10133000 8000 | SUPPLIES | | | |
| | | | | | | CHECK | 9301 TOTAL: | | 86.87 |
| 9302 | 12/05/2025 | EFT | 10 | ICMA RETIREMENT TRUST-401 | 81517 | 12/03/2025 | | 12052025 | 4,658.34 |
| Invoice: 81517 | | | | | | ICMA 401A PE 11/28/25 | | | |
| | | | | 4,658.34 | 101 2236 | 401A DEF COMP - ICMA | | | |
| | | | | | | CHECK | 9302 TOTAL: | | 4,658.34 |
| 9303 | 12/05/2025 | EFT | 34 | ICMA RETIREMENT TRUST-457 | 81518 | 12/03/2025 | | 12052025 | 32,004.96 |
| Invoice: 81518 | | | | | | ICMA 457 PE 11/28/25 | | | |
| | | | | 32,004.96 | 101 2235 | DEFERRED COMP - ICMA | | | |
| | | | | | | CHECK | 9303 TOTAL: | | 32,004.96 |
| 9304 | 12/05/2025 | EFT | 2452 | JACOB DE LA CRUZ | 81394 | 11/25/2025 | | 12052025 | 261.50 |
| Invoice: 81394 | | | | | | REIMBURSEMENT - TEAM MEETING 11/25/2025 | | | |
| | | | | 130.75 | 10154000 7806 | MEETINGS/TRAINING/TRAVEL | | | |
| | | | | 130.75 | 10155000 7806 | MEETINGS/TRAINING/TRAVEL | | | |
| | | | | | | CHECK | 9304 TOTAL: | | 261.50 |
| 9305 | 12/05/2025 | EFT | 1219 | JASON JAURIGUE | 81358 | 11/21/2025 | | 12052025 | 335.40 |
| Invoice: 81358 | | | | | | REIMB-MISAC CONFERENCE 10/19-22/2025 | | | |
| | | | | 335.40 | 10156000 7806 | MEETINGS/TRAINING/TRAVEL | | | |
| | | | | | | CHECK | 9305 TOTAL: | | 335.40 |
| 9306 | 12/05/2025 | EFT | 3035 | KAILA WAYBRIGHT | 81459 | 11/18/2025 | | 12052025 | 483.60 |
| Invoice: 81459 | | | | | | SUPPLIES FOR PROGRAMS, STEAM READS, FIBER ARTS | | | |
| | | | | 308.06 | 24281000 7910 | FOUNDATION - PROGRAMS | | | |
| | | | | 82.10 | 24281000 7914 | FOUNDATION - READING CLUB | | | |
| | | | | 93.44 | | | | | |
| | | | | | E LL_STEAM -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7919 | FOUNDATN-LITERARY LEGACY | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK | 9306 TOTAL: | | 483.60 |
| 9307 | 12/05/2025 | EFT | 2083 | KANOPY INC. | 481479 - PPU | 11/30/2025 | | 12052025 | 1,620.00 |
| | Invoice: 481479 - PPU | | | | | STREAMING SERVICE PE 11/30/2025 | | | |
| | | | | | 1,620.00 24281000 7912 | FOUNDATION - COLLECTION | | | |
| | | | | | | CHECK | 9307 TOTAL: | | 1,620.00 |
| 9308 | 12/05/2025 | EFT | 562 | BRIAN KEPHART | 81377 | 11/24/2025 | | 12052025 | 1,635.70 |
| | Invoice: 81377 | | | | | REIMBURSEMENT - IAEM CONFERENCE 11/14 - 20/2025 | | | |
| | | | | | 1,635.70 10142000 7806 | MEETINGS/TRAINING/TRAVEL | | | |
| | | | | | | CHECK | 9308 TOTAL: | | 1,635.70 |
| 9309 | 12/05/2025 | EFT | 611 | VALENTINE KEPHART | 81516 | 12/03/2025 | | 12052025 | 140.40 |
| | Invoice: 81516 | | | | | REIMBURSE - SUPPLIES FOR GINGERBREAD EVENT | | | |
| | | | | | 140.40 | | | | |
| | | | | | E LL_GINGER -UNDEFINED - - | | | | |
| | | | | | 24281000 7919 | FOUNDATN-LITERARY LEGACY | | | |
| | | | | | | CHECK | 9309 TOTAL: | | 140.40 |
| 9310 | 12/05/2025 | EFT | 2061 | KOFI ANTOBAM | 81485 | 11/26/2025 | | 12052025 | 894.00 |
| | Invoice: 81485 | | | | | EXP REIMB - 2026 CSMFO REGISTRATION & CPE | | | |
| | | | | | 625.00 10155000 7806 | MEETINGS/TRAINING/TRAVEL | | | |
| | | | | | 269.00 10155000 7806 | MEETINGS/TRAINING/TRAVEL | | | |
| | | | | | | CHECK | 9310 TOTAL: | | 894.00 |
| 9311 | 12/05/2025 | EFT | 3228 | MACMILLAN HOLDINGS LLC | MSBCAMC012826-B | 11/24/2025 | | 12052025 | 7,500.00 |
| | Invoice: MSBCAMC012826-B | | | | | 2026 RMWF BALANCE - C MCQUISTON | | | |
| | | | | | 7,500.00 244 7910 | FOUNDATION - PROGRAMS | | | |
| | | | | MACMILLAN HOLDINGS LLC | MSBMEFR013026-B | 10/14/2025 | | 12052025 | 10,000.00 |
| | Invoice: MSBMEFR013026-B | | | | | 2026 RMWF BALANCE - M GATES | | | |
| | | | | | 10,000.00 244 7910 | FOUNDATION - PROGRAMS | | | |
| | | | | MACMILLAN HOLDINGS LLC | MSBDAGO012826-B | 12/10/2024 | | 12052025 | 10,000.00 |
| | Invoice: MSBDAGO012826-B | | | | | 2026 RMWF BALANCE - D GOODWIN | | | |
| | | | | | 10,000.00 244 7910 | FOUNDATION - PROGRAMS | | | |
| | | | | | | CHECK | 9311 TOTAL: | | 27,500.00 |
| 9312 | 12/05/2025 | EFT | 1317 | MISSION LINEN SUPPLY | 525012225 | 11/21/2025 | 20260009 | 12052025 | 30.00 |
| | Invoice: 525012225 | | | | | BI-WEEKLY RENTAL SERVICE | | | |
| | | | | | 30.00 24281000 8002 | EQUIPMENT RENTAL | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK | 9312 | TOTAL: | 30.00 |
| 9313 | 12/05/2025 | EFT | 3390 | MONTEFERANTE FOODS LLC | RML20251117-BALANCE | 11/17/2025 | | 12052025 | 11,468.23 |
| Invoice: RML20251117-BALANCE | | | | | | CATERING SERVICES - RMPLO 30TH ANNIVERSARY | | | |
| | | | | 11,468.23 24281000 7887 | | SPECIAL EVENTS | | | |
| | | | | | | CHECK | 9313 | TOTAL: | 11,468.23 |
| 9314 | 12/05/2025 | EFT | 468 | NATIONWIDE | 81521 | 12/03/2025 | | 12052025 | 1,916.57 |
| Invoice: 81521 | | | | | | PT DEFERRED COMP PE 11/28/25 | | | |
| | | | | 1,916.57 101 2241 | | NATIONAL - PART TIME | | | |
| | | | | | | CHECK | 9314 | TOTAL: | 1,916.57 |
| 9315 | 12/05/2025 | EFT | 260 | OCLC, INC | 1000461764 | 09/01/2025 | | 12052025 | 654.49 |
| Invoice: 1000461764 | | | | | | WORLDSHARE ILL SUBSCRIPTION PE 8/31/2026 | | | |
| | | | | 654.49 24281000 7639 | | COMPUTER MAINTENANCE | | | |
| | | | | | | CHECK | 9315 | TOTAL: | 654.49 |
| 9316 | 12/05/2025 | EFT | 2287 | ONYX PAVING COMPANY, INC | 25-028-2R | 08/31/2025 | | 12052025 | 20,520.00 |
| Invoice: 25-028-2R | | | | | | PAYMENT REISSUE - CP 25-398 PAVEMENT REHAB | | | |
| | | | | 21,600.00 236 9018 | | PAVEMENT REHABILITATION | | | |
| | | | | -1,080.00 101 2050 | | RETENTION PAYABLE | | | |
| | | | | | | CHECK | 9316 | TOTAL: | 20,520.00 |
| 9317 | 12/05/2025 | EFT | 2370 | ROBERT STIFF | 25-248 | 11/01/2025 | 20260133 | 12052025 | 1,375.00 |
| Invoice: 25-248 | | | | | | MOON BALLOONS - EVENT LAWN 11/1/2025 | | | |
| | | | | 1,375.00 10172000 7494 | | AMPHITHEATER PROGRAMMING | | | |
| | | | | ROBERT STIFF | 25-285 | 11/22/2025 | 20260133 | 12052025 | 2,400.00 |
| Invoice: 25-285 | | | | | | MOON BALLOONS - EVENT LAWN SHREK 10/22 - 23/25 | | | |
| | | | | 2,400.00 10172000 7494 | | AMPHITHEATER PROGRAMMING | | | |
| | | | | ROBERT STIFF | 25-240 | 10/26/2025 | 20260133 | 12052025 | 2,775.00 |
| Invoice: 25-240 | | | | | | MOON BALLOONS - ADAMS FAMILY 10/24 - 26/25 | | | |
| | | | | 2,775.00 10172000 7494 | | AMPHITHEATER PROGRAMMING | | | |
| | | | | | | CHECK | 9317 | TOTAL: | 6,550.00 |
| 9318 | 12/05/2025 | EFT | 728 | FIRE PROTECTION SERVICE CORPORATI | 7435161 | 12/01/2025 | | 12052025 | 246.34 |
| Invoice: 7435161 | | | | | | MONITORING SERVICE PE 12/31/2025 | | | |
| | | | | 117.72 24281000 7612 | | MAINTENANCE | | | |
| | | | | 128.62 24282000 7613 | | OBSERVATORY MAINTENANCE | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | FIRE PROTECTION SERVICE CORPORATI | 7434117 | 12/01/2025 | | 12052025 | 542.82 |
| | Invoice: 7434117 | | | | | MONITORING SERVICE PE 12/31/2025 | | | |
| | | | | | 161.31 10133300 7612 | MAINTENANCE | | | |
| | | | | | 124.26 21892000 7612 | MAINTENANCE | | | |
| | | | | | 189.66 10133310 7612 | MAINTENANCE | | | |
| | | | | | 67.59 21500690 7612 | MAINTENANCE | | | |
| | | | | | | CHECK | 9318 TOTAL: | | 789.16 |
| 9319 | 12/05/2025 | EFT | 612 | RACHEL ANNE HORWITZ | L844315 | 11/03/2025 | | 12052025 | 58.74 |
| | Invoice: L844315 | | | | | RMEA GRAPHIC DESIGN SERVICES | | | |
| | | | | | 58.74 600 7842 | ADVERTISING/PUBLISHING | | | |
| | | | | RACHEL ANNE HORWITZ | L844338 | 12/02/2025 | 20260036 | 12052025 | 3,377.54 |
| | Invoice: L844338 | | | | | GRAPHIC DESIGN SERVICES FOR RMLOF 11/2025 | | | |
| | | | | | 3,377.54 24281000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | RACHEL ANNE HORWITZ | L844339 | 12/02/2025 | 20260035 | 12052025 | 2,405.86 |
| | Invoice: L844339 | | | | | GRAPHIC DESIGN SERVICES FOR RMWF 11/2025 | | | |
| | | | | | 2,405.86 244 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | RACHEL ANNE HORWITZ | L844332 | 12/02/2025 | 20260135 | 12052025 | 780.97 |
| | Invoice: L844332 | | | | | GRAPHIC DESIGN WORK 11/2025 | | | |
| | | | | | 102.00 10172000 7494 | AMPHITHEATER PROGRAMMING | | | |
| | | | | | 678.97 107 7478 | MARKETING PROGRAM | | | |
| | | | | RACHEL ANNE HORWITZ | L844300 | 10/01/2025 | 20260135 | 12052025 | 2,255.96 |
| | Invoice: L844300 | | | | | GRAPHIC DESIGN WORK 9/2025 | | | |
| | | | | | 1,343.00 10172000 7494 | AMPHITHEATER PROGRAMMING | | | |
| | | | | | 912.96 107 7478 | MARKETING PROGRAM | | | |
| | | | | RACHEL ANNE HORWITZ | L844283 | 09/02/2025 | 20260135 | 12052025 | 1,747.80 |
| | Invoice: L844283 | | | | | GRAPHIC DESIGN WORK 8/2025 | | | |
| | | | | | 867.00 10172000 7494 | AMPHITHEATER PROGRAMMING | | | |
| | | | | | 880.80 107 7478 | MARKETING PROGRAM | | | |
| | | | | RACHEL ANNE HORWITZ | L844316 | 11/03/2025 | 20260135 | 12052025 | 906.98 |
| | Invoice: L844316 | | | | | GRAPHIC DESIGN WORK 10/2025 | | | |
| | | | | | 600.98 10172000 7494 | AMPHITHEATER PROGRAMMING | | | |
| | | | | | 306.00 107 7478 | MARKETING PROGRAM | | | |
| | | | | | | CHECK | 9319 TOTAL: | | 11,533.85 |
| 9320 | 12/05/2025 | EFT | 2814 | RUBY HWONG | 21 | 11/25/2025 | | 12052025 | 2,880.00 |
| | Invoice: 21 | | | | | 2026 RMWF CONCIERGE PE 11/25/2025 | | | |
| | | | | | 2,880.00 244 7400 | PROFESSIONAL/TECHNICAL | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK | 9320 TOTAL: | | 2,880.00 |
| 9321 | 12/05/2025 | EFT | 2459 | SELF INSURED SERVICES COMPANY | B0KXT4 | 12/01/2025 | | 12052025 | 16,241.00 |
| | Invoice: B0KXT4 | | | | | DENTAL & VISION 12/2025 | | | |
| | | | | | 9,817.60 101 2277 | DENTAL WITHHOLDING | | | |
| | | | | | 2,202.40 10151000 7205 | GROUP INSURANCE-DENTAL | | | |
| | | | | | 3,296.40 101 2278 | VISION WITHHOLDING | | | |
| | | | | | 924.60 10151000 7210 | GROUP INSURANCE-VISION | | | |
| | | | | SELF INSURED SERVICES COMPANY | 17808 | 12/01/2025 | | 12052025 | 7,272.06 |
| | Invoice: 17808 | | | | | DISABILITY 12/25 | | | |
| | | | | | 7,272.06 101 2279 | ADDITIONAL LIFE INSURANCE | | | |
| | | | | | | CHECK | 9321 TOTAL: | | 23,513.06 |
| 9322 | 12/05/2025 | EFT | 640 | STEVEN B QUINTANILLA, | 81498 | 11/26/2025 | | 12052025 | 59,202.50 |
| | Invoice: 81498 | | | | | LEGAL SERVICES 9/2025 | | | |
| | | | | | 56,611.00 10114000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | 1,140.00 24281000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | 1,451.50 28000000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 9322 TOTAL: | | 59,202.50 |
| 9323 | 12/05/2025 | EFT | 254 | UNDERGROUND SERVICES ALERT | 25-261839 | 12/01/2025 | | 12052025 | 65.83 |
| | Invoice: 25-261839 | | | | | CA STATE FEE REGULATORY COSTS PE 11/15/2025 | | | |
| | | | | | 65.83 10131000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | UNDERGROUND SERVICES ALERT | 1120250596 | 12/01/2025 | | 12052025 | 450.00 |
| | Invoice: 1120250596 | | | | | DIG ALERT TICKETS 11/2025 | | | |
| | | | | | 450.00 10131000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 9323 TOTAL: | | 515.83 |
| 9324 | 12/05/2025 | EFT | 2244 | U.S. BANK CORPORATE PAYMENT SYSTE | 6960 PE 11/22/2025 | 11/23/2025 | | 12052025 | 40,808.99 |
| | Invoice: 6960 PE 11/22/2025 | | | | | CC 6960 PE 11/22/2025 | | | |
| | | | | | 40,808.99 242 2011 | CAL CARD - US BANK | | | |
| | | | | | | CHECK | 9324 TOTAL: | | 40,808.99 |
| 9325 | 12/05/2025 | EFT | 218 | TRACY FINNELL, INC | 139996 | 11/24/2025 | | 12052025 | 48.75 |
| | Invoice: 139996 | | | | | PM SERVICE - 2003 FORD PICKUP F350 | | | |
| | | | | | 48.75 10132000 7624 | VEHICLE MAINTENANCE | | | |
| | | | | TRACY FINNELL, INC | 139982 | 11/21/2025 | | 12052025 | 57.00 |
| | Invoice: 139982 | | | | | SMOG - 2015 FORD TRANSIT | | | |
| | | | | | 57.00 10151000 7624 | VEHICLE MAINTENANCE | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | TRACY FINNELL, INC | 139991 | 11/21/2025 | | 12052025 | 48.75 |
| | Invoice: 139991 | | | | | PM SERVICE 2007 FORD - EXPLORER | | | |
| | | | | | 48.75 10133000 7624 | VEHICLE MAINTENANCE | | | |
| | | | | TRACY FINNELL, INC | 139972 | 11/21/2025 | | 12052025 | 48.75 |
| | Invoice: 139972 | | | | | PM SERVICE - 2009 HONDA CIVIC | | | |
| | | | | | 48.75 10133000 7624 | VEHICLE MAINTENANCE | | | |
| | | | | TRACY FINNELL, INC | 139987 | 11/21/2025 | | 12052025 | 57.00 |
| | Invoice: 139987 | | | | | SMOG - 2013 FORD CMAX | | | |
| | | | | | 57.00 10133000 7624 | VEHICLE MAINTENANCE | | | |
| | | | | TRACY FINNELL, INC | 140001 | 11/24/2025 | | 12052025 | 48.75 |
| | Invoice: 140001 | | | | | SMOG - 2008 FORD RANGER | | | |
| | | | | | 48.75 10133000 7624 | VEHICLE MAINTENANCE | | | |
| | | | | TRACY FINNELL, INC | 140006 | 11/24/2025 | | 12052025 | 48.75 |
| | Invoice: 140006 | | | | | SMOG - 2008 FORD F350 | | | |
| | | | | | 48.75 10133000 7624 | VEHICLE MAINTENANCE | | | |
| | | | | TRACY FINNELL, INC | 140027 | 11/25/2025 | | 12052025 | 48.75 |
| | Invoice: 140027 | | | | | SMOG - 2013 FORD CMAX HYBRID | | | |
| | | | | | 48.75 10133000 7624 | VEHICLE MAINTENANCE | | | |
| | | | | | | CHECK 9325 TOTAL: | | | 406.50 |
| 9326 | 12/05/2025 | EFT | 3335 | VICTUS ADVISORS LLC | 3432 | 11/30/2025 | 20260061 | 12052025 | 22,250.00 |
| | Invoice: 3432 | | | | | AMPHITHEATER MASTER PROGRAMMING PE 11/30/2025 | | | |
| | | | | | 22,250.00 10172000 7494 | AMPHITHEATER PROGRAMMING | | | |
| | | | | | | CHECK 9326 TOTAL: | | | 22,250.00 |
| 9327 | 12/05/2025 | EFT | 2889 | VINTAGE ASSOCIATES INC | 239064 | 11/21/2025 | 20260100 | 12052025 | 1,000.00 |
| | Invoice: 239064 | | | | | TREE REMOVAL | | | |
| | | | | | 1,000.00 10133310 7612 | MAINTENANCE | | | |
| | | | | VINTAGE ASSOCIATES INC | 239065 | 11/21/2025 | 20260100 | 12052025 | 320.00 |
| | Invoice: 239065 | | | | | VALVE REPLACEMENT | | | |
| | | | | | 320.00 201 7612 | MAINTENANCE | | | |
| | | | | VINTAGE ASSOCIATES INC | 239092 | 11/25/2025 | 20260100 | 12052025 | 1,860.00 |
| | Invoice: 239092 | | | | | PLANT REMOVAL | | | |
| | | | | | 1,860.00 10133320 7612 | MAINTENANCE | | | |
| | | | | VINTAGE ASSOCIATES INC | 239091 | 11/25/2025 | 20260100 | 12052025 | 250.00 |
| | Invoice: 239091 | | | | | MAINLINE REPAIR | | | |
| | | | | | 250.00 10133320 7612 | MAINTENANCE | | | |
| | | | | VINTAGE ASSOCIATES INC | 239117 | 11/26/2025 | 20260100 | 12052025 | 21,400.00 |
| | Invoice: 239117 | | | | | SLOPE MAINTENANCE - MONTEREY MARKET PLACE | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | 21,400.00 10133320 7612 MAINTENANCE | | | | |
| | | | VINTAGE ASSOCIATES INC | | 239223 | 12/01/2025 | 20260007 | 12052025 | 62,700.00 |
| | Invoice: 239223 | | | | | CITYWIDE LANDSCAPE MAINTENANCE 11/2025 | | | |
| | | | | | 549.91 10132000 7630 TRAILS & BIKE PATH MAINT | | | | |
| | | | | | 3,739.39 10133300 7612 MAINTENANCE | | | | |
| | | | | | 329.95 10133310 7612 MAINTENANCE | | | | |
| | | | | | 6,602.01 10133320 7612 MAINTENANCE | | | | |
| | | | | | 22,660.38 201 7612 MAINTENANCE | | | | |
| | | | | | 439.93 202 7612 MAINTENANCE | | | | |
| | | | | | 329.95 203 7612 MAINTENANCE | | | | |
| | | | | | 219.96 204 7612 MAINTENANCE | | | | |
| | | | | | 1,045.34 205 7612 MAINTENANCE | | | | |
| | | | | | 439.93 207 7612 MAINTENANCE | | | | |
| | | | | | 439.93 21500500 7612 MAINTENANCE | | | | |
| | | | | | 439.93 21500690 7612 MAINTENANCE | | | | |
| | | | | | 5,114.68 21891000 7612 MAINTENANCE | | | | |
| | | | | | 11,109.21 21892000 7612 MAINTENANCE | | | | |
| | | | | | 2,859.53 21893000 7612 MAINTENANCE | | | | |
| | | | | | 879.83 21895000 7612 MAINTENANCE | | | | |
| | | | | | 1,429.77 21896000 7612 MAINTENANCE | | | | |
| | | | | | 1,429.77 21897000 7612 MAINTENANCE | | | | |
| | | | | | 2,640.60 24281000 7612 MAINTENANCE | | | | |
| | | | | | | CHECK | 9327 TOTAL: | | 87,530.00 |
| 9328 | 12/05/2025 | EFT | 3397 | WESTAIR GASES & EQUIPMENT INC | 0080711844 | 11/30/2025 | | 12052025 | 21.00 |
| | Invoice: 0080711844 | | | | | HELIUM TANK | | | |
| | | | | | 21.00 24281000 8000 SUPPLIES | | | | |
| | | | | | | CHECK | 9328 TOTAL: | | 21.00 |
| 9329 | 12/05/2025 | EFT | 2109 | WITTMAN ENTERPRISES LLC | 251102547 | 12/01/2025 | | 12052025 | 7,248.00 |
| | Invoice: 251102547 | | | | | AMBULANCE BILLING SERVICES 11/2025 | | | |
| | | | | | 7,248.00 21500000 7400 PROFESSIONAL/TECHNICAL | | | | |
| | | | | | | CHECK | 9329 TOTAL: | | 7,248.00 |
| 9330 | 12/05/2025 | EFT | 1848 | EMPLOYEE BENEFIT SPECIALISTS, INC | 11302025 | 11/30/2025 | | 12052025 | 33,092.61 |
| | Invoice: 11302025 | | | | | MEDICAL REIMBURSEMENT 11/2025 | | | |
| | | | | | 23,342.68 10151000 7212 INSURANCE REIMBURSEMENT | | | | |
| | | | | | 8,394.68 24281000 7212 INSURANCE REIMBURSEMENT | | | | |
| | | | | | 1,355.25 28000000 7212 INSURANCE REIMBURSEMENT | | | | |
| | | | | | | CHECK | 9330 TOTAL: | | 33,092.61 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | INVOICE DTL DESC | | | | |
| 9331 | 12/05/2025 | EFT | 1720 | ZEN AQUATICS DESIGN LTD | 101477 | 12/01/2025 | | 12052025 | 325.00 |
| Invoice: 101477 | | | | | | AQUARIUM MAINTENANCE 11/2025 | | | |
| | | | | | 325.00 24281000 7612 | MAINTENANCE | | | |
| | | | | | | CHECK 9331 TOTAL: | | | 325.00 |
| 242010 | 12/05/2025 | PRTD | 3222 | ABD OFFICE MACHINES INC | ABD25110128 | 11/15/2025 | 20260077 | 12052025 | 688.04 |
| Invoice: ABD25110128 | | | | | | PRINTER MAINTENANCE 11/2025 | | | |
| | | | | | 688.04 10156000 8000 | SUPPLIES | | | |
| | | | | | | CHECK 242010 TOTAL: | | | 688.04 |
| 242011 | 12/05/2025 | PRTD | 56 | ALTURA CREDIT UNION | 81519 | 12/03/2025 | | 12052025 | 176.00 |
| Invoice: 81519 | | | | | | CREDIT UNION PE 11/28/25 | | | |
| | | | | | 176.00 101 2245 | EMPLOYEE CREDIT UNION | | | |
| | | | | | | CHECK 242011 TOTAL: | | | 176.00 |
| 242012 | 12/05/2025 | PRTD | 186 | ANDERSON COMMUNICATIONS INC | 21528B | 11/01/2025 | 20260020 | 12052025 | 1,065.00 |
| Invoice: 21528B | | | | | | RADIO SITE LEASE FOR (3) REPEATERS ON INDIO HILL | | | |
| | | | | | 1,065.00 10142000 7824 | COMMUNICATION MAIN/SERV | | | |
| | | | | | | CHECK 242012 TOTAL: | | | 1,065.00 |
| 242013 | 12/05/2025 | PRTD | 3250 | JAMES H KOCH | 81509 | 11/21/2025 | | 12052025 | 250.00 |
| Invoice: 81509 | | | | | | HONORARIUM - PALM SPRINGS TUNED 1/13/2026 | | | |
| | | | | | 250.00 10157000 7875 | CULTURAL SPECIAL EVENTS | | | |
| | | | | | | CHECK 242013 TOTAL: | | | 250.00 |
| 242014 | 12/05/2025 | PRTD | 3288 | BERNARD EPPS JR | 81505 | 11/21/2025 | | 12052025 | 250.00 |
| Invoice: 81505 | | | | | | HONORARIUM - ALL IN THE BRITISH FAMILY 12/5/2025 | | | |
| | | | | | 250.00 | | | | |
| | | | | | E LL_FILM -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7919 | FOUNDATN-LITERARY LEGACY | | | |
| | | | | | | CHECK 242014 TOTAL: | | | 250.00 |
| 242015 | 12/05/2025 | PRTD | 3248 | CAPITOL ADVOCACY, LLC | 998935 | 12/01/2025 | 20260033 | 12052025 | 10,000.00 |
| Invoice: 998935 | | | | | | STATE AND FEDERAL REPRESENTATION SERVICES 12/2025 | | | |
| | | | | | 10,000.00 10151000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK 242015 TOTAL: | | | 10,000.00 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| 242016 | 12/05/2025 | PRTD | 275 | CINTAS DOCUMENT MANAGEMENT | 9348800843 | 11/30/2025 | 20260034 | 12052025 | 426.69 |
| Invoice: 9348800843 | | | | | | AED SERVICE AGREEMENT 11/2025 | | | |
| | | | | | 426.69 24281000 8220 | LEASE PAYMENTS | | | |
| | | | | CINTAS DOCUMENT MANAGEMENT | 9348803019 | 11/30/2025 | 20260021 | 12052025 | 135.77 |
| Invoice: 9348803019 | | | | | | AED SERVICE AGREEMENT 11/2025 | | | |
| | | | | | 135.77 10142000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | CINTAS DOCUMENT MANAGEMENT | 9348791010 | 11/30/2025 | 20260021 | 12052025 | 543.06 |
| Invoice: 9348791010 | | | | | | AED SERVICE AGREEMENT 11/2025 | | | |
| | | | | | 543.06 10142000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | CINTAS DOCUMENT MANAGEMENT | 9348803932 | 11/30/2025 | 20260021 | 12052025 | 139.00 |
| Invoice: 9348803932 | | | | | | AED SERVICE AGREEMENT 11/2025 | | | |
| | | | | | 139.00 10142000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK 242016 TOTAL: | | | 1,244.52 |
| 242017 | 12/05/2025 | PRTD | 13 | COACHELLA VALLEY WATER DISTRICT | 75844811172025 | 11/19/2025 | | 12052025 | 40.65 |
| Invoice: 75844811172025 | | | | | | SERVICE PE 11/17/2025 (ACCT# 298439-758448) | | | |
| | | | | | 40.65 24281000 7606 | WATER | | | |
| | | | | COACHELLA VALLEY WATER DISTRICT | 56772211172025 | 11/19/2025 | | 12052025 | 618.99 |
| Invoice: 56772211172025 | | | | | | SERVICE PE 11/17/2025 (ACCT# 214945-567722) | | | |
| | | | | | 618.99 24281000 7606 | WATER | | | |
| | | | | | | CHECK 242017 TOTAL: | | | 659.64 |
| 242018 | 12/05/2025 | PRTD | 1902 | COMPLETE PAPERLESS SOLUTIONS, LLC | 4623 | 10/07/2025 | | 12052025 | 58,030.00 |
| Invoice: 4623 | | | | | | LASERFICHE CLOUD SUBSCRIPTION FY 25/26 | | | |
| | | | | | 58,030.00 10156000 7639 | COMPUTER MAINTENANCE | | | |
| | | | | | | CHECK 242018 TOTAL: | | | 58,030.00 |
| 242019 | 12/05/2025 | PRTD | 157 | COUNTY OF RIVERSIDE DEPARTMENT | IN1065902 | 12/01/2025 | | 12052025 | 1,052.00 |
| Invoice: IN1065902 | | | | | | CAL EPA SURCHARGE - FS69 PE 12/31/2026 | | | |
| | | | | | 1,052.00 21500690 8700 | MISC EXPENDITURE | | | |
| | | | | | | CHECK 242019 TOTAL: | | | 1,052.00 |
| 242020 | 12/05/2025 | PRTD | 741 | DAVID BARRY | 2026 RMWF DEPOSIT | 12/03/2025 | | 12052025 | 12,500.00 |
| Invoice: 2026 RMWF DEPOSIT | | | | | | 2026 RMWF DEPOSIT - D BARRY | | | |
| | | | | | 12,500.00 244 7910 | FOUNDATION - PROGRAMS | | | |
| | | | | | | CHECK 242020 TOTAL: | | | 12,500.00 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| 242021 | 12/05/2025 | PRTD | 1491 | DESERT ARC | 20973 | 11/30/2025 | | 12052025 | 335.00 |
| Invoice: 20973 | | | | | | SHREDDING SERVICES PE 11/25/2025 | | | |
| | | | | | 270.00 10112000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | 65.00 24281000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK 242021 TOTAL: | | | 335.00 |
| 242022 | 12/05/2025 | PRTD | 601 | JOSUE CAMPA | 110125 | 11/01/2025 | 20260134 | 12052025 | 600.00 |
| Invoice: 110125 | | | | | | VALET SERVICES 11/01/25 | | | |
| | | | | | 600.00 10172000 7494 | AMPHITHEATER PROGRAMMING | | | |
| | | | | JOSUE CAMPA | 102425 | 10/24/2025 | 20260134 | 12052025 | 1,800.00 |
| Invoice: 102425 | | | | | | VALET SERVICES 10/24-26/25 | | | |
| | | | | | 1,800.00 10172000 7494 | AMPHITHEATER PROGRAMMING | | | |
| | | | | JOSUE CAMPA | 100425 | 10/04/2025 | 20260134 | 12052025 | 1,200.00 |
| Invoice: 100425 | | | | | | VALET SERVICES 10/4/2025 | | | |
| | | | | | 1,200.00 10172000 7494 | AMPHITHEATER PROGRAMMING | | | |
| | | | | | | CHECK 242022 TOTAL: | | | 3,600.00 |
| 242023 | 12/05/2025 | PRTD | 3274 | DO THE RIGHT THING - GREATER PALM | 81486 | 08/25/2025 | | 12052025 | 5,000.00 |
| Invoice: 81486 | | | | | | SUPPORT FOR NON PROFIT | | | |
| | | | | | 1,000.00 | | | | |
| | | | | | E WEILL -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 10157000 7458 | SUPPORT FOR NON-PROFITS | | | |
| | | | | | 1,000.00 | | | | |
| | | | | | E MALLOTTO -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 10157000 7458 | SUPPORT FOR NON-PROFITS | | | |
| | | | | | 1,000.00 | | | | |
| | | | | | E OKEEFE -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 10157000 7458 | SUPPORT FOR NON-PROFITS | | | |
| | | | | | 1,000.00 | | | | |
| | | | | | E EDELSTEIN -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 10157000 7458 | SUPPORT FOR NON-PROFITS | | | |
| | | | | | 1,000.00 | | | | |
| | | | | | E DOWNS -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 10157000 7458 | SUPPORT FOR NON-PROFITS | | | |
| | | | | | | CHECK 242023 TOTAL: | | | 5,000.00 |
| 242024 | 12/05/2025 | PRTD | 2803 | OBK CORPORATION | 00026 | 10/16/2025 | | 12052025 | 171.94 |
| Invoice: 00026 | | | | | | REFRESHMENTS - CITY COUNCIL MEETING 10/16/2025 | | | |
| | | | | | 171.94 10151000 7806 | MEETINGS/TRAINING/TRAVEL | | | |
| | | | | OBK CORPORATION | 063355 | 12/01/2025 | | 12052025 | 127.95 |
| Invoice: 063355 | | | | | | REFRESHMENTS - CITY COUNCIL MEETING 11/20/2025 | | | |
| | | | | | 127.95 10151000 7806 | MEETINGS/TRAINING/TRAVEL | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK 242024 TOTAL: | | | 299.89 |
| 242025 | 12/05/2025 | PRTD | 1714 | DUNN EDWARDS PAINTS | 2019A59470 | 11/18/2025 | | 12052025 | 147.39 |
| | Invoice: 2019A59470 | | | | | PAINT SUPPLIES | | | |
| | | | | | 147.39 10133310 8004 | REPAIR & MAINT SUPPLIES | | | |
| | | | | | | CHECK 242025 TOTAL: | | | 147.39 |
| 242026 | 12/05/2025 | PRTD | 403 | EMCOR SERVICE | 910076775 | 11/21/2025 | 20260014 | 12052025 | 837.23 |
| | Invoice: 910076775 | | | | | HVAC MAINTENANCE 9/23/2025 | | | |
| | | | | | 837.23 21892000 7612 | MAINTENANCE | | | |
| | | | | EMCOR SERVICE | 910077106 | 12/02/2025 | 20260014 | 12052025 | 4,634.60 |
| | Invoice: 910077106 | | | | | REPLACED CHILLER OIL | | | |
| | | | | | 4,634.60 10133300 7612 | MAINTENANCE | | | |
| | | | | | | CHECK 242026 TOTAL: | | | 5,471.83 |
| 242027 | 12/05/2025 | PRTD | 1702 | DEPT OF ENVIRONMENTAL HEALTH | IN1064350 | 12/01/2025 | | 12052025 | 2,778.00 |
| | Invoice: IN1064350 | | | | | ENVIRONMENTAL HEALTH PERMIT CY 2026 | | | |
| | | | | | 2,778.00 28100000 8700 | MISC EXPENDITURE | | | |
| | | | | DEPT OF ENVIRONMENTAL HEALTH | IN1064397 | 12/01/2025 | | 12052025 | 926.00 |
| | Invoice: IN1064397 | | | | | ENVIRONMENTAL HEALTH PERMIT CY 2026 | | | |
| | | | | | 926.00 28600000 8700 | MISC EXPENDITURE | | | |
| | | | | | | CHECK 242027 TOTAL: | | | 3,704.00 |
| 242028 | 12/05/2025 | PRTD | 24 | FEDERAL EXPRESS CORPORATION | 9-075-17178 | 11/21/2025 | | 12052025 | 14.75 |
| | Invoice: 9-075-17178 | | | | | POSTAGE 11/13/2025 | | | |
| | | | | | 14.75 10151000 7869 | EMPLOYEE EVENTS | | | |
| | | | | | | CHECK 242028 TOTAL: | | | 14.75 |
| 242029 | 12/05/2025 | PRTD | 3311 | INLAND SOUTHERN CALIFORNIA UNITED | 81523 | 12/03/2025 | | 12052025 | 3.85 |
| | Invoice: 81523 | | | | | UNITED WAY PE 11/28/25 | | | |
| | | | | | 3.85 101 2250 | DONATIONS-UNITED WAY | | | |
| | | | | | | CHECK 242029 TOTAL: | | | 3.85 |
| 242030 | 12/05/2025 | PRTD | 2876 | IT MANAGEMENT CORPORATION | IN81371 | 12/01/2025 | 20260067 | 12052025 | 1,371.27 |
| | Invoice: IN81371 | | | | | SAAS LICENSE SUBSCRIPTIONS 12/2025 | | | |
| | | | | | 1,371.27 10156000 8028 | COMPUTER ENHANCEMENT | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | INVOICE DTL DESC | | | | | |
| | | | | | | | CHECK | 242030 TOTAL: | 1,371.27 |
| 242031 | 12/05/2025 | PRTD | 36 | JOSLYN CENTER | 81497 | 11/17/2025 | | 12052025 | 250.00 |
| Invoice: 81497 | | | | | | HONORARIUM - JOSLYN SINGERS 12/4/2025 | | | |
| | | | | 250.00 | | | | | |
| | | | | | E LB_MUSIC -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7910 FOUNDATION - PROGRAMS | | | | |
| | | | | | | | CHECK | 242031 TOTAL: | 250.00 |
| 242032 | 12/05/2025 | PRTD | 3366 | LARRY PEDERSEN | 1020 | 12/01/2025 | | 12052025 | 900.00 |
| Invoice: 1020 | | | | | | VIDEOGRAPHY AND POST-PRODUCTION SERVICES 11/2025 | | | |
| | | | | 900.00 | 10156000 7400 PROFESSIONAL/TECHNICAL | | | | |
| | | | | | | | CHECK | 242032 TOTAL: | 900.00 |
| 242033 | 12/05/2025 | PRTD | 2861 | LEADING AUTHORITIES, INC | INV102184 | 10/07/2025 | | 12052025 | 6,000.00 |
| Invoice: INV102184 | | | | | | 2026 RMWF BALANCE - D JOLLY | | | |
| | | | | 6,000.00 | 244 7910 FOUNDATION - PROGRAMS | | | | |
| | | | | | | | CHECK | 242033 TOTAL: | 6,000.00 |
| 242034 | 12/05/2025 | PRTD | 185 | LIEBERT CASSIDY WHITMORE | 309332 | 10/31/2025 | | 12052025 | 1,724.00 |
| Invoice: 309332 | | | | | | LEGAL SERVICES 10/31/2025 | | | |
| | | | | 1,724.00 | 10154000 7400 PROFESSIONAL/TECHNICAL | | | | |
| | | | | | | | CHECK | 242034 TOTAL: | 1,724.00 |
| 242035 | 12/05/2025 | PRTD | 190 | MIDWEST TAPE | 508111133 | 11/30/2025 | | 12052025 | 8,265.69 |
| Invoice: 508111133 | | | | | | HOOPLA DIGITAL MEDIA 11/2025 | | | |
| | | | | 8,265.69 | | | | | |
| | | | | | E LB_ELECT -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7912 FOUNDATION - COLLECTION | | | | |
| | | | | MIDWEST TAPE | 508063311 | 11/21/2025 | | 12052025 | 122.78 |
| Invoice: 508063311 | | | | | | DVDS | | | |
| | | | | 122.78 | | | | | |
| | | | | | E LB_ELECT -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7912 FOUNDATION - COLLECTION | | | | |
| | | | | MIDWEST TAPE | 508082464 | 11/25/2025 | | 12052025 | 53.32 |
| Invoice: 508082464 | | | | | | DVDS | | | |
| | | | | 53.32 | | | | | |
| | | | | | E LB_ELECT -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7912 FOUNDATION - COLLECTION | | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK | 242035 TOTAL: | | 8,441.79 |
| 242036 | 12/05/2025 | PRTD | 2028 | PJ CASTORENA, INC. | 82062 | 10/30/2025 | | 12052025 | 141.60 |
| Invoice: 82062 | | | | | | RMEA MAILINGS O0N1/O0N2 10/22 - 10/29/2025 | | | |
| | | | | | 141.60 600 7842 | ADVERTISING/PUBLISHING | | | |
| | | | | | | CHECK | 242036 TOTAL: | | 141.60 |
| 242037 | 12/05/2025 | PRTD | 895 | NV5 INC | 482508-A | 11/10/2025 | 20260082 | 12052025 | 1,125.00 |
| Invoice: 482508-A | | | | | | ENGINEERING DESIGN SERVICES 10/2025 | | | |
| | | | | | 1,125.00 10131000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 242037 TOTAL: | | 1,125.00 |
| 242038 | 12/05/2025 | PRTD | 2852 | ODP BUSINESS SOLUTIONS, LLC | 443092110001 | 11/19/2025 | | 12052025 | 101.41 |
| Invoice: 443092110001 | | | | | | PAPER, LABEL | | | |
| | | | | | 101.41 10151000 8000 | SUPPLIES | | | |
| | | | | ODP BUSINESS SOLUTIONS, LLC | 444515164001 | 11/20/2025 | | 12052025 | 107.73 |
| Invoice: 444515164001 | | | | | | PAPER | | | |
| | | | | | 107.73 24281000 8000 | SUPPLIES | | | |
| | | | | ODP BUSINESS SOLUTIONS, LLC | 446708669001 | 11/17/2025 | | 12052025 | 159.88 |
| Invoice: 446708669001 | | | | | | COFFEE SUPPLIES, PAPER, PEN | | | |
| | | | | | 159.88 10151000 8000 | SUPPLIES | | | |
| | | | | ODP BUSINESS SOLUTIONS, LLC | 446709518001 | 11/14/2025 | | 12052025 | 49.77 |
| Invoice: 446709518001 | | | | | | VOICE RECORDER | | | |
| | | | | | 49.77 10151000 8000 | SUPPLIES | | | |
| | | | | ODP BUSINESS SOLUTIONS, LLC | 448094811001 | 11/18/2025 | | 12052025 | 121.20 |
| Invoice: 448094811001 | | | | | | PAPER, TAPE | | | |
| | | | | | 121.20 24281000 8000 | SUPPLIES | | | |
| | | | | ODP BUSINESS SOLUTIONS, LLC | 448381281001 | 11/19/2025 | | 12052025 | 56.18 |
| Invoice: 448381281001 | | | | | | ROLLER, PEN,WALL | | | |
| | | | | | 56.18 10151000 8000 | SUPPLIES | | | |
| | | | | | | CHECK | 242038 TOTAL: | | 596.17 |
| 242039 | 12/05/2025 | PRTD | 99999 | AARON ALLBRIGHT | 81379 | 11/24/2025 | | 12052025 | 210.00 |
| Invoice: 81379 | | | | | | REIMBURSEMENT - PET ADOPTION | | | |
| | | | | | 210.00 10157000 7420 | ANIMAL SERVICES | | | |
| | | | | | | CHECK | 242039 TOTAL: | | 210.00 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | INVOICE DTL DESC | | | | |
| 242040 | 12/05/2025 | PRTD | 99999 | MARK JACOB | 81442 | 12/02/2025 | | 12052025 | 10.00 |
| Invoice: 81442 | | | | | REIMBURSEMENT - LIVE SCAN | | | | |
| | | | | 10.00 | 10154000 7860 RECRUITMENT/LIVESCANS | | | | |
| | | | | | CHECK 242040 TOTAL: | | | | 10.00 |
| 242041 | 12/05/2025 | PRTD | 99999 | PAUL HUIZENGA | 81456 | 11/20/2025 | | 12052025 | 27.00 |
| Invoice: 81456 | | | | | REFUND - RMLOF DONATION TRANSACTION FEE | | | | |
| | | | | 27.00 | 243 7438 BANKING SERVICES | | | | |
| | | | | | CHECK 242041 TOTAL: | | | | 27.00 |
| 242042 | 12/05/2025 | PRTD | 99999 | TONI HYAMS | 81376 | 11/24/2025 | | 12052025 | 625.14 |
| Invoice: 81376 | | | | | EPC GO BAG EVENT SUPPLIES | | | | |
| | | | | 625.14 | 10142000 7486 COMMUNITY FORUMS | | | | |
| | | | | | CHECK 242042 TOTAL: | | | | 625.14 |
| 242043 | 12/05/2025 | PRTD | 3383 | PALADIN INVESTIGATIONS & TRAINING | 1076 | 10/13/2025 | | 12052025 | 6,187.50 |
| Invoice: 1076 | | | | | PROFESSIONAL SERVICES PE 11/17/2025 | | | | |
| | | | | 6,187.50 | 10151000 7400 PROFESSIONAL/TECHNICAL | | | | |
| | | | | | CHECK 242043 TOTAL: | | | | 6,187.50 |
| 242044 | 12/05/2025 | PRTD | 472 | PALM SPRINGS OPERA GUILD | 81506 | 11/21/2025 | | 12052025 | 1,200.00 |
| Invoice: 81506 | | | | | HONORARIUM - PALM SPRINGS OPERA GUILD COMPETITION | | | | |
| | | | | 1,200.00 | | | | | |
| | | | | | E LB_MUSIC -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7910 FOUNDATION - PROGRAMS | | | | |
| | | | | | CHECK 242044 TOTAL: | | | | 1,200.00 |
| 242045 | 12/05/2025 | PRTD | 2120 | STEVEN K SALMACIA | 17612 | 11/19/2025 | | 12052025 | 450.00 |
| Invoice: 17612 | | | | | PIANO TUNNING 11/12/2025, 11/19/2025 | | | | |
| | | | | 450.00 | | | | | |
| | | | | | E LB_MUSIC -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7910 FOUNDATION - PROGRAMS | | | | |
| | | | | | CHECK 242045 TOTAL: | | | | 450.00 |
| 242046 | 12/05/2025 | PRTD | 181 | PLANT MASTERS INC | 00012250 | 11/30/2025 | | 12052025 | 175.00 |
| Invoice: 00012250 | | | | | PLANT MAINTENANCE 11/2025 | | | | |
| | | | | 175.00 | 24281000 7612 MAINTENANCE | | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK | 242046 TOTAL: | | 175.00 |
| 242047 | 12/05/2025 | PRTD | 5 | POWERS AWARDS | 162825 | 12/01/2025 | | 12052025 | 56.41 |
| Invoice: 162825 | | | | | | NAME PLATE - MAYOR/COUNCIL | | | |
| | | | | | 56.41 10111000 8000 | SUPPLIES | | | |
| | | | | | | CHECK | 242047 TOTAL: | | 56.41 |
| 242048 | 12/05/2025 | PRTD | 49 | THE PRINTING PLACE | 251566B | 11/26/2025 | | 12052025 | 1,820.98 |
| Invoice: 251566B | | | | | | ENVELOPES | | | |
| | | | | | 1,820.98 10155000 8000 | SUPPLIES | | | |
| | | | | | | CHECK | 242048 TOTAL: | | 1,820.98 |
| 242049 | 12/05/2025 | PRTD | 2680 | RENEGADE PEST CONTROL INC | 48606 | 11/19/2025 | | 12052025 | 175.00 |
| Invoice: 48606 | | | | | | PEST CONTROL 11/19/2025 | | | |
| | | | | | 175.00 10133320 7612 | MAINTENANCE | | | |
| | | | | | | CHECK | 242049 TOTAL: | | 175.00 |
| 242050 | 12/05/2025 | PRTD | 61 | SOUTHERN CALIFORNIA EDISON COMPAN | 351811122025 | 11/19/2025 | | 12052025 | 2,006.26 |
| Invoice: 351811122025 | | | | | | SERVICE PE 11/12/2025 (ACCT #700409463518) | | | |
| | | | | | 2,006.26 201 7603 | ELECTRICITY | | | |
| | | | | SOUTHERN CALIFORNIA EDISON COMPAN | 593211162025 | 11/19/2025 | | 12052025 | 214.50 |
| Invoice: 593211162025 | | | | | | SERVICE PE 11/16/2025 (ACCT #700310815932) | | | |
| | | | | | 214.50 201 7603 | ELECTRICITY | | | |
| | | | | SOUTHERN CALIFORNIA EDISON COMPAN | 603511162025 | 11/19/2025 | | 12052025 | 1,969.12 |
| Invoice: 603511162025 | | | | | | SERVICE PE 11/16/2025 (ACCT #700100656035) | | | |
| | | | | | 1,969.12 21500690 7603 | ELECTRICITY | | | |
| | | | | SOUTHERN CALIFORNIA EDISON COMPAN | 533611172025 | 11/20/2025 | | 12052025 | 246.47 |
| Invoice: 533611172025 | | | | | | SERVICE PE 11/17/2025 (ACCT #700013705336) | | | |
| | | | | | 246.47 201 7603 | ELECTRICITY | | | |
| | | | | | | CHECK | 242050 TOTAL: | | 4,436.35 |
| 242051 | 12/05/2025 | PRTD | 62 | SOUTHERN CALIFORNIA GAS COMPANY | 6818711172025 | 11/19/2025 | | 12052025 | 1,116.50 |
| Invoice: 6818711172025 | | | | | | SERVICE PE 11/17/2025 (ACCT# 106 253 6818 7) | | | |
| | | | | | 1,116.50 24281000 7600 | NATURAL GAS | | | |
| | | | | | | CHECK | 242051 TOTAL: | | 1,116.50 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | INVOICE DTL DESC | | | | |
| 242052 | 12/05/2025 | PRTD | 234 | DESERT LIMNOLOGISTS INC | 10-23816 | 09/20/2025 | 20260004 | 12052025 | 147.00 |
| | Invoice: 10-23816 | | | | | POND MAINTENANCE - WOLFSON PARK 8/2025 | | | |
| | | | | | 147.00 21893000 7612 | MAINTENANCE | | | |
| | | | | | | CHECK | 242052 TOTAL: | | 147.00 |
| 242053 | 12/05/2025 | PRTD | 457 | STATE OF CALIF ENERGY RESOURCES | 12399 | 11/06/2025 | | 12052025 | 11,460.16 |
| | Invoice: 12399 | | | | | 1% LOAN INSTALLMENT FOR CHILLER | | | |
| | | | | | 11,460.16 24281000 8221 | LIABILITY PAYMENT | | | |
| | | | | | | CHECK | 242053 TOTAL: | | 11,460.16 |
| 242054 | 12/05/2025 | PRTD | 153 | STATE WATER RESOURCES CONTROL | WD-0310091 | 11/19/2025 | | 12052025 | 4,439.00 |
| | Invoice: WD-0310091 | | | | | ANNUAL PERMIT FEE - INDEX NO: 691562 FY 2026 | | | |
| | | | | | 4,439.00 248 7854 | ANNUAL ADMINISTRATIVE FEE | | | |
| | | | | | | CHECK | 242054 TOTAL: | | 4,439.00 |
| 242055 | 12/05/2025 | PRTD | 2471 | STEPHANIE TRICK | 81507 | 11/21/2025 | | 12052025 | 1,600.00 |
| | Invoice: 81507 | | | | | HONORARIUM - FOUR HANDS JAZZ PIANO 1/7/2026 | | | |
| | | | | | 1,600.00 | | | | |
| | | | | | E LB_MUSIC -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7910 | FOUNDATION - PROGRAMS | | | |
| | | | | | | CHECK | 242055 TOTAL: | | 1,600.00 |
| 242056 | 12/05/2025 | PRTD | 2844 | STEVEN C SMITH | 81508 | 11/21/2025 | | 12052025 | 1,000.00 |
| | Invoice: 81508 | | | | | HONORARIUM - HITCHCOCK & HERRMANN 1/12/2026 | | | |
| | | | | | 1,000.00 | | | | |
| | | | | | E LL_LECTURE-UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7919 | FOUNDATN-LITERARY LEGACY | | | |
| | | | | | | CHECK | 242056 TOTAL: | | 1,000.00 |
| 242057 | 12/05/2025 | PRTD | 816 | BRUCE SWAN | 81393 | 11/25/2025 | | 12052025 | 1,850.00 |
| | Invoice: 81393 | | | | | CLEAN/WAX - PYRAMID STRUCTURE | | | |
| | | | | | 1,850.00 21895000 7612 | MAINTENANCE | | | |
| | | | | | | CHECK | 242057 TOTAL: | | 1,850.00 |
| 242058 | 12/05/2025 | PRTD | 9 | UNITED RENTALS (NORTH AMERICA) IN | 255553894-001 | 11/18/2025 | | 12052025 | 290.67 |
| | Invoice: 255553894-001 | | | | | SCISSOR LIFT MAINTENANCE - LIBRARY 11/13/2025 | | | |
| | | | | | 290.67 24281000 7612 | MAINTENANCE | | | |
| | | | | UNITED RENTALS (NORTH AMERICA) IN | 255212150-001 | 11/18/2025 | | 12052025 | 478.18 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | INVOICE DTL DESC | |
| | Invoice: 255212150-001 | | | | | | | SCISSOR LIFT MAINTENANCE - LIBRARY 11/3/2025 | |
| | | | | 478.18 24281000 7612 | | | | MAINTENANCE | |
| | | | | UNITED RENTALS (NORTH AMERICA) IN | 255212280-001 | 11/18/2025 | | 12052025 | 640.64 |
| | Invoice: 255212280-001 | | | | | | | SCISSOR LIFT MAINTENANCE - LIBRARY 11/5/2025 | |
| | | | | 640.64 24281000 7612 | | | | MAINTENANCE | |
| | | | | | | | | CHECK 242058 TOTAL: | 1,409.49 |
| 242059 | 12/05/2025 | PRTD | 480 | US BANK | 7977857 | 11/25/2025 | | 12052025 | 4,075.00 |
| | Invoice: 7977857 | | | | | | | ADMIN FEES PE 10/31/2026 | |
| | | | | 4,075.00 720 7440 | | | | BOND SERVICING | |
| | | | | | | | | CHECK 242059 TOTAL: | 4,075.00 |
| 242060 | 12/05/2025 | PRTD | 3251 | VINCENT STOPPIA | 81510 | 11/21/2025 | | 12052025 | 250.00 |
| | Invoice: 81510 | | | | | | | HONORARIUM - PALM SPRINGS TUNED 1/13/2026 | |
| | | | | 250.00 10157000 7875 | | | | CULTURAL SPECIAL EVENTS | |
| | | | | | | | | CHECK 242060 TOTAL: | 250.00 |
| 242061 | 12/05/2025 | PRTD | 2119 | VIVID STAGING SOLUTIONS | INV-01685 | 11/09/2025 | 20260136 | 12052025 | 2,350.00 |
| | Invoice: INV-01685 | | | | | | | LIGHTING & SOUND - CV SYMPHONY 11/1/2025 | |
| | | | | 2,350.00 10172000 7494 | | | | AMPHITHEATER PROGRAMMING | |
| | | | | VIVID STAGING SOLUTIONS | INV-01667 | 10/18/2025 | 20260136 | 12052025 | 6,554.61 |
| | Invoice: INV-01667 | | | | | | | LIGHTING & SOUND - FY 2026 LOAD IN | |
| | | | | 6,554.61 10172000 7494 | | | | AMPHITHEATER PROGRAMMING | |
| | | | | | | | | CHECK 242061 TOTAL: | 8,904.61 |
| 242062 | 12/05/2025 | PRTD | 213 | WASHINGTON SPEAKERS BUREAU INC | 139977 | 11/21/2025 | | 12052025 | 48.75 |
| | Invoice: 139977 | | | | | | | SMOG | |
| | | | | 48.75 10133000 7624 | | | | VEHICLE MAINTENANCE | |
| | | | | | | | | CHECK 242062 TOTAL: | 48.75 |
| 242063 | 12/05/2025 | PRTD | 2007 | WESTERN AUDIO VISUAL | 23473 | 11/17/2025 | | 12052025 | 9,527.69 |
| | Invoice: 23473 | | | | | | | SOFTWARE MAINTENANCE - WAV PE 11/14/2026 | |
| | | | | 9,527.69 10156000 7639 | | | | COMPUTER MAINTENANCE | |
| | | | | | | | | CHECK 242063 TOTAL: | 9,527.69 |
| 242064 | 12/05/2025 | PRTD | 2881 | WELTYS ENTERPRISES, INC | 25-75292 | 11/16/2025 | | 12052025 | 1,257.98 |
| | Invoice: 25-75292 | | | | | | | 2026 RMWF BADGES | |
| | | | | 1,257.98 244 7839 | | | | REPRODUCTION & PRINTING | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | WELTYS ENTERPRISES, INC | 25-7558 | 11/25/2025 | | 12052025 | 232.27 |
| | Invoice: 25-7558 | | | | | RMWF BOOK COVER POSTERS | | | |
| | | | | 232.27 244 7839 | | REPRODUCTION & PRINTING | | | |
| | | | | WELTYS ENTERPRISES, INC | 25-75285 | 11/16/2025 | 20260045 | 12052025 | 8,574.80 |
| | Invoice: 25-75285 | | | | | QUARTERLY PROGRAM BOOKLETS FY 25/26 | | | |
| | | | | 8,574.80 243 7839 | | REPRODUCTION & PRINTING | | | |
| | | | | | | CHECK 242064 TOTAL: | | | 10,065.05 |
| 242065 | 12/05/2025 | PRTD | 129 | ZUMAR INDUSTRIES INC | 11287 | 11/19/2025 | | 12052025 | 1,380.73 |
| | Invoice: 11287 | | | | | STREET SIGN | | | |
| | | | | 1,380.73 10132000 8003 | | STREET SIGNS & MARKINGS | | | |
| | | | | | | CHECK 242065 TOTAL: | | | 1,380.73 |
| | | | | | NUMBER OF CHECKS 99 | *** CASH ACCOUNT TOTAL *** | | | 734,767.99 |

| | COUNT | AMOUNT |
|---|---|---|
| TOTAL PRINTED CHECKS | 56 | 197,689.10 |
| TOTAL EFT'S | 43 | 537,078.89 |

*** GRAND TOTAL *** 734,767.99

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | INVOICE DTL DESC | | | |
| 9332 | 12/12/2025 | EFT | 3317 | UNBOUND EVENTS INC | 7535 | 12/08/2025 | | 12122025 | 3,250.00 |
| Invoice: 7535 | | | | | | 2026 RMWF BALANCE - J SATOW | | | |
| | | | | 3,250.00 244 7910 | | FOUNDATION - PROGRAMS | | | |
| | | | | | | CHECK | 9332 TOTAL: | | 3,250.00 |
| 9333 | 12/12/2025 | EFT | 1657 | CARDIFF TRANSPORTATION | 145858 | 11/03/2025 | | 12122025 | 259.60 |
| Invoice: 145858 | | | | | | TRANSPORTATION SERVICES - E. WEINSTEIN 11/3/2025 | | | |
| | | | | 259.60 244 8700 | | MISC EXPENDITURE | | | |
| | | | | CARDIFF TRANSPORTATION | 146538 | 12/02/2025 | | 12122025 | 223.85 |
| Invoice: 146538 | | | | | | TRANSPORTATION SERVICES - D. BERRY 12/2/2025 | | | |
| | | | | 223.85 244 7910 | | FOUNDATION - PROGRAMS | | | |
| | | | | CARDIFF TRANSPORTATION | 145857 | 11/20/2025 | | 12122025 | 1,599.00 |
| Invoice: 145857 | | | | | | TRANSPORTATION SERVICES - J. ROBERSON 11/20/2025 | | | |
| | | | | 1,599.00 244 7887 | | SPECIAL EVENTS | | | |
| | | | | CARDIFF TRANSPORTATION | 144921 | 12/09/2025 | | 12122025 | 878.80 |
| Invoice: 144921 | | | | | | TRANSPORTATION - RMWF WRITERS SERIES 12/09/2025 | | | |
| | | | | 878.80 244 7887 | | SPECIAL EVENTS | | | |
| | | | | CARDIFF TRANSPORTATION | 144922 | 12/09/2025 | | 12122025 | 864.30 |
| Invoice: 144922 | | | | | | TRANSPORTATION - RMWF WRITERS SERIES 12/09/2025 | | | |
| | | | | 864.30 244 7887 | | SPECIAL EVENTS | | | |
| | | | | | | CHECK | 9333 TOTAL: | | 3,825.55 |
| 9334 | 12/12/2025 | EFT | 1523 | CDW GOVERNMENT INC | ZR00992535 | 12/01/2025 | 20260075 | 12122025 | 1,562.60 |
| Invoice: ZR00992535 | | | | | | ACRONIS DISASTER BACKUP 11/2025 | | | |
| | | | | 1,562.60 10156000 7639 | | COMPUTER MAINTENANCE | | | |
| | | | | | | CHECK | 9334 TOTAL: | | 1,562.60 |
| 9335 | 12/12/2025 | EFT | 3257 | CHARGEPOINT INC | IN382216 | 12/02/2025 | | 12122025 | 3,700.00 |
| Invoice: IN382216 | | | | | | EV CHARGING STATION | | | |
| | | | | 3,700.00 600 7426 | | SUSTAINABILITY REBATES & PRGRM | | | |
| | | | | | | CHECK | 9335 TOTAL: | | 3,700.00 |
| 9336 | 12/12/2025 | EFT | 2860 | CHARTER COMMUNICATIONS HOLDINGS, | 187879401112125 | 11/21/2025 | | 12122025 | 3,517.80 |
| Invoice: 187879401112125 | | | | | | SERVICE PE 12/20/2025 (ACCT # 187879401) | | | |
| | | | | 3,517.80 10151000 7826 | | INTERNET ACCESS & SERVICE | | | |
| | | | | CHARTER COMMUNICATIONS HOLDINGS, | 129838601120125 | 12/01/2025 | | 12122025 | 5.51 |
| Invoice: 129838601120125 | | | | | | SERVICE PE 12/31/2025 (ACCT# 129838601) | | | |
| | | | | 5.51 10151000 7824 | | COMMUNICATION MAIN/SERV | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | INVOICE DTL DESC | | | | |
| | | | | CHARTER COMMUNICATIONS HOLDINGS, | 189394201120125 | 12/01/2025 | | 12122025 | 38.24 |
| Invoice: 189394201120125 | | | | | | SERVICE PE 12/31/2025 (ACCT# 189394201) | | | |
| | | | | | 38.24 21500690 7826 | INTERNET ACCESS & SERVICE | | | |
| | | | | | | CHECK | 9336 | TOTAL: | 3,561.55 |
| 9337 | 12/12/2025 | EFT | 134 | CHILDRENS DISCOVERY MUSEUM OF | 81607 | 12/08/2025 | | 12122025 | 1,000.00 |
| Invoice: 81607 | | | | | | SUPPORT FOR NON-PROFIT | | | |
| | | | | | 1,000.00 10157000 7458 | SUPPORT FOR NON-PROFITS | | | |
| | | | | | | CHECK | 9337 | TOTAL: | 1,000.00 |
| 9338 | 12/12/2025 | EFT | 2473 | CHRISTOPHER CHANDLER | 81635 | 12/05/2025 | | 12122025 | 241.28 |
| Invoice: 81635 | | | | | | EXP REIMB - INSPECTOR TOOLS | | | |
| | | | | | 241.28 10122000 8012 | SMALL TOOLS, FURN & EQUIP | | | |
| | | | | | | CHECK | 9338 | TOTAL: | 241.28 |
| 9339 | 12/12/2025 | EFT | 274 | CORELOGIC INFORMATION SOLUTIONS I | 30823900 | 11/30/2025 | | 12122025 | 402.74 |
| Invoice: 30823900 | | | | | | REAL QUEST PROPERTY SERVICE PE 11/30/2025 | | | |
| | | | | | 402.74 10156000 7818 | DUES & SUBSCRIPTIONS | | | |
| | | | | | | CHECK | 9339 | TOTAL: | 402.74 |
| 9340 | 12/12/2025 | EFT | 96 | ENTERPRISE RENT A CAR | 40579009 | 11/30/2025 | | 12122025 | 2,751.86 |
| Invoice: 40579009 | | | | | | SHERIFF VEHICLE RENTAL PE 11/10/2025 | | | |
| | | | | | 2,751.86 10141000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 9340 | TOTAL: | 2,751.86 |
| 9341 | 12/12/2025 | EFT | 73 | ESGIL, LLC | 2894171 | 12/02/2025 | 20260049 | 12122025 | 18,067.73 |
| Invoice: 2894171 | | | | | | PLAN REVIEW SERVICES 11/2025 | | | |
| | | | | | 18,067.73 10122000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 9341 | TOTAL: | 18,067.73 |
| 9342 | 12/12/2025 | EFT | 2875 | GEOTAB USA INC | IN461829 | 11/30/2025 | 20260048 | 12122025 | 770.25 |
| Invoice: IN461829 | | | | | | FLEET MONITORING DATABASE 11/2025 | | | |
| | | | | | 711.00 10133000 7624 | VEHICLE MAINTENANCE | | | |
| | | | | | 59.25 10141000 7550 | CITY-WIDE COPS PROGRAM | | | |
| | | | | | | CHECK | 9342 | TOTAL: | 770.25 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | INVOICE DTL DESC | | | | | |
| 9343 | 12/12/2025 | EFT | 1287 | ENDEAVOR PARENT LLC | 07102402JH-01 | 12/05/2025 | | 12122025 | 3,091.96 |
| Invoice: 07102402JH-01 | | | | | | 2026 RMWF TRAVEL REIMBURSEMENT - C BLOW | | | |
| | | | | 3,091.96 244 7910 | | FOUNDATION - PROGRAMS | | | |
| | | | | | | CHECK | 9343 | TOTAL: | 3,091.96 |
| 9344 | 12/12/2025 | EFT | 3023 | MARK D HENSLEY | 11269 | 12/01/2025 | | 12122025 | 2,730.00 |
| Invoice: 11269 | | | | | | LEGAL SERVICES PE 11/30/2025 | | | |
| | | | | 2,730.00 28000000 7400 | | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 9344 | TOTAL: | 2,730.00 |
| 9345 | 12/12/2025 | EFT | 2738 | HR GREEN PACIFIC INC | 196273 | 12/09/2025 | 20260044 | 12122025 | 4,795.80 |
| Invoice: 196273 | | | | | | SURVEY/CIVIL ENGINEERING PLAN REVIEW PE 11/28/2025 | | | |
| | | | | 4,795.80 10131000 7400 | | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 9345 | TOTAL: | 4,795.80 |
| 9346 | 12/12/2025 | EFT | 3409 | JOSEPH SYSTEMS INC | 2512-PROJECT | 12/03/2025 | | 12122025 | 3,990.00 |
| Invoice: 2512-PROJECT | | | | | | MICRSOFT CONFIGURATION | | | |
| | | | | 3,990.00 10156000 7400 | | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 9346 | TOTAL: | 3,990.00 |
| 9347 | 12/12/2025 | EFT | 2452 | JACOB DE LA CRUZ | 81590 | 12/05/2025 | | 12122025 | 2,492.90 |
| Invoice: 81590 | | | | | | REIMBURSEMENT-ACTIVE CELL CONFERENCE 12/1 - 3/2025 | | | |
| | | | | 2,492.90 10155000 7806 | | MEETINGS/TRAINING/TRAVEL | | | |
| | | | | | | CHECK | 9347 | TOTAL: | 2,492.90 |
| 9348 | 12/12/2025 | EFT | 645 | KIMLEY-HORN & ASSOCIATES INC | 33680357 | 08/30/2025 | 20260046 | 12122025 | 30,818.75 |
| Invoice: 33680357 | | | | | | RM TS INTERCONNECT DESIGN SERVICES PE PE 8/30/2025 | | | |
| | | | | 30,818.75 10134000 9524 | | CTYWD TRF SIGL INT CNTRL | | | |
| | | | | | | CHECK | 9348 | TOTAL: | 30,818.75 |
| 9349 | 12/12/2025 | EFT | 3144 | LEADSONLINE PARENT LLC | 422411 | 11/15/2025 | | 12122025 | 5,889.00 |
| Invoice: 422411 | | | | | | CELLHAWK SVC RENEWAL- RIV CO SHERIFF PE 1/31/2027 | | | |
| | | | | 5,889.00 10141000 7400 | | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 9349 | TOTAL: | 5,889.00 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| 9350 | 12/12/2025 | EFT | 1317 | MISSION LINEN SUPPLY | 525092624 | 12/05/2025 | 20260009 | 12122025 | 41.00 |
| Invoice: 525092624 | | | | | | BI-WEEKLY RENTAL SERVICE | | | |
| | | | | 41.00 21500500 8002 | | EQUIPMENT RENTAL | | | |
| | | | | MISSION LINEN SUPPLY | 525092635 | 12/05/2025 | 20260009 | 12122025 | 30.00 |
| Invoice: 525092635 | | | | | | BI-WEEKLY RENTAL SERVICE | | | |
| | | | | 30.00 24281000 8002 | | EQUIPMENT RENTAL | | | |
| | | | | MISSION LINEN SUPPLY | 525092622 | 12/05/2025 | 20260009 | 12122025 | 54.00 |
| Invoice: 525092622 | | | | | | BI-WEEKLY RENTAL SERVICE | | | |
| | | | | 54.00 10133300 8002 | | EQUIPMENT RENTAL | | | |
| | | | | | | CHECK | 9350 TOTAL: | | 125.00 |
| 9351 | 12/12/2025 | EFT | 295 | OVERDRIVE INC | 01187DA25383640 | 12/02/2025 | | 12122025 | 252.48 |
| Invoice: 01187DA25383640 | | | | | | EBOOKS & AUDIOBOOKS | | | |
| | | | | 252.48 | | | | | |
| | | | | | E LB_ELECT -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7912 | FOUNDATION - COLLECTION | | | |
| | | | | OVERDRIVE INC | 01187CO25381043 | 12/01/2025 | | 12122025 | 692.83 |
| Invoice: 01187CO25381043 | | | | | | EBOOKS & AUDIOBOOKS | | | |
| | | | | 692.83 | | | | | |
| | | | | | E LB_ELECT -UNDEFINED -UNDEFINED -UNDEFINED | | | | |
| | | | | | 24281000 7912 | FOUNDATION - COLLECTION | | | |
| | | | | | | CHECK | 9351 TOTAL: | | 945.31 |
| 9352 | 12/12/2025 | EFT | 3391 | PACIFIC COAST PROPANE LLC | 8727 | 11/30/2025 | | 12122025 | 5.00 |
| Invoice: 8727 | | | | | | CAGE RENTAL 11/30/2025 | | | |
| | | | | 5.00 10133310 8004 | | REPAIR & MAINT SUPPLIES | | | |
| | | | | | | CHECK | 9352 TOTAL: | | 5.00 |
| 9353 | 12/12/2025 | EFT | 2370 | ROBERT STIFF | 25-301 | 12/06/2025 | 20260133 | 12122025 | 1,500.00 |
| Invoice: 25-301 | | | | | | MOON BALLOONS - CABERET #1 12/6/2025 | | | |
| | | | | 1,500.00 10172000 7494 | | AMPHITHEATER PROGRAMMING | | | |
| | | | | ROBERT STIFF | 25-306 | 12/12/2025 | 20260133 | 12122025 | 450.00 |
| Invoice: 25-306 | | | | | | MOON BALLOONS - HOLIDAY FARMERS MARKET 12/12/2025 | | | |
| | | | | 450.00 10172000 7494 | | AMPHITHEATER PROGRAMMING | | | |
| | | | | | | CHECK | 9353 TOTAL: | | 1,950.00 |
| 9354 | 12/12/2025 | EFT | 2165 | JESSICA PULLIAM | 81636 | 12/09/2025 | | 12122025 | 707.16 |
| Invoice: 81636 | | | | | | EXP REIMB - CAL CHOICE ENERGY CONFERENCE | | | |
| | | | | 707.16 600 7806 | | MEETINGS/TRAINING/TRAVEL | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK | 9354 TOTAL: | | 707.16 |
| 9355 | 12/12/2025 | EFT | 728 | FIRE PROTECTION SERVICE CORPORATI | 7494655 | 12/04/2025 | | 12122025 | 378.87 |
| Invoice: 7494655 | | | | | | DATA MODULE INSTALLATION - CITY YARD | | | |
| | | | | | 378.87 10133310 7612 | MAINTENANCE | | | |
| | | | | FIRE PROTECTION SERVICE CORPORATI | 7494669 | 12/04/2025 | | 12122025 | 330.00 |
| Invoice: 7494669 | | | | | | ANNUAL INSPECTION - CITY YARD | | | |
| | | | | | 330.00 10133310 7612 | MAINTENANCE | | | |
| | | | | | | CHECK | 9355 TOTAL: | | 708.87 |
| 9356 | 12/12/2025 | EFT | 50 | RANCHO MIRAGE CHAMBER OF COMMERCE | 116346 | 12/08/2025 | 20260008 | 12122025 | 15,000.00 |
| Invoice: 116346 | | | | | | 2026 RAMMY AWARDS SPONSORSHIP | | | |
| | | | | | 15,000.00 10172000 7468 | CHAMBER OF COMMERCE | | | |
| | | | | | | CHECK | 9356 TOTAL: | | 15,000.00 |
| 9357 | 12/12/2025 | EFT | 934 | MATTHEW REYNOLDS | 81634 | 12/04/2025 | | 12122025 | 259.82 |
| Invoice: 81634 | | | | | | EXP REIMB - CVAG TRAINING LUNCH | | | |
| | | | | | 259.82 10132000 7806 | MEETINGS/TRAINING/TRAVEL | | | |
| | | | | | | CHECK | 9357 TOTAL: | | 259.82 |
| 9358 | 12/12/2025 | EFT | 626 | JUSTIN RUBERG | 77549 | 08/11/2025 | | 12122025 | 81.17 |
| Invoice: 77549 | | | | | | MEAL REIMBURSEMENT - STAFF LUNCH | | | |
| | | | | | 81.17 10153000 7595 | DESERT RESOURCE CENTER | | | |
| | | | | | | CHECK | 9358 TOTAL: | | 81.17 |
| 9359 | 12/12/2025 | EFT | 3350 | UNIVERSAL CONSTRUCTION AND ENGINE | 2513-4 | 10/31/2025 | 20260096 | 12122025 | 230,301.39 |
| Invoice: 2513-4 | | | | | | CP 22-378: PUBLIC PARKING IMPROVEMENTS 10/31/2025 | | | |
| | | | | | 242,422.51 10134000 9003 | PUBLIC PARKING LOT IMPROVEMENT | | | |
| | | | | | -12,121.12 101 2050 | RETENTION PAYABLE | | | |
| | | | | UNIVERSAL CONSTRUCTION AND ENGINE | 2513-5 | 11/30/2025 | 20260096 | 12122025 | 522,501.02 |
| Invoice: 2513-5 | | | | | | CP 22-378: PUBLIC PARKING IMPROVEMENTS 11/30/2025 | | | |
| | | | | | 550,001.08 10134000 9003 | PUBLIC PARKING LOT IMPROVEMENT | | | |
| | | | | | -27,500.06 101 2050 | RETENTION PAYABLE | | | |
| | | | | | | CHECK | 9359 TOTAL: | | 752,802.41 |
| 9360 | 12/12/2025 | EFT | 121 | UNITED PARCEL SERVICE | 0000E405A5475 | 11/22/2025 | | 12122025 | 25.00 |
| Invoice: 0000E405A5475 | | | | | | EXPRESS MAIL 11/1/2025 | | | |
| | | | | | 25.00 10151000 8000 | SUPPLIES | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK | 9360 TOTAL: | | 25.00 |
| 9361 | 12/12/2025 | EFT | 2889 | VINTAGE ASSOCIATES INC | 239251 | 12/01/2025 | 20260068 | 12122025 | 9,500.00 |
| | Invoice: 239251 | | | | 9,500.00 28600000 7612 | LANDSCAPE MAINTENANCE - SAN JACINTO VILLAS 12/2025 MAINTENANCE | | | |
| | | | | VINTAGE ASSOCIATES INC | 239249 | 12/01/2025 | 20260071 | 12122025 | 11,000.00 |
| | Invoice: 239249 | | | | 11,000.00 28100000 7612 | LANDSCAPE MAINTENANCE - PARKVIEW VILLAS 12/2025 MAINTENANCE | | | |
| | | | | VINTAGE ASSOCIATES INC | 239248 | 12/01/2025 | 20260070 | 12122025 | 4,300.00 |
| | Invoice: 239248 | | | | 4,300.00 28300000 7612 | LANDSCAPE MAINTENANCE - WHISPERING WATERS 12/2025 MAINTENANCE | | | |
| | | | | VINTAGE ASSOCIATES INC | 239247 | 12/01/2025 | 20260069 | 12122025 | 4,800.00 |
| | Invoice: 239247 | | | | 4,800.00 28400000 7612 | LANDSCAPE MAINTENANCE - SANTA ROSA VILLAS 12/2025 MAINTENANCE | | | |
| | | | | | | CHECK | 9361 TOTAL: | | 29,600.00 |
| 9362 | 12/12/2025 | EFT | 1542 | WAXIE SANITARY SUPPLY | 83674780 | 12/05/2025 | | 12122025 | 1,193.71 |
| | Invoice: 83674780 | | | | 1,193.71 24281000 8000 | JANITORIAL SUPPLIES SUPPLIES | | | |
| | | | | | | CHECK | 9362 TOTAL: | | 1,193.71 |
| 9363 | 12/12/2025 | EFT | 2978 | YESENIA AMADOR | 81631 | 12/09/2025 | | 12122025 | 37.90 |
| | Invoice: 81631 | | | | 37.90 10151000 7869 | REFRESHMENTS - STAFF MEETING 12/9/2025 EMPLOYEE EVENTS | | | |
| | | | | | | CHECK | 9363 TOTAL: | | 37.90 |
| 242066 | 12/12/2025 | PRTD | 2888 | UNIVERSAL BUILDING MAINTENANCE, L | 17844830 | 12/06/2025 | 20260111 | 12122025 | 100.00 |
| | Invoice: 17844830 | | | | 100.00 107 7872 | JANITORIAL SERVICES 11/14/2025 PUBLIC RELATIONS | | | |
| | | | | UNIVERSAL BUILDING MAINTENANCE, L | 17844831 | 12/06/2025 | 20260111 | 12122025 | 200.00 |
| | Invoice: 17844831 | | | | 200.00 10172000 7494 | JANITORIAL SERVICES 11/30/2025 AMPHITHEATER PROGRAMMING | | | |
| | | | | UNIVERSAL BUILDING MAINTENANCE, L | 17844832 | 12/06/2025 | 20260111 | 12122025 | 100.00 |
| | Invoice: 17844832 | | | | 100.00 107 7872 | JANITORIAL SERVICES 11/21/2025 PUBLIC RELATIONS | | | |
| | | | | UNIVERSAL BUILDING MAINTENANCE, L | 17844833 | 12/06/2025 | 20260111 | 12122025 | 225.00 |
| | Invoice: 17844833 | | | | 225.00 10172000 7494 | JANITORIAL SERVICES 11/30/2025 AMPHITHEATER PROGRAMMING | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | INVOICE DTL DESC | | | | |
| | | | | UNIVERSAL BUILDING MAINTENANCE, L | 17844834 | 12/06/2025 | 20260111 | 12122025 | 200.00 |
| | Invoice: 17844834 | | | | | JANITORIAL SERVICES 11/26/2025 | | | |
| | | | | | 200.00 10172000 7494 | AMPHITHEATER PROGRAMMING | | | |
| | | | | UNIVERSAL BUILDING MAINTENANCE, L | 17846224 | 12/04/2025 | 20260111 | 12122025 | 13,152.06 |
| | Invoice: 17846224 | | | | | JANITORIAL SERVICES 12/31/2025 | | | |
| | | | | | 4,533.39 10133300 7612 | MAINTENANCE | | | |
| | | | | | 968.82 10133310 7612 | MAINTENANCE | | | |
| | | | | | 7,220.71 24281000 7612 | MAINTENANCE | | | |
| | | | | | 429.14 24282000 7613 | OBSERVATORY MAINTENANCE | | | |
| | | | | | | CHECK | 242066 TOTAL: | | 13,977.06 |
| 242067 | 12/12/2025 | PRTD | 199 | DBA EDWARD S. BABCOCK & SONS, INC | CL50274-2391M | 12/05/2025 | | 12122025 | 882.04 |
| | Invoice: CL50274-2391M | | | | | ANNUAL TEST - VEHICLE WASH CLARIFIER | | | |
| | | | | | 882.04 10133310 8700 | MISC EXPENDITURE | | | |
| | | | | | | CHECK | 242067 TOTAL: | | 882.04 |
| 242068 | 12/12/2025 | PRTD | 3403 | CHEERS COFFEE LLC | 0002 | 12/05/2025 | | 12122025 | 4,377.32 |
| | Invoice: 0002 | | | | | REFRESHMENTS - HOLIDAY SHOW 12/5/2025 | | | |
| | | | | | 4,377.32 107 7478 | MARKETING PROGRAM | | | |
| | | | | | | CHECK | 242068 TOTAL: | | 4,377.32 |
| 242069 | 12/12/2025 | PRTD | 275 | CINTAS DOCUMENT MANAGEMENT | 5306162004 | 12/04/2025 | | 12122025 | 112.60 |
| | Invoice: 5306162004 | | | | | FIRST AID SUPPLIES | | | |
| | | | | | 112.60 10133310 8000 | SUPPLIES | | | |
| | | | | CINTAS DOCUMENT MANAGEMENT | 5306162007 | 12/04/2025 | | 12122025 | 675.18 |
| | Invoice: 5306162007 | | | | | FIRST AID SUPPLIES | | | |
| | | | | | 675.18 24281000 8000 | SUPPLIES | | | |
| | | | | | | CHECK | 242069 TOTAL: | | 787.78 |
| 242070 | 12/12/2025 | PRTD | 275 | CINTAS DOCUMENT MANAGEMENT | 5306708001 | 12/08/2025 | | 12122025 | 95.99 |
| | Invoice: 5306708001 | | | | | FIRST AID SUPPLIES | | | |
| | | | | | 95.99 10133310 8000 | SUPPLIES | | | |
| | | | | | | CHECK | 242070 TOTAL: | | 95.99 |
| 242071 | 12/12/2025 | PRTD | 11 | COACHELLA VALLEY ASSOCIATION | 81618 | 12/01/2025 | | 12122025 | 8,520.00 |
| | Invoice: 81618 | | | | | TUMF FEES 11/25 | | | |
| | | | | | 8,520.00 702 2460 | TUMF DEPOSITS | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK | 242071 TOTAL: | | 8,520.00 |
| 242072 | 12/12/2025 | PRTD | 311 | COACHELLA VALLEY CONSERVATION COM | 81619 | 12/01/2025 | | 12122025 | 5,108.40 |
| Invoice: 81619 | | | | | | MSHCP FEES 11/25 | | | |
| | | | | | 5,160.00 702 2473 | MSHCP FEES | | | |
| | | | | | -51.60 101 4222 | PROFESSIONAL SERVICE FEES | | | |
| | | | | | | CHECK | 242072 TOTAL: | | 5,108.40 |
| 242073 | 12/12/2025 | PRTD | 13 | COACHELLA VALLEY WATER DISTRICT | 84858211172025 | 12/03/2025 | | 12122025 | 351.24 |
| Invoice: 84858211172025 | | | | | | SERVICE PE 11/17/2025 (ACCT# 316055-848582) | | | |
| | | | | | 351.24 24281000 7606 | WATER | | | |
| | | | | | | CHECK | 242073 TOTAL: | | 351.24 |
| 242074 | 12/12/2025 | PRTD | 3365 | CONNOR HORN | 1017 | 11/21/2025 | | 12122025 | 850.00 |
| Invoice: 1017 | | | | | | SOCIAL MEDIA VIDEOGRAPHY SERVICES -CHEERS, WALLIES | | | |
| | | | | | 850.00 107 7830 | PHOTOGRAPHY | | | |
| | | | | | | CHECK | 242074 TOTAL: | | 850.00 |
| 242075 | 12/12/2025 | PRTD | 1314 | COVE ELECTRIC INC | 18896 | 09/30/2025 | 20260104 | 12122025 | 21,647.00 |
| Invoice: 18896 | | | | | | ELECTRICAL WORK - FLOOR OUTLETS | | | |
| | | | | | 21,647.00 243 9536 | LIBRARY INFRASTRUCTURE | | | |
| | | | | COVE ELECTRIC INC | 18911 | 11/30/2025 | | 12122025 | 5,000.00 |
| Invoice: 18911 | | | | | | ELECTRICAL ROUTING - RMPLO | | | |
| | | | | | 5,000.00 24281000 9454 | LIBRARY BUILDING IMPROVEM | | | |
| | | | | | | CHECK | 242075 TOTAL: | | 26,647.00 |
| 242076 | 12/12/2025 | PRTD | 1491 | DESERT ARC | 90501 | 11/30/2025 | | 12122025 | 735.00 |
| Invoice: 90501 | | | | | | LANDSCAPE MAINTENANCE 11/2025 | | | |
| | | | | | 735.00 10133320 7612 | MAINTENANCE | | | |
| | | | | | | CHECK | 242076 TOTAL: | | 735.00 |
| 242077 | 12/12/2025 | PRTD | 1491 | DESERT ARC | 20694 | 11/13/2025 | | 12122025 | 3,109.75 |
| Invoice: 20694 | | | | | | SHREDDING SERVICES PE 11/13/2025 | | | |
| | | | | | 3,109.75 251 7563 | SOLID WASTE & RECYCLING | | | |
| | | | | | | CHECK | 242077 TOTAL: | | 3,109.75 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| 242078 | 12/12/2025 | PRTD | 2803 | OBK CORPORATION | 063357 | 12/04/2025 | | 12122025 | 102.97 |
| Invoice: 063357 | | | | | | REFRESHMENTS - CITY COUNCIL MEETING 12/4/2025 | | | |
| | | | | | 102.97 10151000 7806 | MEETINGS/TRAINING/TRAVEL | | | |
| | | | | | | CHECK 242078 TOTAL: | | | 102.97 |
| 242079 | 12/12/2025 | PRTD | 403 | EMCOR SERVICE | 910077168 | 12/04/2025 | 20260014 | 12122025 | 960.78 |
| Invoice: 910077168 | | | | | | HVAC MAINTENANCE 12/2/2025 | | | |
| | | | | | 960.78 24281000 7612 | MAINTENANCE | | | |
| | | | | EMCOR SERVICE | 910077169 | 12/04/2025 | 20260014 | 12122025 | 960.78 |
| Invoice: 910077169 | | | | | | HVAC MAINTENANCE 12/2/2025 | | | |
| | | | | | 960.78 10133300 7612 | MAINTENANCE | | | |
| | | | | EMCOR SERVICE | 910077269 | 12/05/2025 | 20260014 | 12122025 | 9,253.25 |
| Invoice: 910077269 | | | | | | HVAC MAINTENANCE 12/31/2025 | | | |
| | | | | | 4,616.20 10133300 7612 | MAINTENANCE | | | |
| | | | | | 438.72 21500500 7612 | MAINTENANCE | | | |
| | | | | | 497.33 21500690 7612 | MAINTENANCE | | | |
| | | | | | 329.41 21892000 7612 | MAINTENANCE | | | |
| | | | | | 3,371.59 24281000 7612 | MAINTENANCE | | | |
| | | | | | | CHECK 242079 TOTAL: | | | 11,174.81 |
| 242080 | 12/12/2025 | PRTD | 1891 | FOLLETT HIGHER EDUCATION GROUP, I | 1382973 | 12/05/2025 | | 12122025 | 88,580.68 |
| Invoice: 1382973 | | | | | | BOOKS | | | |
| | | | | | 88,580.68 244 7887 | SPECIAL EVENTS | | | |
| | | | | | | CHECK 242080 TOTAL: | | | 88,580.68 |
| 242081 | 12/12/2025 | PRTD | 3120 | GANNETT MEDIA CORP | 0007461647 | 11/30/2025 | | 12122025 | 640.48 |
| Invoice: 0007461647 | | | | | | PUBLIC HEAR NOTICES PE 11/30/2025 (ACCT #1252602) | | | |
| | | | | | 640.48 10121000 7842 | ADVERTISING/PUBLISHING | | | |
| | | | | | | CHECK 242081 TOTAL: | | | 640.48 |
| 242082 | 12/12/2025 | PRTD | 3369 | GEARGRID LLC | 0026859-IN | 11/24/2025 | | 12122025 | 5,402.00 |
| Invoice: 0026859-IN | | | | | | STORAGE EQUIPMENT | | | |
| | | | | | 5,402.00 21500000 8910 | OTHER EQUIPMENT | | | |
| | | | | | | CHECK 242082 TOTAL: | | | 5,402.00 |
| 242083 | 12/12/2025 | PRTD | 3114 | GRANITE TELECOMMUNICATIONS LLC | 725743973 | 12/01/2025 | | 12122025 | 811.73 |
| Invoice: 725743973 | | | | | | SERVICES PE 12/31/2025 | | | |
| | | | | | 192.52 28100000 7821 | TELEPHONE | | | |
| | | | | | 202.59 28600000 7821 | TELEPHONE | | | |

## A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | 282.68 28400000 7821 TELEPHONE | | | | |
| | | | | | 133.94 28300000 7821 TELEPHONE | | | | |
| | | | | | | CHECK 242083 TOTAL: | | | 811.73 |
| 242084 | 12/12/2025 | PRTD | 146 | HOME DEPOT CREDIT SERVICES | 1291048 | 10/07/2025 | | 12122025 | -56.02 |
| Invoice: 1291048 | | | | | -56.02 21500690 8004 CREDIT - THRESHOLD REPAIR & MAINT SUPPLIES | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 6904126 | 10/22/2025 | | 12122025 | -687.42 |
| Invoice: 6904126 | | | | | -687.42 28600000 8900 CREDIT - STOVE FURNITURE & EQUIPMENT | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 1404137 | 10/27/2025 | | 12122025 | -42.02 |
| Invoice: 1404137 | | | | | -42.02 28600000 8900 CREDIT - APPLIANCE DELIVERY FEE FURNITURE & EQUIPMENT | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 611537 | 10/28/2025 | | 12122025 | 150.76 |
| Invoice: 611537 | | | | | 150.76 10133310 8004 LIGHT BLUBS REPAIR & MAINT SUPPLIES | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 9011435 | 10/29/2025 | | 12122025 | 82.67 |
| Invoice: 9011435 | | | | | 82.67 10133300 8000 MOVING BOXES COUNCIL SUPPLIES | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 9011436 | 10/29/2025 | | 12122025 | 25.71 |
| Invoice: 9011436 | | | | | 25.71 24281000 8004 DOOR STOPS REPAIR & MAINT SUPPLIES | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 9022958 | 10/29/2025 | | 12122025 | 44.63 |
| Invoice: 9022958 | | | | | 44.63 201 8000 ELECTRICAL SUPPLIES | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 7404236 | 10/31/2025 | | 12122025 | 352.81 |
| Invoice: 7404236 | | | | | 352.81 21500690 8004 SUPPLIES KYLE JORDAN REPAIR & MAINT SUPPLIES | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 5510378 | 11/12/2025 | | 12122025 | 34.44 |
| Invoice: 5510378 | | | | | 34.44 10133300 8004 LIGHT BLUBS REPAIR & MAINT SUPPLIES | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 4024122 | 11/13/2025 | | 12122025 | 29.03 |
| Invoice: 4024122 | | | | | 29.03 24281000 8004 ACCESS CENTER - AUSTIN REPAIR & MAINT SUPPLIES | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 4631751 | 11/13/2025 | | 12122025 | 3.17 |
| Invoice: 4631751 | | | | | 3.17 21891000 8004 SCREWS REPAIR & MAINT SUPPLIES | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 4901547 | 11/13/2025 | | 12122025 | 1,484.17 |
| Invoice: 4901547 | | | | | WASHER&DRYER-PARVIEW VILLAS #49 | | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | 1,484.17 28100000 8900 FURNITURE & EQUIPMENT | | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 3901643 | 11/14/2025 | | 12122025 | 417.77 |
| Invoice: 3901643 | | | | | 417.77 28600000 8900 FURNITURE & EQUIPMENT | DISHWASHER SJV #1402 | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 3901645 | 11/14/2025 | | 12122025 | 417.77 |
| Invoice: 3901645 | | | | | 417.77 28600000 8900 FURNITURE & EQUIPMENT | DISHWASHER SJV #1110 | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 8024399 | 11/19/2025 | | 12122025 | 100.42 |
| Invoice: 8024399 | | | | | 100.42 10133300 8004 REPAIR & MAINT SUPPLIES | HANGERS PICTURE | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 8404814 | 11/19/2025 | | 12122025 | 171.16 |
| Invoice: 8404814 | | | | | 171.16 21500500 8004 REPAIR & MAINT SUPPLIES | SUPPLIES MATT GOTTA | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 8902423 | 11/19/2025 | | 12122025 | 665.51 |
| Invoice: 8902423 | | | | | 665.51 28400000 8900 FURNITURE & EQUIPMENT | RANGE SANTA ROSA VILLAS #35 | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 6613591 | 11/21/2025 | | 12122025 | 72.81 |
| Invoice: 6613591 | | | | | 72.81 10123000 7624 VEHICLE MAINTENANCE | ABATEMENT SUNNY LN | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 3014078 | 11/24/2025 | | 12122025 | 53.83 |
| Invoice: 3014078 | | | | | 53.83 24281000 8004 REPAIR & MAINT SUPPLIES | LIGHT BULBS | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 3512627 | 11/24/2025 | | 12122025 | 86.17 |
| Invoice: 3512627 | | | | | 86.17 10133310 8012 SMALL TOOLS, FURN & EQUIP | TONE TESTER | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 3613809 | 11/24/2025 | | 12122025 | 24.39 |
| Invoice: 3613809 | | | | | 24.39 10123000 7624 VEHICLE MAINTENANCE | ABATEMENT | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 3903145 | 11/24/2025 | | 12122025 | 592.80 |
| Invoice: 3903145 | | | | | 592.80 28400000 8900 FURNITURE & EQUIPMENT | REFRIGERATOR SANTA ROSA VILLAS #28 | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 3903149 | 11/24/2025 | | 12122025 | 1,349.50 |
| Invoice: 3903149 | | | | | 1,349.50 28100000 8900 FURNITURE & EQUIPMENT | WASHER&DRYER-PARVIEW VILLAS #64 | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 3903151 | 11/24/2025 | | 12122025 | 665.61 |
| Invoice: 3903151 | | | | | 665.61 28600000 8900 FURNITURE & EQUIPMENT | RANGE-SJV #1106 | | | |
| | | | | HOME DEPOT CREDIT SERVICES | 1543744 | 11/26/2025 | | 12122025 | 64.43 |
| Invoice: 1543744 | | | | | | TRASHCAN REPAIR | | | |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | INVOICE DTL DESC | | | | |
| | | | | | 64.43 21891000 8004 REPAIR & MAINT SUPPLIES | | | | |
| | | | | | | | CHECK | 242084 TOTAL: | 6,104.10 |
| 242085 | 12/12/2025 | PRTD | 30 | IMPERIAL IRRIGATION DISTRICT | 5092838812012025 | 12/01/2025 | | 12122025 | 80.33 |
| | Invoice: 5092838812012025 | | | | | SERVICE PE 12/1/2025 (ACCT# 50928388) | | | |
| | | | | | 80.33 10132000 7618 TRAFFIC SIGNAL MAINT/ELEC | | | | |
| | | | | IMPERIAL IRRIGATION DISTRICT | 5092838912012025 | 12/04/2025 | | 12122025 | 48.41 |
| | Invoice: 5092838912012025 | | | | | SERVICE PE 12/01/2025 (ACCT# 50928389) | | | |
| | | | | | 48.41 10132000 7618 TRAFFIC SIGNAL MAINT/ELEC | | | | |
| | | | | IMPERIAL IRRIGATION DISTRICT | 5092838812022025 | 12/04/2025 | | 12122025 | 92.52 |
| | Invoice: 5092838812022025 | | | | | SERVICE PE 12/02/2025 (ACCT# 50928388) | | | |
| | | | | | 92.52 10132000 7618 TRAFFIC SIGNAL MAINT/ELEC | | | | |
| | | | | | | | CHECK | 242085 TOTAL: | 221.26 |
| 242086 | 12/12/2025 | PRTD | 628 | INTERSTATE ALL BATTERY CENTER | 1920701020131 | 12/08/2025 | | 12122025 | 2,804.43 |
| | Invoice: 1920701020131 | | | | | BATTERIES - TRAFFIC SIGNALS | | | |
| | | | | | 2,804.43 10132000 7618 TRAFFIC SIGNAL MAINT/ELEC | | | | |
| | | | | | | | CHECK | 242086 TOTAL: | 2,804.43 |
| 242087 | 12/12/2025 | PRTD | 2886 | JORGE AVILA | 81514 | 12/01/2025 | | 12122025 | 300.00 |
| | Invoice: 81514 | | | | | REIMBURSEMENT- WORK BOOT FY 25-26 | | | |
| | | | | | 300.00 10133000 8020 UNIFORMS | | | | |
| | | | | | | | CHECK | 242087 TOTAL: | 300.00 |
| 242088 | 12/12/2025 | PRTD | 3366 | LARRY PEDERSEN | 1006 | 09/30/2025 | | 12122025 | 900.00 |
| | Invoice: 1006 | | | | | VIDEOGRAPHY AND POST-PRODUCTION SERVICES 9/2025 | | | |
| | | | | | 900.00 10156000 7400 PROFESSIONAL/TECHNICAL | | | | |
| | | | | LARRY PEDERSEN | 1011 | 10/17/2025 | | 12122025 | 450.00 |
| | Invoice: 1011 | | | | | VIDEOGRAPHY AND POST-PRODUCTION SERVICES 10/2025 | | | |
| | | | | | 450.00 10156000 7400 PROFESSIONAL/TECHNICAL | | | | |
| | | | | | | | CHECK | 242088 TOTAL: | 1,350.00 |
| 242089 | 12/12/2025 | PRTD | 3082 | RCA INVESTMENTS INC | 1001 | 11/21/2025 | 20260121 | 12122025 | 32,115.15 |
| | Invoice: 1001 | | | | | SHERIFF MOTORCYCLE | | | |
| | | | | | 32,115.15 10141000 8905 AUTOMOTIVE | | | | |
| | | | | | | | CHECK | 242089 TOTAL: | 32,115.15 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | INVOICE DTL DESC | | | | | |
| 242090 | 12/12/2025 | PRTD | 1723 | LOWES | 970578-PYJAQJ | 12/01/2025 | | 12122025 | 73.01 |
| Invoice: 970578-PYJAQJ | | | | SCREWS | | | | | |
| | | | | 73.01 21500690 8004 REPAIR & MAINT SUPPLIES | | | | | |
| | | | | LOWES | 978506-PWKNVP | 11/13/2025 | | 12122025 | 40.51 |
| Invoice: 978506-PWKNVP | | | | SANDING SPONGE | | | | | |
| | | | | 40.51 10133310 8004 REPAIR & MAINT SUPPLIES | | | | | |
| | | | | LOWES | 989299-PVRERN | 11/07/2025 | | 12122025 | 118.44 |
| Invoice: 989299-PVRERN | | | | PEST CONTROL SUPPLIES | | | | | |
| | | | | 118.44 24281000 8004 REPAIR & MAINT SUPPLIES | | | | | |
| | | | | LOWES | 979770-PVEGBT | 11/04/2025 | | 12122025 | 59.01 |
| Invoice: 979770-PVEGBT | | | | OUTLET TESTER | | | | | |
| | | | | 59.01 24281000 8004 REPAIR & MAINT SUPPLIES | | | | | |
| | | | | LOWES | 985225-PUBKOM | 10/27/2025 | | 12122025 | 13.38 |
| Invoice: 985225-PUBKOM | | | | DROP CLOTH | | | | | |
| | | | | 13.38 10133300 8004 REPAIR & MAINT SUPPLIES | | | | | |
| | | | | LOWES | 986664-PUBKOY | 10/27/2025 | | 12122025 | 27.85 |
| Invoice: 986664-PUBKOY | | | | PLUMBING SUPPLIES | | | | | |
| | | | | 27.85 24281000 8004 REPAIR & MAINT SUPPLIES | | | | | |
| | | | | | | CHECK | 242090 TOTAL: | | 332.20 |
| 242091 | 12/12/2025 | PRTD | 2372 | MADISON WORKSHOP WEST | 16-16034 | 11/25/2025 | | 12122025 | 1,726.25 |
| Invoice: 16-16034 | | | | FLOWERS FOR RMWF ANGEL EVENT 12/1/2025 | | | | | |
| | | | | 1,726.25 244 7887 SPECIAL EVENTS | | | | | |
| | | | | | | CHECK | 242091 TOTAL: | | 1,726.25 |
| 242092 | 12/12/2025 | PRTD | 437 | NAI CONSULTING INC | 2019-04.68 | 12/03/2025 | 20260063 | 12122025 | 78.50 |
| Invoice: 2019-04.68 | | | | CP 14-313: CALTRANS COMPLIANCE PE 11/30/2025 | | | | | |
| | | | | 78.50 10134000 9523 RMN RD ST WID/FR RGT/SND | | | | | |
| | | | | | | CHECK | 242092 TOTAL: | | 78.50 |
| 242093 | 12/12/2025 | PRTD | 447 | ON THE FLY SERVICES, INC | 414666 | 11/19/2025 | 20260005 | 12122025 | 77.00 |
| Invoice: 414666 | | | | MONTHLY PEST CONTROL 11/2025 | | | | | |
| | | | | 77.00 24281000 7612 MAINTENANCE | | | | | |
| | | | | ON THE FLY SERVICES, INC | 414669 | 11/19/2025 | 20260005 | 12122025 | 62.00 |
| Invoice: 414669 | | | | MONTHLY PEST CONTROL 11/2025 | | | | | |
| | | | | 62.00 24282000 7613 OBSERVATORY MAINTENANCE | | | | | |

## A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | INVOICE DTL DESC | | | | | |
| | | | | | | CHECK | 242093 TOTAL: | | 139.00 |
| 242094 | 12/12/2025 | PRTD | 99999 | DENISE M CRAWFORD | BR20250027 | 12/08/2025 | | 12122025 | 1,500.00 |
| | Invoice: BR20250027 | | | | | RMEA RESILIENCY BATTERY PROGRAM | | | |
| | | | | 1,500.00 600 7426 | | SUSTAINABILITY REBATES & PRGRM | | | |
| | | | | | | CHECK | 242094 TOTAL: | | 1,500.00 |
| 242095 | 12/12/2025 | PRTD | 99999 | LESLIE ADELSON | BR20250029 | 12/08/2025 | | 12122025 | 1,650.00 |
| | Invoice: BR20250029 | | | | | RMEA RESILIENCY BATTERY PROGRAM | | | |
| | | | | 1,650.00 600 7426 | | SUSTAINABILITY REBATES & PRGRM | | | |
| | | | | | | CHECK | 242095 TOTAL: | | 1,650.00 |
| 242096 | 12/12/2025 | PRTD | 99999 | MAUREEN MCGRATH | BR20250030 | 12/08/2025 | | 12122025 | 1,000.00 |
| | Invoice: BR20250030 | | | | | RMEA RESILIENCY BATTERY PROGRAM | | | |
| | | | | 1,000.00 600 7426 | | SUSTAINABILITY REBATES & PRGRM | | | |
| | | | | | | CHECK | 242096 TOTAL: | | 1,000.00 |
| 242097 | 12/12/2025 | PRTD | 99999 | ROBERT J RAKER | BR20250028 | 12/08/2025 | | 12122025 | 1,500.00 |
| | Invoice: BR20250028 | | | | | RMEA RESILIENCY BATTERY PROGRAM | | | |
| | | | | 1,500.00 600 7426 | | SUSTAINABILITY REBATES & PRGRM | | | |
| | | | | | | CHECK | 242097 TOTAL: | | 1,500.00 |
| 242098 | 12/12/2025 | PRTD | 360 | PACIFIC TELEMANAGEMENT SERVICES` | 2148377 | 11/27/2025 | | 12122025 | 118.00 |
| | Invoice: 2148377 | | | | | SERVICE PE 12/31/2025 | | | |
| | | | | 118.00 24281000 7821 | | TELEPHONE | | | |
| | | | | | | CHECK | 242098 TOTAL: | | 118.00 |
| 242099 | 12/12/2025 | PRTD | 45 | PALM SPRINGS MOTORS INC | 922275/1 | 12/04/2025 | | 12122025 | 173.04 |
| | Invoice: 922275/1 | | | | | PM SERVICE - 2016 FORD EXPLORER | | | |
| | | | | 173.04 10141000 7624 | | VEHICLE MAINTENANCE | | | |
| | | | | | | CHECK | 242099 TOTAL: | | 173.04 |
| 242100 | 12/12/2025 | PRTD | 181 | PLANT MASTERS INC | 00012259 | 12/09/2025 | | 12122025 | 1,610.96 |
| | Invoice: 00012259 | | | | | HOLIDAY FLORAL DECORATIONS | | | |
| | | | | 1,610.96 24281000 8032 | | HOLIDAY DECORATIONS | | | |
| | | | | | | CHECK | 242100 TOTAL: | | 1,610.96 |

# A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
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| | | | | | | INVOICE DTL DESC | | | |
| 242101 | 12/12/2025 | PRTD | 197 | PVP COMMUNICATIONS INC | 137391 | 11/10/2025 | | 12122025 | 95.90 |
| Invoice: 137391 | | | | | | HELMET RADIO - SHERIFF | | | |
| | | | | | 95.90 10141000 7824 | COMMUNICATION MAIN/SERV | | | |
| | | | | | | CHECK | 242101 TOTAL: | | 95.90 |
| 242102 | 12/12/2025 | PRTD | 147 | RIVERSIDE COUNTY SHERIFFS DEPT | SH000049389 | 11/19/2025 | | 12122025 | 951.64 |
| Invoice: SH000049389 | | | | | | EXTRA DUTY - CV SYMPHONY 11/1/2025 | | | |
| | | | | | 951.64 10141000 7404 | SHERIFF SERVICES | | | |
| | | | | | | CHECK | 242102 TOTAL: | | 951.64 |
| 242103 | 12/12/2025 | PRTD | 1675 | KENNETH J DAHLEEN | 81654 | 12/04/2025 | | 12122025 | 5,000.00 |
| Invoice: 81654 | | | | | | HONORARIUM - KEN DAHLEEN & HIS BIG BAND 1/14/2026 | | | |
| | | | | | 5,000.00 | | | | |
| | | | | | | E LL_MUSIC -UNDEFINED -UNDEFINED -UNDEFINED | | | |
| | | | | | 24281000 7919 | FOUNDATN-LITERARY LEGACY | | | |
| | | | | | | CHECK | 242103 TOTAL: | | 5,000.00 |
| 242104 | 12/12/2025 | PRTD | 61 | SOUTHERN CALIFORNIA EDISON COMPAN | 660311182025 | 11/21/2025 | | 12122025 | 11,642.31 |
| Invoice: 660311182025 | | | | | | SERVICE PE 11/18/2025 (ACCT# 700301966603) | | | |
| | | | | | 11,642.31 24281000 7603 | ELECTRICITY | | | |
| | | | | | | CHECK | 242104 TOTAL: | | 11,642.31 |
| 242105 | 12/12/2025 | PRTD | 62 | SOUTHERN CALIFORNIA GAS COMPANY | 7973311172025 | 11/19/2025 | | 12122025 | 2.79 |
| Invoice: 7973311172025 | | | | | | SERVICE PE 11/17/2025 (ACCT# 123 062 7973 3) | | | |
| | | | | | 2.79 28600000 7600 | NATURAL GAS | | | |
| | | | | SOUTHERN CALIFORNIA GAS COMPANY | 2300611142025 | 11/18/2025 | | 12122025 | 825.43 |
| Invoice: 2300611142025 | | | | | | SERVICE PE 11/14/2025 (ACCT #051 525 2300 6) | | | |
| | | | | | 825.43 10133300 7600 | NATURAL GAS | | | |
| | | | | SOUTHERN CALIFORNIA GAS COMPANY | 0930111142025 | 11/18/2025 | | 12122025 | 126.12 |
| Invoice: 0930111142025 | | | | | | SERVICE PE 11/14/2025 (ACCT #154 326 0930 1) | | | |
| | | | | | 126.12 21500690 7600 | NATURAL GAS | | | |
| | | | | SOUTHERN CALIFORNIA GAS COMPANY | 3388011172025 | 11/19/2025 | | 12122025 | 28.31 |
| Invoice: 3388011172025 | | | | | | SERVICE PE 11/17/2025 (ACCT #066 225 3388 0) | | | |
| | | | | | 28.31 21500500 7600 | NATURAL GAS | | | |
| | | | | SOUTHERN CALIFORNIA GAS COMPANY | 8066512032025 | 12/05/2025 | | 12122025 | 150.61 |
| Invoice: 8066512032025 | | | | | | SERVICE PE 12/3/2025 (ACCT #170 464 8066 5) | | | |
| | | | | | 150.61 10133300 7600 | NATURAL GAS | | | |

## A/P CASH DISBURSEMENTS JOURNAL

CASH ACCOUNT: 999 1005 CHECKING

| CHECK NO | CHK DATE | TYPE | VENDOR | NAME | INVOICE | INV DATE | PO | CHECK RUN | NET |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | INVOICE DTL DESC | | | | |
| | | | | | | CHECK | 242105 TOTAL: | | 1,133.26 |
| 242106 | 12/12/2025 | PRTD | 532 | SUNLINE TRANSIT AGENCY | INV09320 | 11/30/2025 | 20260006 | 12122025 | 4,763.67 |
| Invoice: INV09320 | | | | | | BUS SHELTER MAINTENANCE 11/2025 | | | |
| | | | | | 4,763.67 10133000 7612 | MAINTENANCE | | | |
| | | | | | | CHECK | 242106 TOTAL: | | 4,763.67 |
| 242107 | 12/12/2025 | PRTD | 2824 | T-MOBILE USA INC | L2511100664 | 11/10/2025 | | 12122025 | 165.00 |
| Invoice: L2511100664 | | | | | | RIVCO SHERIFF PE 8/26/2025 | | | |
| | | | | | 165.00 10141000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | T-MOBILE USA INC | L2511200352 | 11/20/2025 | | 12122025 | 50.00 |
| Invoice: L2511200352 | | | | | | RIVCO SHERIFF PE 9/28/2025 | | | |
| | | | | | 50.00 10141000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | T-MOBILE USA INC | L2511180709 | 11/18/2025 | | 12122025 | 50.00 |
| Invoice: L2511180709 | | | | | | RIVCO SHERIFF PE 10/17/2025 | | | |
| | | | | | 50.00 10141000 7400 | PROFESSIONAL/TECHNICAL | | | |
| | | | | | | CHECK | 242107 TOTAL: | | 265.00 |
| 242108 | 12/12/2025 | PRTD | 315 | TOLERANCE EDUCATION CENTER | 81606 | 12/08/2025 | | 12122025 | 1,000.00 |
| Invoice: 81606 | | | | | | SUPPORT FOR NON-PROFIT | | | |
| | | | | | 1,000.00 10157000 7458 | SUPPORT FOR NON-PROFITS | | | |
| | | | | | | CHECK | 242108 TOTAL: | | 1,000.00 |
| 242109 | 12/12/2025 | PRTD | 2881 | WELTYS ENTERPRISES, INC | 25-75946 | 12/10/2025 | | 12122025 | 277.11 |
| Invoice: 25-75946 | | | | | | POSTERS FOR WRITERS GUILD | | | |
| | | | | | 277.11 24281000 7910 | FOUNDATION - PROGRAMS | | | |
| | | | | | | CHECK | 242109 TOTAL: | | 277.11 |
| | | | | | NUMBER OF CHECKS 76 | *** CASH ACCOUNT TOTAL *** | | | 1,146,389.35 |

| | COUNT | AMOUNT |
|---|---|---|
| TOTAL PRINTED CHECKS | 44 | 250,006.03 |
| TOTAL EFT'S | 32 | 896,383.32 |

*** GRAND TOTAL *** 1,146,389.35

**City Council Staff Report**

**Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21-0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case Number TPM23-0002 (TPM38768) - Ritz Carlton Rancho Mirage. Applicant: Kam Sang Company on Behalf of Newage Rancho Mirage LLC/ Ritz Carlton. Consideration to Construct the Ritz Carlton Residences which is a Modification to Previously Approved Entitlements Consisting of 106 Condo Units; Event Space and Room for Amenities; Subterranean Parking Structure; and Additional Residential Parking Spaces. Additionally, a Newly Proposed Sky Mesa Recreational Area will Include a Restaurant, Additional Lawn Event Space and Pool Area. The 35.07 Acre Project Site (Excluding Previously Approved Tennis Villas Site (7.96 Acres on APN: 689-330-011)) Occurs Along Frank Sinatra Drive (68900 Frank Sinatra Drive) Approximately 0.85 Miles Southwest of the Intersection with Highway 111 Within the City of Rancho Mirage (APNs: 689-330-026, -028, -031, -032, -034; 689-020-012, -014; & 689-331-001, -018)**

| DATE | ITEM # |
|---|---|
| December 18, 2025 | PUBLIC HEARINGS - 6A. |
| **Presented To** | **Presented By** |
| Mayor and City Council | Ben Torres, Planning Manager |

## RECOMMENDED ACTION

1. Adopt Resolution No. 2025-(Next-in-Order), Approving the Mitigation Monitoring and Reporting Program and Mitigated Negative Declaration (SCH# 2024030267) for the Proposed Project Based on Environmental Assessment Case No. EA21-0002;
2. Adopt Resolution No. 2025-(Next-in-Order), Approving General Plan Zoning Map Amendment (GPZMA21-0001), Tentative Parcel Map Case No. TPM23-0002, & Major Modification Case No. MOD21-0004; and
3. Introduce Ordinance No. (Next-in-Order), 1st Reading, Approving Development Agreement Amendment (DA21-0002).

## DISCUSSION

### Background and Request

On August 3, 2006 the City approved Environmental Impact Report Case No. EIR06001, Tentative Tract Map No. 34640, and Preliminary Development Plan Case No. PDP06001. On September 30, 2006 the City Entered into a 9th Development Agreement Amendment. This project consisted of renovating the existing three story Ritz Carlton hotel and adding four additional guest rooms (244 total rooms), a 50,647 Spa Building with additional Spa Suites, T-Wing Building with 54 units ranging in size from 1 to 3 bedrooms (location of current Building A-1), Hotel Villas with 57 two story units ranging in size from 2 to 4 bedrooms (location of current Buildings B-1 to B-15), and 25 (with a total of 49 keys) one and two story Hotel Villas on the former tennis site (located west of the existing Ritz Carlton Hotel). The Tennis Villas ranged in size from one bedroom (1,228 square feet) to three bedrooms (2,705 square feet).

The hotel renovations and Spa Building (constructed in 2015) were completed as part of the 2006 entitlements. Although the 14 tennis courts, basketball court, sand volleyball court, small building, and associated improvements on the 7.96-acre Tennis Villas site were demolished. No modifications are proposed to the Tennis Villas, and they are not part of the current Major Modification application. The project site for the T-Wing Building and Hotel Villas (111 units in total as approved with 2006 entitlements) was partially graded but construction never occurred, this portion of the project site is part of the subject Major Modification (which now includes 106 units, event space, and subterranean parking). A detailed description of the project site background is included in the Planning Commission staff report (Attachment 1).

The applicant, Kam Sang Company on Behalf of Newage Rancho Mirage LLC/Ritz Carlton, is requesting approval of several entitlement applications that are being processed concurrently pursuant to RMMC Section 17.36.020 which requires that "[a]n applicant for a development project that requires the filing of more than one application, shall file all related applications concurrently unless waived by the director," and "permit processing and environmental/design review shall be concurrent."

- Environmental Assessment Case No. EA21-0002 (the "EA"): The EA will analyze the project's impacts to the environment.
- General Plan Zoning Map Amendment Case No. GPZMA21-0001 (the "GPZMA"): The GPZMA will amend the projects General Plan and Zoning designation from Mountain Reserve (MR) to Resort Hotel for the projects Sky Mesa Recreational Area (3.88 acres).
- Development Agreement Amendment Case No. DA21-0002 (the "DA": The DA Amendment proposes a 10th amendment to the Development Agreement updating terms and expectations for the proposed project and contains terms for previous entitlements (Tennis Villas, Spa Suites, & existing Ritz Carlton Hotel).
- Tentative Parcel Map No. TPM23-0002 (TPM38768) (the "TPM"): The TPM will establish three parcels (excluding Sky Mesa recreational area), with Parcel 3 of the map containing the 106 condo units (Ritz Carlton Residences).
- Major Modification Case No. MOD21-0004: The MOD shows the modifications to the prior 2006 entitlements by providing updated engineering, architectural, and landscaping plans for review and also includes new development with the Sky Mesa recreational area.

**Project Summary**

The proposal is a consideration of the Ritz Carlton residences, which is a modification to previously approved entitlements, consisting of 106 condo units; event space and room for amenities; subterranean parking structure; and additional residential parking spaces. The previously approved entitlement consisted of 111 condo units. Additionally, the Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. As part of the proposed project, a General Plan Zoning Map Amendment is proposed to amend the Mountain Reserve (MR) designation for the project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014). A Tentative Parcel Map (TPM38768) proposes to establish three parcels (excluding Sky Mesa area) with Parcel 3 of the map containing condo units (Ritz Carlton residences). Lastly, a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment") is proposed. Please note that the proposed project (excluding Sky Mesa) is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums.

**DEVELOPMENT AGREEMENT AMENDMENT (DA21-0002)**

In California, cities are allowed to enter into development agreements with any person(s) or entity(ies) having a legal or equitable interest in real property for the development of property in order to establish certain development rights in the real property.

A development agreement is intended to provide assurances to the developer that an approved project may proceed subject to the policies, rules, regulations, and conditions of approval applicable to the project at the time of approval, regardless of any changes to the City's policies, rules, and regulations after the project approval. This is in exchange for assurances that the City will receive certain payment of fees, the installation of certain unfractured, and other benefits the City cannot otherwise unilaterally impose as conditions of approval of the project outside the context of a negotiated development agreement. Development agreements basically eliminate a lot of uncertainty in planning, secure orderly development of the projects, assures progressive installation of improvements and provides the least economic cost to its residents.

The 10th Development Agreement Amendment for the proposed project is necessary to update the terms for project site and to incorporate the modifications to previously approved entitlements that are part of the current request. It is very important to note that a condo-hotel is not a timeshare project, since the ownership of a condo-hotel unit constitutes an interest (ownership) in real property, whereas ownership of a timeshare unit constitutes an interest in a share of time in a timeshare unit.

Pursuant to Section 17.30.095 of the RMMC, the development standards applicable to resort hotels apply to condo-hotel units projects, unless otherwise provided by a development agreement. Under the proposed Development Agreement, the future owners of the condo hotel units detailed in the Development Agreement Amendment would be allowed to occupy the unit for a period not to exceed six (6) months (consecutive or non-consecutive) per calendar year. An owner can rent the unit for additional personal occupancy provided that transient occupancy taxes are paid for each day the owner occupies the unit beyond the allowable occupancy period. When the unit is not occupied by the owner it shall be made available for transient rentals to the general public. The Ritz Carlton hotel will manage all condo hotel rentals, per Section 7 of the Development Agreement Amendment. The term of the Development Agreement Amendment is 10 years and that will only apply to the project, not the financial terms listed in the agreement.

The City Attorney Independent Analysis on the Development Agreement Amendment Ordinance is included in the Planning Commission Staff Report (Attachment 1).

**Planning Commission**

On January 9, 2025, the Planning Commission conducted a duly noticed public hearing to consider the proposed project. Staff presented the highlights of the proposed project, and multiple public comments were received during the public hearing. As summarized in the meeting minutes attached to this report, the Commissioners asked questions which the staff addressed. After due consideration of the staff report and public testimony, the Planning Commission made the following motion.

**MOVED/SECONDED BY CURRAN/BRYANT TO ADOPT RESOLUTION NO. 2025-PC-02 RECOMMENDING THAT THE CITY COUNCIL TAKE THE FOLLOWING ACTIONS:**

1. **ADOPT RESOLUTION NO. 2025-(NEXT-IN-ORDER), APPROVING THE MITIGATION MONITORING AND REPORTING PROGRAM AND MITIGATED NEGATIVE DECLARATION (SCH# 2024030267) FOR THE PROPOSED PROJECT BASED ON ENVIRONMENTAL ASSESSMENT CASE NO. EA21-0002.**
2. **ADOPT RESOLUTION NO. 2025-(NEXT-IN-ORDER), APPROVING GENERAL PLAN ZONING MAP AMENDMENT (GPZMA21-0001), TENTATIVE PARCEL MAP CASE NO. TPM23-0002, & MAJOR MODIFICATION CASE NO. MOD21-0004.**
3. **INTRODUCE AND ADOPT ORDINANCE (NEXT-IN-ORDER), APPROVING DEVELOPMENT AGREEMENT AMENDMENT (DA21-0002).**

**MOTION CARRIED 4/1 with Commissioner Grey Abstained.**

Planning Commission's findings, determinations and actions are based on contents of the Planning Commission Staff Report, attachments and Staff presentation for the proposed project, and all public documents, records and references related thereto submitted or provided at or prior to the Planning Commission's consideration of the item; testimony and/or comments from the applicant and its representatives submitted or provided at, or prior to the Planning Commission's consideration of the item, if any; and testimony and/or comments from all persons that were provided in written format, or correspondence, at, or prior to, the Planning Commission's consideration of the item, including without limitation public comments made at the meeting.

After the Planning Commission meeting the project applicant prepared a response to the comment letters received for the public hearing (Attachment 16).

**Environmental Determination**

An environmental assessment application was submitted for the proposed project and the determination was made that the project required an Initial Study. An Initial Study has been prepared resulting in the recommendation to adopt a Mitigated Negative Declaration (MND). Mitigation measures were recommended for Air Quality, Biological Resources, Cultural Resources, Noise, Transportation/Traffic, & Tribal Cultural Resources. A Notice of Determination will be filed with the Riverside County Clerk once a final determination has been made by the City Council.

The Initial Study/Mitigated Negative Declaration was first circulated for public review for a 30-day review period starting on March 11, 2024 to April 9, 2024, and the City received four comment letters. After reviewing the comments received on the March 2024 IS/MND, the City determined that the air quality needed additional study. As specifically requested in one of the comment letters a Health Risk Assessment (HRA) was prepared to analyze the project's potential to expose sensitive receptors to substantial pollutant concentrations. The results of this HRA concluded that with additional mitigation the impacts are less than significant. Revisions were also made to mitigation measures MM-BIO-1 through MM-BIO-3 in response to comments made from the California Department of Fish and Wildlife (CDFW), and MM-CUL-1 in response to comments from Agua Caliente Band of Cahuilla Indians. These changes merely clarified or amplified information already found in the March 2024 IS/MND, and did not raise important new issues about significant effects on the environment. While the City is not required to respond to comments, Sections 21091(d)(1) and 21092.5 of the Public Resources Code (PRC) and Section 150874 (b) of the California Environmental Quality Act Guidelines require that prior to project approval a Lead Agency must consider all comments received before making a final determination.

A Notice of Intent to Adopt a Mitigated Negative Declaration was published in the Desert Sun on July 21, 2024, and distributed to interested parties. A 30-day public review period for the revised Draft Mitigated Negative Declaration commenced on Monday, July 22, 2024, and ended on Tuesday, August 20, 2024. During the second public review period, the City received four additional comment letters. A Noise Memorandum has been prepared to update the construction noise analysis using the FHWA RCNM model, and to include jackhammers, trucks, and vibratory rollers. Revisions were also made to mitigation measures MM-CUL-1 in response to additional comments from Agua Caliente Band of Cahuilla Indians. These changes do not raise important new issues about significant effects on the environment. Revisions are presented in strikeout/underline format in the Final IS/MND. A draft revised IS/MND with the requested mitigation measures has been included as Attachment 4.

**AB 52 & SB 18 Tribal Consultation:**

The City initiated tribal consultation in accordance with Assembly Bill 52 (AB 52) and Senate Bill 18 (SB 18) on November 21, 2021, with contacts for twenty-three (23) tribes and representatives provided by the Native American Heritage Commission (NAHC) notifying them of the proposed project. The City received three comment letters:

- The Quechan Indian Tribe responded on December 1, 2021, deferring to other tribes.
- The Morongo Band of Mission Indians responded on January 26, 2022, indicating that the proposed project is not located within their traditionally affiliated boundaries and encouraged consultation with other tribes.
- The Agua Caliente Band of Cahuilla Indians (ACBCI) responded on January 24, 2022, requested formal consultation under AB 52. The City engaged in government to government consultation with ACBCI concerning tribal cultural resources. On March 1, 2022, ACBCI sent a letter to the City stating that their concerns have been addressed and formally concluded consultation.

No additional correspondence or requests for formal consultation were received and the SB 18 and AB 52 noticing period was concluded.

**Noticing Requirement**

RMMC Section 17.74.020, *Hearing and notice*, requires that all property owners, as shown on the county's latest equalized assessment roll, within a 500-foot radius of the boundaries of the subject parcel(s) be notified of matters requiring a public hearing. If the number of property owners to whom the notice would be mailed is less than 25, then the mailing radius is required to be increased to 1,000 feet as measured from the exterior boundaries of the subject parcel.

On December 3, 2025, public hearing notices were mailed to property owners within a **500-foot** radius of the parcel boundary and posted at the City's designated community posting sites pursuant to the requirements of RMMC Chapter 17.74. Notification of the public hearing was published in *The Desert Sun* newspaper on December 7, 2025.

All written public comments related to the City Council's review of the proposed project received prior to the publication of this agenda packet, including any comments received for consideration of the Planning Commission, have been attached as Attachment 17; any oral testimony or comments made, including those by Developer, it's representatives, or public, if any, can be found on the video recording of the meeting on the city's website and were reviewed by the City Council prior to City Council's consideration of the item. All items were made publicly available at the same time as they were made available to a majority of the council in accordance with the Brown Act.

**Attachments**

Attachment 1 - 01/09/2025 PC Staff Report with Conditions of Approval
Attachment 2 - Aerial
Attachment 3 - Public Hearing Notice
Attachment 4 PART 1 - Final Initial Study / Mitigated Negative Declaration
Attachment 4 PART 2 - Final Initial Study / Mitigated Negative Declaration
Attachment 5 - Draft Notice of Determination
Attachment 6 - 01/09/2025 PC Meeting Minutes
Attachment 7 - 02/27/2023 & 03/27/2023 ARB Meeting Minutes
Attachment 8 - Draft Development Agreement Amendment
Attachment 9 - PC Resolution No 2025-PC-02
Attachment 10 - Draft CC Resolution MND & MMRP
Attachment 11 - Draft CC Resolution GPZMA, TPM, & MOD
Attachment 12 - Draft Ordinance Development Agreement Amendment
Attachment 13 - General Plan Zoning Map Amendment Exhibit
Attachment 14 - Tentative Parcel Map
Attachment 15 - Major Modification Exhibit Booklet
Attachment 16 - Response to PC Comment Letters
Attachment 17 - Public Comments

CITY OF RANCHO MIRAGE ©

# STAFF REPORT

**TO:** Planning Commission **DATE:** January 9, 2025

**FROM:** Ben Torres, Planning Manager
Colin Kirkpatrick, City Attorney

**SUBJECT:** Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21-0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case Number TPM23-0002 (TPM38768) – Ritz Carlton Rancho Mirage

## SPECIFIC REQUEST OR RECOMMENDATION

Staff recommends that the Planning Commission adopt Resolution No. 2025-(Next-in-Order), recommending that the City Council take the following actions:

a) Adopt Resolution No. 2025-(Next-in-Order), approving the Mitigation Monitoring and Reporting Program and Mitigated Negative Declaration (SCH# 2024030267) for the Proposed Project based on Environmental Assessment Case No. EA21-0002;

b) Adopt Resolution No. 2025-(Next-in-Order), approving General Plan Zoning Map Amendment (GPZMA21-0001), Tentative Parcel Map Case No. TPM23-0002, & Major Modification Case No. MOD21-0004.

c) Introduce and adopt Ordinance (Next-In-Order), approving Development Agreement Amendment (DA21-0002).

## ATTACHMENTS:

1. Aerial
2. Public Hearing Notice
3. Final Initial Study / Mitigated Negative Declaration
4. Draft Notice of Determination
5. ARB Minutes dated February 27, 2023 & March 27, 2023
6. Draft Development Agreement Amendment
7. Planning Commission Resolution recommending that the City Council Approve a Mitigated Negative Declaration, General Plan Zoning Map Amendment, Development Agreement, Tentative Parcel Map, and Major Modification for the Ritz Carlton project.
8. Draft resolution of the City Council approving and adopting the Mitigation Monitoring and

Reporting Program and Mitigated Negative Declaration (SCH#2024030267) for the Proposed Project based on Environmental Assessment Case No. EA21-0002.

9. Draft resolution of the City Council approving the proposed General Plan Zoning Map Amendment Case No. GPZMA21-0001, Tentative Parcel Map Case No. TPM23-0002 (TPM38768) and Major Modification Case No. MOD21-0004.
10. Draft Ordinance of the City Council approving Development Agreement Amendment Case No. DA21-0002.
11. General Plan Zoning Map Amendment (GPZMA21-0001) Exhibit
12. Tentative Parcel Map No. TPM23-0002 (TPM38768)
13. Major Modification Exhibit Booklet
14. Public Comments

## FACT/STATISTICS

| | |
|---|---|
| 1. Applicant: | Kam Sang Company on behalf of Newage Rancho Mirage LLC/ Ritz Carlton |
| 2. Purpose of Request: | Consideration to construct the Ritz Carlton residences which is a modification to previously approved entitlements consisting of 106 condo units; event space and room for amenities; subterranean parking structure; and additional residential parking spaces. Additionally, the Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. As part of the proposed project, a General Plan Zoning Map Amendment is proposed to amend the Mountain Reserve (MR) designation for the project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014). A Tentative Parcel Map (TPM38768) proposes to establish three parcels (excluding Sky Mesa area) with Parcel 3 of the map containing condo units (Ritz Carlton residences). A Major Modification is proposed for modifications to the prior 2006 entitlements by providing updated engineering, architectural, and landscaping plans for review and also includes new development with the Sky Mesa recreational area. Lastly, a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment") is proposed. Please note that the proposed project (excluding Sky Mesa) is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums. |
| 3. Location: | The project site (68900 Frank Sinatra Drive) occurs along Frank Sinatra Drive approximately 0.85 miles southwest of the intersection with Highway 111 within the |

| | |
|---|---|
| | City of Rancho Mirage (APNs: 689-330-026, -028, -031, -032, -034; 689-020-012, -014; & 689-331-001, -018). |
| 4. Parcel Size: | 35.07 acres (excluding previously approved Tennis Villas Site 7.96 acres on APN:689-330-011) |
| 5. Existing Streets: | Frank Sinatra Drive |
| 6. Existing Land Use: | Resort Hotel (Rs-H) and Mountain Reserve (MR) |
| 7. Proposed Land Use: | Resort Hotel (Rs-H) |
| 8. Surrounding Land Use: | **West:** Resort Hotel (Rs-H), Medium Density Residential, Very Low Density Residential (R-L-2), & Mountain Reserve (MR); **North:** Resort Hotel (Rs-H), Medium Density Residential (R-M), & Mountain Reserve (MR); **South:** Resort Hotel (Rs-H), Very Low Density Residential (R-L-2), & Mountain Reserve (MR) ; **East:** Mountain Reserve (MR) & Medium Density Residential (R-M) |
| 8. Environmental Information: | The recommendation is to adopt a Mitigated Negative Declaration (SCH#2024030267) for the Proposed Project based on Environmental Assessment Case No. EA24-0001 pursuant to the California Environmental Quality Act (CEQA) Section 15074. |
| 9. Date Staff Deemed Application Complete: | December 20, 2024 |

## PROJECT SUMMARY

Consideration of the Ritz Carlton residences, which is a modification to previously approved entitlements, consisting of 106 condo units; event space and room for amenities; subterranean parking structure; and additional residential parking spaces. The previously approved entitlement consisted of 111 condo units. Additionally, the Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. As part of the proposed project, a General Plan Zoning Map Amendment is proposed to amend the Mountain Reserve (MR) designation for the project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014). A Tentative Parcel Map (TPM38768) proposes to establish three parcels (excluding Sky Mesa area) with Parcel 3 of the map containing condo units (Ritz Carlton residences). Lastly, a 10$^{th}$ Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10$^{th}$ Amendment") is proposed. Please note that the proposed project (excluding Sky Mesa) is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums.

## PROJECT ENTITLEMENT

Given the multi-faceted nature of the proposed project, the applicant submitted several entitlement applications that are being processed concurrently pursuant to RMMC Section 17.36.020 which requires that "[a]n applicant for a development project that requires the filing of more than one application, shall file all related applications concurrently unless waived by the director," and "permit processing and environmental/design review shall be concurrent."

- Environmental Assessment Case No. EA21-0002 (the “EA”): The EA will analyze the project’s impacts to the environment.
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- Development Agreement Amendment Case No. DA21-0002 (the “DA”: The DA Amendment proposes a 10th amendment to the Development Agreement updating terms and expectations for the proposed project and contains terms for previous entitlements (Tennis Villas, Spa Suites, & existing Ritz Carlton Hotel).
- Tentative Parcel Map No. TPM23-0002 (TPM38768) (the “TPM”): The TPM will establish three parcels (excluding Sky Mesa recreational area), with Parcel 3 of the map containing the 106 condo units (Ritz Carlton Residences).
- Major Modification Case No. MOD21-0004: The MOD shows the modifications to the prior 2006 entitlements by providing updated engineering, architectural, and landscaping plans for review and also includes new development with the Sky Mesa recreational area.

The Initial Study is the environmental assessment (EA) of the potential environmental impacts for the project as a whole. City completed the Initial Study and based on the environmental assessment, recommends adoption of a Mitigated Negative Declaration in accordance with CEQA and CEEQA Guidelines. This is the first application in the entitlement package because the environmental assessment, Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program (which is a program for monitoring and reporting on the proposed project’s mitigation measures) and provides the support and justification (from an environmental perspective) for considering the project’s entitlements. Additionally, before approving a project, the Planning Commission and City Council (as “lead agency” under CEQA) must consider the proposed declaration along with any public comments. Should the City desire to approve the proposed project, the General Plan Zoning Map Amendment (GPZMA) must be approved to change the land use designation for 3.88 acre of the Sky Mesa recreational area project site to Resort Hotel (Rs-H) to match the rest of the project site, to allow for the proposed uses. The Development Agreement Amendment provides updated terms for past entitlements and current modifications to the project’s already established Development Agreement (10th Amendment). The Tentative Parcel Map for condominium purposes to establish three parcels, and parcel three contains 106 condo units. The Major Modification would allow updates to the 2006 entitlements and allows for the development of the Sky Mesa Recreational Area (not part of 2006 entitlements).

## BACKGROUND AND EXISTING CONDITIONS

In 1980, Federated Development Company submitted a master plan and associated Environmental Impact Report (EIR) for the subject property, in addition to the adjacent residential communities proposing the development of residential units, commercial and office space, and a restaurant and sports club. The EIR was certified in April 1981.

Federated Development entered into a Development Agreement (original DA) for the subject property in August of 1983. The original DA addressed the concurrent approval of a "Conceptual

Land Use Approval" (Land Use Case 83-P-145). Nine (9) subsequent amendments have been made to the original DA (a Tenth Amendment is proposed as part of this entitlement package).

The City subsequently permitted the Ritz-Carlton Hotel (formerly known as the Lodge Hotel) and the Mirada Estates Phase I project and development of portions of the project began in 1986.

In 1991, MCO Properties acquired the Villas site, consisting of approximately 15 acres, located between the existing Lodge Hotel and Phase I of the Mirada Estates residential development, and agreed to develop it. Under the Development Agreement (DA), the site was originally entitled to construct 169 residential units at a density of about 11.5 units per acre. Two-story development was approved, in principal, for the Villas project, in accordance with existing entitlements and zoning; however, the exact type of development had not at that time been determined.

In 2000 the City and MCO Properties entered into a Memorandum of Understanding that recognized four separate planning areas. One of these planning areas, the "Villas Site," is within the boundaries of the subject project, and was designated for hotel villa-condominium development. The City approved the Subsequent EIR for development of the Mirada property, including the Villa Site, in October 2000. That approval and the resulting Eighth Amendment (approved on March 19, 2005) to the original DA established a right to develop 138 hotel villas (reduced from 169 units), up to two stories in height, on the Villas Site.

GenLB-Rancho LLC, acquired the hotel, tennis complex and Villas site in 2005. On August 3, 2006 the City approved Environmental Impact Report Case No. EIR06001, Tentative Tract Map No. 34640, and Preliminary Development Plan Case No. PDP06001. On September 30, 2006 the City Entered into a 9$^{th}$ Development Agreement Amendment. This project consisted of renovating the existing three story Ritz Carlton hotel and adding four additional guest rooms (244 total rooms), a 50,647 Spa Building with additional Spa Suites, T-Wing Building with 54 units ranging in size from 1 to 3 bedrooms (location of current Building A-1), Hotel Villas with 57 two story units ranging in size from 2 to 4 bedrooms (location of current Buildings B-1 to B-15), and 25 (with a total of 49 keys) one and two story Hotel Villas on the former tennis site (located west of the existing Ritz Carlton Hotel). The Tennis Villas ranged in size from one bedroom (1,228 square feet) to three bedrooms (2,705 square feet).

The hotel renovations and Spa Building (constructed in 2015) were completed as part of the 2006 entitlements. Although the 14 tennis courts, basketball court, sand volleyball court, small building, and associated improvements on the 7.96-acre Tennis Villas site were demolished, construction of the Tennis Villas never occurred but the entitlements remain valid. No modifications are proposed to the Tennis Villas, and they are not part of the current Major Modification application. The project site for the T-Wing Building and Hotel Villas (111 units in total as approved with 2006 entitlements) was partially graded but construction never occurred, this portion of the project site is part of the subject Major Modification (which now includes 106 units, event space, and subterranean parking).

## Subject Site and Surrounding General Plan, Zoning, and Land Uses

The boundaries of the project are delineated by vacant land part of the Santa Rosa Mountains, and residential subdivisions as further detailed below:

| | General Plan and Zoning Designation | Land Use |
|---|---|---|
| **Project Site** | Resort Hotel (Rs-H) and Mountain Reserve (MR) | Ritz Carlton Hotel and Vacant Land |
| **North** | Resort Hotel (Rs-H), Medium Density Residential (R-M), & Mountain Reserve (MR) | Villas at Mirada and Vacant Land (Santa Rosa Mountains) |
| **East** | Mountain Reserve (MR) & Medium Density Residential (R-M) | Vacant Land (Santa Rosa Mountains) |
| **West** | Resort Hotel (Rs-H), Medium Density Residential, Very Low Density Residential (R-L-2), & Mountain Reserve (MR) | Mirada, Villas at Mirada, and Vacant Land (Santa Rosa Mountains) |
| **South** | Resort Hotel (Rs-H), Very Low Density Residential (R-L-2), & Mountain Reserve (MR) | Mirada and Vacant Land (Santa Rosa Mountains) |

## GENERAL PLAN ZONING MAP AMENDMENT

The existing General Plan and Zoning designation of the project site is Resort Hotel (Rs-H) and Mountain Reserve (MR). Only 3.88 acres (two parcels) of the project site for the proposed Sky Mesa recreational area are currently designated Mountain Reserve. This proposed change will align with the rest of the Ritz Carlton property, which is designated as Resort Hotel (Rs-H), to allow for the proposed uses delineated in the entitlement package.

The proposed condo hotel units are located on the Rs-H zoned property and therefore consistent with the General Plan designation. This designation allows for the development of hotels and destination resorts with limited, ancillary commercial uses, such as spas, recreational facilities, restaurants, lounges, and small retail shops that directly support the primary use.

The Sky Mesa recreation area is located on 3.88 acres of the MR zoned portion of the project site. Uses in the MR zone are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails.. Vehicular access is not permitted in this designation.. As part of the proposed project, the applicant is proposing an amendment to the City's General Plan Zoning Map that would expand the Resort Hotel (Rs-H) designation and zoning to encompass the Sky Mesa portion of the site, which has been privately owned property and not public land. The proposed project would not result in any significant impacts to biological resources related to the Sky Mesa recreational area or project as a whole with implementation of mitigation measures. In addition, development within the Sky Mesa recreational area is limited to 6,966 square feet which includes a 6,273 square foot restaurant built into the mountain area to minimize visual impacts and a 693 square foot restroom building. In total buildings within the Sky Mesa recreational area make up less than four (4) percent of the 3.88 acres allocated to the Sky Mesa recreational area. The majority of the area (96%) will be dedicated to recreation uses and open space, which is compatible with the Mountain Reserve (MR) zone.

Per the description of allowable uses outlined above, the Sky Mesa Recreation Area would be consistent with Rs-H zone. With approval and adoption of the zone change by City Council, the proposed project would not conflict with the City's General Plan with regard to allowable land uses. The project site is surrounded open space to the north, northeast, east, and west and

residential to the south and northwest. Additionally, the existing Ritz Carlton Resort is located directly north of the site proposed for the Ritz Carlton residences and directly west of the site proposed for the Sky Mesa Recreation Area. As such, the project's proposed uses would be compatible with nearby land uses.

The General Plan, Land Use Element contains several goals applicable to the proposed project, including providing a resort residential community of desirable neighborhoods, a variety of community facilities, and high-quality development, meeting the City's future needs by providing high-quality commercial land uses distributed throughout Rancho Mirage, preserving the scenic viewsheds from adjoining properties and public rights-of-ways, and utilizing flexible development policies to provide quality amenities within open space. The proposed project would place residential suites, hotel villas, event space, commercial, and amenity space on a previously disturbed site with similar surrounding land uses. The Sky Mesa recreational area has always been privately owned and prior to it being sold to the current owner (Newage Rancho Mirage) it was owned by Federated Dev LLC, the original developer from the 1980's. The Sky Mesa recreational area is currently vacant, with a portion that has been partially graded in the past. The proposed project would include high quality design for resort living, quality commercial uses, and open space amenities while preserving existing viewsheds and scenic resources.

In addition, this GPZMA will help achieve and/or establish the framework for implementation of Goals, Policies and Programs within the Land Use Element of the City's General Plan.

**Land Use Goals & Policies**

- *GOAL LU 1: A resort residential community of desirable neighborhoods, a variety of community facilities, and high-quality development.*

Response: The project expands the resort to include condo- hotel units that are aligned with high quality development and The Ritz brand of hotels; essentially creating the definition of a "resort residential community". The modification also includes additional open space. As detailed above, minimal development is proposed as part of the Sky Mesa recreational area with only a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. All other improvements will be recreation related and will blend in with the surrounding environment and adding beneficial open space to the resort.

- *GOAL LU 2: A balanced mix of functionally integrated land uses, meeting the general social and economic needs of the community through simplified, compatible, and consistent land use and zoning designations.*

Response: The modification includes improvements to the original entitlements, such as additional parking and more open space, which creates even more of a balanced mix of functionally integrated uses to the site. The site will include the existing resort hotel, condo-uses and open space with small restaurant. The condo-hotel use provides an appropriate buffer to the residential homes surrounding the hotel. The project proposes an amendment to the existing General Plan Zoning Map to change the land use and zoning from Mountain Reserve (MR) to

**JUSTIFICATION OR INFORMATION CONTINUED:**

Resort Hotel (Rs-H) for 3.88 acres to allow for the development of the Sky Mesa recreational area. The rest of the project site has a land use designation of Resort Hotel (Rs-H). The Sky Mesa recreational area will provide some commercial space with the 6,273 square foot restaurant development, but will be primarily dedicated to recreational uses. In total buildings within the Sky Mesa recreational area make up less than four (4) percent of the 3.88 acres allocated to the Sky Mesa recreational area. Most of the area (96%) will be dedicated to recreation uses and open space, which is compatible with the both the Resort Hotel (Rs-H) and surrounding Mountain Reserve (MR) zone.

- *Policy LU 2.6: The City shall ensure privacy and safety for residential neighborhoods by providing adequate buffering and screening, particularly where neighborhoods adjoin or are integrated with commercial developments.*

Response: The site will include the existing resort hotel, condo-uses and open space with a small restaurant. The condo-hotel use provides an appropriate buffer to the residential homes surrounding the hotel. Minimal development is proposed as part of the Sky Mesa recreational area with only a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. All other improvements will be recreation-related and will blend in with the surrounding environment. The Sky Mesa area is located approximately 600 feet away from the closest residential property to the south and its design will provide high quality development. In total, buildings within the Sky Mesa recreational area make up less than four (4) percent of the 3.88 acres allocated to the Sky Mesa recreational area. Most of the area (96%) will be dedicated to recreation uses and open space, which is compatible with the Mountain Reserve (MR) zone. The closest buildings next to existing Mirada community are the projects Hotel Villas (Buildings B-1 to B-15); these buildings will operate as condo hotel units. The maximum height of these buildings is 32'-7". For reference the closest home located within Mirada to Building B-6 has a pad elevation of 674' which is 24' higher than the finished floor of Building B-6. The elevation difference between Mirada and the project site buildings is reduced the closer to Frank Sinatra Drive a particular building is measured from. In addition, the project has a minimum 50-foot setback from all exterior property lines, ensuring privacy and safety for residential neighborhoods.

- *POLICY LU 2.7 The Economic Development Division shall actively pursue opportunities to attract high-quality retail commercial establishments and resort hotels in Rancho Mirage.*

Response: The overall project proposes modifications for the construction of the Ritz Carlton residences to the previously approved entitlements. The modification consists of 106 condo hotel units (previously 111); event space and room for amenities; subterranean parking structure; and additional parking spaces. Additionally, the Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. The project also includes a 10$^{th}$ Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10$^{th}$ Amendment"), which sets the terms for Transient Occupancy Tax for the proposed 106 condo hotel units. Overall, the newly proposed additions will provide high quality development to the Ritz Carlton property. With the new event space, the Ritz Carlton will be able to host two simultaneous events and have additional capacity for restaurants with the Sky Mesa restaurant.

**JUSTIFICATION OR INFORMATION CONTINUED:**

- *POLICY LU 3.1 Areas of existing residential development and surrounding vacant lands shall be planned in a manner that preserves neighborhood character and assures a consistent and compatible residential land use pattern.*

Response: The overall project proposes modifications for the construction of the Ritz Carlton residences to the previously approved entitlements. The modification consists of 106 condo hotel units (previously 111); event space and room for amenities; subterranean parking structure; and additional parking spaces that are well planned and suitable for the sites. Additionally, the Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. The Sky Mesa area is located approximately 600 feet away from the closest residential property to the south and its design will provide high quality development. In total buildings within the Sky Mesa recreational area make up less than four (4) percent of the 3.88 acres allocated to the Sky Mesa recreational area. Most of the area (96%) will be dedicated to recreation uses and open space. The closest buildings next to existing Mirada community are the projects Hotel Villas (Buildings B-1 to B-15); these buildings will operate as condo hotel units. The maximum height of these buildings is 32'-7". For reference, the closest home located within Mirada to Building B-6 has a pad elevation of 674' which is 24' higher than the finished floor of Building B-6. The elevation difference between Mirada and the project site buildings is reduced the closer to Frank Sinatra Drive, a particular building is measured from. In addition, the project has a minimum 50-foot setback from all exterior property lines. In 1991, MCO Properties acquired the project site where the A-1 and B buildings are located. Under the Development Agreement at the time, the site was originally entitled to construct 169 units at a density of about 11.5 units per acre. The Eighth Amendment (approved on March 19, 2005) to the original DA established a right to develop 138 units (reduced from 169 units), up to two stories in height. On August 3, 2006, the City approved the construction of 111 units. As part of the current request, only 106 condo hotel units are proposed within the same area, that as detailed above at one point allowed up to 169 units.

- *GOAL LU 4 High-quality commercial land uses conveniently and appropriately distributed throughout Rancho Mirage, to meet the community's current and future needs and to take full advantage of emerging development and economic opportunities.*

Response: The overall project site is primarily designated as Resort Hotel (Rs-H). An amendment is proposed to the existing General Plan Zoning Map to change the designation from Mountain Reserve (MR) to Resort Hotel (Rs-H) for 3.88 acres to allow for the development of the Sky Mesa recreational area. Minimal development is proposed as part of the Sky Mesa recreational area with only a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. The Ritz Resort Hotel has maintained high quality development in the City and the proposed project maintains those standards.

- *POLICY LU 4.1 The City shall designate sufficient lands to provide revenue to the City and a full range of commercial services to the community and surrounding areas for present and future years.*

Response: The overall project site is primarily designated as Resort Hotel (Rs-H). An amendment is proposed to the existing General Plan Zoning Map to change the designation

from Mountain Reserve (MR) to Resort Hotel (Rs-H) for 3.88 acres to allow for the development of the Sky Mesa recreational area. The Sky Mesa recreational area is proposed with a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. All other improvements will be recreation-related and will blend in with the surrounding environment. The project also includes a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment"), which sets the terms for Transient Occupancy Tax for the proposed 106 condo hotel units. Overall, the newly proposed additions will provide high quality development to the Ritz Carlton property. With the new event space the Ritz Carlton will be able to host two simultaneous events and have additional capacity for restaurants with the Sky Mesa restaurant.

- *PROGRAM LU 4.1A Periodically review the Land Use Plan to assure sufficient lands are designated for commercial uses to support the needs of the community and surrounding areas in a manner consistent with economic opportunities and the resort residential character of the community.*

Response: The overall project site is primarily designated as Resort Hotel (Rs-H). An amendment is proposed to the existing General Plan and Zoning Map to change the designation from Mountain Reserve (MR) to Resort Hotel (Rs-H) for 3.88 acres to allow for the development of the Sky Mesa recreational area. The project also includes a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment"), which sets the terms for Transient Occupancy Tax for the proposed 106 condo hotel units. Overall, the newly proposed additions will provide high quality development to the Ritz Carlton property. With the new event space the Ritz Carlton will be able to host two simultaneous events and have additional capacity for restaurants with the Sky Mesa restaurant.

- *PROGRAM LU 7.3A Adopt and implement flexible development policies, standards, and guidelines that encourage quality open space amenities in new residential subdivisions and planned developments. These policies, standards and guidelines shall be incorporated into the City Development Code and other appropriate regulatory documents.*

Response: The project proposes an amendment to the existing General Plan and Zoning Map to change the land use and zoning from Mountain Reserve (MR) to Resort Hotel (Rs-H) for 3.88 acres to allow for the development of the Sky Mesa recreational area. As detailed above minimal development is proposed as part of the Sky Mesa recreational area with a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. All other improvements will be recreation-related and will blend in with the surrounding environment.

## TENTATIVE PARCEL MAP (TPM23-0002)

The Tentative Parcel Map is for condominium purposes to establish three separate parcels for a portion of the Project Site (excluding the Sky Mesa area & Tennis Villas site) that includes Parcel 1 (2.699 acres) for the Spa Suites site which is not being developed with new construction, Parcel 2 (15.995 acres) for the Hotel Site which is not subject to any further

development, and Parcel 3 (11.873 acres) for the Ritz Carlton Residences (that includes the T-Wing (Building A) and Hotel Villas (B Buildings) for the development of 106 residential condominium units, an event space, a restaurant, a subterranean parking structure, and various amenities including recreational amenities.

## CITY ATTORNEY INDEPENDENT ANALYSIS

Since the proposed Project requires the adoption of ordinances approving an amendment to a Statutory Development Agreement, the City Attorney is required to make determinations which address whether the City has the legal authority to adopt said ordinances.

Rancho Mirage Municipal Code Section 1.04.031 (Review And Approval Of Legal Form Of Ordinances By City Attorney) provides that "[n]o ordinance shall be deemed effective unless the City Attorney determines that the City has the authority to adopt the proposed ordinance, that the proposed ordinance is constitutionally valid under the state and federal constitutions, and that the proposed ordinance is consistent with the general powers and purposes of the City, the City's Charter, ordinances approved by the voters, and any applicable federal and/or state laws."

### Legal Authority

#### *Development Agreement Ordinance*

The Development Agreement Statute, as set forth in California Government Code sections 65864 through 65869.5 allows for the vesting of development rights to protect against later changes in planning and zoning regulations. State law permits cities to enter into development agreements with "any person having a legal or equitable interest in real property for the development of the property." *See Govt C §65865(a)*. However, in order to approve the proposed Development Agreement, it must be approved by an ordinance adopted by the City Council.

The proposed Development Agreement amendment may be approved by the City Council if the City Council finds that the provisions of the Development Agreement are consistent with the General Plan, which in this case will be if the City Council ultimately approves the proposed General Plan Zoning Map Amendment. In other words, although development agreements cannot be used to establish land uses not authorized by the zoning ordinance applicable to the property, the subject Development Agreement amendment is contingent upon the City ultimately approving the proposed General Plan Zoning Map Amendment, which together with the Development Agreement amendment and related entitlements will establish the plans, land use regulations, development standards, design guidelines, infrastructure requirements, and implementation programs to guide the development.

Notwithstanding the above, because the decision to enter into a development agreement is a legislative act, the decision of the City Council is not otherwise required to be supported by findings, except for those expressly required by state law (such as the general plan consistency finding) and any local development procedures. *See Native Sun/Lyon Communities v City of Escondido (1993) 15 CA4th 892, 910.*

Pursuant to Chapter 17.56 of the Rancho Mirage Municipal Code, the content of a development agreement must address the following: (1) specify the duration of the agreement; (2) specify the allowed uses for the subject property; (3) specify the density/intensity of the allowed uses; (4) describe the maximum height and size of proposed structures by clearly identifying and referring to the documents and exhibits approved; (5) describe the provisions, if any, for reservation or dedication of land for public purposes; (6) describe the provisions, if any, for the protection from either a future growth control ordinance or a future increase in development and/or effect fees; (7) provide for a tiered amendment review procedure; and (8) provide for the possibility of subsequent discovery of health and safety issues like a compelling public necessity (e.g., a new environmental health hazard is discovered), which would necessitate a reconsideration or amendment of the previously approved development agreement.

Moreover, Government Code Section 65868 provides in relevant part that a development agreement may be amended by mutual consent of the parties to the agreement or their successors in interest. Rancho Mirage Municipal Code Section 17.56.060 (Amendment and cancellation of development agreements) further provides that either party to the agreement may propose an amendment and that the procedure and notice requirements for amendment is the same as entering into the agreement. Rancho Mirage Municipal Code Section 17.56.060(C) does not apply in this instance as the City did not initiate the amendment.

It is the independent opinion of the City Attorney that based on the content and findings in the Staff Report and the terms and conditions of the proposed Development Agreement amendment, that the proposed Development Agreement, as amended, conforms with and meets all of the above requirements. In addition, the City Attorney finds and concludes that based on the foregoing, the City Council has the legal authority to adopt the proposed Development Agreement Amendment Ordinance since the proposed ordinance is constitutionally valid under the state and federal constitutions, is consistent with the general powers and purposes of the City, the City's charter, ordinances approved by the voters, and applicable federal and state laws.

## DEVELOPMENT AGREEMENT AMENDMENT (DA21-0002)

In California, cities are allowed to enter into development agreements with any person(s) or entity(ies) having a legal or equitable interest in real property for the development of property in order to establish certain development rights in the real property.

A development agreement is intended to provide assurances to the developer that an approved project may proceed subject to the policies, rules, regulations, and conditions of approval applicable to the project at the time of approval, regardless of any changes to the City's policies, rules, and regulations after the project approval. This is in exchange for assurances that the City will receive certain payment of fees, the installation of certain unfractured, and other benefits the City cannot otherwise unilaterally impose as conditions of approval of the project outside the context of a negotiated development agreement. Development agreements basically eliminate a lot of uncertainty in planning, secure orderly development of the projects, assures progressive installation of improvements and provides the least economic cost to its residents.

JUSTIFICATION OR INFORMATION CONTINUED:

The 10th Development Agreement Amendment for the proposed project is necessary to update the terms for project site and to incorporate the modifications to previously approved entitlements that are part of the current request. It is very important to note that a condo-hotel is not a timeshare project, since the ownership of a condo-hotel unit constitutes an interest (ownership) in real property, whereas ownership of a timeshare unit constitutes an interest in a share of time in a timeshare unit.

Pursuant to Section 17.30.095 of the RMMC, the development standards applicable to resort hotels apply to condo-hotel units projects, unless otherwise provided by a development agreement. Under the proposed Development Agreement, the future owners of the condo hotel units detailed in the Development Agreement Amendment would be allowed to occupy the unit for a period not to exceed six (6) months (consecutive or non-consecutive) per calendar year. An owner can rent the unit for additional personal occupancy provided that transient occupancy taxes are paid for each day the owner occupies the unit beyond the allowable occupancy period. When the unit is not occupied by the owner it shall be made available for transient rentals to the general public. The Ritz Carlton hotel will manage all condo hotel rentals, per Section 7 of the Development Agreement Amendment. The term of the Development Agreement Amendment is 10 years and that will only apply to the project, not the financial terms listed in the agreement.

Per RMMC Section 17.30.095, the following provisions are required in development agreements:

| RMMC Requirement | Development Agreement |
|---|---|
| Development Standards. The development standards applicable to resort hotels shall apply to all condo-hotel projects unless otherwise provided in this chapter or pursuant to a development agreement. | The project is consistent with this provision. |
| Conversions. No existing hotel room or existing hotel facility or structure shall be converted to condo-hotel status unless otherwise permitted pursuant to a development agreement. | The proposed 106 condo hotel units (part of Major Modification) are a new development and there are no existing hotel rooms or hotel facilities that are being converted to condo-hotel status. The Development Agreement Amendment does list terms for the 16 Spa Suites and 25 Tennis Villas. |
| The number of units of a condo-hotel project that may be condo-hotel units shall be limited to no more than ten percent of the project's total sum of condo-hotel units and hotel rooms combined unless otherwise permitted pursuant to a development agreement. | Overall the Ritz Carlton property at build out including past active entitlements will consist of one hundred forty seven (147) condo-hotel units and two hundred forty four (244) hotel rooms, with the number of condo-hotel units constituting thirty eight percent (38%) of the total sum of both condo-hotel units and hotel rooms planned for the proposed project. |
| Each owner of a condo-hotel unit shall enter into an agreement with a professional hotel management entity/company which, at a minimum, provides that the management | This is addressed in Development Agreement Section 7. |

JUSTIFICATION OR INFORMATION CONTINUED:

| | |
|---|---|
| entity/company will collect all transient occupancy taxes required on rentals of that owner's unit, outside the owner occupancy periods, whether or not such rentals are handled by said management entity/company. The management entity/company shall then be responsible for forwarding transient occupancy taxes to the city in accordance with the city's transient occupancy tax regulations. | |
| The professional management entity/company designated to collect transient occupancy taxes pursuant to this section must have at least five consecutive years of experience, meeting the First-Class Hotel Standards and having no fewer than ten other properties (in separate cities, or distinct and separate projects in any given city, nationally or internationally) under current management unless otherwise provided pursuant to a development agreement. | This is addressed in DA Section 7, with the Ritz Carlton managing the condo hotel rentals. |

**Major Modification**

A Major Modification is required due to the proposed site changes to an already developed project site. As proposed, the project will meet all applicable regulations of the Rancho Mirage Municipal Code. As detailed in the background section of this staff report, the City Council on August 3, 2006, approved a Preliminary Development Plan which included multiple project components. One of these components was the development of a T Wing Building and various hotel villas (located on current project area where A-1 building and B1-B15 buildings are proposed).

When comparing the 2006 entitlements to the current modifications, the Hotel Villas (B Buildings) are similar in nature and concept. They were also setback a minimum of 50 feet the exterior property lines, were two story in height, and were located in the same location. The T-wing units were also similar in nature. Differences between the 2006 entitlements and the current project include the addition of a 381-stall subterranean parking structure, the addition of the Venue event space so that the Ritz Carlton can host two simultaneous events, addition of garages to Hotel Villas, and a reduction from a previous total of 111 units to 106 units currently proposed. The Sky Mesa recreational area is also a new addition to the project.

The following tables provide a breakdown of the proposed buildings and square footages:

| Building A-1 – The Venue | |
|---|---|
| Space Description: | Square Footage: |
| Prefunction Space | 5,600 SF |
| Main Event Space | 11,135 SF |
| Auxiliary Spaces | 7,108 SF |
| Venue Total | 23,843 SF |

JUSTIFICATION OR INFORMATION CONTINUED:

| Building A-1 – Residential Units (T-wing) – Part of 2006 Entitlements | | | |
|---|---|---|---|
| Plan Type | Count | Unit Area | Net Area |
| Plan A – 1BR/1BA | 26 | 1,063 SF | 27,638 SF |
| Plan B – 2BR/2BA Lock-off | 12 | 1,645 SF | 19,740 SF |
| Plan C – 2BR/3BA Lock-off | 10 | 1,918 SF | 19,180 SF |
| Unit Totals | 48 | | 66,558 SF |

| Buildings B-1 to B-15 – Residential Units (Hotel Villas) – Part of 2006 Entitlements | | | |
|---|---|---|---|
| Plan Type | Count | Unit Area | Net Area |
| Plan 1 – 2BR/2BA | 15 | 2,131 SF | 31,965 SF |
| Plan 1X – 2BR/2BA | 14 | 2,117 SF | 29,638 SF |
| Plan 2 – 3BR/3BA | 15 | 2,461 SF | 36,915 SF |
| Plan 2X – 3BR/3BA | 14 | 2,525 SF | 35,350 SF |
| The Lounge – Entry Level | | | 2,444 SF |
| The Lounge – Lower Level | | | 3,069 SF |
| The Lounge Total | | | 5,513 SF |
| Unit Totals | 58 | | 133,868 |

| Sky Mesa Recreational Area | |
|---|---|
| Space Description: | Square Footage: |
| Restaurant | 6,273 SF |
| Restrooms | 693 SF |
| Sky Mesa Total | 6,966 SF |
| **Total Project Units** | **106 Units** |
| **Total Project Square Footage** | **236,748 SF** |

**Access and Circulation**

The project site can be primarily accessed through Frank Sintra through two existing driveways. In addition, there is an existing paved emergency access road located east of the project site that serves both the Ritz Carlton and the Mirada residential community, providing emergency access to and from Highway 111. An internal road network will be constructed to provide access to Buildings B-1 to B-15.

**Lot Coverage**

The Resort Hotel (Rs-H) zone has a 25% site coverage maximum, which is defined as the building-ground contact area divided by the total site area. The project has a size of 35.07 acres or 1,553,500 square feet (excluding Tennis Villas area which was approved as part of the 2006 entitlements). The proposed project and the existing Ritz Carlton Hotel have a total ground floor enclosed area of 360,006 square feet, which equals a lot coverage of 23.17%, which is well under the 25% maximum.

**Setbacks**

The Resort Hotel zone has a minimum setback of 50 feet. The project is proposing a minimum setback of 50 feet along all exterior property lines not owned by the Ritz Carlton. As proposed the project meets all required setbacks.

JUSTIFICATION OR INFORMATION CONTINUED:

## Site Grading and Drainage

The Residences Area (Buildings A & B) of the project site is vacant and has been extensively graded. The Sky Mesa Recreation Area is vacant, with a portion that has been partially graded and the remaining areas containing native desert vegetation along steep slopes.

The project site has a variety of different slopes due to the project's location on mountainous land. Finished surfaces have an elevation between 625.5' to 653.9' for the B Buildings (Hotel Villas). The finished surfaces for the Venue consist of 618' for the ground floor (lowest level) and 628' for the finished floor. The residential component of the A Building (T-wing) ranges from 618' for level P3, 628' for level P2, 640' for level P1, and 650' for level 1. The A-1 building have similar heights when compared to the Hotel Villas from Mirada viewpoints.. The Sky Mesa restaurant will have a finished floor of 657'. For reference the closest home located within Mirada to Building B-6 has a pad elevation of 674' which is 24' higher than the finished floor of Building B-6. The elevation difference between Mirada and the project site buildings is reduced the closer to Frank Sinatra Drive a particular building is measured from.

### The Residences Drainage

The majority of the existing site is mass graded and there is little to no vegetative cover. The total drainage area of the project site is approximately 14 acres with Hydrologic Soil Group Type B soils. On-site runoff is conveyed via sheet flow and shallow drainage courses to the proposed project's discharge points along the western and eastern property boundary. The existing site is divided into three basins, Basin 100, Basin 200, and Basin 300. Basin 100 drains generally west to the gutter on Frank Sinatra Drive (Discharge Point 1). From Discharge Point 1, flow is conveyed north in the Frank Sinatra Drive gutter to an existing inlet and storm drain system, which eventually discharges to a natural drainage channel. Basin 200 drains generally east to Discharge Point 2 in the natural drainage channel located east of the site. Basin 300 drains west to Discharge Point 3 at the Mirada Circle gutter, which flows west and eventually discharges to a natural drainage channel.

### Sky Mesa Recreational Area Drainage

The existing site is partially graded with generally low desert vegetative cover. On-site runoff is conveyed via sheet flow and shallow drainage courses to the proposed project's discharge points along the western property boundary. The existing site is divided into two basins, Basin 400 and Basin 500. Basin 400 drains generally west to the existing Ritz Carlton development (Discharge Point 4). Basin 500 drains northwest to Discharge Point 5 in the existing natural drainage channel west of the site.

A final Hydrology Report is conditioned to be submitted to the Public Works Department and shall meet all City requirements.

## Floor/Roof Plan

Building A-1 will consist of 48 Residential units with sizes ranging from 1,063 SF to 1,918 SF (1-to-2-bedroom units). The units will have a kitchen, great room, bedrooms, and a patio/deck area. The Venue will be used as an event space and consists of 23,843 square feet. The Venue will have areas for event space, pre-function space, coat check/storage and a kitchen.

JUSTIFICATION OR INFORMATION CONTINUED:

Buildings B-1 to B-15 will have 58 residential units with units ranging in size from 2,131 SF to 2,525 SF (1-to-3-bedroom units). The units will have a kitchen, great room, garage, and some will have a bedroom on the first floor. The second floor will have bedrooms, potential loft area, and deck space. A 5,513 SF lounge area is also proposed within Building B-5, with a lounge area, kitchen and bar area.

The Sky Mesa portion of the site will consist of various walking paths and recreational areas. Two buildings will be located within this area a 6,273 square foot restaurant and 693 square feet of restroom facilities. The restaurant will contain 3,049 square feet of dining space, 2,752 square feet for kitchen/storage and a 472 square foot bar area.

Project roofs will consist of concrete tile in a California mission blend color. The projects roofs will have adequate space for mechanical equipment. Roofs within Building B will have parapets ranging in height from 3'-6" to 4'.

In total the project proposes 236,748 square feet of new development.

**Parking**

The project proposes a combination of subterranean parking and parking within the Hotel Villas (Buildings B-1 to B-15). The following table provides a breakdown of the minimum parking required.

| Parking Requirements | | | |
|---|---|---|---|
| **Building/Use** | **Square Footage/Units** | **Parking Ratio** | **Number of Required Spaces** |
| The Venue (Event Space in Building A) | 11,135 SF | 1 space per 50 SF (Per event space area) | 223 |
| Residential Units (Building A) | 48 Units | 1.1 Spaces Per Guest Room | 53 |
| Residential Units (Buildings B-1 to B-15) | 58 Units | 2 spaces per Unit & 1 space per 2 Units (guest space) | 145 |
| Sky Mesa Restaurant | 6,273 SF | 1 space per 80 SF | 78 |
| **Total Parking Required:** | | | **499** |
| **Total Parking Proposed:** | | | **499** |

**Electric Vehicle Charging Stations**

Pursuant to Section 17.26.030 of the Rancho Mirage Municipal Code (RMMC), all new construction and projects requiring discretionary action shall provide a defined amount of electric vehicle charging stations. For projects that have between 201-500 parking spaces, four (4) electric vehicle charging spaces are required. A Condition of approval has been added to ensure that a minimum of four electric vehicle charging spaces are provided.

**Shaded Parking**
Pursuant to Section 17.26.070 of the RMMC, a minimum of 25% of the parking spaces shall be shaded. The new subterranean parking structure area exceeds this requirement with a total of 381 parking spaces and 87 garage spaces within the Hotel Villas (Buildings B-1 to B-15). The combination of the various shading methods will far exceed the 25% shade requirement for the project site.

**ADA Parking**
Pursuant to Section 17.26.060 of the RMMC, a proposed project of 301-400 parking spaces shall provide a minimum of eight (8) handicapped parking spaces. The 381-stall subterranean parking structure meets this requirement as proposed. Handicapped parking spaces are located on levels P1 & P2 of the parking structure. Although the project as a whole provides a total of 499 parking spaces, the additional spaces not part of the parking structure are either located within garages or within the driveways of Buildings B1-B15 (Hotel Villas).

**Architecture**
The architectural style of the new building is best described as contemporary desert architecture compatible with the existing Ritz Carlton hotel. Colors and Material for the Venue, Building A-1 Residences and Buildings B1-15 will consist of a main stucco color of Benjamin Moore Bleeker Beige in a smooth finish, with an accent stucco color of Sherwin Williams Backgrop Integral also in a smooth finish. Masonry veneer in a Timberwolf color will add interest to the architecture. Roofing will consist of concrete tiles in a California mission blend color. A variety of other trims and finishes that complement the primary materials are proposed for the facias and metal elements of the buildings A primary feature of the Venue building will be its tower element located at the entrance with a maximum height of 39’-3”. Within the Sky Mesa recreational area the restaurant and bathroom building will also be designed with a main material of smooth stucco in a Benjamin Moore Bleeker Beige color with an accent of Backdrop Integral. Accents of a concrete wall in a smooth finish with metal trims of painted in a Toucan Black. Door and window frames will be painted in a dark bronze finish. Buildings within Sky Mesa will be built into the mountain area to create a unique and visually appealing design. Overall, the projects architecture and building placement takes advantage of the different elevations due to the mountainous terrain to incorporate well into the project site.

**Building Height**
**Height Consideration**: Staff has conducted an analysis per Section 17.20.100 of the Rancho Mirage Municipal Code (RMCC), which governs structures over 20’ in height. The Venue building will have a maximum height of 39’-3” at the tower element located at the entrance, The maximum height of the project site is proposed at 47’ which is only for a small portion of the project site only visible from the existing Ritz Carlton Hotel when measuring the bottom of the subterranean parking structure entrance to the top of Building A-1. The condo hotel units of Building A-1 when viewed from Mirada to the south have heights primarily of 25’-6”, with only a few tower elements exceeding this. Building heights for Buildings B-1 to B-15 range from 32’-4” to 32’-7”. The Sky Mesa restaurant will have a maximum height of 18’-6”, but as previously described the restaurant will be built within the mountain area. The following is Staff’s analysis of the proposed building heights:

**JUSTIFICATION OR INFORMATION CONTINUED:**

1. *In addition to the minimum required setbacks for one (1) story or twenty (20) foot high buildings, the setback shall be increased a minimum of two (2) feet for each one (1) foot of additional building height above twenty (20) feet; however, the council in exercising their discretion may require significantly greater setbacks;*

   **Staff Response:** The project site proposes a minimum 50-foot setback from all exterior property lines in compliance with the Resort Hotel (Rs-H) standards. In addition, the project is at a lower elevation than the adjacent Mirada development. This is in line with the previously approved entitlements.

2. *Enhanced buffering to surrounding development, land uses designations, and zoning shall be demonstrated.*

   **Staff Response:** The project has reduced the number of units from 111 units as previously approved in 2006 to now 106 units. The project heights remain at two stories as previously approved with heights ranging from 32'-4" to 32'-7" for the buildings closest to the Mirada development along the southern boundary of the project site. The project proposes a high-quality architectural design that is compatible with adjacent developments.

3. *A visual and spatial analysis relating building proportions, massing, height, and setback shall be conducted to preserve and enhance the scenic view shed.*

   **Staff Response:** Site sections and a sight viewpoint study were prepared from Frank Sinatra Drive along areas viewing from Mirada to study the project. All studies show that the maximum height of the building will not cause detrimental viewshed impacts to these areas due to the 50 foot setbacks around the entire project site. The Site Visual Study and site sections can be found on pgs. C-2.4 to C-2.5, V-2.6, VS.0.01 to VS.0.06, & R-2.2 of the exhibit booklet (Attachment 12). In addition, the project site has a variety of different slopes due to the project's location on mountainous land. Finished surfaces have an elevation between 625.5' to 653.9' for the B Buildings (Hotel Villas). The finished surfaces for the Venue consist of 618' for the ground floor (lowest level) and 628' for the finished floor. The residential component of the A Building (T-wing) ranges from 618' for level P3, 628' for level P2, 640' for level P1, and 650' for level 1. The building will look like a two-story building when looking from Mirada. The Sky Mesa restaurant will have a finished floor of 657'. For reference the closest home located within Mirada to Building B-6 has a pad elevation of 674' which is 24' higher than the finished floor of Building B-6. The elevation difference between Mirada and the project site buildings is reduced the closer to Frank Sinatra Drive a particular building is measured from.

4. *The need and appropriateness of the additional height shall be demonstrated.*

   **Staff Response:** The applicant has paid special attention to the placement of the additional height and buildings. The additional height is needed in order to meet the needs of the hotel. In addition, the project is in compliance with the height requirements of the Municipal Code.

5. *Compatibility and harmony with surrounding development, land uses designations, and zoning shall be demonstrated.*

   **Staff Response:** The maximum height of the project site is proposed at 47' which is only for a small portion of the project site only visible from the existing Ritz Carlton Hotel when measuring the bottom of the subterranean parking structure entrance to the top of Building A-1. The second tallest portion is the tower element at the Venue with a maximum height of 39 feet, this again, is located closest to the existing hotel and away from existing residential uses. Along residential uses and next to Frank Sinatra Drive the closest buildings will have a maximum height of two stories and a height of approximately 32', which is lower than the existing three-story existing Ritz Carlton Hotel. Therefore, the proposed project is compatible and harmonious with within the Ritz Carlton development and surrounding residential communities.

**Landscape/Lighting**

The project site will be lushly landscaped with a variety of trees and shrubs. Trees proposed include Mulga, Sweet Acacia, Desert Willow, Blue Palo Verde and a variety of others in 36 inch box sizes. A variety of Date Palms (15') and California Fan Palms in a various sizes (10'-15') are also proposed. Shrubs like Desert Milkweed, Brittle Bush and Autumn Sage will provide color and interest.

The Sky Mesa recreational area will as incorporate many of the same landscaping choices, such as Palo Verdes and various Date and California Fan Palms. A variety of shrubs primarily in 5-gallon sizes are proposed to line the walking paths and other landscaped areas.

The only lighting proposed as part of the new construction is low voltage landscape lighting and pathway lights in a bronze finish. Landscape uplighting is not proposed for trees and lights on palms in pool areas will be mounted on the trunks with low volage LED's and downlights casing light to the terraces and patios below. If additional lighting is proposed it will be revised according to the appropriate review process as determined by staff.

**Final Development Plan (FDP)**

Prior to the issuance of any building permits, the applicant shall submit a Final Development Plan and pay the requisite fees. The FDP shall include detailed written responses to each of the project's conditions of approval along with final sets of construction, grading, lighting and landscaping plans.

Any revisions that are in substantial compliance with the original project, and do not trigger the need for additional environmental analysis, can likely be reviewed at the staff level through either the FDP process or Minor Modification process. If, however, there are wholesale changes to the project during the FDP review, the applicant shall be required to submit additional applications to modify the entitlement as necessary.

JUSTIFICATION OR INFORMATION CONTINUED:

## ARCHITECTURAL REVIEW BOARD

On February 27, 2023, the Architectural Review Board (ARB) conducted a public meeting to discuss the proposed project. No public comments were received during the public meeting. As summarized in the minutes attached to this report, the ARB members asked questions to which staff and the applicant answered. After the board's discussion, ARB Board Member Milander made a motion to request additional information and recommend that the applicants further study certain elements of the project as detailed in the meeting minutes (Attachment 5). A vote was taken, and the motion carried 5/0.

The project was brought back to the ARB on March 27, 2023 after additional information was provided. As summarized in the minutes attached to this report, the ARB members asked questions to which staff and the applicant answered. One member of the public did speak regarding hiring local contractors and utilizing an apprenticeship program (See Attachment 13 for written public comment submitted). The Board had a discussion regarding the Sky Mesa walkway and regarding the retaining wall at the southern project boundary. With a proposed condition for the wall that a detailed cut section of the retaining wall be provided for the Engineering Division review and consideration.

After the board's discussion, ARB Board Member Greenwood made a motion to recommend the project to the Planning Commission with the conditions for the Sky Mesa walkway and the retaining wall. Vice Chair Patel seconded the motion. A vote was taken, and the motion carried 5/0.

The applicant restudied the plans regarding the elevated Sky Mesa walkway after the ARB meeting and decided to remove it from the plans, therefore no condition was added for the walkway.

## CEQA COMPLIANCE/ENVIRONMENTAL DETERMINATION

An environmental assessment application was submitted for the proposed project and the determination was made that the project required an Initial Study. An Initial Study has been prepared resulting in the recommendation to adopt a Mitigated Negative Declaration (MND). Mitigation measures were recommended for Air Quality, Biological Resources, Cultural Resources, Noise, Transportation/Traffic, & Tribal Cultural Resources. A Notice of Determination will be filed with the Riverside County Clerk once a final determination has been made by the City Council. The complete Initial Study, along with the Mitigation Measures, is included as Attachment 3 – Draft Mitigated Negative Declaration.

The Initial Study/Mitigated Negative Declaration was first circulated for public review for a 30-day review period starting on March 11, 2024 to April 9, 2024, and the City received four comment letters. After reviewing the comments received on the March 2024 IS/MND, the City determined that the air quality needed additional study. As specifically requested in one of the comment letters a Health Risk Assessment (HRA) was prepared to analyze the project's potential to expose sensitive receptors to substantial pollutant concentrations. The results of this HRA concluded that with additional mitigation the impacts are less than significant. Revisions were also made to mitigation measures MM-BIO-1 through MM-BIO-3 in response to comments made from the California Department of Fish and Wildlife (CDFW), and MM-CUL-1 in response to comments from Agua Caliente Band of Cahuilla Indians. These changes merely clarified or

amplified information already found in the March 2024 IS/MND, and did not raise important new issues about significant effects on the environment. While the City is not required to respond to comments, Sections 21091(d)(1) and 21092.5 of the Public Resources Code (PRC) and Section 150874 (b) of the California Environmental Quality Act Guidelines require that prior to project approval a Lead Agency must consider all comments received before making a final determination.

A Notice of Intent to Adopt a Mitigated Negative Declaration was published in the Desert Sun on July 21, 2024, and distributed to interested parties. A 30-day public review period for the revised Draft Mitigated Negative Declaration commenced on Monday, July 22, 2024, and ended on Tuesday, August 20, 2024. During the second public review period, the City received four additional comment letters. A Noise Memorandum has been prepared to update the construction noise analysis using the FHWA RCNM model, and to include jackhammers, trucks, and vibratory rollers. Revisions were also made to mitigation measures MM-CUL-1 in response to additional comments from Agua Caliente Band of Cahuilla Indians. These changes do not raise important new issues about significant effects on the environment. Revisions are presented in strikeout/underline format in the Final IS/MND. A draft revised IS/MND with the requested mitigation measures has been included as Attachment 3.

**AB 52 & SB 18 Tribal Consultation:**

The City initiated tribal consultation in accordance with Assembly Bill 52 (AB 52) and Senate Bill 18 (SB 18) on November 21, 2021, with contacts for twenty-three (23) tribes and representatives provided by the Native American Heritage Commission (NAHC) notifying them of the proposed project. The City received three comment letters:

- The Quechan Indian Tribe responded on December 1, 2021, deferring to other tribes.
- The Morongo Band of Mission Indians responded on January 26, 2022, indicating that the proposed project is not located within their traditionally affiliated boundaries and encouraged consultation with other tribes.
- The Agua Caliente Band of Cahuilla Indians (ACBCI) responded on January 24, 2022, requested formal consultation under AB 52. The City engaged in government to government consultation with ACBCI concerning tribal cultural resources. On March 1, 2022, ACBCI sent a letter to the City stating that their concerns have been addressed and formally concluded consultation.

No additional correspondence or requests for formal consultation were received and the SB 18 and AB 52 noticing period was concluded.

## NOTICING REQUIREMENT

Rancho Mirage Municipal Code Section 17.74.020, *Hearing and notice*, requires that all property owners, as shown on the county's latest equalized assessment roll, within a 500-foot radius of the boundaries of the subject parcel(s) be notified of matters requiring a public hearing. If the number of property owners to whom the notice would be mailed to is less than 25, then the mailing radius is required to be increased to 1,000 feet as measured from the exterior boundaries of the subject parcel.

**JUSTIFICATION OR INFORMATION CONTINUED:**

On December 20, 2025, public hearing notices were mailed to property owners within a **500**-foot radius of the parcel boundaries and posted at the City's designated community posting sites pursuant to the requirements of Chapter 17.74 of the Municipal Code. Notification of the public hearing was published in *The Desert Sun* on December 29, 2024. Any information addressed to the Planning Commission, but received after completion of this final report, will be distributed at the public hearing. No new public comments have been received as of the publication date of this report.

JUSTIFICATION OR INFORMATION CONTINUED:

## ENVIRONMENTAL ASSESSMENT CASE NO. EA21-0002, GENERAL PLAN ZONING MAP AMENDMENT CASE NO. GPZMA 21-0001, DEVELOPMENT AGREEMENT AMENDMENT CASE NO. DA21-0002, MAJOR MODIFICATION CASE NO. MOD21-0004, & TENTATIVE PARCEL MAP CASE NO. TPM23-0002 CONDITIONS OF APPROVAL

Special conditions (or portions thereof) are designated in **bold.**

### *GENERAL*

1. This Major Modification and Tentative Parcel Map approval shall be effective for two (2) years from the date of City Council approval, unless extended as provided by 17.68.070 of the Rancho Mirage Municipal Code, or as determined by the projects Development Agreement. Building and Engineering Permits are required to be obtained by the applicant prior to project expiration. If no permits have been obtained, the application will expire and become null and void.

2. The proposed project shall substantially conform to the Planning Division's approved exhibits, including the materials board as contained in **Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA 21-0001, Development Agreement Amendment Case No. DA21-0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case No. TPM23-0002.** The applicant shall not misconstrue this as an approval to obtain a Building Permit at this time. Applicable structural and conformance plan check procedures, along with Public Works Department requirements, must be completed and approved prior to the issuance of a Grading or Building Permit. Should the plans be modified from the design approved by the City Council, the applicant/property owner shall submit a Minor Modification application to the Planning Division for review and approval as required by the Rancho Mirage Municipal Code (RMMC).

3. Prior to issuance of any permits, the applicant shall acknowledge that the approved project and any or all proposed modifications to the approved project shall be completed in accordance with applicable City Ordinances, Guidelines, and other requirements in effect at the time of building permit issuance.

4. The approval will not become effective until the approval letter is signed and returned to the Planning Division.

5. The Conditions of Approval set forth herein may include certain fees, dedication requirements, reservation requirements, and other exactions. Pursuant to Government Code Section 66020(d)(1), these Conditions constitute written notice of a statement of the amount of such fees, and a description of the dedications, reservations, and other exactions. You are hereby further notified that the 90-day approval period in which you may protest these fees, dedications, reservations, and other exactions, pursuant to Government Code Section 66020(a), has begun.

6. Prior to occupancy, all mechanical equipment shall be architecturally screened by walls from the view of surrounding properties and public right-of-way(s). The screening wall

material(s), color(s), and texture(s) shall match the structure or perimeter wall. Mechanical equipment shall not be located in the front setback area. Roof-mounted mechanical and solar equipment shall be screened from the street.

7. All walls shall follow RMMC Section 17.20.070. Wall pilasters shall not exceed six inches above the maximum wall heights. All walls shall be architecturally treated on both sides to be compatible with the structure.

FINAL DEVELOPMENT PLAN REQUIRED

8. A Final Development Plan application (FDP) shall be required prior to issuance of any grading or building permits (application on file with the Planning Division). The Final Development Plan (FDP) shall include a complete set of Building Construction Plans, Final Lighting Plans (including cut-sheets with Photometric Plan), Precise Grading Plan, Wall Plans, Final Landscaping and Irrigation Plans, a written response to the project Conditions of Approval, and any other requirements as listed in the Final Development Plan application.

9. The Development Services Director shall consider the Final Development Plan Permit application. He or she may approve a Final Development Plan permit if it substantially conforms to the Major Modification and associated Conditions of Approval.

10. The approved Major Modification may be modified only with City approval in a manner pursuant to Section 17.42.120 (Modification of a Development Plan Permit). Minor modifications to an approved Major Modification/Final Development Plan may be considered by the Development Services Director.

11. The project shall be completed in accordance with the Ordinances, requirements, guidelines and other criteria in effect at the time of construction.

FINAL DEVELOPMENT PLAN – LIGHTING

12. All exterior lighting shall be shown on the Final Development Plan and shall be low-level directed lighting, energy-efficient and shielded or recessed so that direct glare and reflections are confined within the boundaries of the subject site. All pole or building mounted lighting shall be directed downward and away from adjoining properties and public right of way. Lighting shall not blink, flash, or be of unusually high intensity or brightness. All lighting fixtures shall be appropriate in scale, intensity, and height to the building and shall be subject to review and approval by the Planning Division. A photometric Plan shall be required as a part of the Final Development Plan application

OTHER

13. All green waste shall be disposed of at a permitted composting facility.

14. The applicant shall undertake or cause to be undertaken such action or actions as are necessary to permit and/or otherwise accommodate the implementation of recycling services. Such action or actions may include, but are not limited to: designating and

providing adequate area at convenient locations with appropriate access for the placement of dumpsters and/or bin sets; constructing permanent enclosures that meet all requirements of the Code of the City of Rancho Mirage for each dumpster and/or bin set; providing for the security of each dumpster to discourage scavenging, and; providing adequate indoor area at convenient locations for the collection and short-term storage of recyclables. The applicant shall submit a "Recycling Program" that has been reviewed by an agent of the City, which, at a minimum, explains, states or otherwise defines: (1) recyclables generated by type; (2) estimate by pounds for each recyclable generated; (3) number of dumpsters and/or plastic bin sets (one set equals three "baskets") needed to accommodate estimated recyclables; (4) location of each dumpster (may be identified on a map attached as an exhibit); (5) method of collection such as curbside at each residential unit or at rear of property by dumpster, etc.; and (6) pick-up schedule for recyclables. The applicant shall provide other such information as may be necessitated by the development proposal.

15. The development shall comply with the requirements of Assembly Bill AB341 which mandates recycling for all new commercial developments. Recycling containers shall be sized in accordance with the anticipated need as approved by the City's contracted waste hauler. **The applicant shall also participate in the Burrtec Organic and Food Waste Recycling program.** Recycling bin enclosures shall be located and architecturally screened in accordance with the Rancho Mirage Municipal Code as approved by Staff.

16. As part of the FDP submittal, the applicant shall obtain a letter of compliance/approval from the City's contracted Waste Hauler (Burrtec) for the design of their trash bin enclosures. Said enclosures shall be designed to accommodate trash, recycle, and organic waste receptacles as required by State law.

17. All water features shall be maintained in compliance with Ordinance No. 844.

## PLANNING

HARDSCAPE, LANDSCAPE AND SCREENING

18. In conformance with Rancho Mirage Municipal Code Chapter 17.24, a complete set of on-site and off-site Landscaping Plans and installation schedules shall be required for all public and private street parkway areas between any curb and the right of way line or perimeter wall, including any common areas, and shall be submitted to, and approved by the Planning Division prior to issuance of a building permit.

19. The plans shall be submitted as a Landscape Documentation Package in accordance with Ordinance No. 990. Such Plan(s) shall be consistent with the Preliminary Landscape Plan, and the applicant shall provide evidence that the landscape plan has been reviewed and approved by the Riverside County Office of the Agricultural Commissioner and the Coachella Valley Water District (CVWD) prior to issuance of permits as a component of the Final Development Plan (FDP) or conformance check.

20. Where perimeter walls are shown on the development plan they shall be designed with aesthetic relief and be of high-quality architectural design to complement adjacent

developments, subject to approval of a Preliminary Development Plan application. In accordance with the Community Design Elements, the landscaped parkway and perimeter wall along all property lines shall be aesthetically enriched and subject to approval of planning staff, with Architectural Review Board review as deemed necessary. All top of wall elevations and adjacent finish grade elevations for the project perimeter and entry walls shall be subject to review and approval by the Planning Division and City Engineer.

21. The final landscaping and irrigation plans shall incorporate the use of Evapotranspiration (ET) irrigation "smart" controllers which shall include automatic water scheduling, rain and temperature sensors. Prior to a final inspection, the landscape contractor shall verify in writing with Planning staff that controllers have been installed, are correctly programmed, and operate with these features. More information on smart controllers can be found at www.irrigation.com.

22. Landscaping, Wall and Grading Plans shall demonstrate that all electrical distribution lines, electrical transformers, utility pads, cable TV and phone boxes, and similar utility fixtures will be screened, pursuant to Chapter 17.20 of the Rancho Mirage Municipal Code and/or installed underground if required **pursuant to Chapter 12.16 (Underground Utility Lines)**.

LANDSCAPE VERIFICATION

23. The project landscape architect shall submit written verification that the landscaping and irrigation has been installed per the approved landscape plan.

24. Water efficient landscaping shall be maintained in compliance with Chapter 17.24 (Landscaping Standards) of the Rancho Mirage Municipal Code.

25. All roof vents and plumbing stacks shall be routed to the interior side and/or rear of the structure so as to not be seen from the front building elevation. All vents and stacks shall be of a color compatible with the Planning approved building color(s) and have non-reflective surfaces.

26. Pursuant to Ordinance No. 1101, the applicant shall submit landscape plans to the Planning Division prior to requesting a final inspection. The applicant shall provide a copy of the CVWD approved landscape plans to the Planning Division prior to requesting a final inspection.

27. Prior to issuance of a Building Permit, the applicant shall provide evidence that the landscape plan has been reviewed and approved by the Riverside County Office of the Agricultural Commissioner (760-342-5070).

28. Per RMMC Sections 17.26.070 and 17.18.050, all lighting shall be designed and located to confine direct light within the subject project boundaries, with no light to surrounding properties. Exterior lighting shall be shielded or recessed in order that direct glare and reflections are confined within the boundaries of the subject property and shall be directed downward and away from adjoining properties and public rights-of-way. Lighting shall not

be of unusually high intensity or brightness. All lighting fixtures shall be appropriate in scale, intensity, and height to the use they are serving. **Candlelight measurements on all exterior property lines of the Ritz Carlton project site shall show a zero foot candlelight on the project's final photometric plan.**

OTHER

29. **All mitigation measures set forth in the projects Mitigated Negative Declaration shall be complied with as part of this project and are incorporated as conditions of approval.**

30. **A total of four electric vehicle charging spaces shall be provided within the project site, prior to a Planning Division final inspection.**

31. **A detailed cut section of the southern retaining wall shall be provided to the Engineering Division for their review and approval as part of the grading permit.**

32. **A traffic control plan for traffic routing during construction of the project shall be prepared.**

33. **There shall be no cacti or other spiny vegetation within three feet of pedestrian walkways for public safety.**

34. **Noise levels for the project site shall comply with Chapter 8.45 (Noise) of the Rancho Mirage Municipal Code.**

35. **All condo hotel units part of this project shall only be rented though the Ritz Carlton hotel as required by the applicable Development Agreement.**

36. **Within 5 days of project approval the applicant shall submit to the City of Rancho Mirage a check in the total amount of $2,966.75 made payable to the City of Rancho Mirage for the CEQA filing fees for the IS/MND (SCH# 2024030267).**

***PUBLIC WORKS – PRIOR TO CITY COUNCIL APPROVAL OF THE FINAL MAP, THE FOLLOWING CONDITIONS SHALL BE SATISFIED:***

FORMATION AND/OR ANNEXATION TO CFD

37. Pursuant to Ordinance №485 the applicant shall provide evidence that formation of, or annexation to a Communities Facilities District (CFD) No. 1 –Police and Fire services - to pay the City annually for public service costs associated with this project has been initiated. This requires the submittal of an application fee, the preparation of a boundary map, and 6-8 weeks processing time. The applicant is advised to begin the application process as soon as possible, because the CFD annexation must occur prior to issuance of Grading Permits, or prior to Final Map approval if there is one.

**JUSTIFICATION OR INFORMATION CONTINUED:**

STUDIES AND CALCULATIONS REQUIRED

38. The applicant shall submit a soils report, geological and hydrology studies, and hydraulic calculations, as required by the City Engineer, prior to approval of the Grading Plan.

GRADING & DRAINAGE PLAN

39. The applicant shall be required to submit a grading and drainage plan prepared by a licensed civil engineer to the City Engineer for plan check and approval. The grading and drainage plan shall be consistent with any and all conditions of approval associated with any applicable subdivision map and any Development Permit entitlements issued for the subject project by the City or any other responsible public agency. The grading and drainage plan shall conform to all city policies, standards and regulations applicable to the project. In addition, if the project involves grading and drainage issues related to Coachella Valley Water District (CVWD) facilities, written evidence of the District's approval shall be included with the submittal required by the City of Rancho Mirage.

STORMWATER RETENTION

40. Per Municipal Code Section 15.64.140.B, if the project is less than 1 acre or if it is south of the Whitewater Flood Channel, the grading of the project may be designed for the drainage to be conveyed to an "acceptable disposal site as determined by the City Engineer". Surface streets are not considered "an acceptable disposal site" for common "nuisance water" from sprinklers and cleaning. Therefore, at a minimum, all projects shall make provisions to absorb such "nuisance water" to the satisfaction of the City Engineer. A Hydrology/Hydraulic Report, in accordance with the Riverside County Hydrology Manual, shall be submitted from a Registered Civil Engineer, showing how this stormwater is handled. **The existing Ritz-Carlton detention system was designed to reduce the peak rate of stormwater runoff into the canyon below by the Water Tanks on Frank Sinatra. All new construction should be included in this system and the hydrology report shall analyze and show how this new area drainage can be done without overloading the downstream areas.**

WQMP

41. Whether they are in areas that must retain 100% stormwater or not, all discretionary projects that meet any of the following criteria must submit "Project-Specific Water Quality Management Plans (WQMP)" in accordance with Appendix H of the Whitewater River Region Storm Water Management Plan (SWMP) (available at: http://content.rcflood.org/NPDES/WhitewaterWS.aspx
    A.) "single family hillside residences that create 10,000 square feet or more of impervious area where natural slope is 25% or greater;
    B) single-family hillside residences that create 10,000 square feet of impervious area where the natural slope is 10% or greater where erosive soil conditions are known;
    C.) Commercial and industrial developments of 100,000 square foot or more;

D.) Automotive repair shops [includes Standard Industrial Classification (SIC) codes 5013, 7532, 7333,7534, 7537, 7538, and 7539];
E.) Retail gasoline outlets disturbing greater than 5,000 square feet;
F.) Restaurants disturbing greater than 5,000 square feet;
G.) Home subdivisions with 10 or more housing units;
H.) Parking lots of 5,000 square feet or more or with 25 or more parking spaces and potentially exposed to Urban Runoff; or
I.) Discharge into the MS4 (aka Municipal Storm Drain System) and disturb an area of one acre or more, or disturb less than one acre, but are part of a larger common plan of development or sale (referred to as Other Development Projects)

If any of the above criteria exist, or at the discretion of the City, a Final WQMP shall be required prior to permit issuance, with Recording of a Covenant, or other approved mechanism, establishing the WQMP as a Public Record that shall apply upon occupancy, and continuing forward, to all future operators/residents of the project. Any approved design modifications that take place during construction shall be documented and incorporated into the Recorded WQMP Covenant prior to occupancy. **On the basis of criteria C and H this project will need to do a WQMP. The focus of the WQMP should include maintenance issues on the Ritz-Carlton detention system and the tributary drain system.**

STANDARD AGREEMENT FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS

42. If public infrastructure is to be included in this project, the applicant shall execute and submit the City of Rancho Mirage's Standard Agreement for Construction of Public Improvements for review and approval by the City Engineer and City Attorney.

STREET IMPROVEMENTS

43. Street improvements shall be required as specified below. Paved access in accordance with the City Master Plan of Streets and City Standards shall be provided to the subdivision. Plans for the construction of the required street improvements shall be designed by a California Registered Engineer and approved by the City Engineer prior to Final Map approval. All street construction shall be in conformance with these plans and the City's General Plan and Standard Details. Plans shall be approved prior to or concurrent with Final Development Plan approval and construction shall occur prior to occupancy. The developer shall furnish proof that any Sewer and Water Improvement Plans have been reviewed and approved by CVWD. The developer shall furnish proof that the Fire Marshal has approved the Water Plans and Street layout for the project.

A.) **Public Streets Existing Emergency Road**

**The existing Emergency Fire Access Road coming to the site from the canyon to the east shall be kept connected to the on-site roadway**

**system and on-site fire access easements with adequate access to any expected emergency vehicles.**

B.) **Private Streets/Parking Lots**

i. Private street and/or parking lot paving shall consist of a minimum of 3" A.C. paving over 4" of compacted Class II aggregate base material. On private streets and parking lots, and as may be required by a condition of approval, decorative concrete or other surfacing materials shall be reviewed by Public Works for conformance to Public Works standards**.**

ii. On private streets and parking lots, non-standard curb and gutter maybe acceptable if the City's standard drainage criteria is satisfied, and the specific non-standard curb and gutter is approved by the Department of Public Works.

iii. The parking lot design and construction shall be completed in accordance with the City of Rancho Mirage standards and codes unless superseded by more stringent requirements from the State or Federal ADA guidelines. Such design shall include demonstration of adequate fire and delivery truck turning movements.

iv. In accordance with Municipal Code 17.26.070(d), all required off-street parking areas shall be designed so that surface water shall not drain over any sidewalks or adjoining parcels.

v. Private streets within the project shall be constructed with a minimum two-way travel way of 36 feet. Any median islands shall have a minimum of 24 feet clearance on either side of them. Private street paving shall consist of a minimum of 3" A.C. paving over 4" of compacted Class II aggregate base material.

DEDICATION OF DRAINAGE EASEMENTS

44. All easements for drainage facilities necessary to accommodate the final approved Grading and Drainage Plan shall be offered for dedication to the appropriate serving agency. Such offer shall be done by separate documents, or incorporated on the Final Map, if there is one, or as required by the City Engineer.

DEDICATION OF PUBLIC UTILITY EASEMENTS

45. A ten (10) foot public utility easement adjacent to the curb and gutter and edge of pavement shall be provided by the property owner for all public and private streets, and for public streets where the public right-of-way is less than the required 10 feet. All necessary utilities; sewer, water, electric, phone, fiber optic communications, natural gas, and television cable shall be provided to the lots and along the property frontage, unless otherwise approved.

UNDERGROUND UTILITIES REQUIRED

46. All existing or proposed Southern California Edison, General Telephone, CATV, or other overhead service facilities, shall be installed underground in accordance with the provisions of Section 12.16 of the Rancho Mirage Municipal Code. The undergrounding installation of all existing or proposed overhead distribution utility lines shall be completed and/or appropriate guarantee arrangements shall be entered into for any structure constructed pursuant to this approval as required by the City Engineer. Such guarantee arrangement shall be approved by the City administrative staff and the City Attorney and shall include the posting of improvement security adequate to secure the periphery of the subject property; and as identified above and as required in Section 12.16 of the Rancho Mirage Municipal Code.

SANITARY SEWER SYSTEM

47. A sanitary sewer system shall be required and shall be installed in accordance with the provisions established and set forth by the regulations of the Coachella Valley Water District, the Riverside County Department of Public Health, and/or the regional Water Quality Control Board. All necessary easements shall be provided.

DOMESTIC WATER SYSTEM

48. A domestic water system shall be required and shall be installed in accordance with the provisions established and set forth by the regulations of the Coachella Valley Water District, the Riverside County Department of Public Health, and/or the regional Water Quality Control Board. All necessary easements shall be provided.

LAQMP

49. The applicant shall prepare a Local Air Quality Management Plan (LAQMP) pursuant to Ordinance № 855, Municipal Code Chapter 7.01. Said LAQMP shall detail the project's potential impacts upon the air quality of the area and any necessary mitigation measures, and shall be submitted to the Public Works Department for review and approval prior to the issuance of the Grading Permit. For ease of preparing a LAQMP, the applicant may contact the Public Works Department regarding use of the LAQMP worksheet. Projects over 10 acres shall also submit the 8.5x11 format Dust Control Plan Required by the South Coast Air Quality Management District for review by the City. At the time of payment of the permit fees the developer shall submit a "dust control deposit" to be determined from the acreage and the current fee schedule.

SWPPP / NOI

50. Prior to issuance of Grading Permits, the Property Owner shall submit the completed NOI **(Notice Of Intent)** form and site plan with the appropriate fee, to the State Water Quality Control Board for the General Construction Activity Storm Water Permit. The WDID number issued shall be placed on the cover sheet of the Grading Plans as Proof of Submittal. **The SWPPP promised by the NOI is**

**required to be kept on the project site and may be requested for viewing by City or Water Quality Control Board personnel.**

CONSTRUCTION IMPROVEMENT AGREEMENT

51. The construction of all required public and private improvements, including but not limited to landscaping, sewer, water, curb and gutters, paving, drainage facilities, and other required improvements shall be completed prior to occupancy of any structure and/or the owner shall enter into an agreement, acceptable to the City, ensuring the construction of such improvements within eighteen (18) months of project approval or City Council approval of the Final Map.

WRITTEN VERIFICATION

52. Prior to release of bonds or financial guarantees, the applicant or his successor shall provide written verification that the improvements have been installed in accordance with the approved plans.

AS-BUILT PLANS

53. A complete set of “As-Built” Grading, Sewer, Water, Landscaping, Street, Storm Drain and all other required improvement plans shall be submitted by the engineer of record for review and approval, prior to any occupancy or release of Subdivision Bonds.

SUBDIVISION MAP

54. A subdivision map shall be processed and recorded prior to any release of permits.

SECURITY

55. In accordance with the request of the Rancho Mirage Police Chief, the site shall be fenced and gated for security purposes. Screening material shall be placed on the fence to help block blowsand and to block views through the fence. If necessary, the applicant shall provide a state licensed private security officer during the time construction workers are not onsite

PAD CERTIFICATION

56. Prior to release of Building Permits, a Pad Certification submitted from a Licensed Land Surveyor or Civil Engineer, attesting to the elevation matching the rough grade pad elevation shall be submitted to validate the rough grading completion.

COMPACTION REPORT

57. Prior to the release of Building Permits, the Lot (s) for the building(s) shall have a compaction report submitted from a Geotechnical Engineer attesting to the buildable pad being compacted at least 90% of maximum relative density. If any over-excavation, or slopes steeper than 2:1, are needed for the building pad, a Geotechnical Engineer shall submit a document attesting to the acceptability of

this non-standard earthwork in accordance with the recommendations of the preliminary soil report.

ASSESSMENT DISTRICT REAPPORTIONMENT

58. If the property to be subdivided is located within the boundaries of an Assessment District, assessments shall be reapportioned over the property to account for the newly created lots.

PARK FEES

59. Applicant shall pay all applicable parkland fees for the acquisition and/or development of community parks and recreational facilities in those amounts in effect at the time the grading permit is issued.

## ***BUILDING AND SAFETY***

TUMF FEE

60. The applicant shall pay to the Building Division the Transportation Uniform Mitigation Fee (TUMP) in effect at the time the Building Permits are issued, unless otherwise permitted by the Coachella Valley Association of Goverments (CVAG).

LICENSE TAX FOR NEW CONSTRUCTION

61. The applicant shall pay to the Building Division the License Tax for New Construction pursuant to Chapter 3.28 of the Municipal Code and Capital Facilities Needs Study to mitigate the impact of the development on said capital facilities.

DEVELOPMENT IMPACT FEES

62. The applicant shall pay the commercial Development Impact Fees as a reasonable and proportional share of the cost of public facilities and infrastructure improvements that serve or will benefit the project in accordance with Chapter 3.29 of the Rancho Mirage Municipal Code.

PAD CERTIFICATION

63. Prior to release of Building Permits, a Pad Certification submitted from a Licensed Land Surveyor or Civil Engineer, attesting to the elevation matching the rough grade pad elevation shall be submitted to validate the rough grading completion.

COMPACTION REPORT

64. Prior to the release of Building Permits, the Lot (s) for the building(s) shall have a compaction report submitted from a Geotechnical Engineer attesting to the buildable pad being compacted at least 90% of maximum relative density. If any over-excavation, or slopes steeper than 2:1, is needed for the building pad, a Geotechnical Engineer shall submit a document attesting to the acceptability of this non-standard earthwork in accordance with the recommendations of the preliminary soil report.

OPERATIONAL FIRE HYDRANT

65. In accordance with the Fire Marshall's directives, Building Permits shall not be issued until an acceptable fire hydrant is operational and active within the required distance of the project.

AUTOMATED EXTERNAL DEFIBRILLATOR

66. The Project shall provide one (1) Automated External Defibrillator (AED) device **per building phase (Venue & Building B-5 Lounge area)** reasonably distributed in the public areas. The location of the AED's shall be shown on the construction plans, approved by the Building Official and installed prior to occupancy.

CONSTRUCTION AND DEMOLITION DEBRIS PLAN

67. In conformance with Rancho Mirage Municipal Code Chapter 7.07, construction and demolition debris from the project must be diverted from landfill and either recycled or reused to the maximum extent feasible. The applicant shall have prepared a Construction and Demolition Debris Plan (C&D Debris Plan) that shall be submitted to the Planning Division for review and must be approved by the City's Compliance Officer prior to the issuance of any development, building, grading or demolition permit. For ease of preparing the C&D Waste Diversion Plan, the applicant may contact the Planning Division to obtain the outline and format for the Plan.

PERMITS & CLEARANCES

68. The applicant shall provide evidence of permit(s) or clearance(s) from the following agencies:
    - City Engineer
    - County Dept. of Environmental Health
    - Rancho Mirage Planning Division
    - Coachella Valley Water District
    - Burrtec
    - Palm Springs Unified School District
    - Fire Marshal
    - City Attorney
    - SCAQMD
    - Southern California Edison

***CITY ATTORNEY –*** *PRIOR TO THE ISSUANCE OF BUILDING PERMITS THE FOLLOWING CONDITIONS SHALL BE SATISFIED:*

69. The applicant shall defend, indemnify and hold harmless the City, its agents, officers, and employees from any claim, action, or proceeding against the City or its agents, officers, or employees to attack, set aside, void or annul this permit approval. The City shall notify the applicant of any claim, action, or proceeding and the City shall cooperate in the defense. If the City fails to notify the applicant of any claim, action or proceeding, the

permittee shall not thereafter be responsible to defend, indemnify, or hold harmless the city.

70. The applicant shall reimburse the City for any court and attorney's fees which the City may be required to pay as a result of any claim or action brought against the City because of this project. Although the applicant is the real party in interest in an action, the City may, at its sole discretion, participate in the defense of the action, but such participation shall not relieve the permittee of any obligation under this Condition.

71. Pursuant to RMMC Chapter 15.64.280, all public improvements proposed with the Development Plan submittal, or required by the adopted approval Conditions, shall be guaranteed by cash bonds, letters of credit, or other legal instruments acceptable to the City Attorney and City Council.

72. Written authorization must be obtained from any certified, licensed or registered professional who signed the original building plans authorizing the plans to be made available by the City to all subsequent owners upon request (if on file with the City at the time of the request) for use by any subsequent owners solely for the construction, maintenance, operation, and use of the subject building(s) at the project site.

73. In the event that the applicant receives a notice of default from any lender in connection with funds loaned to the applicant for the proposed development, or that any security instrument given by the applicant to any lender is foreclosed upon whether through a trustee's sale or otherwise, or that the applicant files a petition for bankruptcy, the applicant shall immediately notify the City of such notice of default, foreclosure sale, and/or filing of the bankruptcy petition, as the case may be.

74. The current and future property owner(s) shall be responsible for maintaining in compliance with all City standards for the same, the on-site and off-site landscaping and integrated architectural features required by this entitlement. Landscape maintenance shall consist of regular watering mowing, pruning, fertilizing, clearing of debris and weeds, and the removal and replacement of irrigation systems, in compliance with all relevant and applicable provisions of the Rancho Mirage Municipal Code. Integrated architectural features must be kept in a manner which maintains the desirability of the immediate area and neighboring areas and respects the harmonious relationship with existing and adjoining developments. Due regard for preservation of each feature and its intended irrigation with surrounding landscaping, buildings, structures, screening and signs is required. All features must be maintained in a manner commonly accepted by professionals who are experts in the care and preservation of each particular type of feature. A covenant to assure continued maintenance of on-site and off-site required landscaping and integrated architectural features by the **current and future** property owners or other liable entity, consistent with the terms and provisions of this condition of approval, shall be prepared in a format approved by the City Attorney and recorded in the Office of the Riverside County Recorder against all parcels created with this subdivision and any subsequent amendments thereto.

75. DECLARATION OF COVENANTS, CONDITIONS, AND RESTRICTIONS (CC&RS)
The subdivider shall submit to the City a Declaration of Covenants, Conditions and Restrictions (CC&Rs) which shall demonstrate, to the satisfaction of the City Attorney that the entire project will be developed and maintained in accordance with the intent and purpose of the approval. The approved documents shall be recorded concurrently.

76. The applicant shall submit documents for recordation which clearly prohibit installation of improvements in the common area by individual homeowner or documents which allow and govern installation of such improvements within the identified common areas. The documents shall be subject to approval of the City Engineer and City Attorney.

77. The CC&Rs shall be submitted to the City for review and shall contain provisions for a Homeowners' Association, with the unqualified right to assess owners of individual units for reasonable maintenance costs to common areas and improvements. The Homeowners' Association shall have the right to lien units of the owners who default in the payment of any assessment so provided. Any deed of trust recorded prior to said CC&Rs shall be subordinated to the CC&Rs. Any lien imposed shall not be superior to any lien for property taxes or government assessments. The CC&Rs will be clearly marked to identify those sections addressing the Conditions of Approval.

78. All conditions, covenants, and restrictions described herein shall be covenants running with the land, and shall, in any event, and without regard to technical classification or designation, legal or otherwise, be, to the fullest extent permitted by law and equity, binding for the benefit and the favor of, and enforceable by [the HOA], and its successors and assigns, and the City of Rancho Mirage, and its successors and assigns. The City shall be a beneficiary of these specific conditions, covenants and restrictions and shall have the right to enforce them in whole or in part; however, the City shall have no obligation to do so. The CC&Rs shall be reviewed by the City Attorney for compliance with this section.

## ***FIRE MARSHAL***

79. Adverse Impacts: The proposed project may have a cumulative adverse impact on the Fire Department's ability to provide an acceptable level of service. These impacts include an increased number of emergency and public service calls due to the increased presence of structures, traffic and population. The project proponents/developers will be expected to provide for a proportional mitigation to these impacts via capital improvements and/or impact fees.

80. Access: Fire Department emergency vehicle apparatus access road locations and design shall be in accordance with the California Fire Code, City of Rancho Mirage Municipal Code, and Riverside County Fire Department Standards. Plans must be submitted to the Fire Department for review and approval prior to building permit issuance.

81. Water: Fire Department water system(s) for fire protection shall be in accordance with the California Fire Code, City of Rancho Mirage Municipal and Riverside County Fire

**JUSTIFICATION OR INFORMATION CONTINUED:**

Department Standards. Plans must be submitted to the Fire Department for review and approval prior to building permit issuance.

JUSTIFICATION OR INFORMATION CONTINUED:

## FINDINGS

### TENTATIVE PARCEL MAP CASE NUMBER TPM23-0002 FINDINGS

The proposed development is:

1. The proposed Tentative Parcel Map is consistent with the City's General Plan as specified in Section 65451 of the California Government Subdivision Map Act, **because the proposed map fulfills the requirements of underlying Resort Hotel (Rs-H) land use designation of the General Plan.**

2. The design and/or improvements for the proposed subdivision are consistent with the City's General Plan and Zoning Ordinance requirements, **because the proposed project area subject to the Tentative Parcel Map is within the Resort Hotel (Rs-H) zone which has a 10-acre minimum lot area, which the project complies with.**

3. The site is physically suitable for the proposed type of development, **because the project site already has paved access along Frank Sinatra Drive. Required utilities are available as conditioned and the subdivision is consistent with the requirements in the Rancho Mirage Municipal Code.**

4. The site is physically suitable for the proposed density of development, **because the map is for condominium purposes with Parcel 3 of the map containing 106 condo hotel units. The Tentative Parcel Map will comply with the development standards of the Resort Hotel (Rs-H) zoning district.**

5. The design of the subdivision or type of improvements will not cause substantial environmental damage or substantially and avoidably injure fish or wildlife or their habitat, **because the subdivision is within an already partially developed area with the existing Ritz Carlton hotel and previously disturbed vacant land. In addition, the project is conditioned to comply with the projects Mitigated Negative Declaration including mitigation measures for Biological Resources, which will reduce any impacts to a level of less than significant.**

6. The design of the subdivision or type of improvements will not cause serious public health problems, **because the project has been reviewed by various public agencies and City Departments and no public health impacts are expected; and**

7. The design of the subdivision or the type of improvements will not conflict with easements, acquired by the public at large, for access through or use of, property within the proposed subdivision, **because the map has been conditioned to record any necessary easements.**

### MAJOR MODIFICATION CASE NO. MOD21-0004 FINDINGS

The proposed development:

1. Is allowed within the respective zoning district, **because as part of the project**

JUSTIFICATION OR INFORMATION CONTINUED:

**entitlements a General Plan Zoning Map Amendment is proposed to amend 3.88 acres of Mountain Reserve (MR) zoning to Resort Hotel (Rs-H) for the projects Sky Mesa recreational area. The proposed uses as condition will be compatible with existing and surrounding developments. The condo-hotel portion of the major modification is already zoned Rs-H.**

2. Is in compliance with all of the applicable provisions of Title 17 in the Rancho Mirage Municipal Code that are necessary to carry out the purpose and requirements of the respective zoning district, including prescribed development standards and applicable design guidelines, **because the project, as conditioned, meets the requirements of the Rancho Mirage Municipal Code. The project meets and exceeds development standards with an abundance of proposed mature landscaping and high quality architectural design. In addition, 50' minimum setbacks along exterior property lines are provided, which are in compliance with the Municipal Code.**

3. Consistent with the General Plan, **because the project proposes 106 condo hotel units, new event space, restaurant, & recreation uses with the development of this project which is being considered primarily in the Resort Hotel zone (Rs-H). In addition, the condo hotel units will be managed by the Ritz Carlton. The Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. As part of the proposed project, a General Plan Zoning Map Amendment is proposed to amend the Mountain Reserve (MR) designation for the project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014). As previously detailed minimal development is proposed as part of the Sky Mesa recreational area with only a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. All other improvements will be recreation related and will blend in with the surrounding environment. The Sky Mesa area is located approximately 600 feet away from the closest residential property and its design will provide high quality development. The following are the goals, policies, and programs from the General Plan that the project implements:**

- ***GOAL LU 1: A resort residential community of desirable neighborhoods, a variety of community facilities, and high-quality development.***

**Response: The project expands the resort to include condo- hotel units that are aligned with high quality development and The Ritz brand of hotels; essentially creating the definition of a "resort residential community". The modification also includes additional open space. As detailed above, minimal development is proposed as part of the Sky Mesa recreational area with only a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. All other improvements will be recreation related and will blend in with the surrounding environment and adding beneficial open space to the resort.**

- ***GOAL LU 2: A balanced mix of functionally integrated land uses, meeting the general social and economic needs of the community through simplified, compatible, and consistent land use and zoning designations.***

JUSTIFICATION OR INFORMATION CONTINUED:

**Response: The modification includes improvements to the original entitlements, such as additional parking and more open space, which creates even more of a balanced mix of functionally integrated uses to the site. The site will include the existing resort hotel, condo-uses and open space with small restaurant. The condo-hotel use provides an appropriate buffer to the residential homes surrounding the hotel. The project proposes an amendment to the existing General Plan Zoning Map to change the land use and zoning from Mountain Reserve (MR) to Resort Hotel (Rs-H) for 3.88 acres to allow for the development of the Sky Mesa recreational area. The rest of the project site has a land use designation of Resort Hotel (Rs-H). The Sky Mesa recreational area will provide some commercial space with the 6,273 square foot restaurant development, but will be primarily dedicated to recreational uses. In total buildings within the Sky Mesa recreational area make up less than four (4) percent of the 3.88 acres allocated to the Sky Mesa recreational area. Most of the area (96%) will be dedicated to recreation uses and open space, which is compatible with the both the Resort Hotel (Rs-H) and surrounding Mountain Reserve (MR) zone.**

- ***Policy LU 2.6: The City shall ensure privacy and safety for residential neighborhoods by providing adequate buffering and screening, particularly where neighborhoods adjoin or are integrated with commercial developments.***

**Response: The site will include the existing resort hotel, condo-uses and open space with a small restaurant. The condo-hotel use provides an appropriate buffer to the residential homes surrounding the hotel. Minimal development is proposed as part of the Sky Mesa recreational area with only a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. All other improvements will be recreation-related and will blend in with the surrounding environment. The Sky Mesa area is located approximately 600 feet away from the closest residential property to the south and its design will provide high quality development. In total, buildings within the Sky Mesa recreational area make up less than four (4) percent of the 3.88 acres allocated to the Sky Mesa recreational area. Most of the area (96%) will be dedicated to recreation uses and open space, which is compatible with the Mountain Reserve (MR) zone. The closest buildings next to existing Mirada community are the projects Hotel Villas (Buildings B-1 to B-15); these buildings will operate as condo hotel units. The maximum height of these buildings is 32'-7". For reference the closest home located within Mirada to Building B-6 has a pad elevation of 674' which is 24' higher than the finished floor of Building B-6. The elevation difference between Mirada and the project site buildings is reduced the closer to Frank Sinatra Drive a particular building is measured from. In addition, the project has a minimum 50-foot setback from all exterior property lines, ensuring privacy and safety for residential neighborhoods.**

- ***POLICY LU 2.7 The Economic Development Division shall actively pursue opportunities to attract high-quality retail commercial establishments and resort hotels in Rancho Mirage.***

**Response: The overall project proposes modifications for the construction of the Ritz Carlton residences to the previously approved entitlements. The modification consists of**

JUSTIFICATION OR INFORMATION CONTINUED:

**106 condo hotel units (previously 111); event space and room for amenities; subterranean parking structure; and additional parking spaces. Additionally, the Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. The project also includes a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment"), which sets the terms for Transient Occupancy Tax for the proposed 106 condo hotel units. Overall, the newly proposed additions will provide high quality development to the Ritz Carlton property. With the new event space, the Ritz Carlton will be able to host two simultaneous events and have additional capacity for restaurants with the Sky Mesa restaurant.**

- ***POLICY LU 3.1 Areas of existing residential development and surrounding vacant lands shall be planned in a manner that preserves neighborhood character and assures a consistent and compatible residential land use pattern.***

**Response: The overall project proposes modifications for the construction of the Ritz Carlton residences to the previously approved entitlements. The modification consists of 106 condo hotel units (previously 111); event space and room for amenities; subterranean parking structure; and additional parking spaces that are well planned and suitable for the sites. Additionally, the Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. The Sky Mesa area is located approximately 600 feet away from the closest residential property to the south and its design will provide high quality development. In total buildings within the Sky Mesa recreational area make up less than four (4) percent of the 3.88 acres allocated to the Sky Mesa recreational area. Most of the area (96%) will be dedicated to recreation uses and open space. The closest buildings next to existing Mirada community are the projects Hotel Villas (Buildings B-1 to B-15); these buildings will operate as condo hotel units. The maximum height of these buildings is 32'-7". For reference, the closest home located within Mirada to Building B-6 has a pad elevation of 674' which is 24' higher than the finished floor of Building B-6. The elevation difference between Mirada and the project site buildings is reduced the closer to Frank Sinatra Drive, a particular building is measured from. In addition, the project has a minimum 50-foot setback from all exterior property lines. In 1991, MCO Properties acquired the project site where the A-1 and B buildings are located. Under the Development Agreement at the time, the site was originally entitled to construct 169 units at a density of about 11.5 units per acre. The Eighth Amendment (approved on March 19, 2005) to the original DA established a right to develop 138 units (reduced from 169 units), up to two stories in height. On August 3, 2006, the City approved the construction of 111 units. As part of the current request, only 106 condo hotel units are proposed within the same area, that as detailed above at one point allowed up to 169 units.**

- ***GOAL LU 4 High-quality commercial land uses conveniently and appropriately distributed throughout Rancho Mirage, to meet the community's current and future needs and to take full advantage of emerging development and economic opportunities.***

**Response: The overall project site is primarily designated as Resort Hotel (Rs-H). An amendment is proposed to the existing General Plan Zoning Map to change the designation from Mountain Reserve (MR) to Resort Hotel (Rs-H) for 3.88 acres to allow for**

JUSTIFICATION OR INFORMATION CONTINUED:

**the development of the Sky Mesa recreational area. Minimal development is proposed as part of the Sky Mesa recreational area with only a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. The Ritz Resort Hotel has maintained high quality development in the City and the proposed project maintains those standards.**

- ***POLICY LU 4.1 The City shall designate sufficient lands to provide revenue to the City and a full range of commercial services to the community and surrounding areas for present and future years.***

**Response: The overall project site is primarily designated as Resort Hotel (Rs-H). An amendment is proposed to the existing General Plan Zoning Map to change the designation from Mountain Reserve (MR) to Resort Hotel (Rs-H) for 3.88 acres to allow for the development of the Sky Mesa recreational area. The Sky Mesa recreational area is proposed with a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. All other improvements will be recreation-related and will blend in with the surrounding environment. The project also includes a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment"), which sets the terms for Transient Occupancy Tax for the proposed 106 condo hotel units. Overall, the newly proposed additions will provide high quality development to the Ritz Carlton property. With the new event space the Ritz Carlton will be able to host two simultaneous events and have additional capacity for restaurants with the Sky Mesa restaurant.**

- ***PROGRAM LU 4.1A Periodically review the Land Use Plan to assure sufficient lands are designated for commercial uses to support the needs of the community and surrounding areas in a manner consistent with economic opportunities and the resort residential character of the community.***

**Response: The overall project site is primarily designated as Resort Hotel (Rs-H). An amendment is proposed to the existing General Plan and Zoning Map to change the designation from Mountain Reserve (MR) to Resort Hotel (Rs-H) for 3.88 acres to allow for the development of the Sky Mesa recreational area. The project also includes a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment"), which sets the terms for Transient Occupancy Tax for the proposed 106 condo hotel units. Overall, the newly proposed additions will provide high quality development to the Ritz Carlton property. With the new event space the Ritz Carlton will be able to host two simultaneous events and have additional capacity for restaurants with the Sky Mesa restaurant.**

- ***PROGRAM LU 7.3A Adopt and implement flexible development policies, standards, and guidelines that encourage quality open space amenities in new residential subdivisions and planned developments. These policies, standards and guidelines shall be incorporated into the City Development Code and other appropriate regulatory documents.***

JUSTIFICATION OR INFORMATION CONTINUED:

**Response: The project proposes an amendment to the existing General Plan and Zoning Map to change the land use and zoning from Mountain Reserve (MR) to Resort Hotel (Rs-H) for 3.88 acres to allow for the development of the Sky Mesa recreational area. As detailed above minimal development is proposed as part of the Sky Mesa recreational area with a 6,273 square foot restaurant that will be built within the mountain area so visual impacts will be minimized and a 693 square foot restroom building. All other improvements will be recreation-related and will blend in with the surrounding environment.**

4. The proposed project produces a comprehensive development incorporating a more enhanced environment and architectural excellence (e.g., appropriate variety of structure placement and orientation opportunities, appropriate mix of structure sizes, high quality architectural design, increased amounts of landscaping and open space, improved solutions to the design and placement of parking facilities, etc.) than would normally be possible under more standard district development requirements, **because the project meets the landscape requirements, provides a high level of architectural excellence and takes into account the surrounding properties with its two story design that is sufficiently set back from adjacent properties with a minimum 50 foot setback from exterior property lines. The design of the project is also enhanced by focusing higher building areas away from adjacent properties; and**

5. The design, location, shape, size, operating characteristics, and the provision of public and emergency vehicle access and public services and utilities (e.g., drainage, fire protection, sewers, water, etc.), ensure that the proposed development would not endanger, jeopardize, or otherwise constitute a hazard to the public convenience, health, interest, safety, or welfare, or injurious to the property or improvements in the vicinity and the applicable zoning district, **because the project site will have access to Frank Sinatra Drive and sufficient emergency vehicle access will be provided. As proposed the project will not create a hazard or cause impacts to utilities as conditioned; and**

6. Meets the criteria for payment of all of the Development Impact Mitigation Fees imposed upon new nonresidential construction in accordance with Chapter 3.29 of the Rancho Mirage Municipal Code; and

7. The design, location, and proposed uses is compatible with the character of existing development in the surrounding neighborhood, **because the project, as proposed and conditioned, meets all development requirements of the Rancho Mirage Municipal Code. The project is consistent with the surrounding uses. The project design ensures compatibility with the surrounding neighborhood using architecture and site design; and**

8. The subject site is physically suitable for the type and density/intensity of development being proposed, **because the project complies with applicable provisions of the Rancho Mirage Municipal Code. The project provides high quality architectural design and is physically suitable in the location proposed. In addition, detailed site sections and a site visual plan which takes into account 16 viewpoints from the**

**JUSTIFICATION OR INFORMATION CONTINUED:**

**adjacent Mirada residential community were prepared to ensure neighborhood compatibility.**

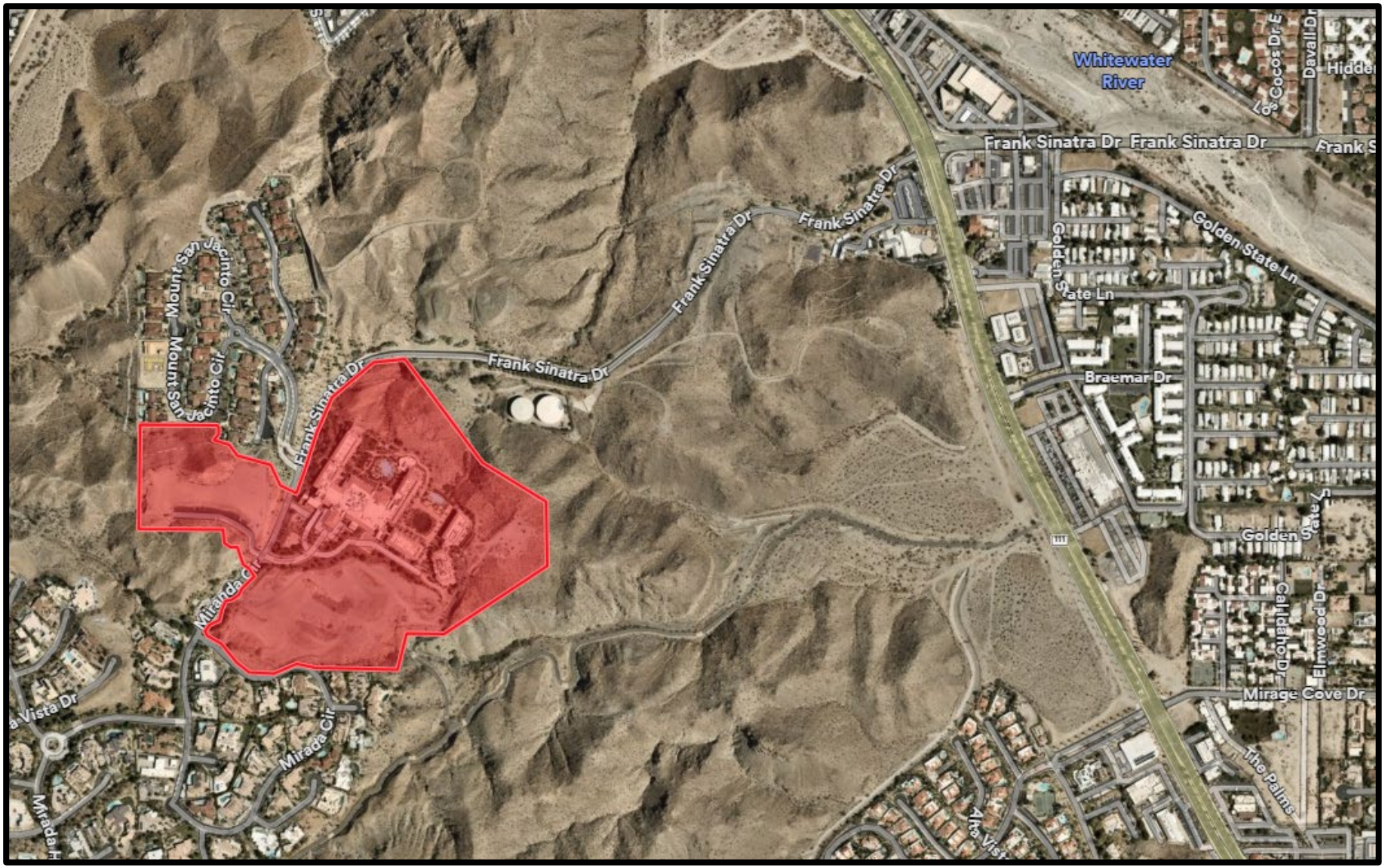
9. The proposed project has been reviewed in compliance with the provisions of the California Environmental Quality Act (CEQA); **A Mitigated Negative Declaration (SCH#2024030267) was prepared based on Environmental Case No. EA21-0002 pursuant to the California Environmental Quality Act Section 15074. Environmental impacts will be less than significant with implementation of the project's mitigation measures for Air Quality, Biological Resources, Cultural Resources, Noise, Transpiration/Traffic, and Tribal Cultural Resources.**

**ATTACHMENT 2**

# Aerial

## Ritz Carlton Rancho Mirage

Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21 0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case Number TPM23-0002 (TPM38768)



**ATTACHMENT 3**

# CITY OF RANCHO MIRAGE

Planning Division
69-825 Highway 111
Rancho Mirage, CA 92270
Planning@RanchoMirageCA.gov
(760) 328-2266

# PUBLIC HEARING NOTICE

## CITY COUNCIL MEETING
## Thursday, December 18, 2025 – 1:00 p.m.

Ritz Carlton Rancho Mirage - Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21-0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case Number TPM23-0002 (TPM38768).

**Applicant:** Kam Sang Company

**Request:** Consideration of the Ritz Carlton residences which is a modification to previously approved entitlements consisting of 106 condo units; event space and room for amenities; subterranean parking structure; and additional residential parking spaces. Additionally, the Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. As part of the proposed project, a General Plan Zoning Map Amendment is proposed to amend the Mountain Reserve (MR) designation for the project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014). A Tentative Parcel Map (TPM38768) proposes to establish three parcels (excluding Sky Mesa area) with Parcel 3 of the map containing condo units (Ritz Carlton residences). Lastly, a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment") is proposed. Please note that the proposed project (excluding Sky Mesa) is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums. The Planning Commission recommended approval on January 9, 2025.

**Location:** The project site occurs along Frank Sinatra Drive approximately 0.85 miles southwest of the intersection with Highway 111 within the City of Rancho Mirage (APNs: 689-330-026, -028, -031, -032, -034; 689-020-012, -014; & 689-331-001, -018).

**NOTICE IS HEREBY GIVEN** that a Public Hearing will be held before the City of Rancho Mirage City Council regarding consideration of the above referenced project, pursuant to Rancho Mirage Municipal Code Titles 16 & 17. An environmental assessment application was submitted for the subject project and the determination was made that the project required an initial study. An Initial Study has been prepared to result in the recommendation to adopt a Mitigated Negative Declaration (MND). The IS/MND was circulated for a 30-day public review period from March 11, 2024 to April 9, 2024. Based

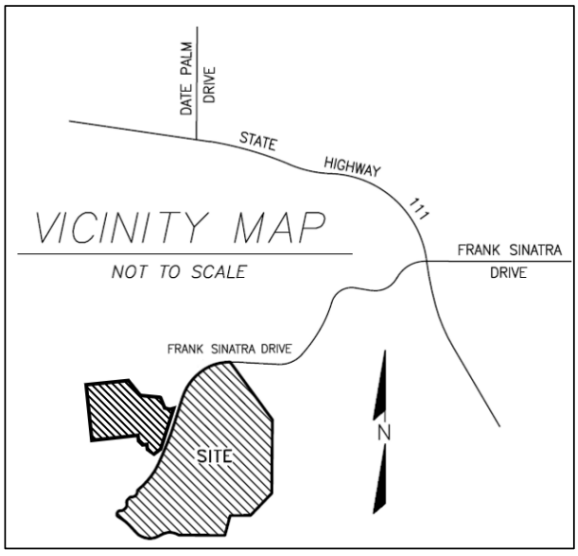
on the comments received, revisions were made to the IS/MND and it was recirculated for a subsequent 30-day public review period from July 22, 2024 to August 20, 2024.

The Public Hearing will be held on Thursday, December 18, 2025, at 1:00 p.m., in the Council Chamber, 69-825 Highway 111, Rancho Mirage, California, at which time and place pertinent testimony will be heard. The file, including all environmental information, is available for public inspection at City Hall, Monday through Friday, between 8 a.m. and 5 p.m., and will be posted on the City's website with the publication of the City Council Agenda, to be posted at least 72 hours prior to the meeting.

Written testimony may be submitted to the City Clerk via email to CityClerk@RanchoMirageCA.gov, or mailed to City of Rancho Mirage, ATTN: City Clerk, 69-825 Highway 111, Rancho Mirage, CA 92270. Written testimony must be received no later than 10:00 a.m. on the day of the hearing to be considered by the City Council.

**GOVERNMENT CODE § 65009 NOTICE**: If you challenge this proposed activity in court, you may be limited to raising only those issues you or someone else raised at the Public Hearing described in this notice, or in written correspondence delivered to the City Council sufficiently prior to the Public Hearing to enable its consideration by them.

Vicinity Map – Not to Scale



# Introduction

The City has prepared this Final Initial Study/ Mitigated Negative Declaration (IS/MND) in conformance with Section 15070(a) of the CEQA Guidelines. This Final IS/MND includes a description of the proposed project, evaluation of potentially significant impacts associated with the proposed project, and incorporation of mitigation measures into the project design as necessary to reduce or eliminate the potentially significant effects of the project.

## Recirculated IS/MND

The March IS/MND was circulated for a 30-day public review period from March 11 to April 9, 2024. During the first public review period, the lead agency received four comment letters. After reviewing the comments received on the March 2024 IS/MND, the lead agency determined that the proposed project would have a potentially significant impact related to air quality that was not adequately analyzed or mitigated in the March 2024 IS/MND.
As specifically requested in the comment letter from Californians Allied for a Responsible Economy, a Health Risk Assessment (HRA) was prepared to analyze the project's potential to expose sensitive receptors to substantial pollutant concentrations. The results of this HRA concluded that additional mitigation was required to reduce impacts to less than significant.

Revisions were also made to mitigation measures MM-BIO-1 through MM-BIO-3 in response to comments made from CDFW, and MM-CUL-1 in response to comments from Agua Caliente Band of Cahuilla Indians. These changes merely clarify or amplify information already found in the March 2024 IS/MND, and do not raise important new issues about significant effects on the environment. Revisions are presented in strikeout/underline format in the Final MND.

## Final IS/MND

During the second public review period from July 22, 2024 to August 20, 2024, the lead agency received four additional comment letters. In response to comments from CARE CA, a Noise Memorandum has been prepared to update the construction noise analysis using the FHWA RCNM model, and to include jackhammers, trucks, and vibratory rollers. Revisions were made to mitigation measures MM-CUL-1 in response to comments from Agua Caliente Band of Cahuilla Indians. These changes merely clarify or amplify information already found in the IS/MND, and do not raise important new issues about significant effects on the environment. Revisions are presented in strikeout/underline format in the Final IS/MND.

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# ENVIRONMENTAL INITIAL STUDY

| | |
|---|---|
| Project Title: | Ritz-Carlton Rancho Mirage |
| City Project No: | EA21-0002, GPZMA21-0001, MOD21-0004 DA21-0002, and TPM23-0002 |
| Lead Agency Name and Address: | City of Rancho Mirage<br>69-825 Highway 111<br>Rancho Mirage, California 92270<br>Phone: (760) 328-2266 Fax: (760) 324-9851 |
| Applicant: | Kam Sang Company, Inc.<br>411 E. Huntington Drive, Suite 305<br>Arcadia, California 91006 |
| Contact Person: | Ben Torres<br>Planning Manager |
| Phone Number: | Phone: (760) 328-2266 X253 |
| Project Location: | The project site occurs along Frank Sinatra Drive approximately 0.85 miles southwest of the intersection with Highway 111 within the City of Rancho Mirage. |
| Accessor Parcel Numbers: | 689-330-026, -28, -31, -32, -34; 689-020-012, -14; 689-331-001,-18 |
| General Plan Designation: | Resort Hotel (Rs-H) and Mountain Reserve (MR) |
| Zoning Designation: | Resort Hotel (Rs-H) and Mountain Reserve (MR) |

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# CHAPTER 1: PROJECT DESCRIPTION

## Background

In 2006, an environmental impact report (EIR) was prepared for the Lodge at Rancho Mirage Hotel Expansion Project, which encompassed a total of 39.01 acres that included the existing Lodge Hotel site, and other developed and entitled lands within the lower foothills of the Santa Rosa Mountains. The 2006 Lodge at Rancho Mirage Hotel Expansion Project EIR (2006 EIR) included expansion, renovation and upgrading of the existing Lodge at Rancho Mirage Hotel (the "Hotel"), construction of new structures, parking and interior roadways, accessory buildings, support facilities and infrastructure, landscaping, and demolition of the existing tennis complex. The 2006 EIR also included an amendment to the existing Development Agreement for the subject property. The 2006 EIR analyzed portions of the Ritz-Carlton Residences site of the Ritz-Carlton Rancho Mirage Project (the proposed project) analyzed in this Initial Study but did not analyze the Sky Mesa Recreational Area (Figures 1-1 and 1-2).

The 2006 Lodge at Rancho Mirage Hotel Project site is located to the southwest of the Sky Mesa Recreation Area (Figure 1-2). The proposed project as analyzed in this Initial Study is not a tiered document of the 2006 The Lodge at Rancho Mirage Hotel Expansion Project EIR because the project analyzed in this Initial Study contains an area (the Sky Mesa Recreation Area) not analyzed in the 2006 EIR. Additionally, the 2006 EIR included development of the Tennis Villas within the approximately 7.96-acre area (APN: 689-330-011) across Frank Sinatra Drive from the project site. The Tennis Villas include the development of 80,248 square feet of new development including 25 villas (with a total of 49 keys), outdoor patios/ gardens, plunge pool, hot tub, water features, pool bar, a wine cave, a covered golf cart pickup area, equipment, and a 26,330-sf underground parking structure onsite. The 25 Villas would be comprised of (1) one-bedroom suite (1 key); (11) two-bedroom villas (2 keys); (11) two-bedroom suites (2 keys); and (2) three-bedroom suites (2 keys). The currently proposed project as addressed in this Initial Study does not alter any portion of the Tennis Villas as analyzed in the 2006 EIR.

## California Environmental Quality Act Compliance

The City of Rancho Mirage (City) is the California Environmental Quality Act (CEQA) lead agency responsible for the review and approval of the proposed project. The City has prepared this Initial Study pursuant to the requirements of Section 15063 of the State CEQA Guidelines to determine if the proposed project may have a significant effect on the environment. The purpose of an Initial Study is to provide the Lead Agency (in this case, the City of Rancho Mirage) with information to use as the basis for deciding whether a project may have a significant effect on the environment. The City will utilize the Initial Study to determine if an EIR or a Negative Declaration is the appropriate environmental review document for the proposed project. The Initial Study also enables the applicant or City to modify a project to mitigated adverse impacts before an EIR is prepared, thereby enabling the project to qualify for a Negative Declaration.

In accordance with Section 15063(d) of the State CEQA Guidelines, this Initial Study contains: a description of the project; an identification of the environmental setting; an identification of environmental effects by use of a checklist and explanation; a discussion of ways to mitigate the significant effects identified, if any; an examination of the project's consistency with existing zoning and plans; and the persons who prepared the Initial Study.

## Purpose and Need

The purpose of the proposed project is to construct 48 residential suites (Building A-1) and 58 villas (Buildings B-1 to B-15) within the Ritz-Carlton Residences section of the project site (encompassing approximately 200,474 square feet), to construct 23,840 square feet of venue space, 5,510 square feet of amenity space, and 6,273 square feet of commercial space within the Sky Mesa Recreational Area portion of the project site for a total project size of approximately 236,750 square feet (Figure 1-2).

## Project Location

The project site is located at 68900 Frank Sinatra Drive approximately 0.85 miles southwest of the intersection with State Route 111 in the City of Rancho Mirage, Riverside County (Assessor's Parcel Numbers 689-330-026, -028, -031 -032, -034; 689-020-012, -014 and 689-331-001, -18) (Figure 1-2). The majority of the 16.13-acre project site is currently vacant and lies south and east of the existing Ritz-Carlton Rancho Mirage Hotel. Figures 1-1 and 1-2 show the regional location and local vicinity, respectively. The Residences portion accounts for approximately 11.62 acres and the Sky Mesa Recreation Area accounts for approximately 4.51 acres.

## Environmental Setting and Surrounding Land Uses

The project site is vacant with dirt covering the majority of the site. The majority of the site that includes The Residences is mass graded. The portion of the site for the Sky Mesa Recreational Area is partially graded. An asphalt dead-end road has been constructed on the property as a temporary construction access point for the hotel to the north. A shipping container and construction equipment remain on the project site from construction staging activities during previous development on the hotel property. As mentioned above, the existing Ritz-Carlton Rancho Mirage Hotel is to the north and west of the project site with a hotel service access road immediately bordering the property. Another hotel service access road borders the project site to the northeast which leads to the proposed Sky Mesa Recreation Area. To the south is Mirada Circle and the Mirada single-family residential development. Confronting the project site across Frank Sinatra Drive to the northwest is a rough graded but undeveloped parcel that contains the site where the Tennis Villas of the Lodge at Rancho Mirage Hotel Project would be developed.

### *Land Use*

The project site is situated on all or portions of Assessor parcel numbers 689-330-026, -028, -031 -032, -034; 689-020-012, -014 and 689-331-001, -18 which have a General Plan Land Use designation of Commercial: Resort Hotel (Rs-H) and on parcels 689-020-012, -14 carrying an Open Space: Mountain Reserve (MR) designation.

The stated goal of the Resort Hotel (Rs-H) zone is for "the development of hotels and destination resorts with limited, ancillary commercial uses, such as spas, recreational facilities, restaurants, lounges, and small retail shops that directly support the primary use."

The stated goal of the Mountain Reserve (MR) zone is "for public lands or property subject to conservation easements in the Santa Rosa Mountains. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation."

## Project Description

### *Proposed Land Uses*

The applicant, Kam Sang Company, proposes to construct 106 residential suites and hotel villas encompassing approximately 200,474-square feet, approximately 23,840-square feet of event space, approximately 6,273-square feet of commercial, and approximately 5,510-square feet of amenity space at 68900 Frank Sinatra Drive. The proposed project would be approximately 236,748 square feet in total. Figure 1-3 and 1-4 shows the proposed site plans for the Ritz Carlton Residences and the Sky Mesa Recreational Area, respectively.

***Ritz Carlton Residences and Hotel Villas***

***Residential Suites (Building A-1):*** The residential suites, event space, and commercial area would be located within Building A-1. This new building would provide an approximately 23,840-square feet indoor event space and 3,960-square feet exterior entertaining and garden spaces. The building would also house 48 residential suites over underground parking for both the suites and the event space along with additional parking for the existing hotel. Building A-1 would be 3 stories with a maximum height of 30-feet, 3-inches, with the exception of the entrance of the event space, which will be 39- feet 3- inches in height. Building elevations are shown on Figure 1-5.

***Hotel Villas (Buildings B-1 to B-15):*** The proposed project also includes 58 proposed hotel villas with private garages across 15 buildings (Buildings B-1 to B-15) to the south and east of Building A-1. The hotel villas would be 2 stories with a maximum height of approximately 32-feet, 4-inches and building elevations are shown on Figures 1-6a and 1-6b. These residential suites and hotel villas would be comprised of a mix of one, two, and three-bedroom units; refer to Table 1-1, Proposed Residential Suite and Hotel Villa Unit Types, for a breakdown of unit types between the residential suites and hotel villas.

**Table 1-1. Proposed Residential Suite and Hotel Villa Unit Types**

| Location | Unit Type | Count |
|---|---|---|
| Residential Suites | 1 bedroom/1 bath | 26 |
| | 2 bedroom/2 bath | 12 |
| | 3 bedroom/3 bath | 10 |
| | *Residential Suite Subtotal* | *48* |
| Hotel Villas | 2 bedroom/2 bath | 29 |
| | 3 bedroom/3 bath | 29 |
| | *Hotel Villas Subtotal* | *58* |
| | **Total Units** | **106** |

An approximately 5,510-square-foot, 33 feet and 6 inches tall, community clubroom/lounge with access to a central pool terrace as well as smaller amenity areas would also be located with the same area as the hotel villas. Refer to Figure 1-3 for the proposed location of the community lounge and Figure 1-5 for building elevations.

***Sky Mesa Recreation Area***

To the northeast, the proposed 6,273-square-foot Sky Mesa Recreation Area would provide additional event space, restaurant, and amenities such as a pool terrace and view opportunities of the surrounding areas. The Sky Mesa Recreation Area includes a restaurant built into the natural hillside with a pool and large lawn event space below the restaurant. A proposed 693 square foot restroom facility would be constructed into the hillside adjacent the restaurant and pool. Figure 1-7 shows the proposed building elevations for the Sky Mesa Recreation Area. A General Plan Zoning Map Amendment from Mountain Reserve (MR) to Resort Hotel (Rs-H) is concurrently proposed for the Sky Mesa Recreation Area.

### *Access and Parking*

Proposed access and circulation to and within the project site is shown on Figure 1-8. Primary site access would be from Frank Sinatra Drive, with associated monument signage. Access to the hotel villas would be located at the existing traffic circle on Frank Sinatra Drive just south of the existing hotel access driveway. Access to Building A-1 (residential suites, event spaces, and underground parking) would be from the existing hotel access driveway. The existing hotel motor court would be modified to serve as the drop-off and entry point for the new event space and residential suites. An additional vehicular connection would be located to the east of Building A-1, which would provide additional hotel villa residential and service access. An internal road network and sidewalks provide connections throughout the site, to the existing hotel, and to the Sky Mesa Recreation Area.

The proposed project would include 499 parking spaces total, with 381 subterranean parking and 116 residential parking. As mentioned above, parking for Building A-1 is provided in a parking structure where 381 spaces serve the residential suites, event space, commercial uses, and additional spaces for the existing hotel. The hotel villas would have either 1 or 2-car private garages, plus a driveway space for the one car garage hotel villas totaling 116 spaces.

### *Landscaping and Open Space*

The proposed project will provide approximately 35% open space made up of landscape areas, pools, water features, and paths. Figures 1-9a and 1-9b shows the proposed landscape plan for the Residences at Ritz Carlton and the Sky Mesa Recreational Area, respectively. A desert landscape design is proposed throughout the project site including water cascades, multiple pools, rock escarpments, and fountains. Landscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network. The proposed plant palette would comprise of native, drought-tolerant plantings, consistent with the existing hotel landscaping and surrounding areas.

A pedestrian walkway network would be located throughout the hotel villas and Sky Mesa Recreation Area. The pedestrian network would provide access to pools, ponds, and open space areas within the project site. Within the Sky Mesa Recreation Area, north of the proposed restaurant and pool, the pedestrian network would include viewpoints towards the north/east.

### *Utilities*

Coachella Valley Water District (CVWD) provides domestic water service to the existing Ritz-Carlton Hotel via 18-inch diameter water mains located in Frank Sinatra Drive and 8-inch mains located in previous Tennis Complex entry drive. 12-inch water mains are also located in roadways within the

adjacent Mirada Estates subdivision.

CVWD provides wastewater collection and treatment services to the proposed project vicinity. Wastewater is collected via 8-inch sewer mains located within the Frank Sinatra Drive right-of-way. These mains extend north along Frank Sinatra Drive, cross Highway 111 and connect with a sewer line located about one block northeast of Highway 111.

The proposed project would require sewer, water, and fire-serve water line lateral connections to the existing facilities in Frank Sinatra Drive. New irrigation improvements would follow the CVWD Model Water Efficient Landscape Ordinance.

## Construction

For the purposes of air quality analysis, it is anticipated that construction of the proposed project would begin in 2023[1]. The anticipated sequence of construction is as follows:

- Demolition (none necessary)
- Site Preparation (previously performed)
- Grading (5 months)
- Building Construction (17 months)
- Paving (1 month)
- Architectural Coating (3 months)

Refer to the air quality analysis in Section 3 of this Initial Study for additional details. During the grading phase of construction, it is anticipated that approximately 6,920 cubic yards of material would be exported and no material would be imported. No-VOC paint, defined as paint with a VOC content of 5 grams/liter or less is proposed for the project.

## Operation

The proposed project entails operation of residential suites and hotel villas, event space, commercial, and amenity space. The proposed 23,840 square foot event space and exterior entertaining and garden space would provide a space for residents, visitors and hotel guests. The proposed project would involve the construction of 106 residential units. These residential units would operate similar to time-share properties and therefore future residents would not be in the proposed residential units year-round.

During operation of the proposed project, special events would be held, similar to special events held at the existing hotel. Prior to any special event, the proposed project would obtain necessary and required approvals from the City with respect to special event permits and traffic management.

## Discretionary Approvals

The two primary components of the proposed project, the Ritz Carlton Residences and the Sky Mesa Recreation Area, require a separate set of discretionary approvals. While these two components are considered a single project under CEQA, one portion may be developed separately from the other The approvals required of each are outlined below. The project requires approval of a Tentative Parcel Map (TPM38768) (see Figure 1-10, Tentative Parcel Map) which proposes to establish three parcels with Parcel 3 of the map containing 106 condo units.

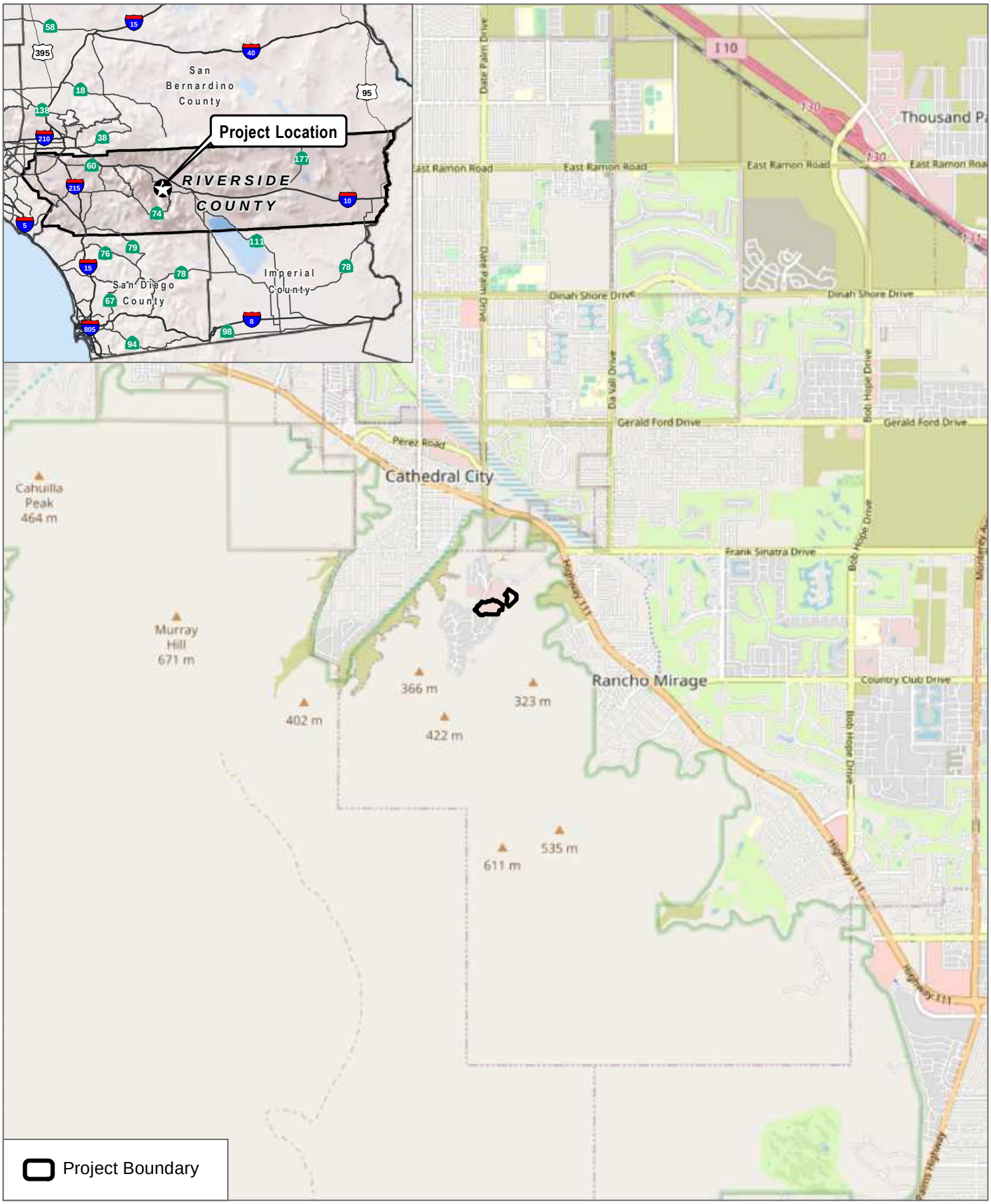
[1] The analysis assumes a construction start date of February 2023 and conclude in November 2024–, which represents the earliest date construction would initiate. While February 2023 has already passed, assuming the earliest start date and duration for construction represents the worst-case scenario for criteria air pollutant and GHG emissions because equipment and vehicle emission factors for later years would be slightly less due to more stringent standards for in-use off-road equipment and heavy-duty trucks, as well as fleet turnover replacing older equipment and vehicles in later years. Additionally, a shorter modeled duration results in slightly higher daily and annual emissions. Therefore, despite the fact that the construction schedule used for modeling has previously passes, given it represents the worst-case scenario, the analysis is still valid.

**Ritz Carlton Residences Discretionary Approvals**

- Environmental Assessment
- Development Agreement Amendment
- Major Modification
- Tentative Parcel Map

**Sky Mesa Recreation Area Discretionary Approvals**

- Environmental Assessment
- Development Agreement Amendment
- General Plan Zoning Map Amendment from Mountain Reserve to Resort Hotel
- Major Modification~~Preliminary Development Plan~~
- Tentative Parcel Map




SOURCE: ESRI OpenStreetMap 2019

DUDEK

0 0.5 1 Miles

**FIGURE 1-1**

Regional Map

Ritz-Carlton Rancho Mirage Initial Study

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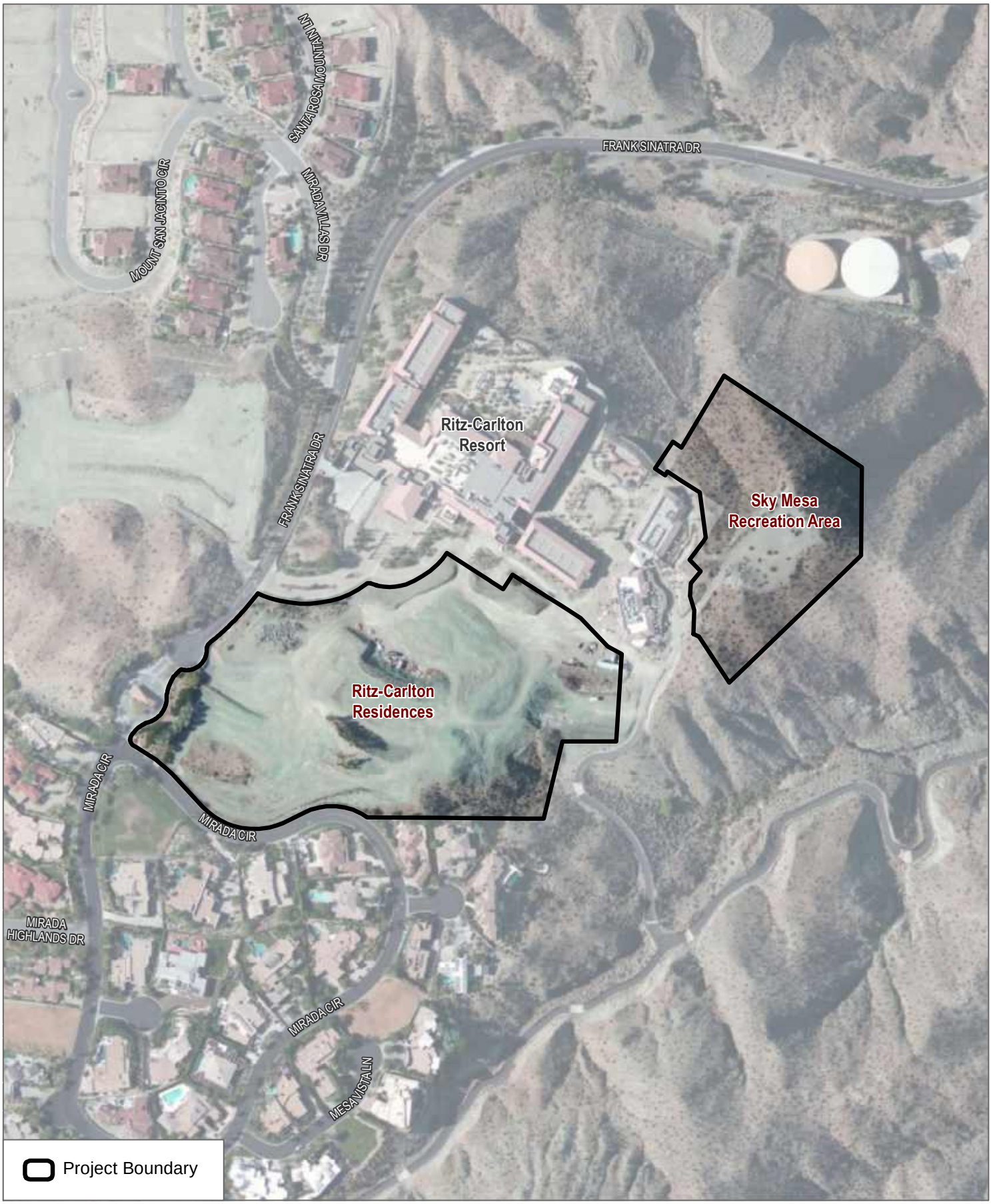


SOURCE: ESRI Clarity Imagery 2019

DUDEK

0 150 300 Feet

**FIGURE 1-2**

Project Location

Ritz-Carlton Rancho Mirage Initial Study

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SOURCE: LCRA 2018

**FIGURE 1-3**

Ritz-Carlton Residences Site Plan

Ritz-Carlton Rancho Mirage Initial Study

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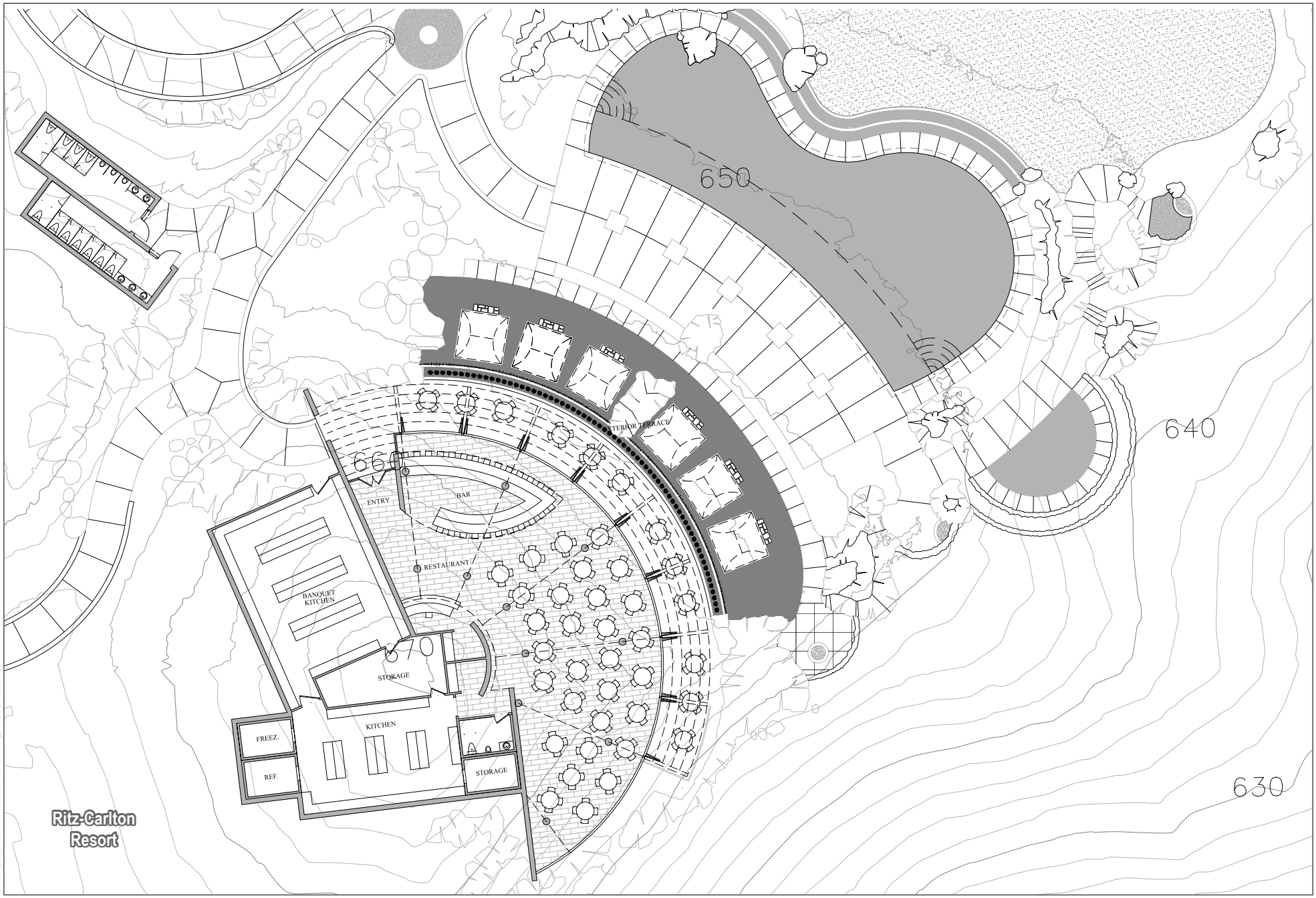


SOURCE: LCRA 2018

**FIGURE 1-4**

Sky Mesa Recreational Site Plan

Ritz-Carlton Rancho Mirage Initial Study

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THE VENUE: FRONT ELEVATION



THE VENUE: WEST ELEVATION



THE VENUE: EAST ELEVATION

Path: Z:\Projects\1194201\MAPDOC\DOCUMENTS\MND\Figure1-4_SkyMesa_SitePlan

SOURCE: LCRA 2018

DUDEK

**FIGURE 1-5**

Event Venue Elevations

Ritz-Carlton Rancho Mirage Initial Study

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RESIDENTIAL SUITES: NORTH ELEVATION




RESIDENTIAL SUITES: NORTH ELEVATION

SOURCE: LCRA 2018

DUDEK

**FIGURE 1-6a**

Residences Elevations

Ritz-Carlton Rancho Mirage Initial Study

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SOURCE: LCRA 2018

**FIGURE 1-6b**

Residences Elevations

Ritz-Carlton Rancho Mirage Initial Study

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Path: Z:\Projects\119\201\MAP\DOC\DOCUMENT\SMND\Figure1-4_SiteMesa_SitePlan

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ELEVATION - NORTH




ELEVATION - EAST

Path: Z:\Projects\19\201\MAP\DOC\DOCUMENTS\MND Figure1-4_SkyMesa_SitePlan

SOURCE: LCRA 2018

DUDEK

**FIGURE 1-7**

Sky Mesa Recreation Area Elevations

Ritz-Carlton Rancho Mirage Initial Study

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SOURCE: Urban Crossroads 2020

**FIGURE 1-8**

Proposed Access and Circulation

Ritz-Carlton Rancho Mirage Initial Study

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SOURCE: Michael McKay 2018

**FIGURE 1-9a**

Landscape Plan for Residences at Ritz Carlton

Ritz-Carlton Rancho Mirage Initial Study

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SOURCE: LCRA, 2022

**FIGURE 1-9b**

Landscape Plan for Sky Mesa Recreational Area

Ritz-Carlton Rancho Mirage Initial Study

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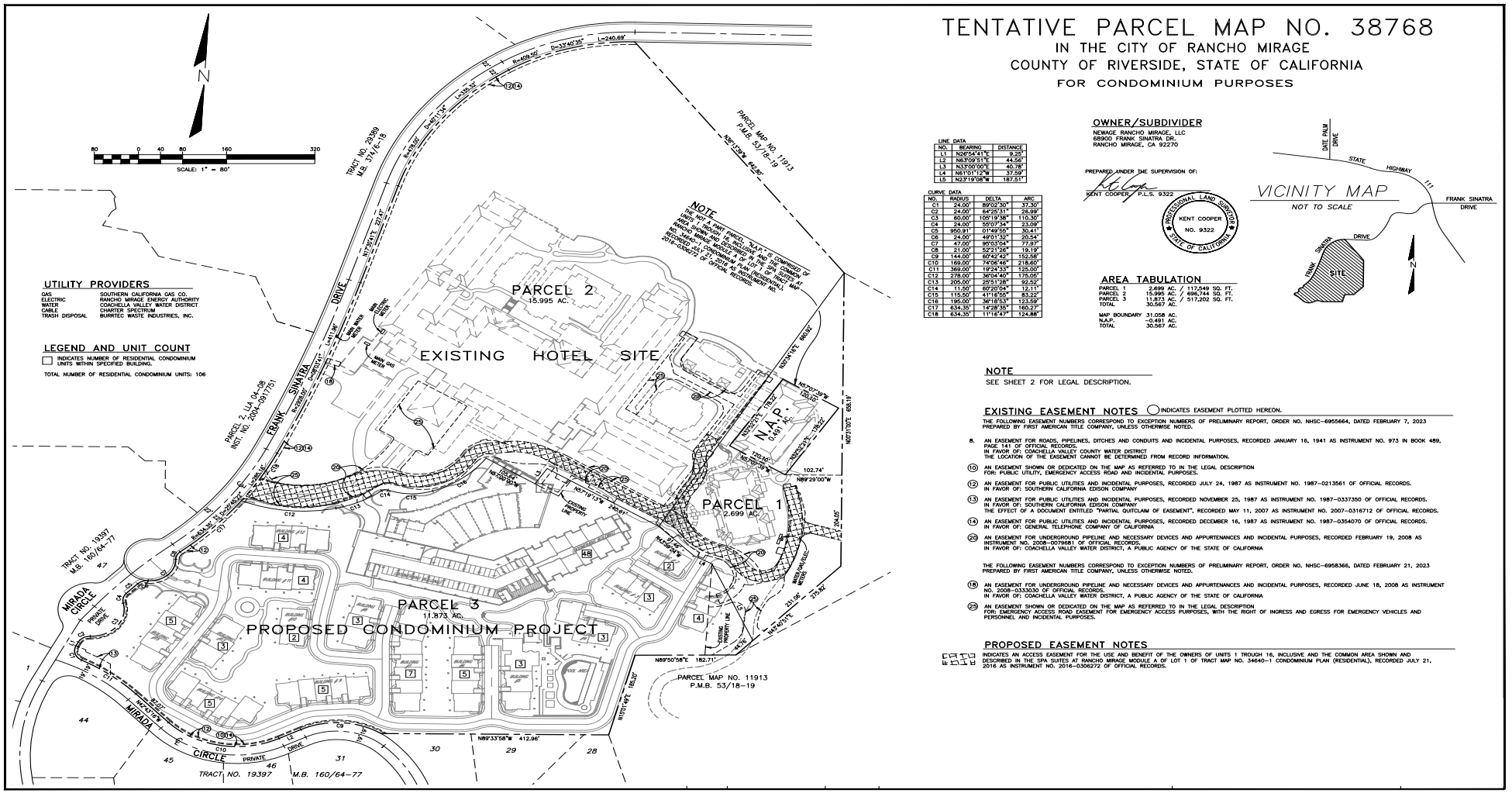


SOURCE: raSmith, 2024

**FIGURE 1-10**

Tentative Parcel Map

Ritz-Carlton Rancho Mirage Initial Study

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**FIGURE 1-11a**

Visual Simulation 1 – Rancho Mirage Entrance

Ritz-Carlton Rancho Mirage Initial Study

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**FIGURE 1-11b**

Visual Simulation 2 – Villas of Mirada (Southern Entrance)

Ritz-Carlton Rancho Mirage Initial Study

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**FIGURE 1-11c**

Visual Simulation 3 – Villas of Mirada (Northern Entrance)

Ritz-Carlton Rancho Mirage Initial Study

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Path: Z:\Projects\11942018\MAPDOC\DOCUMENTS\MND\Figure1-4_SkyMesa_SitePlan

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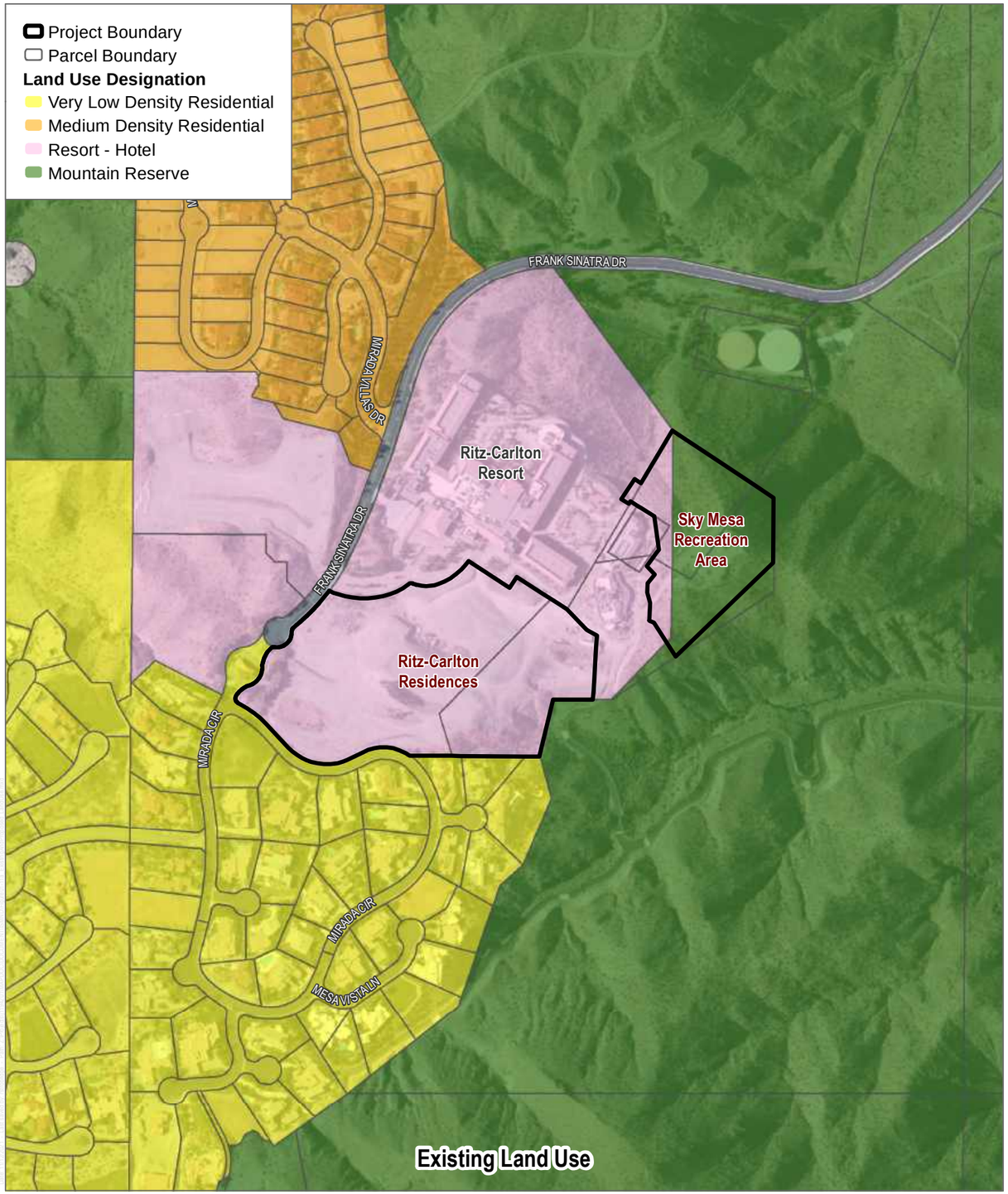


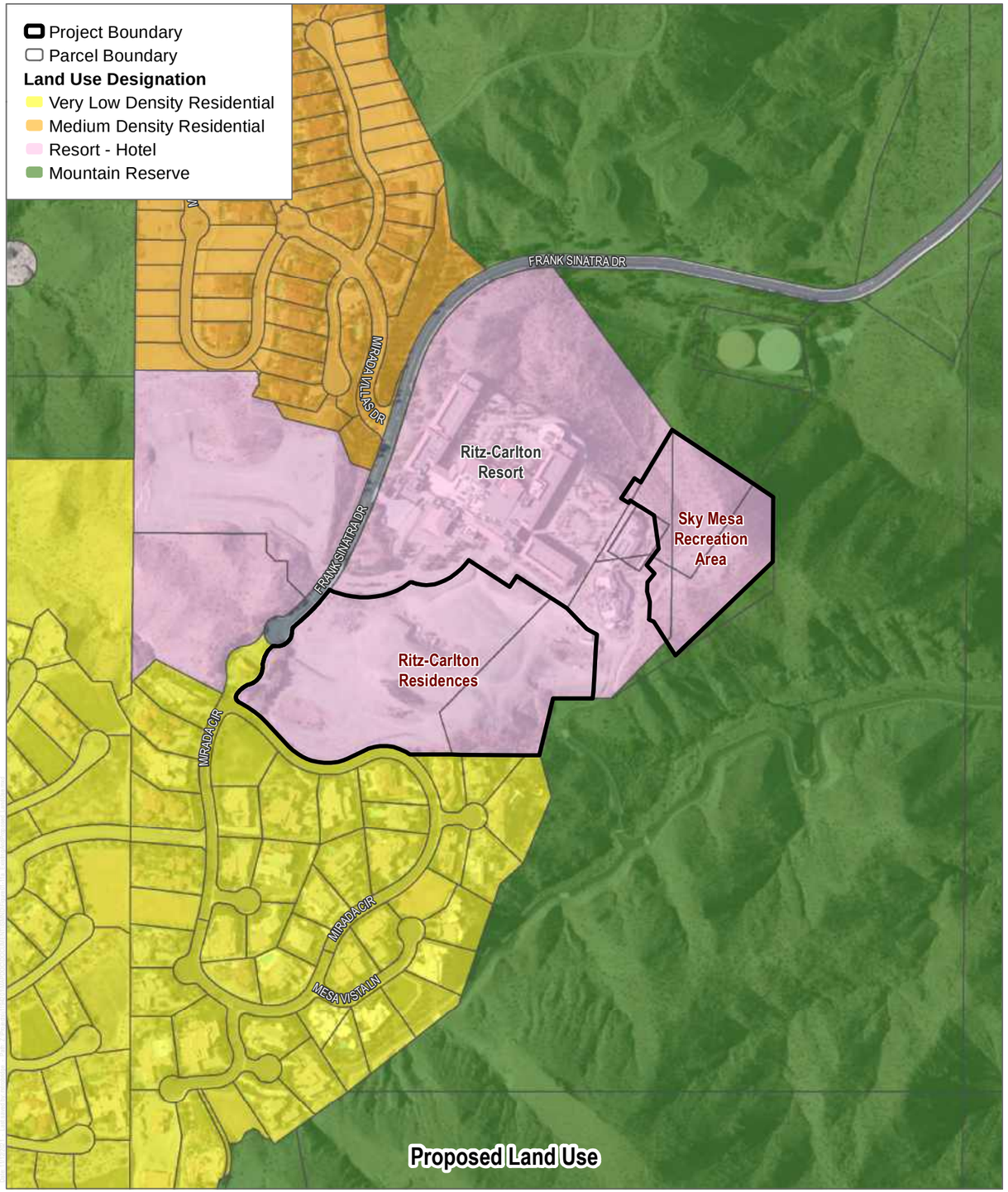


SOURCE: ESRI Clarity Imagery 2019

DUDEK

0 200 400 Feet

**FIGURE 1-1**2

Existing and Proposed Land Use Designations

Ritz-Carlton Rancho Mirage Initial Study

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# CHAPTER 2: ENVIRONMENTAL ANALYSIS AND DETERMINATION
# ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

| | | |
|---|---|---|
| ☐ Aesthetics | ☐ Agriculture and Forestry Resources | ☐ Air Quality |
| ☐ Biological Resources | ☐ Cultural Resources | ☐ Energy |
| ☐ Geology and Soils | ☐ Greenhouse Gas Emissions | ☐ Hazards and Hazardous Materials |
| ☐ Hydrology and Water Quality | ☐ Land Use and Planning | ☐ Mineral Resources |
| ☐ Noise | ☐ Population and Housing | ☐ Public Services |
| ☐ Recreation | ☐ Transportation | ☐ Tribal Cultural Resources |
| ☐ Utilities and Service Systems | ☐ Wildfire | ☐ Mandatory Findings of Significance |

# EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.

   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

   a) the significance criteria or threshold, if any, used to evaluate each question; and

   b) the mitigation measure identified, if any, to reduce the impact to less than significance

**DETERMINATION:** (To be completed by the Lead Agency) On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.



12-20-2024

Ben Torres, Planning Manager
City of Rancho Mirage

Date:

# Environmental Checklist and Discussion:

The following checklist evaluates the proposed project's potential adverse impacts. For those environmental topics for which a potential adverse impact may exist, a discussion of the existing site environment related to the topic is presented followed by an analysis of the proposed project's potential adverse impacts. When the project does not have any potential for adverse impacts for an environmental topic, the reasons why there are no potential adverse impacts are described.

## 1. AESTHETICS

| AESTHETICS -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Have a substantial adverse effect on a scenic vista? | ☐ | ☐ | ☒ | ☐ |
| b) Substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | ☐ | ☐ | ☐ | ☒ |
| c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality? | ☐ | ☐ | ☒ | ☐ |
| d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? | ☐ | ☐ | ☒ | ☐ |

### 1.1 Setting

For the purposes of this analysis, a scenic vista is defined as a long, expansive view of a highly valued landscape from a publicly accessible vantage point. "Highly valued landscapes" can include natural open spaces, topographic formations including mountains or hills, or more generally, areas that

contribute to a high level of visual quality. The City of Rancho Mirage's General Plan has identified view corridors along State Route (SR-) 111.

The proposed project consists of developing 48 residential suites and 58 hotel villas encompassing approximately 200,474-square feet, approximately 23,840-square feet of event space, approximately 6,273-square feet of commercial, and approximately 5,510-square feet of amenity space at 68900 Frank Sinatra Drive. As discussed in the Project Description, the proposed project also includes 58 proposed hotel villas with private garages across 15 buildings (Buildings B-1 to B-15) to the south and east of Building A-1. The hotel villas would be 2 stories with a maximum height of 32-feet, 4-inches and building elevations are shown on Figures 1-6a and 1-6b. The proposed Sky Mesa Recreational Area would construct an event space, a restaurant and bathroom facility built into the natural hillside, a pool and a large lawn event space. The heights of the structures would not substantially differ as the existing buildings are of similar heights.

The proposed Ritz-Carlton Residences site is located south of the existing hotel, north of a gated residential community, and southeast of another gated residential community (Figure 1-2). Additionally, there is a trail adjacent to the gated residential community to the northwest of the project site (Road Runner Trail). The proposed Ritz-Carlton Residences site is graded and is sparsely occupied by small vegetation and storage containers. The proposed Sky Mesa Recreational Area is located east of the existing hotel (Figure 1-2). The proposed Sky Mesa Recreational Area is largely graded atop a hillside and dotted with chaparral vegetation.

## 1.2 Discussion of Impacts

a) ***Less-than-Significant Impact:*** The City of Rancho Mirage General Plan (City of Rancho Mirage 2017) Land Use Element policy states that "the City shall ensure adequate visibility and accessibility for commercial development while preserving the scenic viewsheds from adjoining properties and public rights-of-way" (Policy LU 2.5).

The proposed project is located off of Frank Sinatra Drive, a public right-of-way, which includes views of the Santa Rosa Mountains to the north and southeast. The proposed project occurs to the east/southeast of Frank Sinatra Drive and therefore there is no impact to views to the north. The views of the mountains to the southeast include the existing Mirada single-family residential development which is situated at an elevation approximately 30-feet higher than the proposed project entrance. The proposed buildings are designed to meet the building height and setback regulations as required by the City of Rancho Mirage Zoning Ordinance, as discussed in Threshold 2(c).

Three renderings of the proposed project are presented in Figures 1-11a–c. Locations of the proposed project renderings are also presented in Figures 1-11a-c. The three renderings include renderings of two entrances to the Villas of Mirada (one on the North side of the site and one to the South; Figure 1-11b and 1-11c, respectively) and a rendering from the perspective from the entrance to the proposed development (Figure 1-11a). These three perspectives are generally the only locations along Frank Sinatra Drive in which a motorist could see the proposed project from a public vantage point. The terrain is such that it blocks the project up until the proposed project entrance. Figure 1-11c of the north end of Frank Sinatra Drive is the first location in which the project site can be seen by motorist.

A rendering at the entrance to the project site along Frank Sinatra Drive is presented in Figure 1-11a. Views of the rendering includes multiple palm trees and desert landscaping along the entrance.

Beyond the entrance are multiple buildings that are color blocked with neutral cream or tan color exterior. The buildings are two stories tall and would be surrounded by landscaping. A rendering from the perspective of the southern entrance to the Villas of Mirada (a gated residential neighborhood) shows the proposed buildings of similar designs as previously described (Figure 1-11b). Landscaping along the streets would not change, and low dense landscaping can be seen along the proposed development. A rendering from the perspective of the northern entrance of the Villas of Mirada shows the proposed development just beyond the view of the existing hotel. The proposed Sky Mesa Recreational Area cannot be seen from any of the three perspective locations as specified in Figures 1-11a through 1-11c.

There would be minimal visibility of the proposed development from Highway 111. A brief view of existing hotel buildings can be seen peaking over the hillside, although the majority of the proposed buildings would not be seen from Highway 111 due to mountains and elevation. Visibility of the existing hotel can be seen from the parking lot of a car wash directly adjacent to Highway 111 and Frank Sinatra Drive. Even from the parking lot of the aforementioned car wash, the proposed development cannot be seen. The proposed development cannot be seen until motorists arrive at the northern entrance of Villas of Mirada (Figure 1-11c).

As the existing topography increases to the southeast the views will not be obstructed by the proposed project and the impact to scenic vistas from the public right-of-way will be less than significant.

The City's General Plan Community Design Element (City of Rancho Mirage 2017) includes the goal of preservation and promotion of the special identity of Rancho Mirage as an "Oasis in the Desert," combining quality development with scenic, natural, and open space amenities. Exhibit 32 in the Community Design Element shows designated view corridors. The view corridors potentially within the potential project vicinity are looking northwest/southeasterly along both Highway 111 and the Whitewater River. The Community Design Element also addresses scenic arterial roadways which include Bob Hope Drive, Highway 111, Monterey Avenue, and Da Vall Drive.

The proposed project is not visible from the designated view corridors as it is located to the west over the Santa Rosa Mountains. Additionally, the proposed project is located off of Frank Sinatra Drive which is not considered a scenic roadway (City of Rancho Mirage 2017). Therefore, impacts to scenic vistas regarding view corridors would be **less than significant**.

b) ***No Impact:*** The project site is located off of Frank Sinatra Drive, which is not considered a scenic highway (City of Rancho Mirage 2017). Additionally, the project site has been previously graded and contains no scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings. Therefore, there would be **no impact**.

c) ***Less-than-Significant Impact:*** Per CEQA Statute 21071(a)(2), and urbanized area is defined as "an incorporated city that has a population of less than 100,000 persons …and not more than two contiguous incorporated cities combined equals at least 100,000 persons." The combined populations of Rancho Mirage, Cathedral City, and Palm Springs exceed 100,000 persons, and therefore Rancho Mirage is considered an urbanized area under CEQA (SCAG 2019a, b, c).

In accordance with the City's Zoning Ordinance, the proposed project would comply with all applicable city design standards to protect scenic viewsheds. The project proposes buildings of varying heights with a maximum building height of 33-feet, 6-inches, with the exception of

the entrance to the venue space in Building A-1 (with a height of 39 -feet and 3 inches) and the entrance to the underground parking structure (with a height of 47- feet). Table 2-5 in Section 17.10.20 of the City's Municipal Code identifies the development standards for setbacks and building height in the Rs-H zone, with additional height requirements outlined in Section 17.20.100. As part of the development plan application and project mapping progresses, the applicant would comply with the City's Municipal Code building height requirements with respect to the finished grade and setback requirements along the property line. The proposed event space would be located closest to the existing hotel, with the residential villas proposed between the hotel/event space and neighboring residential to the south. The proposed residential villas would be located at varying finished grades which would provide a variation in rooflines. The residential villas would be set back from surrounding properties by an internal landscaping buffer and internal driveways. Project design would provide a transition between the existing hotel use/proposed event space and the existing residential to the south in compliance with the development standards of the City's Municipal Code.

Additionally, the project site is currently zoned Resort Hotel (Rs-H) and Open Space: Mountain Reserve (MR) in the General Plan (City of Rancho Mirage 2017). The proposed hotel suites and villas are located on the Rs-H zoned property; with the concurrently proposed zoning amendment for the Sky Mesa Recreation Area, the proposed uses would also be located on an Rs-H zoned parcel. Therefore, the project would be consistent with the General Plan designation. Furthermore, the project site is not located within a scenic overlay zone. As described in Response 1(a) above, the proposed buildings will comply with building height and setback regulations and there would be **less than significant impact** regarding existing views and scenic quality from the public right-of-way will not be impacted.

d) ***Less-than-Significant Impact:*** The residential suites, hotel villas, and sky mesa uses would include outdoor lighting. While this is a new source of light, existing hotel and the surrounding Mirada residential development already contains night-lighting. All lighting would comply with City of Rancho Mirage Municipal Code Section 17.18.050 (City of Rancho Mirage 2002) for shielding to control glare and prevent light spillover onto adjacent areas. The proposed project would have a **less-than-significant impact** on day or nighttime views related to light or glare.

## 1.3 Mitigation Measures

No mitigation measures required.

## 2. AGRICULTURE AND FORESTRY RESOURCES

| **AGRICULTURE AND FORESTRY RESOURCES –** In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | ☐ | ☐ | ☐ | ☒ |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | ☐ | ☐ | ☐ | ☒ |
| c) Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production? | ☐ | ☐ | ☐ | ☒ |
| d) Result in the loss of forest land or conversion of forest land to non forest use? | ☐ | ☐ | ☐ | ☒ |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use? | ☐ | ☐ | ☐ | ☒ |

## 2.1 Setting

The project site is situated on all or portions of Assessor parcel numbers 689-330-026, -28, -32 which have a General Plan Land Use designation of Commercial: Resort Hotel (Rs-H) and on parcels 689-020-012, -14 carrying an Open Space: Mountain Reserve (MR) designation.

According to the City of Rancho Mirage's 2005 General Plan Update EIR (City of Rancho Mirage 2005), there is no farming activity in the City and no agricultural land uses in the General Plan. Furthermore, the 2017 Rancho Mirage General Plan Update Addendum (2017 Addendum) states that agricultural lands are still not present in the City.

## 2.2 Discussion of Impacts

a) ***No Impact:*** According to the California Department of Conservation's Important Farmland Finder, the project site is located in Urban and Built-Up Land and Other Land. Urban and Build-Up Land is described as areas occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to 10-acre parcels (DOC 2016). Other Land is described as land not included in any other mapping category, with common examples including low density rural developments, brush, timber, etc. (DOC 2016).

As previously discussed, there is no farming activity in the City and no agricultural land uses in the General Plan. Additionally, the 2005 General Plan EIR, which analyzed the entirely of the City, determined that agricultural resource impacts would be considered less than significant. Furthermore, the 2017 Addendum to the General Plan EIR would not facilitate any conversion of agriculturally zoned lane. Therefore, this threshold is not addressed.

As such, the proposed project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use, and **no impact** would occur.

b) ***No Impact***: The Residences at Ritz Carlton portion of the project site is designated as Resort Hotel (Rs-H), and the Sky Mesa Recreational Area of the project site is designated as an Open Space: Mountain Reserve (MR) zone according to the City's Land Use Map (City of Rancho Mirage 2017). The Rs-H designation is zoned for commercial uses and the MR designation is zoned for open space preserve space (City of Rancho Mirage 2013). Neither of the designations support agricultural uses. As such, development of the proposed project would not conflict with existing zoning for agricultural use or a Williamson Act contract. **No impacts** would occur.

c) ***No Impact:*** The Residences at Ritz Carlton portion of the project site is designated as Resort Hotel (Rs-H), and the Sky Mesa Recreational Area of the project site is designated as an Open Space: Mountain Reserve (MR) zone according to the City's Land Use Map (City of Rancho Mirage 2017). The project site is not currently designated as or used for forestry resources. Therefore, the proposed project would not conflict with existing zoning for forest land or timberland, and **no impact** would occur.

d) ***No Impact:*** See response to Threshold 2(c). The proposed project would not result in the loss of forest land or conversion of forest land to non-forest use, and therefore **no impacts** would occur.

e) ***No Impact:*** See response to Threshold 2(c). The proposed project would not result in the direct or indirect conversion of agricultural uses or forest land, and **no impact** would occur.

## 2.3 Mitigation Measures

No mitigation measures required.

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# 3. AIR QUALITY

| **AIR QUALITY** – Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Conflict with or obstruct implementation of the applicable air quality plan? | ☐ | ☐ | ☒ | ☐ |
| b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard? | ☐ | ☐ | ☒ | ☐ |
| c) Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☒ | ☐~~☒~~ | ☐ |
| d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people? | ☐ | ☐ | ☒ | ☐ |

## 3.1 Setting

This section is based upon the Air Quality and Greenhouse Gas Technical Report and the Health Risk Assessment Memorandum prepared by Dudek (Appendix A-1 and A-2, respectively~~)~~. Background and methodologies regarding the air quality analysis can be found in Appendix A-1 and A-2.

### Criteria Air Pollutants

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include $O_3$, nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), $PM_{10}$, $PM_{2.5}$, and lead. In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants. A detailed discussion of each pollutant of concern are presented in Appendix A-1.

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the National Ambient Air Quality Standards (NAAQS) to the states. In California, the task of air quality management and regulation has been legislatively granted to the California Air Resources Board (CARB), with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. Air quality is considered "in attainment" if pollutant levels are continuously below the CAAQS and violate the standards no more than once each year. The CAAQS for $O_3$, CO, $SO_2$ (1-hour and 24-hour), $NO_2$, $PM_{10}$, and $PM_{2.5}$ and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. The NAAQS and CAAQS are presented in Table 3-1, Ambient Air Quality Standards.

**Table 3-1. Ambient Air Quality Standards**

| Pollutant | Averaging Time | California Standards[a] | National Standards[b] | |
|---|---|---|---|---|
| | | ***Concentration[s]*** | ***Primary[c,d]*** | ***Secondary[c,e]*** |
| $O_3$ | 1 hour | 0.09 ppm (180 µg/m³) | — | Same as primary standard[f] |
| | 8 hours | 0.070 ppm (137 µg/m³) | 0.070 ppm (137 µg/m³)[f] | |
| $NO_2$[g] | 1 hour | 0.18 ppm (339 µg/m³) | 0.100 ppm (188 µg/m³) | Same as primary standard |
| | Annual arithmetic mean | 0.030 ppm (57 µg/m³) | 0.053 ppm (100 µg/m³) | |
| CO | 1 hour | 20 ppm (23 mg/m³) | 35 ppm (40 mg/m³) | None |
| | 8 hours | 9.0 ppm (10 mg/m³) | 9 ppm (10 mg/m³) | |
| $SO_2$[h] | 1 hour | 0.25 ppm (655 µg/m³) | 0.075 ppm (196 µg/m³) | — |
| | 3 hours | — | — | 0.5 ppm (1,300 µg/m³) |
| | 24 hours | 0.04 ppm (105 µg/m³) | 0.14 ppm (for certain areas)[g] | — |
| | Annual | — | 0.030 ppm (for certain areas)[g] | — |
| $PM_{10}$[i] | 24 hours | 50 µg/m³ | 150 µg/m³ | Same as primary standard |
| | Annual arithmetic mean | 20 µg/m³ | — | |
| $PM_{2.5}$[i] | 24 hours | — | 35 µg/m³ | Same as primary standard |

**Table 3-1. Ambient Air Quality Standards**

| Pollutant | Averaging Time | California Standards[a] | National Standards[b] | |
|---|---|---|---|---|
| | | ***Concentration[s]*** | ***Primary[c,d]*** | ***Secondary[c,e]*** |
| | Annual arithmetic mean | 12 µg/m³ | 12.0 µg/m³ | 15.0 µg/m³ |
| Lead[i,k] | 30-day average | 1.5 µg/m³ | — | — |
| | Calendar quarter | — | 1.5 µg/m³ (for certain areas)[k] | Same as primary standard |
| | Rolling 3-month average | — | 0.15 µg/m³ | |
| Hydrogen sulfide | 1 hour | 0.03 ppm (42 µg/m³) | — | — |
| Vinyl chloride[j] | 24 hours | 0.01 ppm (26 µg/m³) | — | — |
| Sulfates | 24- hours | 25 µg/m³ | — | — |
| Visibility reducing particles | 8 hour (10:00 a.m. to 6:00 p.m. PST) | Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to the number of particles when the relative humidity is less than 70% | — | — |

**Source:** Appendix A-1.
**Notes:** $O_3$ = ozone; ppm = parts per million by volume; µg/m³ = micrograms per cubic meter; $NO_2$ = nitrogen dioxide; CO = carbon monoxide; mg/m³= milligrams per cubic meter; $SO_2$ = sulfur dioxide; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; PST = Pacific Standard Time.

[a] California standards for $O_3$, CO, $SO_2$ (1-hour and 24-hour), $NO_2$, suspended particulate matter ($PM_{10}$, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than $O_3$, $NO_2$, $SO_2$, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The $O_3$ standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For $PM_{10}$, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National primary standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[e] National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] On October 1, 2015, the national 8-hour $O_3$ primary and secondary standards were lowered from 0.075 to 0.070 ppm.

[g] To attain the national 1-hour standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of ppm. To directly compare

the national 1-hour standard to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

h On June 2, 2010, a new 1-hour $SO_2$ standard was established, and the existing 24-hour and annual primary standards were revoked. To attain the national 1-hour standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 $SO_2$ national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

i On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m$^3$ to 12.0 µg/m$^3$. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m$^3$, as was the annual secondary standard of 15 µg/m$^3$. The existing 24-hour $PM_{10}$ standards (primary and secondary) of 150 µg/m$^3$ were also retained. The form of the annual primary and secondary standards is the annual mean averaged over 3 years.

j CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

k The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m$^3$ as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

### Sensitive Receptors

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. People most likely to be affected by air pollution include children, the elderly, athletes, and people with cardiovascular and chronic respiratory diseases. Facilities and structures where these air pollution-sensitive people live or spend considerable amounts of time are known as sensitive receptors. Land uses where air pollution-sensitive individuals are most likely to spend time include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities (sensitive sites or sensitive land uses). The South Coast Air Quality Management District (SCAQMD) identifies sensitive receptors as residences, schools, playgrounds, childcare centers, long-term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes (SCAQMD 1993). Residential land uses are located to the south of the project site. The closest off-site sensitive receptors to the project site include residences located approximately 25 meters (82 feet) south of the proposed project's limits of construction.

### Toxic Air Contaminants (TACs)

The state Air Toxics Program was established in 1983 under AB 1807 (Tanner). The California TAC list identifies more than 700 pollutants, of which carcinogenic and noncarcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. In accordance with AB 2728, the state list includes the (federal) HAPs. In 1987, the Legislature enacted the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) to address public concern over the release of TACs into the atmosphere. AB 2588 law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years. TAC emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment (HRA), and if specific thresholds are exceeded, the facility operator is required to communicate the results to the public in the form of notices and public meetings.

In 2000, CARB approved a comprehensive diesel risk reduction plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines (CARB 2000). The regulation is anticipated to result in an 80% decrease in statewide diesel health risk in 2020 compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-Ignition (Diesel) Engines and Equipment program. These regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment. There are several Airborne Toxic Control Measures that reduce diesel emissions, including In-Use Off-Road Diesel-Fueled Fleets (13 CCR 2449 et seq.) and In-Use On-Road Diesel-Fueled Vehicles (13 CCR 2025).

## Regional and Local Air Quality Conditions

### *Coachella Valley Portion of the Salton Sea Air Basin Attainment Designation*

Pursuant to the 1990 federal Clean Air Act amendments, the U.S. Environmental Protection Agency (EPA) classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutant, based on whether NAAQS have been achieved. Generally, if the recorded concentrations of a pollutant are lower than the standard, the area is classified as "attainment" for that pollutant. If an area exceeds the standard, the area is classified as "nonattainment" for that pollutant. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated as "unclassified" or "unclassifiable." The designation of "unclassifiable/attainment" means that the area meets the standard or is expected to be meet the standard despite a lack of monitoring data. Areas that achieve the standards after a nonattainment designation are re-designated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the standards. The California Clean Air Act, like its federal counterpart, called for the designation of areas as "attainment" or "nonattainment," but based on CAAQS rather than the NAAQS. Table 3-2, Coachella Valley Portions of the Salton Sea Air Basin Attainment Classification, depicts the current attainment status of the project site with respect to the NAAQS and CAAQS.

**Table 3-2. Coachella Valley Portion of the Salton Sea Air Basin Attainment Classification**

| Pollutant | Designation/Classification | |
|---|---|---|
| | ***Federal Standards*** | ***State Standards*** |
| Ozone ($O_3$) – 1 hour | No federal standard | **Nonattainment** |
| Ozone ($O_3$) – 8 hour | **Severe nonattainment** | **Nonattainment** |
| Nitrogen dioxide ($NO_2$) | Unclassifiable/attainment | Attainment |
| Carbon monoxide (CO) | Unclassifiable/attainment | Attainment |
| Sulfur dioxide ($SO_2$) | Unclassifiable/attainment | Attainment |
| Coarse particulate matter ($PM_{10}$) | **Serious nonattainment** | **Nonattainment** |
| Fine particulate matter ($PM_{2.5}$) | Unclassifiable/attainment | Attainment |
| Lead (Pb) | Unclassifiable/attainment | Attainment |
| Hydrogen sulfide | No federal standard | Unclassified |
| Sulfates | No federal standard | Attainment |

**Table 3-2. Coachella Valley Portion of the Salton Sea Air Basin Attainment Classification**

| Pollutant | Designation/Classification | |
|---|---|---|
| | ***Federal Standards*** | ***State Standards*** |
| Visibility-reducing particles | No federal standard | Unclassified |
| Vinyl chloride | No federal standard | No designation |

**Source:** Appendix A-1
**Notes: Bold text** = not in attainment; attainment = meets the standards; attainment/maintenance = achieve the standards after a nonattainment designation; nonattainment = does not meet the standards; unclassified or unclassifiable = insufficient data to classify; unclassifiable/attainment = meets the standard or is expected to be meet the standard despite a lack of monitoring data.

In summary, the Salton Sea Air Basin (SSAB), which is where the project site is located, is designated as a nonattainment area for federal and state $O_3$ standards and federal and state $PM_{10}$ standards. The SSAB is designated as an attainment area for federal and state CO, $PM_{2.5}$, $NO_2$, and $SO_2$ standards.

Despite the current nonattainment status, air quality within the SSAB has generally improved since the inception of air pollutant monitoring in 1976. This improvement is mainly due to lower-polluting on-road motor vehicles, more stringent regulation of industrial sources, and the implementation of emission reduction strategies by SCAQMD. This trend toward cleaner air has occurred in spite of continued population growth. Despite this growth, air quality has improved significantly over the years, primarily due to the impacts of the region's air quality control program. $PM_{10}$ levels have declined almost 50% since 1990, and $PM_{2.5}$ levels have also declined 50% since measurements began in 1999 (SCAQMD 2013). Similar improvements are observed with $O_3$, although the rate of $O_3$ decline has slowed in recent years.

### *Local Ambient Air Quality*

CARB, air districts, and other agencies monitor ambient air quality at approximately 250 air quality monitoring stations across the state. SCAQMD monitors local ambient air quality in the region of the project site. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The most recent background ambient air quality data from 2017 to 2019 are presented in Table 3-3, Local Ambient Air Quality Data. The Palm Springs monitoring station, located at 590 Racquet Club Road, Palm Springs, California, is the nearest air quality monitoring station to the project site, located approximately 12.6 miles northwest of the project site. The data collected at this station are considered representative of the air quality experienced in the proposed project vicinity. Air quality data for $O_3$, CO, $NO_2$, $PM_{10}$, and $PM_{2.5}$ from the Palm Springs monitoring station are provided in Table 3-3, Local Ambient Air Quality Data. Because $SO_2$ measurements are not monitored at the Palm Springs monitoring station, the measurements were taken from the Rubidoux monitoring station (1588 Mission Boulevard, Rubidoux, California, approximately 69 miles northwest of the project site). The number of days exceeding the ambient air quality standards is also shown in Table 3-3, Local Ambient Air Quality Data.

**Table 3-3. Local Ambient Air Quality Data**

| Monitoring Station | Unit | Averaging Time | Agency/ Method | Ambient Air Quality Standard | Measured Concentration by Year | | | Exceedances by Year | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *2017* | *2018* | *2019* | *2017* | *2018* | *2019* |
| ***Ozone ($O_3$)*** | | | | | | | | | | |
| Palm Springs | ppm | Maximum 1-hour concentration | State | 0.09 | 0.113 | 0.111 | 0.100 | 18 | 11 | 5 |
| | ppm | Maximum 8-hour concentration | State | 0.070 | 0.097 | 0.099 | 0.084 | 63 | 58 | 34 |
| | | | Federal | 0.070 | 0.097 | 0.099 | 0.085 | 57 | 56 | 39 |
| ***Nitrogen Dioxide ($NO_2$)*** | | | | | | | | | | |
| Palm Springs | ppm | Maximum 1-hour concentration | State | 0.18 | 0.043 | 0.043 | 0.041 | 0 | 0 | 0 |
| | | | Federal | 0.100 | 0.043 | 0.043 | 0.041 | 0 | 0 | 0 |
| | ppm | Annual concentration | State | 0.030 | 0.007 | 0.007 | 0.00726 | 0 | 0 | 0 |
| | | | Federal | 0.053 | 0.0065 | 0.0068 | 0.00726 | 0 | 0 | 0 |
| ***Carbon Monoxide (CO)*** | | | | | | | | | | |
| Palm Springs | ppm | Maximum 1-hour concentration | State | 20 | 1 | 1.1 | 1.3 | 0 | 0 | 0 |
| | | | Federal | 35 | 1 | 1.1 | 1.3 | 0 | 0 | 0 |
| | ppm | Maximum 8-hour concentration | State | 9.0 | 0.4 | 0.8 | 0.7 | 0 | 0 | 0 |
| | | | Federal | 9 | 0.4 | 0.8 | 0.7 | 0 | 0 | 0 |
| ***Sulfur Dioxide ($SO_2$)*** | | | | | | | | | | |
| Rubidoux | ppm | Maximum 1-hour concentration | Federal | 0.075 | 0.0025 | 0.0017 | 0.0018 | 0 | 0 | 0 |
| | ppm | Maximum 24-hour concentration | Federal | 0.14 | 0.0012 | 0.0009 | 0.0009 | 0 | 0 | 0 |

**Table 3-3. Local Ambient Air Quality Data**

| Monitoring Station | Unit | Averaging Time | Agency/ Method | Ambient Air Quality Standard | Measured Concentration by Year | | | Exceedances by Year | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *2017* | *2018* | *2019* | *2017* | *2018* | *2019* |
| | ppm | Annual concentration | Federal | 0.030 | 0.00029 | 0.00045 | 0.00042 | 0 | 0 | 0 |
| ***Coarse Particulate Matter ($PM_{10}$)[b]*** | | | | | | | | | | |
| Palm Springs | µg/m³ | Maximum 24-hour concentration | State | 50 | 60.5 | 37.4 | 51.8 | -- | 0 | 6 |
| | | | Federal | 150 | 105.6 | 422.3 | 75.6 | 0 | 2 | 0 |
| | µg/m³ | Annual concentration | State | 20 | ND | 20.1 | 19.9 | -- | -- | -- |
| ***Fine Particulate Matter ($PM_{2.5}$)[b]*** | | | | | | | | | | |
| Palm Springs | µg/m³ | Maximum 24-hour concentration | Federal | 35 | 14.5 | 30.2 | 15.5 | 0 | 0 | 0 |
| | µg/m³ | Annual concentration | State | 12 | 6.0 | 6.0 | 6.0 | -- | -- | -- |
| | | | Federal | 12.0 | 6.0 | 6.0 | 6.0 | -- | -- | -- |

**Sources:** Appendix A-1.
**Notes:** ppm = parts per million by volume; ND = insufficient data available to determine the value; -- = not available; µg/m³ = micrograms per cubic meter. Data taken from CARB iADAM (CARB 2020) and EPA AirData (http://www.epa.gov/airdata/) represent the highest concentrations experienced over a given year.
Exceedances of federal and state standards are only shown for $O_3$ and particulate matter. Daily exceedances for particulate matter are estimated days because $PM_{10}$ and $PM_{2.5}$ are not monitored daily. All other criteria pollutants did not exceed federal or state standards during the years shown. There is no federal standard for 1-hour ozone, annual $PM_{10}$, or 24-hour $SO_2$, nor is there a state 24-hour standard for $PM_{2.5}$.

[a] Mean does not satisfy minimum data completeness criteria.

[b] Measurements of $PM_{10}$ and $PM_{2.5}$ are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.

## Air Quality Significance Criteria

The SCAQMD has established Air Quality Significance Thresholds, as revised in March 2023, that set forth quantitative emission significance thresholds below which a project would not have a significant impact on ambient air quality under existing and cumulative conditions. The quantitative air quality analysis provided herein applies the SCAQMD thresholds identified in Table 3-4, SCAQMD Air Quality Significance Thresholds to determine the potential for the proposed project to result in a significant impact under CEQA.

**Table 3-4. SCAQMD Air Quality Significance Thresholds**

| **Criteria Pollutants Mass Daily Thresholds** | | |
|---|---|---|
| ***Pollutant*** | ***Construction (Pounds per Day)*** | ***Operation (Pounds per Day)*** |
| VOCs | 75 | 55 |
| $NO_x$ | 100 | 55 |
| CO | 550 | 550 |
| $SO_x$ | 150 | 150 |
| $PM_{10}$ | 150 | 150 |
| $PM_{2.5}$ | 55 | 55 |
| Lead[a] | 3 | 3 |
| ***TACs and Odor Thresholds*** | | |
| TACs[b] | Maximum incremental cancer risk ≥ 10 in 1 million<br>Chronic and acute hazard index ≥ 1.0 (project increment) | |
| Odor | Project creates an odor nuisance pursuant to SCAQMD Rule 402 | |
| GHG | 10,000 MT/yr $CO_{2eq}$ for industrial facilities | |
| ***Ambient Air Quality Standards for Criteria Pollutants[c]*** | | |
| $NO_2$ 1-hour average<br>$NO_2$ annual arithmetic mean | SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards:<br>0.18 ppm (state)<br>0.030 ppm (state) and 0.0534 ppm (federal) | |
| CO 1-hour average<br>CO 8-hour average | SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards:<br>20 ppm (state) and 35 ppm (federal)<br>9.0 ppm (state/federal) | |
| $PM_{10}$ 24-hour average<br><br>$PM_{10}$ annual average | 10.4 µg/m$^3$ (construction)[d]<br>2.5 µg/m$^3$ (operation)<br>1.0 µg/m$^3$ | |
| $PM_{2.5}$ 24-hour average | 10.4 µg/m$^3$ (construction)[d]<br>2.5 µg/m$^3$ (operation) | |
| $SO_2$ 1-hour average<br>$SO_2$ 24-hour average | 0.25 ppm (state) & 0.075 ppm (federal – 99$^{th}$ percentile)<br>0.04 ppm (state) | |
| Sulfate 24-hour average | 25 µg/m3 (state) | |

**Table 3-4. SCAQMD Air Quality Significance Thresholds**

| Criteria Pollutants Mass Daily Thresholds | | |
|---|---|---|
| ***Pollutant*** | ***Construction (Pounds per Day)*** | ***Operation (Pounds per Day)*** |
| Lead 30-day average<br>Lead Rolling 3-month average | 1.5 µg/m3 (state)<br>0.15 µg/m3 (federal) | |

**Source:** Appendix A. (SCAQMD 2023).
**Notes:** SCAQMD = South Coast Air Quality Management District; VOC = volatile organic compounds; $NO_x$ = oxides of nitrogen; CO = carbon monoxide; $SO_x$ = sulfur oxides; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; TAC = toxic air contaminant; $NO_2$ = nitrogen dioxide; ppm = parts per million by volume; $\mu g/m^3$ = micrograms per cubic meter.
GHG emissions thresholds for industrial projects, as added in the March 2015 revision to the SCAQMD Air Quality Significance Thresholds, were not include included in Table 4 as they are addressed within the GHG emissions analysis and not the air quality study.
For Coachella Valley, the mass daily thresholds for operations are the same as the construction thresholds.
[a] The phaseout of leaded gasoline started in 1976. Since gasoline no longer contains lead, the project is not anticipated to result in impacts related to lead; therefore, it is not discussed in this analysis.
[b] TACs include carcinogens and noncarcinogens.
[c] Ambient air quality standards for criteria pollutants are based on SCAQMD Rule 1303, Table A-2, unless otherwise stated.
[d] Ambient air quality threshold are based on SCAQMD Rule 403.

## 3.2 Discussion of Impacts

a) ***Less-than-Significant Impact:*** The project site is located in the City of Rancho Mirage within the South Coast Air Basin (SCAB), which includes the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, and all of Orange County, and is within the jurisdictional boundaries of the South Coast Air Quality Management District (SCAQMD).

The SCAQMD administers the SCAB's Air Quality Management Plan (AQMP), which is a comprehensive document outlining an air pollution control program for attaining the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS).

The 2022 AQMP was adopted on December 2, 2022, and was developed to address the 2015 national ozone standard. The 2022 AQMP provides the regional path towards improving air quality and meeting federal standards for air pollutants. The 2022 AQMP builds upon measures already in place from previous AQMPs. It also includes a variety of additional strategies such as regulation, accelerated deployment of available cleaner technologies (e.g., zero emissions technologies, when cost-effective and feasible, and low $NO_x$ technologies in other applications), best management practices, co-benefits from existing programs (e.g., climate and energy efficiency), incentives, and other Clean Air Act measures to achieve the 2015 federal ozone standard. The 2022 AQMP provides actions, strategies and steps needed to reduce air pollution emissions and meet ozone standards by 2037 (SCAQMD 2022).

The purpose of a consistency finding with regard to the AQMP is to determine if a project is consistent with the assumptions and objectives of the regional air quality plans, and if it would interfere with the region's ability to comply with federal and state air quality standards. The SCAQMD has established criteria for determining consistency with the currently applicable AQMP in Chapter 12, Sections 12.2 and 12.3 of the SCAQMD CEQA Air Quality Handbook. These criteria are as follows (SCAQMD 1993):

To address the first criterion, project-generated criteria air pollutant emissions have been estimated and analyzed for significance and are addressed under Section 3.3(b). Detailed results of this analysis are included in ~~Appendix A~~Appendix A-1. As presented in Section 3(b), construction and operation of the proposed project would not generate criteria air pollutant emissions that exceed the SCAQMD's thresholds, and it would therefore be consistent with Criterion No. 1.

The second criterion regarding the potential of the proposed project to exceed the assumptions in the AQMP or increments based on the year of project buildout and phase is primarily assessed by determining consistency between the proposed project's land use designations and its potential to generate population growth. In general, projects are considered consistent with, and not in conflict with or obstruct implementation of, the Air Quality Management Plan (AQMP) if the growth they produce in socioeconomic factors is consistent with the underlying regional plans used to develop the AQMP (SCAQMD 1993). The SCAQMD primarily uses demographic growth forecasts for various socioeconomic categories (e.g., population, housing, and employment by industry) developed by the Southern California Association of Governments (SCAG) for its 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (2020 RTP/SCS, also known as Connect SoCal) (SCAG 2020). SCAQMD uses this document, which is based on general plans for cities and counties in the SCAB, to develop the AQMP emissions inventory.[2] The SCAG RTP/SCS, and associated Regional Growth Forecast, are generally consistent with the local plans; therefore, the 2022 AQMP is generally consistent with local government plans. SCAG has developed Connect SoCal, the 2020-2045 RTP/SCS, which is a long-range visioning plan that balances future mobility and housing needs with economic, environmental and public health goals. Connect SoCal charts a path toward a more mobile, sustainable and prosperous region by making connections between transportation networks, between planning strategies and between the people whose collaboration can improve the quality of life for Southern Californians. Connect SoCal embodies a collective vision for the region's future and is developed with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange,

[2] Information necessary to produce the emissions inventory for the SCAB is obtained from the SCAQMD and other governmental agencies, including the California Air Resources Board, Caltrans, and SCAG. Each of these agencies is responsible for collecting data (e.g., industry growth factors, socioeconomic projections, travel activity levels, emission factors, emission speciation profile, and emissions) and developing methodologies (e.g., model and demographic forecast improvements) required to generate a comprehensive emissions inventory. SCAG incorporates these data into its Travel Demand Model for estimating/projecting vehicle miles traveled and driving speeds. SCAG's socioeconomic and transportation activities projections in their *2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* are integrated in the 2022 AQMP (SCAQMD 2022).

Riverside, San Bernardino and Ventura. Connect SoCal was adopted by the regional council on September 3, 2020.

As discussed in Section 11, Land Use and Planning, of this Initial Study, the project site is currently zoned Resort Hotel (Rs-H) and Open Space: Mountain Reserve (MR) in the General Plan (City of Rancho Mirage 2017). The proposed hotel suites and villas are located on the Rs-H zoned property and therefore consistent with the General Plan designation. This designation allows for the development of hotels and destination resorts with limited, ancillary commercial uses, such as spas, recreational facilities, restaurants, lounges, and small retail shops that directly support the primary use. The Sky Mesa is located on the MR zoned portion of the project site which is assigned to public lands or property subject to conservation easements in the Santa Rosa Mountains. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation. Under existing conditions, the Sky Mesa portion of the project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning to encompass the Sky Mesa portion of the site, which is a privately owned property and not public land.

Per the description of allowable uses for Rs-H outlined above, the Sky Mesa Recreation Area would be consistent with Rs-H zone. With future approval and adoption of the zone change by City Council, the proposed project would not conflict with the City's General Plan with regard to allowable land uses.

As discussed in Section 14, Population and Housing, of this Initial Study, SCAG reported the City's population to be 18,739 persons as of 2018 (SCAG 2019a). In 2018 the City had a total of 14,492 housing units, and in 2017 the City had a total of 16,902 jobs (SCAG 2019a). By 2040, SCAG projected the City to have a population of 25,000 persons and 20,500 jobs (SCAG 2016). According to the City of Rancho Mirage's General Plan – Housing Element (City of Rancho Mirage 2022~~017~~), the 2022~~14~~ - 2029~~1~~ Regional Housing Needs Allocation (RHNA) determined that the City needed a total of 1,746~~95~~ housing units. The proposed project would construct 106 residential units. However, these residential units would operate similar to time-share properties and therefore future residents would not be in the proposed residential units year-round. Because the proposed residential units are not typical residential units that residents cannot occupy year-round, theses housing units do not count towards the RHNA housing unit determination. SCAG's Local Profile Report for the City of Rancho Mirage indicated that the City's average household size was two persons per dwelling unit as of 2018 (SCAG 2019a). Using these assumptions, implementation of the proposed project would have the potential to increase the City's population by 216 persons. This population increase would comply with SCAG's projected population increase for the City. Accordingly, the proposed project is consistent with the SCAG RTP/SCS forecasts used in the SCAQMD AQMP development.

In summary, based on the considerations presented for the two criteria, impacts relating to the proposed project's potential to conflict with or obstruct implementation of the applicable AQMP would be **less than significant**.

**b)** ***Less-than-Significant Impact:*** Air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development, and the SCAQMD develops and implements plans for future attainment of ambient air quality standards. Based on these considerations, project-level thresholds of significance for criteria pollutants are used in the determination of whether a project's individual emissions would have a cumulatively considerable contribution on air quality. If a project's emissions would exceed the SCAQMD significance thresholds, it would be considered to have a cumulatively considerable contribution. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant.

A quantitative analysis was conducted to determine whether proposed construction activities would result in a cumulatively considerable net increase in emissions of criteria air pollutants for which the South Coast Air Basin (SCAB) is designated as nonattainment under the NAAQS or CAAQS. Criteria air pollutants include ozone ($O_3$), nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), particulate matter with an aerodynamic diameter less than or equal to 10 microns ($PM_{10}$), particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and lead. Pollutants that are evaluated herein include volatile organic compounds (VOCs) and oxides of nitrogen ($NO_x$), which are important because they are precursors to $O_3$, as well as CO, sulfur oxides ($SO_x$), $PM_{10}$, and $PM_{2.5}$.

Regarding NAAQS and CAAQS attainment status,[3] the SCAB is designated as a nonattainment area for national and California $O_3$ and $PM_{2.5}$ standards. The SCAB is designated as a nonattainment area for California $PM_{10}$ standards; however, it is designated as an attainment area for national $PM_{10}$ standards. The SCAB nonattainment status of $O_3$, $PM_{10}$, and $PM_{2.5}$ standards is the result of cumulative emissions from various sources of air pollutants and their precursors within the SCAB, including motor vehicles, off-road equipment, and commercial and industrial facilities. The SCAB is designated as an attainment area for national and California $NO_2$, CO, and $SO_2$ standards. Although the SCAB has been designated as partial nonattainment (Los Angeles County) for the federal rolling 3-month average lead standard, it is designated attainment for the state lead standard.[4]

The proposed project would result in emissions of criteria air pollutants for which CARB and U.S. Environmental Protection Agency (EPA) have adopted ambient air quality standards (i.e., the NAAQS and CAAQS). Projects that emit these pollutants have the potential to cause, or contribute to, violations of these standards. The SCAQMD CEQA Air Quality Significance Thresholds (refer to Table 3-4), as revised in April 2019, set forth quantitative emission significance

[3] An area is designated as in attainment when it is in compliance with the NAAQS and/or the CAAQS. The NAAQS and CAAQS are set by the Environmental Protection Agency (EPA) and California Air Resources Board (CARB), respectively, for the maximum level of a given air pollutant that can exist in the outdoor air without unacceptable effects on human health or the public welfare. Attainment = meets the standards; attainment/maintenance = achieve the standards after a nonattainment designation; nonattainment = does not meet the standards.

[4] Re-designation of the lead NAAQS designation to attainment for the Los Angeles County portion of the SCAB is expected based on current monitoring data. The phase out of leaded gasoline started in 1976. Since gasoline no longer contains lead, the project is not anticipated to result in impacts related to lead; therefore, it is not discussed in this analysis.

thresholds for criteria air pollutants, which, if exceeded, would indicate the potential for a project to contribute to violations of the NAAQS or CAAQS.

A proposed project would result in a substantial contribution to an existing air quality violation of the NAAQS or CAAQS for $O_3$, which is a nonattainment pollutant, if the proposed project's construction or operational emissions would exceed the SCAQMD VOC or $NO_x$ thresholds shown in Table 3-4. These emission-based thresholds for $O_3$ precursors are intended to serve as a surrogate for an "ozone significance threshold" (i.e., the potential for adverse $O_3$ impacts to occur) because $O_3$ itself is not emitted directly, and the effects of an individual project's emissions of $O_3$ precursors (VOCs and $NO_x$) on $O_3$ levels in ambient air cannot be determined through air quality models or other quantitative methods.

The following discussion quantitatively evaluates project-generated emissions and impacts that would result from implementation of the proposed project.

### Construction Emissions

Construction of the proposed project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (e.g., off-road construction equipment, soil disturbance, VOC off-gassing from architectural coatings and asphalt pavement application) and off-site sources (e.g., vendor trucks, haul trucks, and worker vehicle trips). Specifically, entrained dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, resulting in $PM_{10}$ and $PM_{2.5}$ emissions. Internal combustion engines used by construction equipment, haul trucks, vendor trucks (i.e., delivery trucks), and worker vehicles would result in emissions of VOC, $NO_x$, CO, $PM_{10}$, and $PM_{2.5}$. Construction emissions can vary substantially from day to day depending on the level of activity; the specific type of operation; and, for dust, the prevailing weather conditions.

Application of architectural coatings, such as exterior paint and other finishes, and application of asphalt pavement would also produce VOC emissions. VOC off-gassing emissions result from evaporation of solvents contained in surface coatings such as in paints and primers used during construction of the facility. CalEEMod calculates the VOC evaporative emissions from application of surface coatings based on the VOC emissions factor, the building square footage, and the assumed fraction of surface area. No-VOC paint, defined as paint with a VOC content of 5 grams/liter or less is proposed for the project.

The proposed project would be required to comply with SCAQMD Rule 403 to control dust emissions generated during any dust-generating activities. Standard construction practices that would be employed to reduce fugitive dust emissions include watering of the active dust areas up to two times per day, depending on weather conditions. Rule 403.1 is a supplemental rule to Rule 403 and is applicable to man-made sources of fugitive dust in Coachella Valley. Rule 403.1 requires a Fugitive Dust Control Plan approved by South Coast AQMD or an authorized local government agency prior to initiating any construction/ earth-moving activity. These requirements are only applicable to construction projects with 5,000 or more square feet of surface area disturbance and therefore applicable to the proposed project.

Emissions from the construction phase of the proposed project were estimated using the California Emissions Estimator Model (CalEEMod) version 2020.04.0. For a conservative emission estimation, construction is assumed to begin in February 2023 and conclude in

November 2024. In the event actual construction proceeds longer than this assumption, this analysis provides a conservative approach resulting in slightly higher daily emissions and annual emissions. While February 2023 has already passed, assuming the earliest start date and duration for construction represents the worst-case scenario for criteria air pollutant and GHG emissions because equipment and vehicle emission factors for later years would be slightly less due to more stringent standards for in-use off-road equipment and heavy-duty trucks, as well as fleet turnover replacing older equipment and vehicles in later years. Therefore, despite the fact that the construction schedule used for modeling has previously passed, given it represents the worst-case scenario, the analysis is still valid. Construction is expected to last 22 months. A detailed depiction of expected construction schedules—including information regarding phasing, equipment used during each phase, trucks, and worker vehicles—is provided in ~~Appendix A~~Appendix A-1. General construction equipment modeling assumptions are provided in Table 3-5, Construction Scenario Assumptions. The applicant provided project specific values for equipment mix for all construction phases. Equipment horsepower, and load factors were based on CalEEMod defaults. The project site is currently vacant and site preparation included clearing and grubbing has previously been performed and as such is not part of this analysis.

During the grading phase of construction, it is anticipated that approximately 6,920 cubic yards of material would be exported, and no material would be imported. For the analysis, it was generally assumed that heavy-duty construction equipment would be operating at the site 5 days per week. Detailed construction equipment modeling assumptions are provided in ~~Appendix A~~Appendix A-1.

**Table 3-5. Construction Scenario Assumptions**

| Construction Phase | One-Way Vehicle Trips | | | Equipment | | | Modeled Schedule | |
|---|---|---|---|---|---|---|---|---|
| | *Average Daily Worker Trips* | *Average Daily Vendor Truck Trips* | *Total Haul Truck Trips* | *Types* | *Quantity* | *Usage Hours* | *Start Date* | *Finish Date* |
| Grading | 10 | 8 | 692 | Graders | 1 | 8 | 2/1/2023 | 3/21/2023 |
| | | | | Rubber-Tired Dozers | 1 | 8 | | |
| | | | | Tractors/Loaders/ Backhoes | 2 | 8 | | |
| | | | | Scrapers | 2 | 8 | | |
| | | | | Excavator | 2 | 8 | | |
| Building Construction | 50 | 46 | 60 | Cranes | 1 | 7 | 3/22/2023 | 8/20/2024 |
| | | | | Forklifts | 3 | 8 | | |
| | | | | Generator Sets | 1 | 8 | | |
| | | | | Tractors/Loaders/ Backhoes | 3 | 7 | | |
| | | | | Welders | 1 | 8 | | |
| Paving | 20 | 20 | 197 | Pavers | 2 | 8 | 8/21/2024 | 9/17/2024 |
| | | | | Paving Equipment | 2 | 8 | | |
| | | | | Rollers | 2 | 8 | | |
| Architectural Coating / Finish Phase | 70 | 60 | 380 | Air Compressors | 1 | 6 | 9/18/2024 | 10/15/2024 |

**Notes:** See ~~Appendix A~~Appendix A-1 for details. Two one-way trips will be assumed per worker, per haul truck, and per vendor truck.

Table 3-6, Estimated Maximum Daily Construction Criteria Air Pollutant Emissions – Unmitigated, shows the estimated maximum daily construction emissions associated with the construction phase of the proposed project.

**Table 3-6. Estimated Maximum Daily Construction Emissions – Unmitigated**

| Year | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$[a] | $PM_{2.5}$[a] |
|---|---|---|---|---|---|---|
| | *pounds per day* | | | | | |
| 2023 | 3.39 | 35.53 | 28.73 | 0.07 | 4.10 | 2.05 |
| 2024 | 6.15 | 30.88 | 40.98 | 0.10 | 4.50 | 2.03 |
| **Maximum Daily Emissions** | **6.15** | **35.53** | **40.98** | **0.10** | **4.50** | **2.05** |
| *SCAQMD Threshold* | *75* | *100* | *550* | *150* | *150* | *55* |
| Noted Threshold exceeded? | No | No | No | No | No | No |

**Source:** SCAQMD 2019.
**Notes:** VOC = volatile organic compound; $NO_x$ = oxides of nitrogen; CO = carbon monoxide; $SO_x$ = sulfur oxides; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District.
See ~~Appendix A~~Appendix A-1 for detailed results.
[a] These estimates reflect control of fugitive dust required by SCAQMD Rule 403, specifically, watering of active site areas two times per day.

As shown in Table 3-6, Estimated Maximum Daily Construction Emissions – Unmitigated, daily construction emissions would not exceed the SCAQMD significance thresholds for VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, or $PM_{2.5}$ during project construction. Therefore, construction impacts of the proposed project would be **less than significant**, and no mitigation measures are required.

### Operational Emissions

Operation of the proposed project would produce VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, and $PM_{2.5}$ emissions associated with vehicular traffic, area sources (consumer products, architectural coatings, landscaping equipment), energy sources (natural gas, appliances, and space and water heating), and stationary sources (emergency generator). CalEEMod was used to estimate daily emissions from these operational sources including modelling the emissions of a 1,200-horsepower (hp) diesel-fired emergency generator based on 1-hour per day and 50-hours per year of operation per SCAQMD Rule 1470, which limits emergency generators to 50-hours of use per year for maintenance and testing. CalEEMod default emission factors were used for the proposed generator, corresponding with the install dates.

On-road vehicular emissions associated with the proposed project operation were modeled using trip generation rates for the Ritz-Carlton residences, Sky Mesa Restaurant, and weekend special events at the proposed project venue space estimated by Urban Crossroads. The venue space was modeled in CalEEMod as an arena. Additional modeled land uses include the parking garage with elevator, swimming pools, driveway parking and paved roads. Emissions from energy sources also include natural gas combustion for appliances and space and water heating. CalEEMod defaults were also used for area sources (landscape maintenance equipment, consumer products, and architectural coatings for maintenance of buildings).

Table 3-7, Estimated Maximum Daily Operational Emissions, summarizes the maximum daily area, energy, mobile, and stationary (emergency generator) emissions of criteria pollutants that would be generated by the development of the proposed project and how emissions compare to the SCAQMD thresholds of significance. As shown, the increase in all criteria pollutants is below SCAQMD thresholds. The values shown are the maximum summer or winter daily emissions (i.e., foreseeable worst case) results from CalEEMod. Details of the emission calculations are provided in ~~Appendix A~~Appendix A-1.

**Table 3-7. Estimated Maximum Daily Operational Emissions**

| Emission Source | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| | *(pounds per day)* | | | | | |
| ***Proposed Project*** | | | | | | |
| Area | 3.23 | 0.10 | 8.80 | <0.01 | 0.05 | 0.05 |
| Energy | 0.13 | 1.12 | 0.77 | 0.01 | 0.09 | 0.09 |
| Mobile | 5.29 | 7.37 | 52.23 | 0.12 | 12.46 | 3.39 |
| Stationary | 1.97 | 8.81 | 5.02 | 0.01 | 0.29 | 0.30 |
| **Total** | **10.62** | **17.40** | **66.82** | **0.14** | **12.89** | **3.83** |
| *SCAQMD Threshold* | *75* | *100* | *550* | *150* | *150* | *55* |
| Threshold Exceeded? | No | No | No | No | No | No |

**Source**: ~~Appendix A~~Appendix A-1.
**Notes:** VOC = volatile organic compound; NOx = oxides of nitrogen; CO = carbon monoxide; SOx = sulfur oxides; PM10 = coarse particulate matter; PM2.5 = fine particulate matter.
Area sources = consumer product use, architectural coatings, and landscape maintenance equipment. Energy sources = natural gas. Mobile sources = motor vehicles. Stationary sources = emergency generator.
See ~~Appendix A~~Appendix A-1 for detailed results. The values shown are the maximum summer or winter daily emissions results from CalEEMod.

As shown in Table 3-7, Estimated Maximum Daily Operational Emissions, the increase in emissions associated with the operation of the proposed project would not exceed the SCAQMD thresholds for VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, or $PM_{2.5}$.

As previously discussed, the SCAB has been designated as a federal nonattainment area for $O_3$ and $PM_{2.5}$, and a state nonattainment area for $O_3$, $PM_{10}$, and $PM_{2.5}$. Construction and operational activities of the proposed project would generate VOC and $NO_x$ emissions (precursors to $O_3$) and emissions of $PM_{10}$ and $PM_{2.5}$. However, as indicated in Tables 3-6 and 3-7, project-generated emissions would not exceed the SCAQMD emission-based significance thresholds for VOCs, NOx, $PM_{10}$, or $PM_{2.5}$, and therefore the proposed project would not cause a cumulatively significant impact.

Cumulative localized impacts would potentially occur if a project were to occur concurrently with another off-site project. Schedules for potential future projects near the proposed project area are currently unknown; therefore, potential impacts associated with two or more simultaneous projects would be considered speculative.[5] However, future projects would be subject to CEQA and would require an air quality analysis and, where necessary, mitigation.

[5] The CEQA Guidelines state that if a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact (14 CCR 15145).

Criteria air pollutant emissions associated with construction activity of future projects would also be reduced through implementation of control measures required by the SCAQMD. Cumulative $PM_{10}$ and $PM_{2.5}$ emissions would be reduced because all future projects would be subject to SCAQMD Rule 403 (Fugitive Dust), which sets forth general and specific requirements for all sites in the SCAQMD. In addition, cumulative VOC emissions would be subject to SCAQMD Rule 1113 (Architectural Coatings).

Therefore, the proposed project would not result in a cumulatively considerable increase in emissions of nonattainment pollutants, and impacts would be **less than significant** during construction and operation. No mitigation is required.

c) ***Less-than-Significant Impact with Mitigation Incorporated:*** Localized project impacts associated with construction criteria air pollutants emissions are assessed below and were determined to be less than significant**.** Sensitive receptors are discussed in detail in Section 3.1.2, Sensitive Receptors.

### Localized Significance Thresholds

A localized significance threshold (LST) analysis was performed to evaluate localized air quality impacts to sensitive receptors in the immediate vicinity of the project site as a result of project activities. The impacts were analyzed using methods consistent with those in the SCAQMD's Final Localized Significance Threshold Methodology (2008). The project site is located within Source-Receptor Area 30 (Coachella Valley).

The greatest on-site daily emissions of NOx, CO, $PM_{10}$, and $PM_{2.5}$ generated during construction occurred during the grading period of the project construction. Based on the construction schedule, it was assumed that one grader, one rubber tired dozer, two scrappers and two crawler tractors (CalEEMod category: tractor/loader/backhoes) would be used based on the applicant provided construction equipment schedule. CalEEMod default values assume that during an 8-hour day, graders, rubber tired dozers and crawler tractors can each disturb a maximum of 0.5 acres and scrapers each disturb one acre. This results in a total of four acres disturbed per day from the equipment. The SCAQMD LST values for 2 acres and 5 acres within Source–Receptor Area 30, with a nearby receptor distance of 25 meters (82 feet), were used to interpolate values for the proposed project's 4-acre disturbance per day.

Project construction activities would result in temporary sources of on-site criteria air pollutant emissions associated with construction equipment exhaust and dust-generating activities. According to the Final Localized Significance Threshold Methodology, "off-site mobile emissions from the proposed project should not be included in the emissions compared to the LSTs" (SCAQMD 2008). Trucks and worker trips associated with the proposed project are not expected to cause substantial air quality impacts to sensitive receptors along off-site roadways since emissions would be relatively brief in nature and would cease once the vehicles pass through the main streets. Therefore, off-site emissions from trucks and worker vehicle trips are not included in the LST analysis. For the on-site portions of operation of trucks and worker vehicles, trips were limited to 1,000 feet (assumed on-site distance). The maximum daily on-site construction emissions generated during construction of the proposed project is presented in Table 3-8, Construction Localized Significance Thresholds Analysis, and compared to the SCAQMD localized significance

criteria for Source–Receptor Area 30 to determine whether project-generated on-site construction emissions would result in potential LST impacts.

**Table 3-8. Construction Localized Significance Thresholds Analysis**

| Year | $NO_2$ | CO | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|
| | *pounds per day (on site)* | | | |
| 2023 | 34.76 | 28.30 | 3.77 | 1.95 |
| 2024 | 26.29 | 34.86 | 1.20 | 1.09 |
| **Maximum Daily On Site Emissions** | **34.76** | **34.86** | **3.77** | **1.95** |
| *SCAQMD LST Criteria* | *266.33* | *1,961.00* | *11.67* | *7.00* |
| **Threshold Exceeded?** | No | No | No | No |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** $NO_2$ = nitrogen dioxide; CO = carbon monoxide; $PM_{10}$ = particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District; LST = localized significance threshold.
See ~~Appendix A~~Appendix A-1 for detailed results.
Localized significance thresholds are shown for a 4-acre project site and a distance of 25 meters (82 feet) to the nearest sensitive receptor.

As shown in Table 3-8, proposed construction activities would not generate emissions in excess of site-specific LSTs. Furthermore, in compliance with Program AQ 1.1C, described in the City's General Plan, the City will coordinate with developers and encourage the phasing and staging of development to assure the lowest construction related pollutant emission levels practical and impose mitigation measures, including the use of water trucks and temporary irrigation systems, as well as other measures that will effectively limit fugitive dust emissions resulting from construction or other site disturbance. Therefore, localized project construction impacts would be **less than significant**. No mitigation is required.

### *CO Hotspots*

Traffic-congested roadways and intersections have the potential to generate localized high levels of CO. Localized areas where ambient concentrations exceed federal and/or state standards for CO are termed CO "hotspots." CO transport is extremely limited and disperses rapidly with distance from the source. Under certain extreme meteorological conditions, however, CO concentrations near a congested roadway or intersection may reach unhealthy levels, affecting sensitive receptors. Typically, high CO concentrations are associated with severely congested intersections operating at an unacceptable level of service (LOS) (LOS E or worse is unacceptable). Projects contributing to adverse traffic impacts may result in the formation of a CO hotspot. Additional analysis of CO hotspot impacts would be conducted if a project would result in a significant impact or contribute to an adverse traffic impact at a signalized intersection that would potentially subject sensitive receptors to CO hotspots.

The Code of Federal Regulations (CFR) Procedures for Determining Localized CO, $PM_{10}$, and $PM_{2.5}$ Concentrations (hot-spot analysis), states that "CO, $PM_{10}$, and $PM_{2.5}$ hot-spot analyses are not required to consider construction-related activities, which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established 'Guideline' methods. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site"

(40 CFR 93.123(c)(5)). While project construction would involve on-road vehicle trips from trucks and workers during construction, construction activities are considered temporary. As a result, the proposed construction activities would not require a project-level construction hotspot analysis.

Projects contributing to adverse traffic impacts may result in the formation of CO hotspots. To verify that the project would not cause or contribute to a violation of the CO standard, a screening evaluation of the potential for CO hotspots was conducted. The traffic impact study for the proposed project, which is included in this Initial Study as Appendix F, and Section 17 of this Initial Study evaluated whether there would be a decrease in the level of service (LOS) (i.e., increased congestion) at the intersections affected by the proposed project. The potential for CO hotspots was evaluated based on the results of the traffic impact study. The California Department of Transportation Institute of Transportation Studies Transportation Project-Level Carbon Monoxide Protocol (CO Protocol; Caltrans 2010) was followed for this analysis. CO hotspots are typically evaluated when (1) the LOS of an intersection decreases to LOS E or worse; (2) signalization and/or channelization is added to an intersection; and (3) sensitive receptors such as residences, schools, and hospitals are located in the vicinity of the affected intersection or roadway segment.

The proposed project's traffic impact study evaluated 3 intersections including Frank Sinatra Drive and Dwy, 1, Frank Sinatra Drive and Dwy, 2, and Hwy 111 and Frank Sinatra Drive. As determined by the traffic impact study, the addition of the proposed project traffic to study area intersections did not result in deficient intersection LOS operations. Therefore, further analysis is not required. Accordingly, the proposed project would not generate traffic that would contribute to potential adverse traffic impacts that may result in the formation of CO hotspots. In addition, due to continued improvement in vehicular emissions at a rate faster than the rate of vehicle growth and/or congestion, the potential for CO hotspots in the SCAB is steadily decreasing. Based on these considerations, the proposed project would result in a **less-than-significant impact** to air quality with regard to potential CO hotspots. No mitigation is required.

### *Toxic Air Contaminants*

Toxic air contaminants (TACs) are defined as substances that may cause or contribute to an increase in deaths or in serious illness, or that may pose a present or potential hazard to human health. As discussed under the LST analysis, the nearest sensitive receptors are single family residential dwellings adjacent and south of the project site.

Health effects from carcinogenic air toxics are usually described in terms of cancer risk. The SCAQMD recommends an incremental cancer risk threshold of 10 in 1 million. "Incremental cancer risk" is the net increased likelihood that a person continuously exposed to concentrations of TACs resulting from a project over a 9-, 30-, and 70-year exposure period will contract cancer based on the use of standard Office of Environmental Health Hazard Assessment (OEHHA) risk-assessment methodology (OEHHA 2015). In addition, some TACs have non-carcinogenic effects. The SCAQMD recommends a Hazard Index of 1 or more for acute (short-term) and chronic (long-term) non-carcinogenic effects.[6]

[6] Non-cancer adverse health risks are measured against a hazard index, which is defined as the ratio of the predicted incremental exposure concentrations of the various non-carcinogens from the project to published reference exposure levels that can cause adverse health effects.

TACs that would potentially be emitted during construction activities associated with development of the proposed project would be diesel particulate matter.

Diesel particulate matter (DPM) emissions would be emitted from heavy equipment operations and heavy-duty trucks. Heavy-duty construction equipment is subject to a California Air Resources Board (CARB) Airborne Toxics Control Measure for in-use diesel construction equipment to reduce diesel particulate emissions. As described for the LST analysis, $PM_{10}$ (representative of diesel particulate matter) exposure would be minimal. According to the OEHHA, health risk assessments (which determine the exposure of sensitive receptors to toxic emissions) should be based on a 30-year exposure period for the maximally exposed individual resident. A Health Risk Assessment has been prepared for the project, and the construction HRA for the project demonstrate that the construction DPM emissions would result in a potential maximum cancer risk at the MEIR above the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold in the absence of mitigation. Because the potential maximum cancer risk at the MEIR exceeds the applicable CEQA threshold, project construction would result in a potentially significant impact if mitigation were not imposed.

Mitigation Measure **MM-AQ-1** has been set forth to reduce DPM and any associated cancer risk. **MM-AQ-1** states that, prior to the commencement of construction activities, the applicant shall require its construction contractor to demonstrate that all 75-horsepower or greater diesel-powered equipment is powered with CARB-certified Tier 4 engines. ~~1.However, such assessments should also be limited to the period/duration of activities associated with the proposed project. The duration of the proposed construction activities would constitute a small percentage of the total 30-year exposure period. The construction period for the proposed project would be approximately 22 months, after which construction-related TAC emissions would cease. Due to this relatively short period of exposure and minimal particulate emissions on site, TACs generated during construction would not be expected to result in concentrations causing significant health risks.~~

Following completion of on-site construction activities, the proposed project would not involve routine operational activities that would generate TAC emissions other than intermittent maintenance and testing of the natural diesel-fired emergency generator, which would be limited to 50 hours per year. SCAQMD Rule 1470 limits operation of emergency generators to 50 hours per year for maintenance and testing). Due to this relatively short period of exposure, small engine size of the emergency generator (1,200 hp), and minimal on-site particulate emissions from other sources, TACs generated during operation would not result in concentrations causing significant health risks as demonstrated through SCAQMD' Risk Assessment Tool for Rule 1401 and 212, (Version 8.1). The Risk Assessment Tool, a spreadsheet program, was used to perform a screening level evaluation of the cancer and non-cancer health effects of the emergency generator emissions pursuant to Rule 1401, see ~~Appendix A~~Appendix A-1 for program results. As shown in ~~Appendix A~~Appendix A-1, the emergency generator passes Tier II Maximum Individual Cancer Risk (MICR).

For the reasons described above, the proposed project would not result in substantial TAC exposure to sensitive receptors in the vicinity of the proposed project with the inclusion of MM-AQ-1, and impacts would be **less than significant with mitigation**. ~~No mitigation is required.~~

***Health Effects of Criteria Air Pollutants***

Construction of the proposed project would generate criteria air pollutant emissions; however, the project would not exceed the SCAQMD mass-emission thresholds.

Health effects associated with $O_3$ include respiratory symptoms, worsening of lung disease leading to premature death, and damage to lung tissue. VOCs and $NO_x$ are precursors to $O_3$, for which the SCAB is designated as nonattainment with respect to the NAAQS and CAAQS. Thus, existing $O_3$ levels in the SCAB are at unhealthy levels during certain periods. Because the project would not involve construction or operational activities that would result project is not anticipated to substantially contribute to regional $O_3$ concentrations and the associated health impacts.

Exposure to $NO_2$ and $NO_x$ can irritate the lungs, cause bronchitis and pneumonia, lower resistance to respiratory infections, and enhance allergic responses. Project construction and operation would not exceed the SCAQMD $NO_x$ threshold, and existing ambient $NO_2$ concentrations are below the NAAQS and CAAQS. Thus, implementation of the project is not expected to exceed the $NO_2$ standards or contribute to associated health effects.

Health effects associated with CO include chest pain in patients with heart disease, headache, light-headedness, and reduced mental alertness. CO tends to be a localized impact associated with congested intersections. CO hotspots were discussed previously as a less than significant impact. Thus, the proposed project's CO emissions would not contribute to the health effects associated with this pollutant.

Particulate matter exposure has been linked to a variety of problems, including premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing (EPA 2016). The SCAB is designated as nonattainment for $PM_{10}$ under the CAAQS and nonattainment for $PM_{2.5}$ under the NAAQS and CAAQS. Implementation of the proposed project would not generate emissions of $PM_{10}$ or $PM_{2.5}$ that would exceed the SCAQMD's thresholds. Accordingly, the proposed project's $PM_{10}$ and $PM_{2.5}$ emissions are not expected to cause any increase in related regional health effects for these pollutants. Impacts would be less than significant. No mitigation is required.

In summary, the proposed project would not result in a potentially significant contribution to regional concentrations of non-attainment pollutants and would not result in a significant contribution to the adverse health effects associated with those pollutants with implementation of MM-AQ-1. Impacts would be **less than significant with mitigation**.

~~No mitigation is required.~~

***Less-than-Significant Impact:*** The occurrence and severity of potential odor impacts depend on numerous factors. The nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receiving location each contribute to the intensity of the impact. Although offensive odors seldom cause physical harm, they can be annoying, cause distress among the public, and generate citizen complaints.

During construction of the proposed project, exhaust from equipment may produce discernible odors typical of most construction sites. Potential odors produced during construction would be

attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment. However, such odors would disperse rapidly from the project site and generally occur at magnitudes that would not affect substantial numbers of people. Accordingly, impacts associated with odors during construction would be less than significant.

SCAQMD provides a list of land uses associated with odor concerns, which include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding (SCAQMD 1993). The proposed project includes operation of hotel facilities, and restaurant spaces, which are not anticipated to generate odors and does not result in operation of the types of land uses listed in SCAQMD's screening criteria. For the reasons described above, proposed project construction and operation would result in an odor impact that would be **less than significant**. No mitigation is required.

## 3.3 Mitigation Measures

~~No mitigation is required.~~

**MM-AQ-1 Construction Equipment – Use of Tier 4 Engines**

Prior to the commencement of construction activities for the project, the applicant shall require its construction contractor to use California Air Resources Board (CARB)-certified Tier 4 engines for all diesel-powered equipment pieces that are 75 horsepower or greater throughout all phases of construction.

In the event of changed circumstances (e.g., changes in the availability of specific types of construction equipment), the applicant may submit a request to the City to apply an equivalent method of achieving project-generated construction emissions that fall below the numeric cancer risk standards established by the South Coast Air Quality Management District (SCAQMD). Documentation using industry-standard emission estimation methodologies shall be furnished to the City demonstrating that estimated project-generated construction emissions would not exceed the applicable SCAQMD cancer risk threshold with the alternate construction method(s). If the documentation demonstrates that project-generated construction emissions will remain below the applicable SCAQMD cancer risk threshold, then the City may approve the alternate construction method(s), at the City's discretion.

Required construction equipment fleet and methodologies approved by the City shall be included in the contract specifications for the applicant's construction contractor.

## 4. BIOLOGICAL RESOURCES

| **BIOLOGICAL RESOURCES** -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ☒ | ☐ | ☐ |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service? | ☐ | ☒ | ☐ | ☐ |
| c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ☐ | ☐ | ☐ | ☒ |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☐ | ☒ | ☐ | ☐ |
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☒ | ☐ | ☐ |

| **BIOLOGICAL RESOURCES** -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☒ | ☐ | ☐ |

## 4.1 Setting

This section is partially based upon the Biological Resources Report prepared by Dudek for the Sky Mesa Recreation portion of the project (Appendix B). As the Residences portion of the project site has been analyzed for potential impacts to biological resources as part of the 2006 EIR and subsequently cleared and graded, it is only briefly discussed in this section.

The Residences Area of the project site is vacant and has been extensively graded. The surrounding areas to the east and north are also disturbed, developed urban areas. Surveys conducted in 2006 for the Residences portion indicated that sensitive species known to occur in the area include the Coachella desert snail, chuckwalla, and the Peninsular bighorn sheep (City of Rancho Mirage 2006). The project site is located within the Coachella Valley's Multiple Species Habitat Conservation Plan (CVMSHCP) area of interest, and the Santa Rosa and San Jacinto Mountains Conservation Area is located just south of the project's proposed Sky Mesa Recreational Area (CVMSHCP 2016).

The Sky Mesa Recreation Area is vacant, with a portion that has been partially graded and the remaining areas containing native desert vegetation along steep slopes. A total of six vegetation communities and land cover types occur within the study area based on general physiognomy and species composition. Four vegetation communities were mapped and include brittle bush scrub, creosote bush – brittle bush scrub, fountain grass swards, and tamarisk thickets, and two land covers (disturbed habitat and urban/developed) occur within the Sky Mesa Recreation Area.

## 4.2 Discussion of Impacts

a) ***Less-than-Significant Impact with Mitigation Incorporated***. The proposed Residence Area of the project site has been extensively graded and is not likely support any candidate, sensitive, or special status species (City of Rancho Mirage 2006).

No federally or state-listed plant species have a potential to occur within the proposed Sky Mesa Recreation Area of the project site. There are no special-status plant species with a moderate or high potential to occur. No listed or non-listed special-status wildlife species were incidentally observed during the June 2021 biological survey. One federally and state-listed species has a moderate potential to occur within the study area: Peninsular bighorn sheep. Peninsular bighorn sheep is covered under the CVMSHCP. One non-listed species has a moderate potential to occur within the project site: red diamondback rattlesnake. Red diamondback rattlesnake is not covered under the CVMSHCP.

### Birds

One non-listed special-status species, burrowing owl, has a low potential to occur within the flatter portions of the proposed Sky Mesa Recreation Area site. This species is covered by the CVMSHCP; therefore, the project would implement **MM-BIO-1,** which would ensure consistency with the CVMSHCP, by including payment of the CVMSHCP development mitigation fee. Additionally, **MM-BIO-2** would be implemented and would require adherence to the Land Use Adjacency Guidelines to ensure there would be no significant impacts to this special-status wildlife species. This species is also protected under the Migratory Bird Treaty Act and California Fish and Game Code Section 3516, which protect nesting birds. Additionally, project construction could result in direct and indirect impacts to nesting birds, including the loss of nests, eggs, and fledglings if ground-disturbing activities occur during the nesting season (generally February 15 through August 31). Construction activities during this time may result in reduced reproductive success and may violate the federal Migratory Bird Treaty Act and California Fish and Game Code. If construction (including any ground-disturbing activities) occurs during the nesting season, a nesting bird survey must be conducted by a qualified biologist prior to grading activities and impacts to nests must be avoided. As such, implementation of **MM-BIO-3**, which requires a pre-construction nesting bird survey, and **MM-BIO-4**, which requires a pre-construction survey for burrowing owls, would be required to reduce potential impacts to less than significant.

### Reptiles

One special-status reptile has a moderate potential to occur within the Sky Mesa Recreation Area of the project site: red diamondback rattlesnake. This species is not covered by the CVMSHCP, and impacts could be potentially significant. Due to the amount of adjacent and nearby habitat, loss of fragmented habitat is considered less than significant. However, direct impacts could occur through crushing of individuals during grading, entombment of burrowing species, and removal of habitat.

Most reptile species exhibit a "flight" response to disturbance, resulting in temporary displacement, or if disturbance is constant, permanent displacement. The project contains suitable habitat (i.e., desert scrub and rocky conditions) that may be impacted as a result of project implementation; however, suitable habitat will be available adjacent to the affected region, and individuals would be expected to move away from construction activities. Entombment of individuals would be avoided through implementation of **MM-BIO-5**, which would include covering open trenches. With implementation of **MM-BIO-5,** direct impacts to the few individuals that may be harmed by construction activities would be less than significant.

Potential indirect impacts to red diamondback rattlesnake would be limited to short-term impacts from construction activities and could result from fugitive dust that can degrade habitat and result in health implications for wildlife species; noise and vibration that can stress wildlife species or cause them to leave an area of otherwise suitable habitat; increased human presence, which can also disrupt daily activities of wildlife and cause them to leave an area; and release of chemical pollutants, such as from oil leaks from construction vehicles and machinery. Therefore, indirect impacts to red diamondback rattlesnake could be significant. However, although red diamondback rattlesnake is not covered under the CVMSHCP, the project would be required to implement **MM-BIO-2**, which includes construction best management practices and compliance; therefore, with implementation of **MM-BIO-2,** impacts would be less than significant.

One federally and state-listed threatened species, desert tortoise, has additional requirements under the CVMSHCP. This species is covered by the CVMSHCP; however, according to the USWFS CVMSHCP amended permit (TE-104601-1), permit term and condition no. 45 states for projects located outside of the proposed conservation areas within the 50,272 acres of naturally occurring desert tortoise habitat anticipated to be impacted, the Permittee shall either (1) notify the USFWS 45 days prior to the issuance of a grading permit to allow for the potential salvage of adult tortoises within this notification time period or (2) condition such projects to conduct desert tortoise clearance surveys per the USFWS's protocol. The project site overlaps modeled desert tortoise habitat; however, since it was determined to not support suitable habitat for desert tortoise as discussed in Appendix B, it is recommended that the Permittee notify the USFWS 45 days prior to issuance of a grading permit. Therefore, with implementation of **MM-BIO-1**, **MM-BIO-2,** and **MM-BIO-6**, which requires adherence to the USFWS CVMSHCP amended permit term and condition no. 45, potential impacts to desert tortoise would be reduced to less than significant.

### Mammals

One federally and state-listed species has a moderate potential to occur within the project area: Peninsular bighorn sheep; however, this species is covered under the CVMSHCP. However, with implementation of **MM-BIO-1** and **MM-BIO-2**, impacts would be reduced to a less than significant level.

As such, impacts to candidate, sensitive, or special status species would be **less than significant with mitigation incorporated**.

b) ***Less-than-Significant Impact with Mitigation Incorporated.*** The Residences Area of the project site is vacant and heavily graded. There are no riparian habitat or other sensitive natural communities identified in local or regional plans. The Sky Mesa Recreation Area portion of the project site does not contain any riparian habitat or other sensitive natural community identified by CDFW or USFWS. However, the Sky Mesa Recreation Area portion of the project site includes Sonoran creosote bush scrub, which is a naturally occurring community covered under the CVMSHCP. To comply with the CVMSHCP, development fees will be required to mitigate habitat loss. Therefore, **MM-BIO-1** and **MM-BIO-2** would be implemented to ensure that there would be no significant impacts to special-status vegetation communities. Therefore, impacts would be **less than significant with mitigation incorporated.**

c) ***No Impact.*** The Residences Area portion of the project site has been mass graded and contains no watercourses or natural drainage features. Additionally, the Sky Mesa Recreation Area portion of the project site does not contain any jurisdictional waters. Therefore, **no impacts** associated with federally protected wetlands would occur.

d) ***Less-than-Significant Impact with Mitigation Incorporated.*** According to the City's General Plan – Conservation and Open Space element, the City offers limited opportunities for the preservation of wildlife migration corridors due to the pattern of development in the City. The primary wildlife corridors within the City include Santa Rosa Mountains and the Whitewater River (City of Rancho Mirage 2017). There is existing fencing separating the adjacent Conservation Area from the proposed project site which was previously installed to prevent Peninsular bighorn sheep from entering and grazing on the Ritz Carlton Hotel property. As described in Appendix B, Wildlife movement within the project site is unlikely due to the steep topography

and urbanized area to the west (i.e., existing Ritz-Carlton Hotel). However, the remainder of the site and the surrounding environment consist of open desert scrub habitat that likely function as open habitat but do not function as a corridor for wildlife. The project site does not function as a wildlife corridor and does not support any wildlife nursery sites. Therefore, no impacts associated with wildlife corridors would occur.

Additionally, the project would comply with the federal Migratory Bird Treaty Act with implementation mitigation measure **MM-BIO-3**, which requires pre-construction nesting bird surveys and would reduce potentially significant impacts. Therefore, impacts would be **less than significant with mitigation incorporated**.

e) ***Less-than-Significant Impact with Mitigation Incorporated.*** The City of Rancho Mirage General Plan contains several elements that were established to address potential impacts to biological resources. Specifically, the Conservation and Open Space Element establishes biological resources goals, policies, and programs that address potential impacts to candidate, sensitive, or special-status species and their habitats. The City is a Permittee of the CVMSHCP; therefore, compliance with the CVMSHCP provides Permittees with take authorization for covered species for all covered activities, which includes development outside of CVMSHCP conservation areas. Therefore, the project is a covered activity, and compliance with the CVMSHCP would provide take authorization for covered species. Therefore, with implementation of **MM-BIO-1** through **MM-BIO-6**, the project would not conflict with the City of Rancho Mirage General Plan.

In addition, a General Plan Zoning Map Amendment from Mountain Reserve (MR) to Resort Hotel (Rs-H) is concurrently proposed for the proposed Sky Mesa Recreation Area. Under existing conditions, the proposed Sky Mesa project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning of the existing Ritz Carlton to encompass the Sky Mesa site. As noted, the MR zone was adopted for the purposed of avoiding or mitigating possible impacts on sensitive biological resources and with implementation and adherence of the above mitigation measures, the project would not conflict with the City of Rancho Mirage General Plan. Therefore, impacts would be **less than significant with mitigation incorporated**.

f) ***Less-than-Significant Impact with Mitigation Incorporated.*** The City of Rancho Mirage is a participant of the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) (CVMSHCP n.d.a.). The CVMSHCP aims to conserve over 240,000 acres of open space and protect 27 plant and animal species, and the City of Rancho Mirage represents approximately 15,760 acres of the area covered by the plan (CVMSHCP n.d.a.; City of Rancho Mirage 2017). As stated in Appendix B, the project site is within the CVMSHCP area. The project site is not located within any CVMSHCP conservation areas; however, it is adjacent to the Santa Rosa and San Jacinto Mountains Conservation Area. A fee is required for all projects located within the CVMSHCP plan area. As such, the proposed project would adhere to **MM-BIO-1** and would pay applicable fees as described in Threshold 4(e). Therefore, impacts to the CVMSHCP are expected to be **less than significant with Mitigation Incorporated**.

## 4.3 Mitigation Measures

**MM-BIO-1** **Coachella Valley Multiple Species Habitat Conservation Plan Fee Payment.** As a signatory to the Coachella Valley Multiple Species Habitat Conservation Plan, the City of Rancho Mirage shall require a local development mitigation fee prior to the issuance of building permits for the proposed use on the project site at the rates applicable at the time of payment of the fee as set forth in the most recent fee schedule. The project applicant shall be required to provide documentation to the City of Rancho Mirage confirming the payment of the local development mitigation fee.

**MM-BIO-2** **Coachella Valley Multiple Species Habitat Conservation Plan Land Use Adjacency Guidelines.** The project applicant shall implement the following Land Use Adjacency Guidelines (Coachella Valley Multiple Species Habitat Conservation Plan [CVMSHCP], Section 4.5) to minimize and avoid indirect effects from development adjacent to conservation areas (i.e., Santa Rosa and San Jacinto Mountains Conservation Area), where applicable:

- **Drainage**: Proposed Development adjacent to or within a Conservation Area shall incorporate plans to ensure that the quantity and quality of runoff discharged to the adjacent Conservation Area is not altered in an adverse way when compared with existing conditions. Stormwater systems shall be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials, or other elements that might degrade or harm biological resources or ecosystem processes within the adjacent Conservation Area.
- **Toxics**: Land uses proposed adjacent to or within a Conservation Area that use chemicals or generate bioproducts such as manure that are potentially toxic or may adversely affect wildlife and plant species, habitat, or water quality shall incorporate measures to ensure that application of such chemicals does not result in any discharge to the adjacent Conservation Area.
- **Lighting**: For proposed development adjacent to or within a Conservation Area, lighting shall be shielded and directed toward the developed area. Landscape shielding or other appropriate methods shall be incorporated in project designs to minimize the effects of lighting adjacent to or within the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual. The City of Rancho Mirage and project proponent shall avoid or limit the use of artificial lighting at night during the hours of dawn and dusk when many wildlife species are most active and ensure use of LED lighting with a correlated color temperature of 3,000 Kelvins or less.
- **Noise**: Proposed development adjacent to or within a Conservation Area that generates noise in excess of 75 A-weighted decibels sound equivalent level hourly shall incorporate setbacks, berms, or walls, as appropriate, to minimize the effects of noise on the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual.
- **Invasives**: Invasive, non-native plant species shall not be incorporated in the landscape for land uses adjacent to or within a Conservation Area. Landscape

treatments within or adjacent to a Conservation Area shall incorporate native plant materials to the maximum extent feasible; recommended native species are listed in Table 4-112 [CVMSHCP, Section 4.5.5]. The plants listed in Table 4-113 shall not be used within or adjacent to a Conservation Area. This list may be amended from time to time through a Minor Amendment with Wildlife Agency Concurrence.

- **Barriers**: Land uses adjacent to or within a Conservation Area shall incorporate barriers in individual project designs to minimize unauthorized public access, domestic animal predation, illegal trespass, or dumping in a Conservation Area. Such barriers may include native landscaping, rocks/boulders, fencing, walls and/or signage. Existing fencing separating the Big Horn Reserve Land (i.e., adjacent Conservation Area) from the proposed Project site was previously installed to prevent Peninsular bighorn sheep from entering and grazing on the Ritz Carlton Hotel property (i.e., Project). The project shall maintain a fence, or functionally equivalent structure throughout the lifetime of the project. Therefore, necessary barriers (i.e., fencing) is currently in place.
- **Grading/Land Development**: Manufactured slopes associated with site development shall not extend into adjacent land in a Conservation Area.

**MM-BIO-3** **Nesting Birds**. To maintain compliance with the Migratory Bird Treaty Act and California Fish and Game Code, regardless of the time of year, if ground-disturbing and/or vegetation clearance activities are scheduled to occur ~~during the avian nesting season (typically February 15 through August 31),~~ a qualified biologist shall conduct a pre-construction nesting bird survey within the project impact footprint and a 500-foot buffer where legal access is granted around the disturbance footprint. Surveys shall be conducted within 3 days prior to initiation of ground-disturbing activities.

If an active nest is detected during the nesting bird survey, avoidance buffers shall be implemented as determined by a qualified biologist (typically 300 feet for passerines and 500 feet for raptors and special-status species). The buffer shall be of a distance to ensure avoidance of adverse effects to the nesting bird by accounting for topography, ambient conditions, species, nest location, and activity type. All nests shall be monitored as determined by the qualified biologist until nestlings have fledged and dispersed or it is confirmed that the nest has been unsuccessful or abandoned. The qualified biologist shall halt all construction activities within proximity to an active nest if it is determined that the activities are harassing the nest and may result in nest abandonment or take. The qualified biologist shall also have the authority to require implementation of avoidance measures related to noise, vibration, or light pollution if indirect impacts are resulting in harassment of the nest.

**MM-BIO-4** **Burrowing Owl**. Pre-construction surveys for burrowing owls shall be completed within areas of suitable habitat (i.e., flatter portions of the site) in accordance with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012), with the first survey no less than 14 days prior to initiation of project-related activities, and the second within 24 hours of project-related activities. If ~~an~~ burrowing owls or active burrowing owl burrows ~~is~~are detected, the qualified biologist shall coordinate with CDFW and prepare a Burrowing Owl Plan that shall be

submitted to CDFW and USFWS for review and approval prior to commencing Project activities. The Burrowing Owl Plan shall describe proposed avoidance, minimization, mitigation, and monitoring actions. The Burrowing Owl Plan shall include the number and location of occupied burrow sites, acres of burrowing owl habitat that will be impacted, details of site monitoring, and details on proposed buffers and other avoidance measures if avoidance is proposed. If impacts to occupied burrowing owl habitat or burrow cannot be avoided, the Burrowing Owl Plan shall also describe minimization and relocation actions that will be implemented. Proposed implementation of burrow exclusion and closure should only be considered as a last resort, after all other options have been evaluated as exclusion is not in itself an avoidance, minimization, or mitigation method and has the possibility to result in take. If impacts to occupied burrows cannot be avoided, information shall be provided regarding adjacent or nearby suitable habitat available to owls along with proposed relocation actions. The Project proponent shall implement the Burrowing Owl Plan following CDFW and USFWS review and approval.~~within 500 feet of the impact footprint, avoidance and minimization measures shall be implemented in accordance with the *Staff Report on Burrowing Owl Mitigation* guidelines or agreed upon by the California Department of Fish and Wildlife, including implementation of a non-disturbance buffer and monitoring of the nest to ensure activities are not adversely affecting the nest. If the project will occur within this zone, then work must occur outside the nesting season, or until it can be shown that the birds have finished nesting, at which point passive relocation may occur.~~

**MM-BIO-5** **General Avoidance and Minimization Measures**. The following avoidance and minimization measures shall be implemented during project construction activities:

- To prevent inadvertent entrapment of special-status wildlife during construction, all excavated steep-walled holes or trenches more than 2 feet deep shall be covered with plywood or similar materials at the close of each working day, or be provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped wildlife. If trapped animals are observed, escape ramps or structures shall be installed immediately to allow escape.

**MM-BIO-6** **Desert Tortoise.** Because the project is located outside of a Conservation Area but within the 50,272 acres of naturally occurring desert tortoise habitat anticipated to be impacted under the Coachella Valley Multiple Species Habitat Conservation Plan, the project applicant shall notify the U.S. Fish and Wildlife Service 45 days prior to the issuance of a grading permit to allow for the potential salvage of adult tortoises within this notification time period.

# 5. CULTURAL RESOURCES

| **CULTURAL RESOURCES** -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5? | ☐ | ☐ | ☒ | ☐ |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | ☐ | ☒ | ☐ | ☐ |
| c) Disturb any human remains, including those interred outside of dedicated cemeteries? | ☐ | ☒ | ☐ | ☐ |

## 5.1 Setting

The Residences at Ritz Carlton portion of the project site was previously included in a cultural resources survey completed by CRM TECH in 2006. The 2006 study consisted of a historical/archaeological resources records search, historical background research, Native American consultation, and a systematic field survey. The records search determined that a segment of a prehistoric trail has been recorded in 1979 as extending into the 39-acre area covered in the 2006 study, however a field survey revealed that the segment of the original trail was no longer extant. The 2006 study concluded that there were no cultural resources in the area surveyed, and no evidence of archaeological deposits were found during the monitoring program.

An updated historical/archaeological resources survey was prepared by CRM TECH on September of 2019. The 2019 study includes a survey and analysis on both the proposed Residences at Ritz Carlton and Sky Mesa Recreational Area, updates to the 2006 records search and the historical background research, further consultation with Native American representatives, and a systematic field survey at intensive and reconnaissance levels as appropriate. This section is based upon the 2019 Historical/Archaeological Resources Survey (cultural report) prepared by CRM TECH in September 2019. The cultural report is included as Appendix C to this Initial Study. Background and methodologies regarding the cultural resources analysis are found in Appendix C.

## 5.2 Discussion of Impacts

a) ***Less-than-Significant Impact***: CRM TECH historian Terri Jacquemain, M.A., conducted historical background research for the project site. Historic maps indicated that there were no man-made features present in or near the project site. The earliest man-made features known to be present within the proposed project boundaries were a leveled pad on a hilltop in the eastern portion of the proposed project area and part of a winding dirt road leading to it, both of which were first

noted in 1972.

The western portion of the project site received limited disturbance until 2006 – 2007, when the ground surface in the entire area was cleared and graded. As a result, all preexisting features in that portion of the project site, including a segment of dirt road, where obliterated. To date, however, the property has remained undeveloped and was used only for materials stockpiling, construction staging, and occasional parking. In the eastern portion, the dirt road and the leveled pad observed in 1972 have been the only notable man-made features known to exist.

CRM TECH archaeologist Nina Gallardo, B.A., conducted a records search update on June of 2019 at the Eastern Information Center (EIC), University of California – Riverside. No historic resources were found within the project site. The records search results indicated that 69 historic-period sites have been recorded within a 1-mile radius of the project site. However, the proposed project is not anticipated to impact these resources because of their distance from the site.

CRM TECH archaeologist Daniel Ballester, M.S., conducted a field survey on June and September of 2019. The field survey encountered no potential "historical resources" within or adjacent to the proposed project boundaries.

No historical resources exist within or adjacent to the proposed project area. Therefore, the proposed project will not cause a substantial adverse change to any known historical resources and impacts would be **less than significant**.

b) ***Less-than-Significant Impact with Mitigation Incorporated:*** CRM TECH archaeologist Nina Gallardo, B.A., conducted a records search update on June of 2019 at the Eastern Information Center (EIC), University of California – Riverside. The results indicated that no further studies have occurred in the current proposed project area since 2007, and no cultural resources have been identified on the property. A total of 38 cultural resources studies were found within a 1-mile radius of the project site.

CRM TECH archaeologist Daniel Ballester, M.S., conducted a field survey at the western and eastern portions of the proposed project area. In the western portion of the site, grading activities leveled the majority of the land and removed bedrock outcrops. In the eastern portion, the slopes beyond the leveled hilltops retain the area's native landscape with some bedrock boulders. The badly exfoliating boulders suggest that it would be poor material for use as milling surfaces by the Native people or for preservation of any evidence of such use.

On June 21 and September 6, 2019, CRM TECH archaeologist Daniel Ballester, M.S., carried out the field survey of the western and eastern portions of the proposed project area, respectively. In light of the extensive past ground disturbance, the western portion was surveyed at a reconnaissance level by walking a series of parallel north-south transects at 25-meter (approximately 75-foot) intervals. The less disturbed eastern portion, including the area not covered by the 2006-2007 studies, was surveyed at an intensive level by walking along parallel north-south transects at five-meter (approximately 15-foot) intervals in the relatively level areas and along the contours on the slopes.

Using these methods, the ground surface of the entire proposed project area was systematically and carefully examined for any evidence of human activities dating to the prehistoric or historic period (i.e., 50 years or older). Ground visibility was excellent (90%-100%)

due to the lack of any substantial vegetation growth in either portion of the proposed project area (Appendix C). In addition, bedrock outcrops on the slopes in the eastern portion of the property were closely inspected for any evidence of prehistoric milling features.

The field survey encountered no potential archaeological resources within or adjacent to the proposed project boundaries. In the western portion, past grading of the ground surface has leveled most of the land and removed bedrock outcrops, resulting in a sizable rock pile near the center of the property. In the eastern portion, the slopes beyond the leveled hilltop and the dirt access road retain more of the area's native landscape, with some bedrock boulders exposed naturally on the surface. The badly exfoliating boulders, however, presents a poor material for use as milling surfaces by the Native people or for preservation of any evidence of such use.

Although no archaeological resources were identified as a result of the literature review and field survey, there is a possibility of encountering previously undiscovered archaeological resources at subsurface levels during ground-disturbing activities associated with the proposed project. Implementation of **MM-CUL-1** would ensure that potential impacts to archaeological resources during construction activities to a less than significant level. Therefore, the proposed project would not result in a substantial adverse change in the significance of an archaeological resource and impacts would be **less than significant.**

c) ***Less-than-Significant Impact with Mitigation Incorporated.*** As stated previously, there are no previously recorded cultural resources on the project site. Given the fact that the site has been previously developed, ground-disturbing activities associated with construction of the proposed project are unlikely to uncover previously unknown archaeological resources. In the unlikely event human remains are discovered on-site during construction ground-disturbing activities, implementation of **MM-CUL-2** would set forth proper procedure. Therefore, impacts would be **less than significant.**

## 5.3 Mitigation Measures

**MM-CUL-1** Prior to the issuance of a grading permit or ground disturbing activities, the Applicant/Owner shall enter into a Tribal Cultural Resources Agreement and Repatriation Agreement– with Agua Caliente Band of Cahuilla Indians (ACBCI). The purpose of the agreement shall be to formalize protocols and procedures between the Applicant/Owner and the Tribe for protection, treatment, and repatriation of Native American human remains, funerary objects, cultural and /or religious, ceremonial items, and other Tribal Cultural resources. A Qualified Archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, and an ACBCI Native American monitor shall be present for initial ground-disturbing activities associated with the current proposed project that may occur in areas of native soil. Both the Qualified Archaeologist and ACBCI Native American monitors may temporally halt or divert ground disturbing activities if potential archaeological or Tribal Cultural resources are discovered during construction activities. stop ground-disturbing activities in order to assess any discoveries in the field. ~~in the event unanticipated discoveries are made. The monitors may stop ground-disturbing activities in order to assess any discoveries in the field.~~

In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 50 feet of the find shall immediately stop until a Qualified Archaeologist can evaluate the significance of the find and determine whether additional study is warranted. Depending on the significance of the find under the California Environmental Quality Act (CEQA) and the CEQA Guidelines (California Public Resources Code, Section 21082; 14 CCR 15064.5(f)), the Qualified Archaeologist may exhaust the data potential of the find through the process of field level recordation and then allow work to continue. ~~Isolates are clearly non-significant archaeological resources (as determined by the Qualified archaeologist, in consultation with the Native American monitor) will be minimally documented in the field.~~ If the discovery proves significant under CEQA, additional work such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted. ~~In the event that curation of archaeological resources is required by the superseding regulatory agency, curation shall be conducted by an approved local facility in Riverside County, and curation shall be guided by California State Historical Resources Commission's Guidelines for the Curation of Archaeological Collections. The Applicant/Owner shall be responsible for all curation costs and provide the City written documentation from the curation facility that the curation have been completed.~~

If ~~Native American~~Tribal Ceultural resources (i.e., prehistoric or ethnohistoric-period artifacts, food remains, or features associated with Native Americans) are exposed during proposed project-related ground disturbance, the actions identified by the Agua Caliente Band of Cahuilla Indians in a preexisting agreement for unanticipated discovery shall be followed ~~contacted~~. ~~This agreement may require group shall be asked to provide the services of a trained~~ the Native American Monitor to return to site ~~consultant to monitor ground-disturbing work in the area containing the Native American cultural resources. This monitoring would occur on an as-needed basis and would be intended to ensure that Native American concerns are taken into account during the construction process.~~

**MM-CUL-2** If human remains are discovered during construction of the proposed project, California Health and Safety Code, Section 7050.5, states that further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner shall be contacted. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within two working days of notification of discovery, the appropriate treatment and disposition of the human remains.

Pursuant to California Public Resources Code, Section 5097.98, if the remains are thought to be Native American, the County Coroner will notify the Native American Heritage Commission, which will then notify the most likely descendent. At this time, the person who discovered the remains will contact the City of Rancho Mirage (City) so that they may work with the most likely descendent on the respectful treatment and disposition of the remains. Further provisions of the California Public Resources Code, Section 5097.98, are to be followed as applicable.

## 6. ENERGY

| ENERGY -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation? | ☐ | ☐ | ☒ | ☐ |
| b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency? | ☐ | ☐ | ☒ | ☐ |

### 6.1 Setting

This section is based upon the Air Quality and Greenhouse Gas Technical Report prepared by Dudek (~~Appendix A~~Appendix A-1). Background and methodologies regarding the air quality analysis can be found in ~~Appendix A~~Appendix A-1. The short-term construction and long-term operation of the proposed project will require the consumption of energy resources in several forms at the site and within the proposed project area. An overview of the forms of energy consumption for construction and operation is provided as follows:

#### Construction Energy Consumption

1. Temporary Direct Electrical Service: Energy Provided by Southern California Edison (SCE).
   - Construction site lighting;
   - Computer equipment; and
   - Temporary construction trailer operation
2. Fossil Fuels (Diesel and Gasoline)
   - Off-road construction equipment
   - Diesel-fired electric generators
   - Worker vehicles, vender trucks, and haul trucks

#### Operational Energy Consumption

1. Direct electrical Service: Energy Provided by SCE
   - Building heating, ventilation, and air-conditioning (HVAC)
   - Lighting: interior and exterior facilities

- Swimming pool and water feature operation
- Computer, audio and video equipment; and
- Appliances
- Supply, distribution, and treatment of water, wastewater; and solid waste

2. Fossil Fuels (Diesel, Gasoline, and Natural Gas)
   - Residential vehicles and hotel guests and visitors;
   - Employees, delivery, and customers; and
   - Restaurant and venue employees, delivery, and customers
   - Emergency Generator Maintenance

## 6.2 Discussion of Impacts

a) ***Less-than-Significant Impact***.

### Construction

#### *Electricity*

Temporary electric power for as-necessary lightning and electronic equipment (such as computers inside temporary construction trailers) would be provided by SCE. The electricity used for such activities would be temporary and would be substantially less than that required for proposed project operation and would have a negligible contribution to the proposed project's overall energy consumption.

#### *Natural Gas*

Natural gas is not anticipated to be required during construction of the proposed project. Fuels used for construction would primarily consist of diesel and gasoline, which are discussed below under the "petroleum" subsection. Any minor amounts of natural gas that may be consumed as a result of proposed project construction would be substantially less than required for operation and would have a negligible contribution to the proposed project's overall energy consumption.

#### *Petroleum*

Heavy-duty construction equipment associated with construction activities would rely on diesel fuel, as would vendor trucks involved in delivery of materials to the project site. Construction workers would travel to and from the project site throughout the duration of construction. It is assumed in this analysis that construction workers would travel in gasoline-powered light-duty vehicles.

Heavy-duty construction equipment of various types would be used during each phase of proposed project construction. ~~Appendix A~~Appendix A-1 lists the assumed equipment

usage for each phase of construction. The proposed project's construction equipment is estimated to operate a total combined 35,520 hours.

Fuel consumption from construction equipment was estimated by converting the total carbon dioxide ($CO_2$) emissions from each construction phase to gallons using the conversion factors for $CO_2$ to gallons of gasoline or diesel.

The conversion factor for gasoline is 8.78 kilograms per metric ton $CO_2$ per gallon, and the conversion factor for diesel is 10.21 kilograms per metric ton $CO_2$ per gallon (The Climate Registry 2018). The estimated diesel fuel usage from construction equipment is shown in Table 6-1, Construction Equipment Diesel Demand (Off-Road Equipment).

**Table 6-1. Construction Equipment Diesel Demand (Off-Road Equipment)**

| Phase | Pieces of Equipment | Equipment $CO_2$ (MT) | kg/$CO_2$/ Gallon | Gallons |
|---|---|---|---|---|
| Grading | 8 | 296.87 | 10.21 | 29,076.51 |
| Building Construction | 9 | 431.43 | 10.21 | 42,255.92 |
| Paving | 6 | 22.21 | 10.21 | 2,175.05 |
| Architectural Coating / Finish Phase | 1 | 8.57 | 10.21 | 838.92 |
| | | | **Total** | **74,346.41** |

**Sources:** ~~Appendix A~~Appendix A-1
**Notes:** $CO_2$ = carbon dioxide; MT = metric ton; kg = kilogram.

Fuel consumption from worker, vendor, and haul truck trips are estimated by converting the total $CO_2$ emissions from each construction phase to gallons using the conversion factors for $CO_2$ to gallons of gasoline or diesel. Worker vehicles are assumed to be gasoline and vendor/hauling vehicles are assumed to be diesel. Calculations for total worker, vendor, and haul truck fuel consumption are provided in Tables 6-2 (Construction worker Gasoline Demand), 6-3 (Construction Vendor Diesel Demand), and 6-4 (Construction Haul Truck Diesel Demand).

**Table 6-2. Construction Worker Gasoline Demand**

| Phase | Trips | Vehicle MT $CO_2$ | kg/$CO_2$/ Gallon | Gallons |
|---|---|---|---|---|
| Grading | 1,100 | 6.10 | 8.78 | 694.27 |
| Building Construction | 18,550 | 102.25 | 8.78 | 11,645.77 |
| Paving | 440 | 2.40 | 8.78 | 273.80 |
| Architectural Coating | 4,690 | 25.62 | 8.78 | 2,918.46 |
| | | | **Total** | **15,532.31** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** MT = metric ton; $CO_2$ = carbon dioxide; kg = kilogram.

**Table 6-3. Construction Vendor Diesel Demand**

| Phase | Trips | Vehicle MT $CO_2$ | kg/$CO_2$/Gallon | Gallons |
|---|---|---|---|---|
| Trenching | 854 | 8.58 | 10.21 | 840.44 |
| Building Construction | 17,020 | 167.34 | 10.21 | 16,390.01 |
| Paving | 440 | 4.30 | 10.21 | 421.39 |
| Architectural Coating | 4,020 | 39.31 | 10.21 | 3,849.97 |
| | | | **Total** | **21,501.81** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** MT = metric ton; $CO_2$ = carbon dioxide; kg = kilogram.

**Table 6-4. Construction Haul Truck Diesel Demand**

| Phase | Trips | Vehicle MT $CO_2$ | kg/$CO_2$/Gallon | Gallons |
|---|---|---|---|---|
| Trenching | 692 | 19.30 | 10.21 | 1,890.58 |
| Building Construction | 60 | 1.66 | 10.21 | 162.18 |
| Paving | 197 | 5.41 | 10.21 | 529.44 |
| Architectural Coating | 380 | 10.43 | 10.21 | 1,021.25 |
| | | | **Total** | **3,603.46** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** MT = metric ton; $CO_2$ = carbon dioxide; kg = kilogram.

In summary, construction of the proposed project is conservatively anticipated to consume 15,532 gallons of gasoline and 99,452 gallons of diesel over the construction period. By comparison, California's consumption of petroleum is approximately 78.6 million gallons per day. Based on these assumptions, approximately 44.62 billion gallons of petroleum would be consumed in California over the course of the construction period. Therefore, impacts associated during construction would be **less than significant**.

## Operation

### *Electricity*

Operation of the proposed project upon buildout would require electricity for multiple purposes, including cooling, lighting, appliances, and various equipment. Additionally, the supply, conveyance, treatment, and distribution of water and wastewater would indirectly result in electricity usage. Electricity consumption associated with proposed project operation is based on CalEEMod outputs presented in ~~Appendix A~~Appendix A-1.

CalEEMod default values for energy consumption for each land use were applied for the proposed project analysis. The proposed project involves residential and non-residential uses. The energy use from non-residential land uses is calculated in CalEEMod based on the

California Commercial End-Use Survey database. For parking lots, CalEEMod includes calculation of energy use from lighting, ventilation and elevators in parking lots and structures and is based on the type of parking lot selected by the user, see CalEEMod outputs presented in ~~Appendix A~~Appendix A-1 for all land uses and energy calculations. Energy use in buildings (both natural gas and electricity) is divided by the program into end use categories subject to California Building Standards Code (Title 24) requirements (end uses associated with the building envelope, such as the HVAC system, water heating system, and integrated lighting) and those not subject to California Building Standards Code requirements (such as appliances, electronics, and miscellaneous "plug-in" uses).

Title 24 of the California Code of Regulations serves to enhance and regulate California's building standards. The most recent amendments to Title 24, Part 6, referred to as the 2022 Title 24 updated became effective on January 1, 2023. Although not accounted for in the modeling, energy consumption of the proposed project would also be reduced through installation of high-efficiency lighting. According to these estimations, the proposed project would consume approximately 1,847,175 kilowatt-hours (kWh) per year during operation. For comparison, in 2017 the total residential and non-residential electricity demand in Riverside County was 16,256,705,411 kWh (CEC 2018). Additionally, the Ritz Carlton Rancho Mirage is enrolled in the Rancho Mirage Energy Authority (RMEA). The RMEA supplies power to homes and businesses with an opportunity to opt up to 100% renewable energy. For these reasons, the electricity consumption of the proposed project would not be considered inefficient or wasteful, and impacts would be **less than significant**.

### *Natural Gas*

Project operation would require natural gas for various purposes, including water heating, natural gas appliances and emergency generator routing testing. Natural gas consumption associated with operation is based on the CalEEMod outputs (see ~~Appendix A~~Appendix A-1). According to these estimations, the proposed project would consume approximately 4,273447 kilo-British Thermal Units (kBtu) per year. For comparison, in 2017 the non-residential natural gas use within Riverside County was 39,844,317,732 kBtu (CEC 2018). Since the proposed project would comply with applicable Title 24 requirements the proposed project would not be considered inefficient or wasteful, and impacts would be **less than significant**.

### *Petroleum*

During operations, the majority of fuel consumption resulting from the proposed project would involve the use of motor vehicles traveling to and from the project site including hotel guests, retail and restaurant customers, deliveries, and employees. In addition, fuel would be consumed for the maintenance operations of the emergency.

Petroleum fuel consumption associated with motor vehicles traveling to and from the project site is a function of the vehicle miles traveled (VMT) as a result of proposed project operation. The annual VMT attributable to the proposed project is expected to be 4,593,965 (~~Appendix A~~Appendix A-1). Similar to the construction worker and vendor trips, fuel consumption from operational trips is estimated by converting the total $CO_2$ emissions from operation of the proposed project to gallons using the conversion factors for $CO_2$ to gallons of gasoline or diesel. Based on the annual fleet mix provided in CalEEMod, 89% of the fleet range

from light-duty to medium-duty vehicles and motorcycles are assumed to run on gasoline. The remaining 11% of vehicles represent medium-heavy duty to heavy-duty vehicles and buses and are assumed to run on diesel.

Calculations for annual mobile source fuel consumption are provided in Tables 6-5, Annual Mobile Source Gasoline Demand, and 6-6, Annual Diesel Demand.

**Table 6-5. Annual Mobile Source Gasoline Demand**

| | Vehicle MT $CO_2$ | kg/$CO_2$/Gallon | Gallons |
|---|---|---|---|
| Operation | 1362.85 | 8.78 | 155,222.11 |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** MT = metric ton; $CO_2$ = carbon dioxide; kg = kilogram.

**Table 6-6. Annual Diesel Demand**

| Operation | Vehicle MT $CO_2$ | kg/$CO_2$/Gallon | Gallons |
|---|---|---|---|
| Vehicle | 168.96 | 10.21 | 16,548.67 |
| Emergency Generator | 3,895.00 | — | 3,895.00 |
| | | **Total** | **20,443.67** |

**Source**: ~~Appendix A~~Appendix A-1.
**Notes:** MT = metric ton; $CO_2$ = carbon dioxide; kg = kilogram.

Over the lifetime of the proposed project, the fuel efficiency of on-road vehicles of hotel guests, retail and restaurant customers, deliveries, and employees, commuting to the site is expected to increase. As such, the amount of petroleum consumed as a result of vehicular trips to and from the project site during operation would decrease over time. There are numerous regulations in place that require and encourage increased fuel efficiency. For example, the California Air Resources Board (CARB) has adopted an approach to passenger vehicles by combining the control of smog-causing pollutants and greenhouse gas (GHG) emissions into a single, coordinated package of standards. The approach also includes efforts to support and accelerate the number of plug-in hybrids and zero-emissions vehicles in California (CARB 2013). Additionally, in response to Senate Bill 375, CARB adopted the goal of reducing per-capita GHG emissions from 2005 levels by 8% by 2020, and 18% by 2035 for light-duty passenger vehicles in the planning area for the Southern California Association of Governments (SCAG). As such, operation of the proposed project is expected to use decreasing amounts of petroleum over time due to advances in fuel economy.

In summary, although the proposed project would increase petroleum use during operation as a result of residences, restaurant customers, venue attendees, deliveries, and employees commuting to the site, the use would be a fraction of the state- and County-wide use and, due to efficiency increases, would diminish over time. Given these considerations, petroleum consumption associated with the proposed project would not be considered inefficient or wasteful and would result in a **less-than-significant impact**.

b) ***Less-than-Significant Impact.*** Part 6 of Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. Part 6

establishes energy efficiency standards for residential and non-residential buildings constructed in California to reduce energy demand and consumption. Part 6 is updated periodically (every 3 years) to incorporate and consider new energy efficiency technologies and methodologies. Title 24 also includes Part 11, the California Green Building Standards Code (CALGreen). CALGreen institutes mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential, and state-owned buildings, as well as schools and hospitals. The 2022 CALGreen standards became effective on January 1, 2023. The proposed project would meet Title 24 and CALGreen standards to reduce energy demand and increase energy efficiency.

***City of Rancho Mirage Energy Action Plan***

The City's 2013 Energy Action Plan (ePlan) provides a roadmap of actions within the City's Municipal operations, to help reduce energy consumption, to reduce operation costs and increase energy awareness. The ePlan's goals focuses on three areas: retrofit and expansion of municipal facilities, upgrading the municipal fleet and consideration of municipal programs and actions that will help reduce municipal and community-wide energy use and GHG emissions. The proposed project will not obstruct the City from achieving energy efficiency ePlan goals.

The proposed project would follow applicable energy standards and regulations during construction. In addition, the proposed project would be built and operated in accordance with all existing, applicable regulations at the time of construction. As such, the proposed project would not conflict with existing energy standards and regulations; therefore, impacts during construction and operation of the proposed project would be **less than significant**. No mitigation is required.

## 6.3 Mitigation Measures

No mitigation measures required.

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## 7. GEOLOGY AND SOILS

| **GEOLOGY AND SOILS** -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: | | | | |
| i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. | ☐ | ☐ | ☐ | ☒ |
| ii) Strong seismic ground shaking? | ☐ | ☐ | ☒ | ☐ |
| iii) Seismic-related ground failure, including liquefaction? | ☐ | ☐ | ☒ | ☐ |
| v) Landslides? | ☐ | ☐ | ☒ | ☐ |
| b) Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ☒ | ☐ |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | ☐ | ☐ | ☒ | ☐ |
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property? | ☐ | ☐ | ☒ | ☐ |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? | ☐ | ☐ | ☐ | ☒ |

| **GEOLOGY AND SOILS** -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ☐ | ☐ | ☒ |

## 7.1 Setting

This section is based upon the Geotechnical Report prepared by Earth Systems Southwest. The geotechnical report is included as Appendix H to this Initial Study. Background and methodologies regarding the geotechnical analysis are found in Appendix H.

The project site is situated in an area of rugged foothills and canyons near the base of the Santa Rosa Mountains. The area's site topography is generally dominated by northeast to southwest trending ridges and canyons. Total relief at the project site is on the order of approximately 60 feet. The field exploration conducted in 2006 covered portions of the Residences at Ritz Carlton project site but does not cover the Sky Mesa Recreational Site.

The site from the 2006 geotechnical report is located at the northern edge of the Santa Rosa Mountains, which border the southwest part of the Coachella Valley. The site is located within the Peninsular Ranges geomorphic province, at the boundary of the Colorado Desert geomorphic province. The Peninsular Ranges are characterized by fault-controlled, elongated northwest-trending valleys and ranges. These ranges and valleys extend from the southern end of Baja California to the Los Angeles basin. The rocks underlying this province consist of ancient sedimentary and metasedimentary (partially metamorphosed sedimentary rocks) that mantle a core of granitic rocks that comprise the Southern California Batholith.

The on-site geology reflects a typical contact metamorphic zone along an igneous/sedimentary contact. The metamorphic contact zone contains pegmatitic marble and various calc-silicates. These rocks were formed by the modification of previously existing sediments by the intense heat associated with the intrusion of the igneous rocks. Several baked zones and feldspar and quartz rich gneiss mark the contact zone. Minor quartzite and schist were found; however, marble and marbleized limestone dominate the area. In the vicinity of the project site, the predominant rocks were strongly folded metasediments. Towards the east, the metamorphism grades into foliated migmatites. The faults near the site are pre-Holocene and inactive.

The field exploration indicates that site materials consist generally of outcropping pre-Cretaceous metasedimentary rocks overlain by an approximately 1- to 5-foot layer of gravelly sand with silt to silty sand with gravel. The soil matrix is visually classified to be in the very low expansion (EI < 20) category.

The depth of groundwater in the vicinity of the project site is believed to be greater than 200 feet. Groundwater levels may fluctuate with precipitation, irrigation, drainage, regional pumping from wells, and site grading. The absence of shallow groundwater levels may not represent an accurate or permanent condition; minor localized and seasonal perched groundwater conditions may occur within the adjacent to well defined drainages on the site. The bedrock that underlies the site is considered to be essentially non-water bearing and does not form a continuous aquifer. However, some groundwater is likely to be contained at depth within intermittent joints and fractures of the bedrock. No seeps or springs were observed at the site during the field reconnaissance.

## 7.2 Discussion of Impacts

a)(i) ***No Impact***. According to the City's General Plan Safety Element, the project site is not located on an Alquist-Priolo Earthquake Fault Zoning Map. Exhibit 21, Faults in the Rancho Mirage General Plan Area, in the City's General Plan Safety Element, indicates that closest faults in the broad project region include Santa Ana Thrust Fault and Deep Canyon Fault (City of Rancho Mirage 2017). None of these faults underlie the project site (City of Rancho Mirage 2017). Although the proposed project could experience strong seismic ground shaking, the proposed project is not susceptible to surface rupture. Therefore, **no impacts** associated with fault rupture would occur.

a)(ii) ***Less-than-Significant Impact.*** Similar to other areas located in seismically active Southern California regions, the City is susceptible to ground shaking during an earthquake. However, as addressed in Threshold 7(a(i)), the project site is locate located on an active fault zone and the site would not be affected by ground shaking more than any other area in the seismically active region. Conformance with the most recent California Building Code, which includes building design standards intended to minimize risk to people and structures from potential seismic ground shaking, would ensure that impacts would be **less than significant**.

a)(iii) ***Less-than-Significant Impact.*** According to the Geotechnical Report, the potential for liquefaction to occur on the project site is very low because the site is underlain by non-water crystalline bedrock, and the site does not lie within a County or State liquefaction hazard zone. Additionally, the City's General Plan Safety Element's Exhibit 22 shows that the project site's liquefaction susceptibility is "none" (City of Rancho Mirage 2017). Therefore, impacts would be **less than significant**.

a)(iv) ***Less-than-Significant Impact***. According to Exhibit 24 of the City's General Plan Safety Element, the project site is located in an area where "numerous rock falls and landslides expected to occur during an earthquake" (City of Rancho Mirage 2017). In compliance with the City's General Plan, Safety Element, and the California Building Code (CBC), prior to the issuance of a grading permit the Applicant shall prepare an updated geotechnical analysis for areas subject to rockfall or landslide hazards. With compliance to all relevant policies, the proposed project would have a **less than significant** impact.

b) ***Less-than-Significant Impact.*** According to Exhibit 25 in the City's General Plan Safety Element, the project site is located in a site with only "slight wind erosion hazard". The project site is undeveloped and has been previously graded. Project construction would involve site preparation, some additional grading, and trenching, which may temporarily expose soils to increased erosion potential. The proposed project would be required to comply with the

National Pollutant Discharge Elimination System Construction General Permit, which requires the implementation of a stormwater pollution prevention plan. The stormwater pollution prevention plan would employ various BMPs intended to minimize soil erosion during construction. BMPs may include measures such as watering the exposed areas to reduce erosion potential. Upon completion of construction, the project site would be fully developed with structures, parking, and landscaped areas, which would minimize any long-term erosions potential. Therefore, impacts would be **less than significant**.

The proposed project would expand the existing hotel area and because the expansion would mainly be paved or landscaped, the potential for soil erosion and topsoil loss is reduced during operation. The structural and paved improvements would be impervious areas lacking any exposed soils. The landscape areas, although pervious, would contain various trees, shrubs, and groundcover that would help stabilize any surface soils and contain these soils on the project site. Therefore, impacts associated with soil erosion and topsoil loss would be **less than significant**.

c) ***Less-than-Significant Impact.*** As addressed in Threshold 7(a)(iii), the potential for liquefaction is very low. Prior to the issuance of the grading permit, the applicant shall verify that the applicable recommendations of the of the City engineer. Recommendations shall be held to performance standards Geotechnical Evaluation have been incorporated into the proposed project design and construction documents to the satisfaction within the applicable ordinances (including grading, construction, and landscaping regulations) of the City and the standards provided in the most recent California Building Code that are intended to reduce risk related to geologic hazards. Therefore, with implementation of these recommendations, impacts would be **less than significant**.

d) ***Less-than-Significant Impact.*** Expansive soils are characterized by their potential "shrink/swell" behavior. Shrink/swell is the cyclic change in volume (expansion and contraction) that occurs in certain fine-grained clay sediments from the process of wetting and drying. Clay minerals such as smectite, bentonite, montmorillonite, beidellite, vermiculite, and others are known to expand with changes in moisture content. The higher the percentage of expansive minerals present in near-surface soils, the higher the potential for substantial expansion.

According to the Geotechnical Report, the field exploration indicated that the soil matrix would be classified within the very low expansion index. Therefore, impacts would **be less than significant**.

e) ***No Impact.*** The proposed project would connect to the existing municipal sewer system and would not require a septic or alternative wastewater disposal system. Therefore, **no impacts** associated with the ability of soils to support septic tanks would occur.

f) ***No Impact.*** The project site has been highly disturbed by previous grading activities. There are no unique paleontological resources or sites or unique geologic features on the project site. Therefore, there would be **no impact**.

## 7.3 Mitigation Measures

No mitigation measures required.

# 8. GREENHOUSE GAS EMISSIONS

| **GREENHOUSE GAS EMISSIONS** -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | ☐ | ☐ | ☒ | ☐ |
| b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | ☐ | ☐ | ☒ | ☐ |

## 8.1 Setting

This section is based on the Air Quality and Greenhouse Gas Technical Report prepared by Dudek, incorporated in this Initial Study as ~~Appendix A~~Appendix A-1.

### Global Inventories

Anthropogenic GHG emissions worldwide in 2017 (the most recent year for which data is available) totaled approximately 50,860 MMT of CO2e, excluding land use change and forestry (PBL 2018). Six countries—China, the United States, the Russian Federation, India, Japan, and Brazil—and the European community accounted for approximately 65% of the total global emissions, or approximately 33,290 MMT $CO_2e$ (PBL 2018).

### National and State Inventories

Per the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2021, total U.S. GHG emissions were approximately 6,340.2 MMT $CO_2e$ in 2021 (EPA 2023). The largest source of $CO_2$, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 92.2% of $CO_2$ emissions in 2021 (4,639 MMT $CO_2e$). From 1990 to 2021, total emissions of $CO_2$ decreased by 88.7 MMT $CO_2$ Eq. (1.7 percent), total emissions of $CH_4$ decreased by 141.2 MMT CO2 Eq. (16.3 percent), and emissions of $N_2O$ decreased by 13.0 MMT CO2 Eq. (3.2 percent). (EPA 2023).

According to California Greenhouse Gas Emissions for 2000–2020, Trends of Emissions and Other Indicators (CARB 2022a), California emitted 369.2 MMT $CO_2e$ in 2020, including emissions resulting from out-of-state electrical generation (CARB 2018). The sources of GHG emissions in California include transportation, industrial uses, electric power production from both in-state and out-of-state sources, commercial and residential uses, agriculture, high-GWP substances, and recycling and waste. The California GHG emission source categories (as defined in CARB's 2008 Scoping Plan) and their relative contributions in 2020 are presented in Table 8-1, Greenhouse Gas Emissions Sources in California.

**Table 8-1. Greenhouse Gas Emissions Sources in California**

| Source Category | Annual GHG Emissions (MMT $CO_2e$) | Percent of Total[a] |
|---|---|---|
| Transportation | 136.60 | 37% |
| Industrial uses | 73.84 | 20% |
| Electricity generation[b] | 59.07 | 16% |
| Residential and commercial uses | 36.92 | 10% |
| Agriculture and Forestry | 33.22 | 9% |
| High GWP substances | 22.15 | 6% |
| Recycling and waste | 7.38 | 2% |
| **Totals** | **369.2** | **100%** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** GHG = greenhouse gas; MMT $CO_2e$ = million metric tons of carbon dioxide equivalent; GWP = global warming potential.
Emissions reflect 2020 California GHG inventory.
[a] Percentage of total has been rounded and total may not sum due to rounding.

[b] Includes emissions associated with imported electricity, which account for 18.46 MMT $CO_2e$.

The City developed a GHG emission inventory in March 2013 as part of the Rancho Mirage Sustainability Plan. The inventory provides a detailed analysis of the City's carbon footprint showing the sources and sectors of emissions. In 2010, the City emitted 277,698 metric tons of $CO_2e$. The largest portion of the emission, over 43%, came from the electricity used to power the City's homes, businesses, resorts, fountains and streetlights. The transportation sector made up approximately 33% of the emissions.

## 8.2 Discussion of Impacts

a) ***Less-than-Significant Impact:*** Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind patterns, lasting for an extended period of time (decades or longer). The Earth's temperature depends on the balance between energy entering and leaving the planet's system, and many factors (natural and human) can cause changes in Earth's energy balance. The greenhouse effect is the trapping and build-up of heat in the atmosphere near the Earth's surface (the troposphere). The greenhouse effect is a natural process that contributes to regulating the Earth's temperature, and it creates a livable environment on Earth. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and causing the Earth's surface temperature to rise. Global climate change is a cumulative impact; a project contributes to this impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. Thus, GHG impacts are recognized exclusively as cumulative impacts.

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. As defined in California Health and Safety Code Section 38505(g) for purposes of administering many of the state's primary GHG emissions reduction programs, GHGs include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride (see also

CEQA Guidelines Section 15364.5).[7] The three GHGs evaluated herein are $CO_2$, $CH_4$, and $N_2O$ because these are the only GHG gases would be emitted during project construction and/or operations.

The Intergovernmental Panel on Climate Change developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The reference gas used is $CO_2$; therefore, GWP-weighted emissions are measured in metric tons (MT) of $CO_2$ equivalent ($CO_2e$). Consistent with CalEEMod Version 2020.04.0, this GHG emissions analysis assumed the GWP for $CH_4$ is 25 (i.e., emissions of 1 MT of $CH_4$ are equivalent to emissions of 25 MT of $CO_2$), and the GWP for $N_2O$ is 298, based on the Intergovernmental Panel on Climate Change Assessment Report (IPCC 2007).

As discussed in Section 3 of this Initial Study, the proposed project is located within the jurisdictional boundaries of the SCAQMD. In October 2008, the SCAQMD proposed recommended numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development projects as presented in its *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold* (SCAQMD 2008). This document, which builds on the previous guidance prepared by the California Air Pollution Control Officers Association, explored various approaches for establishing a significance threshold for GHG emissions. The draft interim CEQA thresholds guidance document was not adopted or approved by the Governing Board.

The SCAQMD formed a GHG CEQA Significance Threshold Working Group to work with SCAQMD staff on developing GHG CEQA significance thresholds until statewide significance thresholds or guidelines are established. From December 2008 to September 2010, the SCAQMD hosted working group meetings and revised the draft threshold proposal several times, although it did not officially provide these proposals in a subsequent document. The SCAQMD has continued to consider adoption of significance thresholds for residential and general land use development projects. The most recent proposal issued by SCAQMD, issued in September 2010, uses the following tiered approach to evaluate potential GHG impacts from various uses (SCAQMD 2010):

**Tier 1:** Determine if CEQA categorical exemptions are applicable. If not, move to Tier 2.

**Tier 2:** Consider whether or not the project is consistent with a locally adopted GHG reduction plan that has gone through public hearing and CEQA review, that has an approved inventory, includes monitoring, etc. If not, move to Tier 3.

**Tier 3:** Consider whether the project generates GHG emissions in excess of screening thresholds for individual land uses. The 10,000 MT $CO_2e$ per-year threshold for industrial uses would be recommended for use by all lead agencies. Under option 1, separate screening thresholds are proposed for residential projects (3,500 MT $CO_2e$ per year), commercial projects (1,400 MT $CO_2e$

[7] Climate-forcing substances include GHGs and other substances such as black carbon and aerosols. This discussion focuses on the GHGs identified in the California Health and Safety Code Section 38505 applicable to the project including $CO_2$, $CH_4$, and $N_2O$; impacts associated with other climate-forcing substances are not evaluated herein.

per year), and mixed-use projects (3,000 MT $CO_2e$ per year). Under option 2, a single numerical screening threshold of 3,000 MT $CO_2e$ per year would be used for all non-industrial projects. If the project generates emissions in excess of the applicable screening threshold, move to Tier 4.

**Tier 4:** Consider whether the project generates GHG emissions in excess of applicable performance standards for the project service population (population plus employment). The efficiency targets were established based on the goal of Assembly Bill (AB) 32 to reduce statewide GHG emissions to 1990 levels by 2020. The 2020 efficiency targets are 4.8 MT $CO_2e$ per-service population for project-level analyses and 6.6 MT $CO_2e$ per-service population for plan-level analyses. If the project generates emissions in excess of the applicable efficiency targets, move to Tier 5.

**Tier 5:** Consider the implementation of CEQA mitigation (including the purchase of GHG offsets) to reduce the project efficiency target to Tier 4 levels.

However, neither SCAQMD or Rancho Mirage adopted these thresholds and therefor the quantitative analysis provided herein is provided for informational purposes only. In the absence of an adopted quantitative thresholds, GHGs are evaluated in the context of policy consistency.

### Construction Emissions

Construction of the proposed project would result in GHG emissions primarily associated with the use of off-road construction equipment, on-road trucks, and worker vehicles. A depiction of expected construction schedules (including information regarding phasing, equipment used during each phase, truck trips, and worker vehicle trips) assumed for the purposes of emissions estimation is provided in Table 3-6 and in ~~Appendix A~~Appendix A-1. On-site sources of GHG emissions include off-road equipment; off-site sources include trucks and worker vehicles. Table 8-2, Estimated Annual Construction GHG Emissions, presents construction GHG emissions for the proposed project from on-site and off-site emissions sources.

**Table 8-2. Estimated Annual Construction GHG Emissions**

| Year | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
|---|---|---|---|---|
| | *Metric Tons per Year* | | | |
| 2023 | 571.69 | 0.13 | 0.01 | 579.09 |
| 2024 | 562.96 | 0.08 | 0.03 | 572.69 |
| **Total** | | | | **1151.78** |
| **Amortized Over 30 Years** | | | | **38.39** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** GHG = greenhouse gas; $CO_2$ = carbon dioxide; $CH_4$ = methane; $N_2O$ = nitrous oxide; $CO_2e$ = carbon dioxide equivalent.

As shown in Table 8-2, Estimated Annual Construction GHG Emissions, the estimated total GHG emissions in 2023 through 2024 would be approximately 1,152 MT $CO_2e$. Amortized over 30 years, construction GHG emissions would be approximately 38 MT $CO_2e$ per year. In addition, as with proposed project-generated construction criteria air pollutant emissions, GHG emissions generated during proposed construction activities would be short

term, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions.

### Operational Emissions

Operation of the proposed project would generate GHG emissions through motor vehicle trips to and from the project site; landscape maintenance equipment operation; energy use (natural gas and generation of electricity consumed by the proposed project); solid waste disposal; and generation of electricity associated with water supply, treatment, and distribution; wastewater treatment; and natural gas consumed by the emergency generator. GHG emissions would also be generated through intermittent maintenance and testing of the diesel emergency generator, limited to 50 hours per year. CalEEMod was used to calculate the annual GHG emissions. GHG emission estimates were based on the mobile source, area source, and energy (natural gas) operational assumptions described in Section 3(b), within the air quality analysis. CalEEMod default values were used to estimate GHG emissions associated with energy (electricity) consumption, solid waste, and water and wastewater.

The estimated operational (2023) project-generated GHG emissions from area sources, energy usage, motor vehicles, solid waste generation, water usage and wastewater generation, and stationary sources are shown in Table 8-3, Estimated Annual Operational GHG Emissions.

**Table 8-3. Estimated Annual Operational GHG Emissions**

| Emission Source | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
|---|---|---|---|---|
| | *metric tons per year* | | | |
| ***Proposed Project*** | | | | |
| Area | 1.80 | 0.00 | 0.00 | 1.85 |
| Energy | 555.64 | 0.03 | 0.01 | 558.68 |
| Mobile | 1,507.92 | 0.08 | 0.07 | 1,531.81 |
| Stationary | 22.85 | 0.00 | 0.00 | 22.93 |
| Solid waste | 38.80 | 2.29 | 0.00 | 96.13 |
| Water supply and wastewater | 66.95 | 0.03 | 0.02 | 72.63 |
| | | | **Total** | **2,284.03** |
| | | | *Amortized Construction Emissions* | *38* |
| | | | **Operation + Amortized Construction Total** | **2,322.42** |

**Notes:** $CO_2$ = carbon dioxide; $CH_4$ = methane; $N_2O$ = nitrous oxide; $CO_2e$ = carbon dioxide equivalent
See ~~Appendix A~~Appendix A-1 for detailed results.
These emissions reflect operational year 2023.

As shown in Table 8-3, Estimated Annual Operational GHG Emissions, and provided for informational purposes, the estimated annual net proposed project-generated GHG emissions would be approximately 2,284 MT $CO_2e$ per year as a result of proposed project operations only. Estimated annual proposed project-generated operational emissions in 2024 (2,284 MT $CO_2e$ per year) plus amortized proposed project construction emissions (38 MT $CO_2e$ per year) would be approximately 2,332 MT $CO_2e$ per year. Because no quantitative threshold has been adopted, impacts related to GHGs are discussed in the context of policy consistency below. Therefore, as discussed below, in relation to the generation of GHGs, the proposed project's impact would be **less than significant**. No mitigation is required.

b) ***Less-than-Significant Impact:*** The City has not adopted a comprehensive climate action plan, and there is currently no local guidance that would be applicable to the proposed project. The City addresses GHG-reducing goals in the March 2013, Sustainability Plan and Energy Action Plan. However, while the Sustainability Plan provides GHG reduction goals, they do not extend beyond year 2020. At this time, no mandatory GHG plans, policies, regulations, or finalized agency guidelines would apply to the proposed project. Nonetheless, the proposed project consistency with the SCAG 2020 RTP/SCS, CARB's Scoping Plan, and statewide GHG reduction goals for 2030 or 2045 identified in identified in Senate Bill 32 and Assembly Bill 1279, respectively.

### City of Rancho Mirage Energy Action Plan

The City's Energy Action Plan (ePlan) provides a roadmap of actions within the City's Municipal operations, to help reduce energy consumption, to reduce operation costs and increase energy awareness. The ePlan's goals focuses on three areas: retrofit and expansion of municipal facilities, upgrading the municipal fleet and consideration of municipal programs and actions that will help reduce municipal and community-wide energy use and GHG emissions.

### City of Rancho Mirage Sustainability Plan

In March 2013, the City adopted the 2013 Sustainability Action Plan: Leadership in Energy Efficiency (Sustainability Plan) in order to set GHG reduction goals and measures. The Sustainability Plan is a framework for the documenting and implementation of policies and programs that will reduce the City's GHG emissions, working towards the Statewide target of 1990 levels by 2020, set by AB 32.

The City addresses GHG-reducing goals in the March 2013, Sustainability Plan and Energy Action Plan. However, while the Sustainability Plan provides GHG reduction goals, they do not extend beyond year 2020. In addition, the proposed project does not prevent the City from promoting sustainability and energy efficiency goals to reduce the City's carbon footprint.

### Southern California Association of Governments RTP/SCS

SCAG has developed Connect SoCal, the 2020-2045 RTP/SCS, which is a long-range visioning plan that balances future mobility and housing needs with economic, environmental and public health goals. Connect SoCal charts a path toward a more mobile, sustainable and prosperous region by making connections between transportation networks, between planning strategies and between the people whose collaboration can improve the quality of life for Southern Californians. Connect SoCal embodies a collective vision for the region's future and is developed with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura.

On September 3, 2020, Connect SoCal was adopted by SCAG's Regional Council. Connect SoCal is a long-range visioning plan that builds upon and expands land use and transportation strategies established over several planning cycles to increase mobility options and achieve a more sustainable growth pattern. The major goals of the Connect SoCal are outlined in Table 8-4, Project Consistency with the SCAG Connect SoCal RTP/SCS, along with the proposed project's consistency with them.

**Table 8-4**

**Project Consistency with the SCAG Connect SoCal RTP/SCS**

| RTP/SCS Measure | Proposed Project Potential to Conflict |
|---|---|
| Encourage regional economic prosperity and global competitiveness. | *Not applicable.* The proposed project would not inhibit SCAG from encouraging regional economic prosperity and global competitiveness. |
| Improve mobility, accessibility, reliability, and travel safety for people and goods. | *Not applicable.* The proposed project would not inhibit SCAG from strengthening the regional transportation network for goods movement. |
| Enhance the preservation, security, and resilience of the regional transportation system. | *Not applicable.* The proposed project would not inhibit SCAG from enhancing the resilience of the regional transportation system. |
| Increase person and goods movement and travel choices within the transportation system. | *Not applicable.* The proposed project would not inhibit SCAG from increasing person and goods movement and travel choices within the transportation system. |
| Reduce greenhouse gas emissions and improve air quality. | *No conflict.* The proposed project would result in criteria air pollutant and GHG emissions during construction and operation. However, as presented in Section 3.2, the proposed project would not exceed the SCAQMD mass daily significance thresholds during construction or operation. GHG emissions would be reduced through compliance with applicable CALGreen standards. |
| Support healthy and equitable communities. | *No conflict*. A desert landscape design is proposed throughout the project site including water cascades, multiple pools, rock escarpments, and fountains. Landscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network. |
| Adapt to a changing climate and support an integrated regional development pattern and transportation network. | *Not applicable.* The proposed project would not inhibit SCAG from supporting an integrated regional development pattern and transportation network. |
| Leverage new transportation technologies and data-driven solutions that result in more efficient travel. | *Not applicable.* The proposed project would not inhibit SCAG from leveraging technology for the transportation system. |
| Encourage development of diverse housing types in areas that are supported by multiple transportation options. | *Not applicable.* The proposed project does not include traditional housing, but rather would operate as time-share properties, and would not inhibit SCAG from encouraging development of diverse housing types. |
| Promote conservation of natural and agricultural lands and restoration of habitats. | *No conflict.* The project site is vacant with dirt covering the majority of the site. The proposed project will provide approximately 35% open space made up of landscape areas, pools, water features, and paths. A desert landscape design is proposed throughout the |

**Table 8-4**
**Project Consistency with the SCAG Connect SoCal RTP/SCS**

| RTP/SCS Measure | Proposed Project Potential to Conflict |
|---|---|
| | project site including water cascades, multiple pools, rock escarpments, and fountains. Landscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network. The proposed plant palette would comprise of native, drought-tolerant plantings, consistent with the existing hotel landscaping and surrounding areas. |

**Source:** SCAG 2020.

As shown in Table 8-4, the proposed project would be consistent with all applicable measures within the SCAG Connect SoCal RTP/SCS.

### California Air Resources Board Scoping Plan and Reduction Goals

The Climate Change Scoping Plan, approved by CARB in 2008 and updated in 2014 2017, and 2022, provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs.

The 2022 Scoping Plan outlines the state's plan to reach carbon neutrality by 2045 or earlier, while also assessing the progress the state is making toward achieving GHG reduction goals by 2030. Per the Legislative Analyst's Office, the 2022 Scoping Plan identifies a more aggressive 2030 GHG goal. As it relates to the 2030 goal, perhaps the most significant change in the 2022 plan (as compared to previous Scoping Plans) is that it identifies a new GHG target of 48% below the 1990 level, compared to the current statutory goal of 40% below. Current law requires the state to reduce GHG emissions by at least 40% below the 1990 level by 2030 but does not specify an alternative goal. According to CARB, a focus on the lower target is needed to put the state on a path to meeting the newly established 2045 goal, consistent with the overall path to 2045 carbon neutrality. The carbon neutrality goal requires CARB to expand proposed actions from only the reduction of anthropogenic sources of GHG emissions to also include those that capture and store carbon (e.g., through natural and working lands, or mechanical technologies). The carbon reduction programs build on and accelerate those currently in place, including moving to zero-emission transportation; phasing out use of fossil gas use for heating homes and buildings; reducing chemical and refrigerants with high GWP; providing communities with sustainable options for walking, biking, and public transit; displacement of fossil-fuel fired electrical generation through use of renewable energy alternatives (e.g., solar arrays and wind turbines); and scaling up new options such as green hydrogen (CARB 2022ib.

The 2022 Scoping Plan details "Local Actions" in Appendix D. The Local Actions includes recommendations intended to build momentum for local government actions that align with the State's climate goals, with a focus on local GHG reduction strategies (commonly referred to as climate action planning) and approval of new land use development projects, including through environmental review under CEQA. The recommendations provided in Appendix D are

non-binding and should not be interpreted as a directive to local governments, but rather as evidence-based analytical tools to assist local governments with their role as essential partners in achieving California's climate goals. Appendix D recognizes consistency with a CEQA-qualified GHG reduction plan such as a Climate Action Plan as a preferred option for evaluating potential GHG emission impacts under CEQA. Absent a qualified GHG reduction plan, Appendix D provides recommendations for key attributes that residential and mixed-use projects should achieve that would align with the State's climate goals including EV charging infrastructure, infill location, no loss or conversion of natural and working lands, transit-supportive densities or proximity to transit stops, reducing parking requirements, provision of affordable housing (20% of units), and all-electric appliances with no natural gas connection (CARB 2022i). Projects that achieve all key attributes are considered clearly consistent with the State's climate and housing goals and would have a less-than-significant GHG impact under CEQA. However, projects that do not achieve all attributes are not considered to result in a potentially significant GHG emission impact (CARB 2022i). A net-zero threshold and use of air district recommended thresholds of significance were two other CEQA thresholds Appendix D recommends.

The 2022 Scoping Plan reflects the 2030 target of a 40% reduction below 1990 levels codified by SB 32, and the 2045 target of carbon neutrality established by EO B-55-18 (AB 1279), as detailed in Section 4.6.2, Regulatory Requirements, above. Per the 2022 Scoping Plan, empirical evidence shows that residential development projects that are consistent with these project attributes to reduce GHG emissions will accommodate growth in a manner that aligns with the GHG and equity goals of SB 32. As detailed above, absent a qualified GHG reduction plan, Appendix D of the CARB Scoping Plan provides recommendations for key attributes that residential and mixed-use projects should achieve that would align with the State's climate goals. (CARB 2022b. The proposed project would involve the construction of 106 residential suites, hotel villas, event spaces, commercial spaces, and an amenity space totaling 236,748 square feet. However, the 106 residential suites are anticipated to be treated as a time-share home in which residents are allowed to live at the residence only during a specified time frame. Therefore, the project's operation is more in line with a commercial hotel use than a traditional residential project. As such the Scoping Plan Appendix D recommendations for residential and mixed-use projects are not appropriate for the project.

Nevertheless, many of the measures and programs included in the Scoping Plan would result in the reduction of project-related GHG emissions with no action required at the project-level, including GHG emission reductions through increased energy efficiency and renewable energy production (SB 350), reduction in carbon intensity of transportation fuels (LCFS), and the accelerated efficiency and electrification of the statewide vehicle fleet (Mobile Source Strategy).

The Project would provide EV charging infrastructure that, meets the California Green Building Standards Code. The Project site is surrounded by the existing Ritz Carlton facilities to the north and existing residential single-family homes to the south. The site has nearby access through Frank Santra Drive and access to existing utilities and essential public services. As discussed in the Utilities and Service Systems section of the Initial Study, the proposed project would connect to existing electric, natural gas, and telecommunication lines and facilities within and adjacent to the project site. The proposed project does not propose uses that would be expected to

generate an excessive need for these facilities such that construction or relocation would be required.

Overall, the Project would comply will all regulations adopted in furtherance of the Scoping Plan to the extent applicable and required by law. As demonstrated above, the proposed Project would not conflict with CARB's 2022 Scoping Plan updates and with the state's ability to achieve the GHG reduction and carbon neutrality goals. Further, the Project's consistency with the applicable measures and programs would assist in meeting the City's contribution to GHG emission reduction targets in California. Based on the considerations previously outlined, the Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

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The proposed project would not interfere with implementation of GHG reduction goals for 2030 or 2045 because it would not conflict with the SCAG RTP/SCS or with the state's trajectory toward future GHG reductions. Therefore, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs; therefore, impact would be **less than significant**.

## 8.3 Mitigation Measures

No mitigation measures required.

Intentionally left blank

## 9. HAZARDS AND HAZARDOUS MATERIALS

| **HAZARDS AND HAZARDOUS MATERIALS** -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☐ | ☐ | ☒ | ☐ |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | ☐ | ☐ | ☒ | ☐ |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ☐ | ☐ | ☐ | ☒ |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | ☐ | ☐ | ☒ | ☐ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area? | ☐ | ☐ | ☐ | ☒ |

| HAZARDS AND HAZARDOUS MATERIALS -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☒ | ☐ |
| g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires? | ☐ | ☐ | ☒ | ☐ |

## 9.1 Setting

The analysis in this section of the Initial Study is based on a Phase I Environmental Site Assessment for the project site, included as Appendix I of this Initial Study.

### Current Operational Activities

The proposed project is currently a vacant full service hospitality facility and is undergoing renovation and new construction activities. No noteworthy tenants occupy the proposed project and no environmentally significant operations are conducted at the proposed project. Considering the current operations assessed at the proposed project, no environmental permits, registrations, or notifications appear to be required.

An inactive dry-cleaning machine is located in the commercial laundry at the project site. The dry-cleaning machine is identified as an Aero-Tech Green Jet Dry-Wetcleaning Machine, Model #DWC-45. The dry-cleaning machine uses DWX-44 Dry-Cleaning Solution, a water-based, non-toxic solution, instead of perchloroethylene (PCE). Currently available information indicates the use of DWX-44 Dry-Cleaning Solution is highly unlikely to impact the proposed project when properly used. DWX-44 Dry-Cleaning Solution does not contain chlorinated hydrocarbons (such as PCE) and wastes generated in the process would not be classified as hazardous. Material Safety Data Sheet (MSDS) information for DWX-44 confirms that this substance contains no ingredients identified as Hazardous Substances according to SARA Hazard Title III, Section 313 - CFR-355. The existing dry-cleaning machine is associated with the ongoing renovation, is new equipment which has never been used, and appeared to be empty at the time of EMG's site visit. Copies of a specification sheet and brochure for the Green jet Dry-Wetcleaning Machine, as well as the MSDS sheet for DWX-44 and a Laundry Plan showing the location of the dry cleaning machine, have been appended as supporting documents (Appendix I).

No information was identified to confirm whether dry cleaning was previously conducted on-site between 1988 and the time of closure in 2006. Based on the historical use as a full-service Ritz Carlton, it is somewhat likely that a dry cleaning plant, which possibly operated an older PCE machine, was formerly located on-site. By its chemical nature, PCE has the potential to penetrate through concrete

and impact subsurface conditions. However, any such dry cleaning facility would have operated since the promulgation of RCRA in 1986, the legislation that regulates the handling and disposal of hazardous materials and wastes. As such, waste handling and disposal practices would have been regulated since the facility's inception. Furthermore, because the laundry is underlain by two levels of parking garage and not the earth, it is unlikely that subsurface conditions would have been impacted as a result of any historical dry cleaning plant operations in this area.

### *Hazardous Materials/Petroleum Products Storage and Handling*

Visual observation for the use and/or storage of hazardous materials and petroleum products was performed. The following hazardous materials and petroleum products were identified:

- Routine construction and maintenance supplies (i.e. adhesives, sealants, paints, etc. were observed at the proposed project in retail-sized containers.
- Diesel fuel is stored in an integral belly tank associated with the backup generator.
- Cooling system water treatment chemicals are maintained in poly drums located in the central plant and cooling tower areas in association with routine operation and upkeep of the cooling equipment.

The identified chemicals, materials, and products were observed in their sealed, original containers and in designated storage areas. Materials appeared to be properly stored. No evidence of spills or staining was observed. In addition, the concrete surfaces appeared intact, and no cracks were observed in the areas of product storage/usage.

### *Waste Generation, Treatment, Storage, and Disposal*

Visual observation for the generation, treatment, storage, and disposal of wastes was performed. The following wastes were identified:

- Municipal trash is stored in the compactor or roll-off debris boxes (when appropriate) and disposed of by contracted waste haulers.
- Domestic sewage is disposed of to the municipal sanitary sewer system.

No evidence of spills or staining was observed in the area of waste generation or pre-disposal storage. In addition, the concrete surfaces appeared intact, and no cracks were observed in the areas of waste generation or pre-disposal storage. No excessive odors or overflowing/excessive ground trash were noted in the vicinity of the compactor or debris boxes. No hazardous, regulated, or medical wastes were noted in the compactor or debris boxes. No wastewater discharge that would require permitting through local or state regulator agencies was identified at the proposed project. No current or former septic systems or drywells were identified at the proposed project.

## 9.2 Discussion of Impacts

a) ***Less-than-Significant Impact.*** Construction of the proposed project would require the transport of potentially hazardous materials including but not limited to fuels, lubricants, and various other liquids needed for operation of construction equipment. Proper BMPs and hazardous materials handling protocols would be prepared and implemented to ensure safe storage, handling,

transport, use, and disposal of all hazard materials during the construction phase of the proposed project. Construction would also adhere to any local standards set forth by the City, as well as state and federal health and safety requirements that are intended to minimize hazardous materials risk to the public, such as the California Occupational Safety and Health requirements, Hazardous Waste Control Act, California Accidental Release Prevention Program, and the California Health and Safety Code. Furthermore, all construction waste, including trash, litter, garbage, solid waste, petroleum products, and any other potentially hazardous materials would be removed and transported to a permitted waste facility for treatment, storage, or disposal. Use of these materials during construction for their intended purpose would not pose a significant risk to the public or the environment. Therefore, impacts related to routine transport, use, or disposal of hazardous materials during construction would be **less than significant**.

The proposed project would involve development of residential land uses, event space, restaurant, and associated landscaping and facilities. During operation of the proposed project, use of hazardous materials would primarily involve the private use of commercially available cleaning products, landscaping chemicals and fertilizers, and various other commercially available substances. According to the 2006 DEIR for the Lodge Expansion Project, the existing hotel site operates an approximately 825 square foot dry cleaning facility on-site, and stores approximately 20 to 30 gallons on average of dry-cleaning chemicals on-site. Wastes generated from this facility are also limited to an average of approximately 20 to 30 gallons and are stored on-site for approximately three months until hauled off-site by a licensed waste management hauler.

These substances are required to comply with relevant federal, state, and local health and safety laws, which are intended to minimize health risk to the public associated with hazardous materials. Therefore, impacts related to routine transport, use, or disposal of hazardous materials during operation would be **less than significant**.

b) ***Less-than-Significant Impact:*** As discussed in Threshold 9 (a), a variety of hazardous substances and wastes typical to standard construction projects would be stored and used on the project site during construction of the proposed project. Accidental spills, leaks, fires, explosions, or pressure releases involving hazardous materials represent a potential threat to human health and the environment. During both construction and operation of the proposed project, there is potential for release of hazardous materials related to storage, transport, use, and disposal from construction debris, landscaping, and commercial products. However, the proposed project would be required to adhere to federal, state, and local laws, such as the California Occupational Safety and Health requirements, Hazardous Waste Control Act, California Accidental Release Prevention Program, and the California Health and Safety Code, which are intended to minimize risk to public health associated with hazardous materials. Therefore, impacts would be **less than significant**.

c) ***No Impact.*** No schools are located within 0.25 miles of the project site. The nearest school, Cathedral City Elementary, is located approximately 2.5 mile north of the project site. **No impact** would occur.

d) ***Less-than-Significant Impact.*** The 2012 Phase I ESA of the project site discusses the regulatory database report from Environmental Data Resources, Inc. (EDR), which determines if the

proposed project is a listed regulatory site and whether there are any mappable regulatory database sites. The following databases were reviewed for this assessment; NPL, Proposed NPL, NPL LIENS, Delisted NPL, CERCLIS, CERCLIS-NFRAP, CORRACTS, RCRA-TSDF, RCRA-LQG, RCRA-SQG, RCRA-CESQG, US ENG CONTROLS, US INST CONTROL, ERNS, FINDS, SWF, LUST, INDIAN LUST, UST, AST, US BROWNFIELDS, ENVIROSTOR, SLIC, RESPONSE, VCP, HIST CAL-SITES, TOXIC PITS, Notify 65, and Indian Reserve. Details on each of these databases can be found in Appendix I.

According to the database report, the project site is listed on the CHMIRS and RCRA-SQG databases. The CHMIRS listing does not constitute a Recognized Environmental Condition (REC) because of the small-scale nature of the incident. The Riverside County Fire Department responded to a solo vehicle accident on the road in front of the project site that resulted in the release of approximately one gallon of diesel fuel from a truck's saddle tank.

Information on the RCRA-Generators database indicates that the proposed project was identified as a Small Quantity Generator of hazardous wastes in 1992, likely related to wastes generated during construction or renovation activities. The type of hazardous waste generated was not identified in the database listing. The database indicates that there are no violations associated with the RCRA-Generator listing. The RCRA-Generator database is a listing of facilities that are required to register for tracking purposes due to the amount of hazardous waste generated and are not necessarily sites with reported contamination incidents.

There are no EnviroStor facilities listed within a 0.5-mile distance of the project site. Based on the databased report discussed above, the proposed project would not create a significant to the public or the environment, and impacts would be **less than significant**.

e) ***No Impact.*** The proposed project is not located within 2 miles of a public airport, nor is it located within an airport land use plan. The nearest airport is Palm Springs International Airport, located approximately 6 miles away. Therefore, because the site is not located within an airport land use plan or within 2 miles of a public/public use airport, there would be **no impacts**.

f) ***Less-than-Significant Impact.*** The City participates in the Riverside County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). The proposed project would not interfere with the City's emergency plans. The City's main evacuation routes are the Interstate 10 (I-10) and Highway 111 (City of Rancho Mirage 2017). Access to these evacuation routes and all local roads would be maintained during construction and operation of the proposed project. Emergency procedures or design features required by federal, state, or City regulations would be implemented as appropriate during construction and/or operation. Maintaining access along all local roads during construction would minimize the potential for traffic conflicts with designated evacuation routes, and implementation of emergency procedures would minimize the potential for interference with an adopted emergency response plan. The proposed project would be constructed over the course of three years and would not impede access to local roadways or evacuation routes. The operation of the hotel would not induce a substantial increase in traffic, as none of the newly constructed residences will have permanent year-round residents and special events at the event spaces would abide by the special events traffic and parking plan to be prepared by the applicant. Therefore, impacts resulting from the proposed project would be **less than significant**.

g) ***Less-than-Significant Impact.*** According to Exhibit 27 of the City's General Plan Safety Element, the project site is located within a moderate fire threat zone and is adjacent to a high fire threat zone (City of Rancho Mirage 2017). However, the City's General Plan Safety Element also notes that "the historical record indicates that the wildland fire hazard in Rancho Mirage is relatively low" (City of Rancho Mirage 2017).

The types of potential ignition sources that currently exist in the area include vehicle and roadway, electrical transmission line, and machinery associated with various land uses in the vicinity, as well as off-site residential neighborhoods. The proposed project would introduce potential ignition sources but would also include conversion of fuels to lower flammability landscape and include better access throughout the site, managed and maintained landscapes, higher site awareness/monitoring, and generally a reduction in the receptiveness of the areas landscape to ignition. Fires from off-site would not have continuous fuels across this site, and therefore, would be expected to burn around and/or over the site through spotting. Burning vegetation embers may land on project structures but are not likely to result in ignition based on ember decay rates and the types of non-combustible and ignition resistant materials that will be used on site.

The proposed project would comply with ignition resistant fire and building codes and would include a layered fire protection system designed to current codes and inclusive of site-specific measures that will result in a project that is less susceptible to wildfire than surrounding landscapes and that would facilitate fire fighter and medical aid response. Further, modern infrastructure will be provided along with implementation for the latest ignition resistant construction methods and materials. All structures are required to include interior sprinklers consistent with City of Rancho Mirage and County of Riverside Fire and Building Codes. Fuel modification areas receive fuel reduction treatments initially, and then maintenance over time includes removing all dead and dying materials and maintaining appropriate horizontal and vertical spacing.

By complying with all fire-related codes, the proposed project would not expose people or structures to a significant risk, injury, or death involving wildland fires. As such, impacts would be **less than significant**.

## 9.3 Mitigation Measures

No mitigation measures required.

## 10. HYDROLOGY AND WATER QUALITY

| **HYDROLOGY AND WATER QUALITY** - - Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality? | ☐ | ☐ | ☒ | ☐ |
| b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin? | ☐ | ☐ | ☒ | ☐ |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: | ☐ | ☐ | ☒ | ☐ |
| i) result in substantial erosion or siltation on or off site; | ☐ | ☐ | ☒ | ☐ |
| ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site; | ☐ | ☐ | ☒ | ☐ |
| iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or | ☐ | ☐ | ☒ | ☐ |
| iv) impede or redirect flood flows? | ☐ | ☐ | ☒ | ☐ |

| HYDROLOGY AND WATER QUALITY - - Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation? | ☐ | ☐ | ☐ | ☒ |
| e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan? | ☐ | ☐ | ☒ | ☐ |

## 10.1 Setting

Part of the following analysis is based on the information provided in the Preliminary Drainage Study for Ritz Carlton Rancho Mirage report, prepared by Tory R. Walker Engineering. The report is included as Appendix D to the Initial Study.

### Summary of Existing Conditions

#### *The Residences*

The majority of the existing site is mass graded and there is little to no vegetative cover. The total drainage area of the project site is approximately 14 acres with Hydrologic Soil Group Type B soils. The soil type was assumed based on the proposed project's geotechnical study (the proposed project is not mapped by the Riverside County hydrology manual or the NRCS Web Soil Survey). Hydrologic Soil Group Type B soils have moderately low runoff potential when thoroughly wet. They also have between 10% and 20% clay and 50% to 90% sand and have loamy sand or sandy loam textures (USDA 2007).

On-site runoff is conveyed via sheet flow and shallow drainage courses to the proposed project's discharge points along the western and eastern property boundary (Figure 10-1a). The existing site is divided into three basins, Basin 100 (denoted by 100 series nodes), Basin 200 (denoted by 200 series nodes), and Basin 300 (denoted by 300 series nodes). Basin 100 drains generally west to the gutter on Frank Sinatra Drive (Discharge Point 1) (Figure 10-1a). From Discharge Point 1, flow is conveyed north in the Frank Sinatra Drive gutter to an existing inlet and storm drain system, which eventually discharges to a natural drainage channel. Basin 200 drains generally east to Discharge Point 2 in the natural drainage channel located east of the site. Basin 300 drains west to Discharge Point 3 at the Mirada Circle gutter, which flows west and eventually discharges to a natural drainage channel.

#### *Sky Mesa Recreational Area*

The existing site is partially graded with generally poor desert vegetative cover. The total drainage area of the project site is approximately 2.6 acres with Hydrologic Soil Group Type B soils. The soil type was

assumed based on the proposed project's geotechnical study (the proposed project is not mapped by the Riverside County hydrology manual or the NRCS Web Soil Survey).

On-site runoff is conveyed via sheet flow and shallow drainage courses to the proposed project's discharge points along the western property boundary (Figure 10-1b). The existing site is divided into two basins, Basin 400 (denoted by 400 series nodes), and Basin 500 (denoted by 500 series nodes). Basin 400 drains generally west to the existing Ritz Carlton development (Discharge Point 4). Basin 500 drains northwest to Discharge Point 5 in the existing natural drainage channel west of the site.

## 10.2 Discussion of Impacts:

a) ***Less-than-Significant Impact:*** Construction activities associated with the proposed project could result in wind and water erosion of the disturbed area leading to sediment discharges. Similarly, as described in Section 9, Hazards and Hazardous Materials, fuels, oils, lubricants, and other hazardous substances used during construction could be released and impact water quality. The proposed project is required to comply with the NPDES State Water Resources Control Board Construction General Permit Order No. 2009-0009-DWQ for stormwater discharges and general construction activities and incorporate standard BMPs such as regular cleaning or sweeping of construction areas and impervious areas, and various stormwater BMPs such as filtration media screens. In compliance with the Construction General Permit, a SWPPP would be prepared that specifies BMPS that would be implemented during construction to minimize impacts to water quality. Therefore, impacts would be **less than significant**.

b) ***Less-than-Significant Impact:*** The proposed project would not utilize groundwater during construction or operation. According to the 2006 Geotechnical Report, the depth of groundwater in the vicinity of the project site is believed to be greater than 200 feet. As such, impacts to groundwater supplies would be **less than significant**.

c) i. ***Less-than-Significant Impact:*** The majority of the existing site is mass graded and there is little to no vegetative cover. The total drainage area of the project site is approximately 14 acres with Hydrologic Soil Group Type B soils. The soil type was assumed based on the proposed project's geotechnical study (the proposed project is not mapped by the Riverside County hydrology manual or the NRCS Web Soil Survey). On-site runoff is conveyed via sheet flow and shallow drainage courses to the proposed project's discharge points along the western and eastern property boundary (see Existing Condition Hydrology Map in Appendix D). As shown on the Existing Condition Hydrology Map, the site is divided into three drainage basins, one draining west to the gutter and storm drain system on Frank Sinatra Drive, one draining east to the natural drainage channel located east of the site, and one draining west to the Mirada Circle gutter, which flows west and eventually discharges to a natural drainage channel.

The proposed project includes residential condo and townhome type buildings, road, driveway, parking, patio, and landscaped areas. The project site will be divided into three major drainage basins such that the overall site drainage patterns will remain similar to the existing condition (Proposed Condition Hydrology Map in Appendix D). The development will increase the impervious area and the drainage area; therefore, underground detention vaults are proposed to manage the increase in peak flow to below existing levels.

The Sky Mesa Recreation Area includes a restaurant with roof top garden (built into the natural hillside), driveway, patio, pool, sidewalk, lawn, and desert landscape areas. The project site will be divided into two major drainage basins such that the overall site drainage patterns will remain similar to the existing condition. The proposed project reduces the average on-site slope, maximizes pervious area by incorporating roof top garden areas for the restaurant, and provides extensive landscape areas throughout the site. Therefore, no increase in peak flow rates is anticipated in the proposed condition.

As such, the proposed project would not substantially alter the existing drainage pattern such that substantial erosion would occur on or off site. Therefore, impacts would be **less than significant**.

c) ii. ***Less-than-Significant Impact:*** With implementation of the proposed project, the flow patterns of the site will largely stay the same. The proposed project would implement underground detention vaults. Detention basin analysis was conducted for each of the detention vaults. The Drainage study found that the outflows for 100-year storm events at the discharge points will be reduced by 0.13 cubic feet per second, offsetting the 1.52 cubic feet per second increase that would have occurred without detention. As such, the proposed project would not substantially alter the existing drainage patterns such that it would increase flooding on or off site. Impacts would be **less than significant**.

c) iii. ***Less-than-Significant Impact:*** Refer to responses in Threshold 10(c)(ii) and 10(c)(iii). The Drainage Study (Appendix D) that was prepared for the proposed project concluded that, during operation, the flow patterns of the site will largely stay the same with implementation of the proposed project. Although the proposed project would increase the amount of impervious surface at the site compared to existing conditions, this increase would not be significant. Further, underground detention vaults would be implemented as part of the proposed project to ensure runoff from large storm events would not exceed the capacity of the stormwater drainage system. As such, impacts would be **less than significant**.

c) iv. ***Less-than-Significant Impact:*** According to Exhibit 26 of the City's General Plan Safety Element (City of Rancho Mirage 2017), the project site is not located in any type of flood zone as defined by the Flood Emergency Management Agency (FEMA). According to FEMA, the project site is located within Zone X, or an area of minimal flood hazard (FEMA n.d.). Refer to the responses above regarding proposed stormwater facilities per the Drainage Study. Impacts would be **less than significant**.

d) ***No Impact:*** Refer to response to Threshold 10(c)(iv). The proposed project would not be located within a 100-year flood hazard area (City of Rancho Mirage 2017). The project site is located approximately 100 miles inland from the Pacific Ocean and therefore would not be subject to tsunami inundation. Further, the project site is not located near a large standing body of water. The closest body of water is the Whitewater River, located approximately 0.66 miles to the northwest. Thus, inundation by seiche (or standing wave) is considered negligible. As such, **no impact** would occur.

e) ***Less-than-Significant Impact:*** A drainage study has been prepared for the proposed project and incorporated into project design, as discussed previously. The drainage study and project designs has been prepared consistent with the requirements of the City's BMP Design Manual, consistent with the requirements of the Santa Ana Regional Water Quality Control Board

(RWQCB) Order No. RB8-2010-003 (Regional MS4 Permit). The City of Rancho Mirage, along with other Riverside County cities within the Santa Ana RWQCB and Riverside County, voluntarily applied for and received a permit to discharge stormwater to the Santa Ana River (Order No. R8-2002-0011, NPDES No. CAS 618033). This MS4, originally approved in 1990, is currently under review for its fourth term re-issuance by the Santa Ana RWQCB. The City's MS4 permit regulates activities related to the quality of discharge through the stormwater management program.

The proposed project would be required to comply with all applicate plans, including policies and programs referred in the City's General Plan Safety element, such as establishing and enforcing regulations and guidelines for the development and maintenance of project-specific on-site retention/detention basin that implement the NPDES program, enhance groundwater recharge, complement regional flood control facilities, and address applicable community design policies. The proposed project would not conflict of obstruct with the applicable water quality plans. Additionally, as described above, the proposed project would not interfere with groundwater recharge or use. Therefore, impacts would be **less than significant**.

## 10.3 Mitigation Measures

No mitigation measures required.

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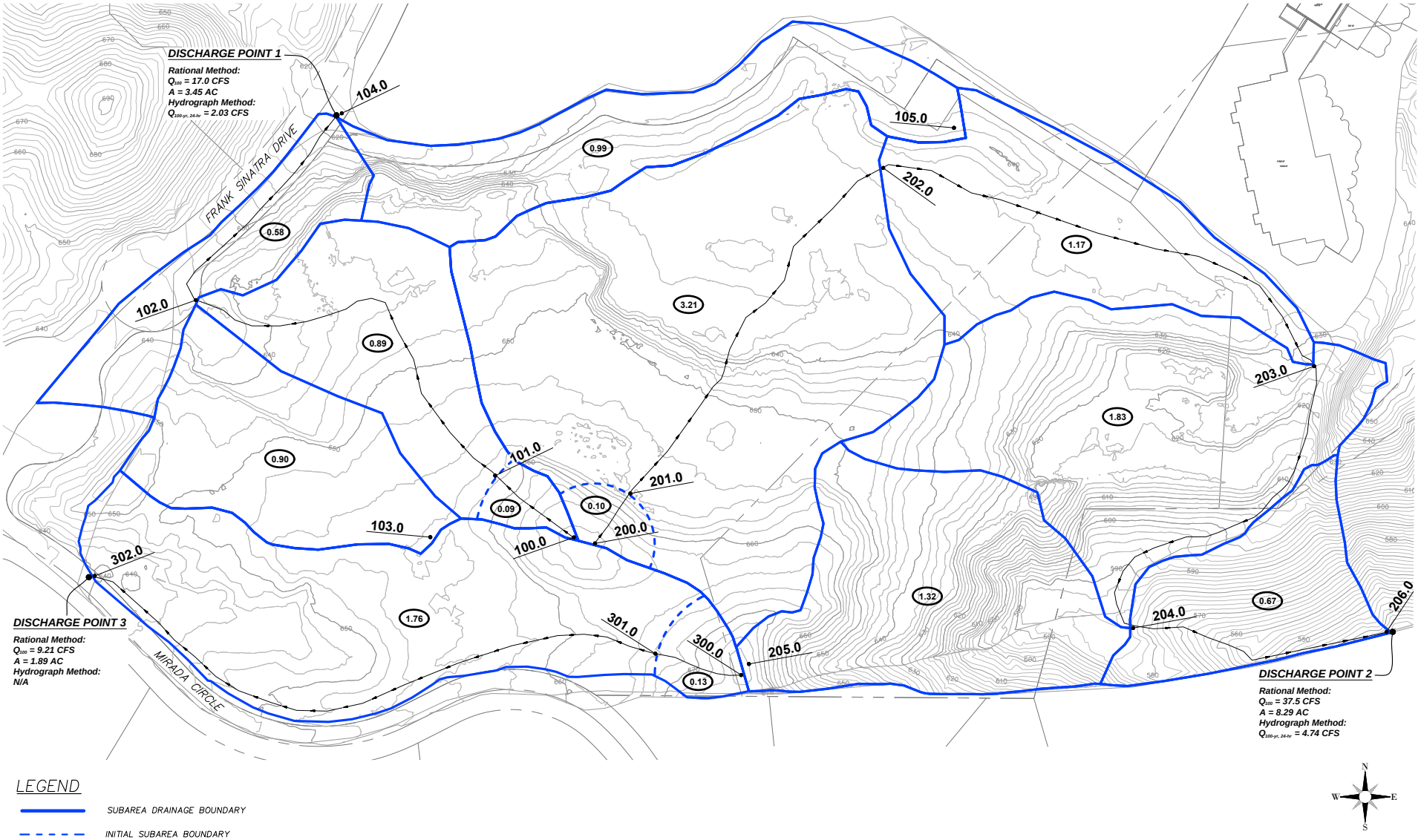


SOURCE: Tory R. Walker Engineering 2019

**FIGURE 10-1a**

Existing Conditions Hydrology Map for Residences at Ritz Carlton

Ritz-Carlton Rancho Mirage Initial Study

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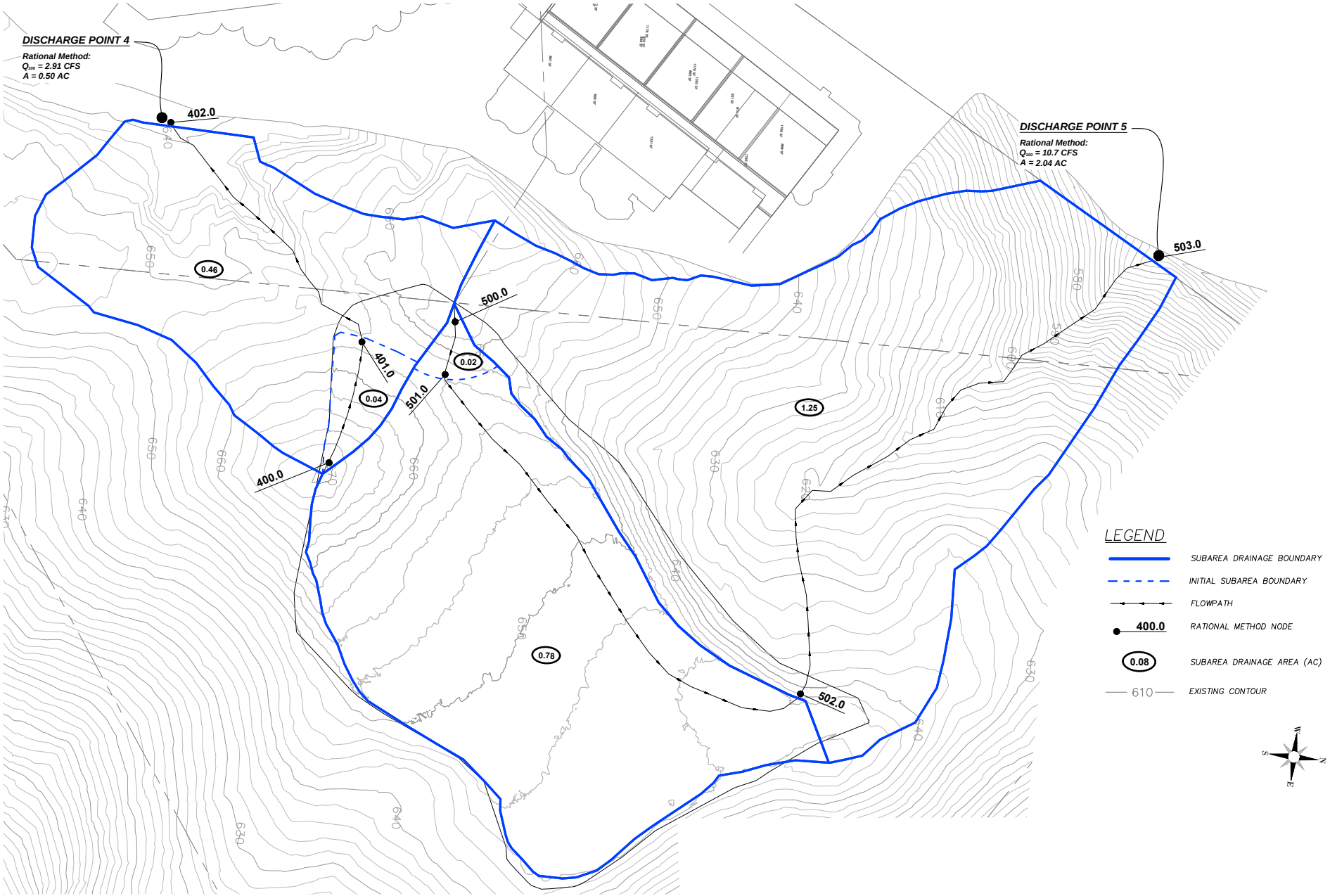


SOURCE: Tory R. Walker Engineering 2019

**FIGURE 10-1b**

Existing Conditions Hydrology Map for Sky Mesa Recreational Area

Ritz-Carlton Rancho Mirage Initial Study

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# 11. LAND USE AND PLANNING

| **LAND USE AND PLANNING** - Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Physically divide an established community? | ☐ | ☐ | ☐ | ☒ |
| b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect? | ☐ | ☐ | ☒ | ☐ |

## 11.1 Setting

The project site is situated on all or portions of Assessor parcel numbers 689-330-026, -28, -32 which have a General Plan Land Use designation of Commercial: Resort Hotel (Rs-H) and also on parcels 689-020-012, -14 carrying an Open Space: Mountain Reserve (MR) designation.

The project site is surrounded open space to the north, northeast, east, and west and residential to the south and northwest.

## 11.2 Discussion of Impacts

a) ***No Impact:*** The proposed project would be located entirely within the 16.13-acre project site, which is currently vacant. None of the proposed project components would potentially block or impede movements between surrounding established communities. **No impact** would occur.

b) ***Less-than-Significant Impact:*** The project site is currently zoned Resort Hotel (Rs-H) and Open Space: Mountain Reserve (MR) in the General Plan (City of Rancho Mirage 2017). The proposed hotel suites and villas are located on the Rs-H zoned property and therefore consistent with the General Plan designation. This designation allows for the development of hotels and destination resorts with limited, ancillary commercial uses, such as spas, recreational facilities, restaurants, lounges, and small retail shops that directly support the primary use. The

Sky Mesa is located on the MR zoned portion of the project site which is assigned to public lands or property subject to conservation easements in the Santa Rosa Mountains. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation. Under existing conditions, the Sky Mesa portion of the project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning to encompass the Sky Mesa portion of

the site, which is a privately owned property and not public land. As noted above, the MR zone was adopted for the purposed of avoiding or mitigating possible impacts on sensitive biological resources. As discussed In Section 4, Biological Resources, the proposed project could result in significant impacts sensitive biological resources related to the Sky Mesa Recreation Area; implementation of mitigation measures **MM-BIO-1** through **MM-BIO-6** would reduce potentially significant impacts related to burrowing owl, sensitive reptiles and other wildlife, and compliance with the CVMSHCP, to a level below significance. As such, rezoning the Sky Mesa site from MR to Rs-H would not conflict with the City's land use policy of protecting sensitive biological resources.

Per the description of allowable uses for Rs-H outlined above, the Sky Mesa Recreation Area would be consistent with Rs-H zone. With future approval and adoption of the zone change by City Council, the proposed project would not conflict with the City's General Plan with regard to allowable land uses.

The project site is surrounded open space to the north, northeast, east, and west and residential to the south and northwest. Additionally, the existing Ritz Carlton Resort is located directly north of the site proposed for the Ritz Carlton residences and directly west of the site proposed for the Sky Mesa Recreation Area. As such, the project's proposed uses would be compatible with nearby land uses. The proposed project would be required to comply with the goals and policies of the General Plan and the City's zoning codes.

The General Plan, Land Use Element contains several goals applicable to the proposed project, including providing a resort residential community of desirable neighborhoods, a variety of community facilities, and high-quality development, meeting the City's future needs by providing high-quality commercial land uses distributed throughout Rancho Mirage, preserving the scenic viewsheds from adjoining properties and public rights-of-ways, and utilizing flexible development policies to provide quality amenities within open space. The proposed project would place residential suites, hotel villas, event space, commercial, and amenity space on a previously disturbed site with similar surrounding land uses. The proposed project would include high quality design for resort living, quality commercial uses, and open space amenities while preserving existing viewsheds and scenic resources. Thus, the proposed project would not conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Project implementation would not result in significant physical environmental impacts related to land use plan or zoning inconsistencies. Impacts would be **less than significant**.

## 11.3 Mitigation Measures

No mitigation measures required.

## 12. MINERAL RESOURCES

| **MINERAL RESOURCES** -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | ☐ | ☐ | ☐ | ☒ |
| b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | ☐ | ☐ | ☐ | ☒ |

### 12.1 Setting

The City is located in the Palm Springs Production-Consumption (P-C) Zone according to the Department of Conservation (DOC 2007). The project site is located on Mineral Resource Zone (MRZ)-3.

### 12.2 Discussion of Impacts

a, b) ***No Impact:*** The project site is located on MRZ-3, which is defined as areas containing known or inferred mineral occurrences of undetermined mineral resource significance. Additionally, no mineral resource recovery site is delineated in the City's General Plan. Therefore, **no impact** to locally important mineral resources would occur.

### 12.3 Mitigation Measures

No mitigation measures required.

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13. NOISE

| **NOISE** -- Would the project result in: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☐ | ☒ | ☐ |
| b) Generation of excessive groundborne vibration or groundborne noise levels? | ☐ | ☒ | ☐ | ☐ |
| c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |

## 13.1 Setting

This section is based upon the Ritz-Carlton Residences Noise Impact Analysis (noise report) prepared by Urban Crossroads. The noise report and a subsequent noise memo is included as Appendix E-1 and E-2 to this Initial Study. Background and methodologies regarding the noise analysis are found in Appendix E-1.

To assess the existing noise level environment, 24-hour noise level measurements were taken at five locations in the project site (Figure 13-1). The noise level measurements were collected by Urban Crossroads, Inc. on Thursday, December 5, 2019.

### Significance Criteria Summary

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. While the City of Rancho Mirage General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at

which increases are considered substantial for use under Guideline A. CEQA Appendix G Guideline C applies to nearby public and private airports, if any, and the proposed project's land use compatibility.

Noise Impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 13.1, Significance Criteria Summary, shows the significance criteria summary matrix.

**Table 13-1. Significance Criteria Summary**

| Analysis | Receiving Land Use | Condition(s) | Significance Criteria | |
|---|---|---|---|---|
| | | | ***Daytime*** | ***Nighttime*** |
| Off-Site Traffic[1] | Noise-Sensitive | If ambient is < 60 dBA CNEL | ≥ 5 dBA CNEL Project increase | |
| | | If ambient is 60 - 65 dBA CNEL | ≥ 3 dBA CNEL Project increase | |
| | | If ambient is > 65 dBA CNEL | ≥ 1.5 dBA CNEL Project increase | |
| | Non-Noise Sensitive | If ambient is < 70 dBA CNEL | ≥ 5 dBA CNEL Project increase | |
| | | If ambient is > 70 dBA CNEL | ≥ 3 dBA CNEL Project increase | |
| Operational | Residential | Exterior Noise Level Standards | See Table 3-1 | |
| | | If ambient is < 60 dBA $L_{eq}$ | ≥ 5 dBA $L_{eq}$ Project increase | |
| | | If ambient is 60 - 65 dBA $L_{eq}$ | ≥ 3 dBA $L_{eq}$ Project increase | |
| | | If ambient is > 65 dBA $L_{eq}$ | ≥ 1.5 dBA $L_{eq}$ Project increase | |
| Construction | Noise Sensitive | Permitted between 7:00 a.m. to 6:00 p.m. Monday to Saturdays; with no activity allowed on Sundays or holidays. | | |
| | | Noise Level Threshold | 85 dBA $L_{eq}$ | n/a |
| | | Vibration Level Threshold | 80 VdB | n/a |

**Source:** Appendix E-1

## Existing Noise Level Measurements

To assess the existing noise level environment, 24-hour noise level measurements were taken at three locations in the project site (L1, L2, and L3) (Figure 13-1). The receiver locations were selected to describe and document the existing noise environment within the project site. Figure 13-1 provides the boundaries of the proposed project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Thursday, December 5th, 2019. ~~Appendix E~~Appendix E-1 includes study area photos.

### *Measurement Procedure and Criteria*

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013.

### *Noise Measurement Locations*

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources. Further, FTA guidance states, that it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the proposed project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community.

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after proposed project noise levels and is necessary to assess potential noise impacts due to the proposed project's contribution to the ambient noise levels.

### *Noise Measurement Results*

The noise measurements presented below focus on the average or equivalent sound levels ($L_{eq}$). The equivalent sound level ($L_{eq}$) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 13-1, Significance Criteria Summary, identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. ~~Appendix E~~Appendix E-1 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels north of the project site near existing Villas of Mirada single-family homes and dirt parking lot. The noise levels at this location consist primarily of parking lot vehicle movements from dirt lot to the south. The energy (logarithmic) average

daytime noise level was calculated at 49.7 dBA $L_{eq}$ with an average evening noise level of 46.7 dBA $L_{eq}$ and an average nighttime noise level of 44.1 dBA $L_{eq}$.

- Location L2 represents the noise levels near the eastern boundary of the project site near the existing Ritz-Carlton hotel and vacant land. The energy (logarithmic) average daytime noise level was calculated at 53.4 dBA $L_{eq}$ with an average evening noise level of 48.0 dBA $L_{eq}$ and an average nighttime noise level of 48.1 dBA $L_{eq}$. The noise levels at this location consist primarily of walkway activity around the Ritz-Carlton Rancho Mirage.
- Location L3 represents the noise levels by the western boundary of the project site near to the gated entrance of the Mirada Estates. The energy (logarithmic) average daytime noise level was calculated at 50.4 dBA $L_{eq}$ with an average evening noise level of 46.6 dBA $L_{eq}$ and an average nighttime noise level of 41.7 dBA $L_{eq}$. Traffic on Frank Sinatra Drive represents the primary source of noise at this location.

Table 13-1, Significance Criteria Summary, provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. ~~Appendix E~~Appendix E-1 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, $L_1$, $L_2$, $L_5$, $L_8$, $L_{25}$, $L_{50}$, $L_{90}$, $L_{95}$, and $L_{99}$ percentile noise levels observed during the daytime and nighttime periods.

The background ambient noise levels in the project site are dominated by surface street and parking lot activity. This includes the auto and heavy truck activities on study area roadway segments near the noise level measurement locations. The 24-hour existing noise level measurement results are shown on Table 13-2, 24-Hour ambient Noise Level Measurements.

**Table 13-2. 24-Hour Ambient Noise Level Measurements**

| Location[1] | Description | Energy Average Noise Level dBA $L_{eq}$)[2] | | |
|---|---|---|---|---|
| | | ***Daytime*** | ***Evening*** | ***Nighttime*** |
| L1 | Located north of the project site near the existing Villas of Mirada single-family homes and an open dirt parking lot. | 49.7 | 46.7 | 44.1 |
| L2 | Located near the eastern boundary of the project site near the existing Ritz-Carlton hotel and vacant land. | 53.4 | 48.0 | 48.1 |
| L3 | Located by the western boundary of the project site near to the gated entrance of the Mirada Estates. | 50.4 | 46.6 | 41.7 |

**Source:** ~~Appendix E~~Appendix E-1.
**Notes:**
1 See Figure 13-1 for the noise level measurement locations.
2 Energy (logarithmic) average levels. The long-term 24-hour measurement worksheets are included in ~~Appendix E~~Appendix E-1. "Day" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.

## Sensitive Receiver Locations

To assess the potential for long-term short-term construction noise impacts, the following sensitive receiver locations, as shown on Figure 13-2, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Receiver locations are located in outdoor living areas (e.g., backyards) at 10 feet from any existing or proposed barriers or at the building façade, whichever is closer to the project site, based on FHWA guidance, and consistent with additional guidance provided by Caltrans and the FTA. Sensitive receiver locations in the proposed project study area include the nearby residential uses, as described below. Other sensitive land uses in the project site that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

**R1**: Located approximately 591 feet north of the project site, R1 represents existing residential homes (1 Santa Rosa Mountain Lane) west of Frank Sinatra Drive. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

**R2**: Location R2 represents the Ritz-Carlton Rancho Mirage located northeast of the project site at roughly 66 feet. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

**R3**: Location R3 represents the existing residential homes (29 Grande View Court) on the south side of Mirada Circle at approximately 21 feet from the project site.

**R4**: Location R4 represents the existing residential home located at 30 Grande View Court approximately 33 feet from the project site boundary.

**R5**: Location R5 represents the existing residential home located at 31 Mirada Circle approximately 69 feet from the project site boundary.

**R6**: Location R6 represents the existing residential home located at 46 Mirada Circle approximately 108 feet from the project site boundary.

**R7**: Location R7 represents the existing residential home located 45 Mirada Circle approximately 125 feet from the project site boundary.

**R8**: Location R8 represents the existing residential home located at 1 Mirada Circle approximately 160 feet from the project site boundary.

## 13.2 Discussion of Impacts

a) ***Less-than-Significant Impact.*** Per Chapter 8.45 of the City's Municipal Code, the exterior noise limits for Resort commercial space is 65 CNEL from 7:00am to 6:00pm, 60 CNEL from 6:00pm to 10:0pm. And 55 CNEL from 10:00pm to 7:00am (City of Rancho Mirage 2021). The noise limits for Recreation space is 70 CNEL from 7:00am to 6:00pm, 65 CNEL from 6:00pm to 10:00pm, and 60 CNEL from 10:00pm to 7:00am (City of Rancho Mirage 2021). The noise limits for Residential land uses is 55 CNEL from 7:00am to 6:00pm, 50 CNEL from 6:00pm to 10:00pm, and 45 CNEL from 10:00pm to 7:00am (City of Rancho Mirage 2021).

### Construction Noise Impact

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the proposed project. Noise generated by the proposed project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment are expected to occur in the following stages:

- Demolition
- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of proposed project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e. construction equipment). For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver.

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the proposed project construction noise level impacts at the nearby sensitive receiver locations were completed. To assess the worst-case construction noise levels, the proposed project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of construction activity area for each stage of construction to the nearest receiver location. ~~Appendix E~~Appendix E-1 includes the detailed CadnaA construction noise model inputs.

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the closest point from the edge of the construction activity areas to each of the nearby receiver locations. As detailed in ~~Appendix E~~Appendix E-1, the unmitigated construction noise levels are expected to range from 42.1 to 70.6 dBA $L_{eq}$ at the nearby receiver locations. Proposed project construction noise levels are considered exempt if activities occur within the hours specified in the City of Rancho Mirage Municipal Code Section 15.04.030 of 7:00 a.m. to 7:00 p.m. on weekdays.

As stated in ~~Appendix E~~Appendix E-1, to evaluate whether the proposed project will generate potentially significant short-term noise levels at nearby receiver locations, a construction-related noise level threshold is adopted from the *Criteria for Recommended Standard: Occupational Noise Exposure* prepared by the National Institute for Occupational Safety and Health (NIOSH). The threshold of 85 dBA $L_{eq}$ is used as acceptable thresholds for construction noise at the nearby sensitive receiver locations. The construction noise analysis presented in ~~Appendix E~~Appendix E-1, shows that the noise sensitive residential receiver locations will satisfy the 85 dBA $L_{eq}$ significance threshold during proposed project construction activities as shown on Table 13-3, Construction Noise Level Compliance. Therefore, the noise impacts due to proposed project construction noise is considered **less than significant** at all noise sensitive receiver locations.

**Table 13-3. Construction Noise Level Compliance**

| Receiver Location[1] | Construction Noise Levels (dBA $L_{eq}$) | | |
|---|---|---|---|
| | ***Highest Construction Noise Levels[2]*** | ***Threshold[3]*** | ***Threshold Exceeded?[4]*** |
| R1 | 52.2 | 85 | No |
| R2 | 69.6 | 85 | No |
| R3 | 70.3 | 85 | No |
| R4 | 70.6 | 85 | No |
| R5 | 70.2 | 85 | No |
| R6 | 65.2 | 85 | No |
| R7 | 66.5 | 85 | No |
| R8 | 56.1 | 85 | No |

**Source:** ~~Appendix E~~Appendix E-1.
**Notes**:
1 Noise Receiver locations are shown on Figure 13-2.
2 Highest construction noise level calculations based on distance from the construction noise source activity to nearby receiver locations as shown in ~~Appendix E~~Appendix E-1.
3 Construction noise level thresholds as shown in Table 13-1, Significance Criteria Summary.
4 Do the estimated project construction noise levels exceed the construction noise level threshold?

## Operational Noise Impacts

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Figure 13-2 and defined in Section 13.1.3, Sensitive Receiver Locations, resulting from the operation of the proposed project.

It is expected the on-site project-related noise sources will include: air conditioning units, pool activity and outdoor courtyard activity. This noise analysis is intended to describe noise level impacts associated with the typical operational activities at the project site.

Using the reference noise levels to represent the proposed project operations that include, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the project site and the proposed project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 13-4, Project Operational Noise Levels, shows the calculated proposed project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m., evening hours of 7:00 p.m. to 10:00 p.m. and the nighttime hours of 10:00 p.m. to 7:00 a.m. Table 13-4, Project Operational Noise Levels, shows that the proposed project operational noise levels will range from 26.7 to 47.2 dBA $L_{eq}$.

**Table 13-4. Project Operational Noise Levels**

| Receiver Location[1] | Project Operational Noise Levels (dBA $L_{eq}$)[2] | | | Noise Level Standards (dBA Leq)[3] | | | Threshold Exceeded?[4] | | |
|---|---|---|---|---|---|---|---|---|---|
| | ***Day*** | ***Eve.*** | ***Night*** | ***Day*** | ***Eve.*** | ***Night*** | ***Day*** | ***Eve.*** | ***Night*** |
| R1 | 29.6 | 30.3 | 26.7 | 55 | 50 | 45 | No | No | No |
| R2 | 41.9 | 42.9 | 37.3 | 55 | 50 | 45 | No | No | No |
| R3 | 46.8 | 47.2 | 44.6 | 55 | 50 | 45 | No | No | No |
| R4 | 43.7 | 43.7 | 42.2 | 55 | 50 | 45 | No | No | No |
| R5 | 43.5 | 43.6 | 42.0 | 55 | 50 | 45 | No | No | No |
| R6 | 43.1 | 43.5 | 40.8 | 55 | 50 | 45 | No | No | No |
| R7 | 42.3 | 42.3 | 40.7 | 55 | 50 | 45 | No | No | No |
| R8 | 35.3 | 35.4 | 33.7 | 55 | 50 | 45 | No | No | No |

**Source**: ~~Appendix E~~Appendix E-1.
**Notes**:
1 See Figure 13-2 for the noise source and receiver locations.
2 Project operational noise level calculations included in ~~Appendix E~~Appendix E-1.
3 City of Rancho Mirage exterior noise level standards for residential land use, as shown in Table 13-1, Significance Criteria Summary.
4 Do the estimated Project operational noise source activities exceed the noise level standards?
"Day" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.

To demonstrate compliance with local noise regulations, the project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Rancho Mirage exterior noise level standards at nearby noise-sensitive receiver locations. Table 13-4, Project Operational Noise Levels, shows that the operational noise levels associated with project will satisfy the City of Rancho Mirage 55 dBA $L_{eq}$ daytime, 50 dBA $L_{eq}$ evening and 45 dBA $L_{eq}$ nighttime exterior noise level standards at all nearby receiver locations. Therefore, the operational noise impacts are considered less than significant at the nearby noise-sensitive receiver locations.

To describe the proposed project operational noise level contributions, the proposed project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by proposed project operational noise sources.

Tables (9-3 through 9-5) and calculations in ~~Appendix E~~Appendix E-1 show that the proposed project operational noise level increase ranging from 0.0 to 4.7 dBA $L_{eq}$; as such, project operational noise level contributions satisfy the operational noise level increase significance criteria presented in Table 13-1, Significance Criteria Summary. Therefore, the proposed project related operational noise level increases at all sensitive receiver locations will be **less than significant**.

### Off-Site Transportation Noise Impact

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed project, noise contours were developed based on Ritz-Carlton Residences Traffic Impact Analysis (~~Appendix E~~Appendix E-1). Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Without / With Project: This scenario refers to the existing present-day 2019 noise conditions, without and with the development of the full Project. The existing with Project scenario will not actually occur since the Project would not be fully constructed and operational until 2023 conditions.
- Existing plus Ambient (EA) 2023 Without / With Project: This scenario refers to the existing noise conditions plus the estimated 4 years of background growth in ambient traffic conditions without and with the development of the full Project.
- Existing plus Ambient plus Cumulative (EAC) 2023 Without / With Project: This scenario refers to the existing plus ambient plus cumulative noise conditions at 2023 without and with the proposed Project.
- Horizon Year 2040 Without / With Project: This scenario refers to the future Horizon Year conditions at Year 2040 without and with the proposed Project. This scenario represents buildout of the General Plan land use and includes all cumulative projects identified in the Traffic Impact Analysis.

Noise contours were used to assess the proposed project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying proposed project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the project site. ~~Appendix E~~Appendix E-1 present a summary of the exterior traffic noise levels for each traffic condition, and also includes the traffic noise level contours worksheets for each traffic condition.

An analysis of existing traffic noise levels plus traffic noise generated by the proposed project has been included in this report for informational purposes and to fully analyze all the existing traffic scenarios identified in the Ritz-Carlton Residences Traffic Impact Analysis prepared by Urban Crossroads, Inc (Appendix F). However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the project scenario will not actually occur since the proposed

project would not be fully constructed and operational until future year 2023 plus cumulative conditions. Therefore, no mitigation measures are considered to reduce the Existing Plus Project traffic noise level increases. The EAC 2023 and Horizon Year 2040 traffic noise conditions that include all cumulative projects are used to determine the significance of the proposed project off-site traffic noise level increases on the study area roadway segments.

The Existing 2019 without Project exterior noise levels are expected to range from 62.0 to 76.9 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. The Existing 2019 with Project conditions range from 63.6 to 76.9 dBA CNEL. The Project off-site traffic noise level increases range from 0.0 to 1.6 dBA CNEL on the study area roadway segments.

The EA 2023 without Project exterior noise levels are expected to range from 62.4 to 77.2 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. The EA 2023 with Project conditions range from 63.8 to 77.2 dBA CNEL. The Project off-site traffic noise level increases range from 0.0 to 1.4 dBA CNEL.

The EAC 2023 without Project exterior noise levels are expected to range from 62.7 to 77.4 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. The EAC 2023 with Project conditions range from 64.0 to 77.4 dBA CNEL. The Project off-site traffic noise level increases range from 0.0 to 1.3 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 13-1, Significance Criteria Summary, land uses adjacent to the project site roadway segments would experience **less-than-significant** noise level impacts due to proposed project-related traffic noise levels.

The Horizon Year 2040 without Project exterior noise levels are expected to range from 63.1 to 77.8 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. The Horizon Year 2040 with Project conditions range from 64.3 to 77.8 dBA CNEL. The Project off-site traffic noise level increases range from 0.0 to 1.2 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 13-1, Significance Criteria Summary, land uses adjacent to the study area roadway segments would experience **less-than-significant** noise level impacts due to unmitigated proposed project-related traffic noise levels.

### Summary

The proposed project would not generate substantial temporary or permanent increase in ambient noise levels in the vicinity of the proposed project in excess of standards established in local plans or by other agencies. The proposed project would comply with all State of California noise requirements, the California Building Code, and policies and programs outlined in the City's General Plan Noise Element. Therefore, impacts would be **less than significant**.

***b) Less-than-Significant Impact with Mitigation Incorporated.*** Construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized in Table 13-5, Vibration Source Levels for Construction Equipment. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA.

**Table 13-5. Vibration Source Levels for Construction Equipment**

| Equipment | Vibration Decibels (VdB) at 25 feet |
|---|---|
| Small bulldozer | 58 |
| Jackhammer | 79 |
| Loaded Trucks | 86 |
| Large Bulldozer | 87 |

**Source:** ~~Appendix E~~Appendix E-1.

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from proposed project construction activities would cause only intermittent, localized intrusion. The proposed project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the project site were estimated by data published by the Federal Transit Administration (FTA). Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site during various stages of construction. Using the vibration source level of construction equipment provided on Table 13-5, Vibration Source Levels for Construction Equipment, and the construction vibration assessment methodology published by the FTA, it is possible to estimate the project vibration impacts. Table 13-6, Unmitigated Construction Equipment Vibration Levels, presents the expected project related vibration levels at the nearby receiver locations.

**Table 13-6. Unmitigated Construction Equipment Vibration Levels**

| Receiver [1] | Distance to Const. Activity (Feet)[2] | Receiver Vibration Levels (VdB)[3] | | | | | | Threshold (VdB)[4] | Threshold Exceeded?[5] |
|---|---|---|---|---|---|---|---|---|---|
| | | *Small Bulldozer* | *Jack-hammer* | *Loaded Trucks* | *Large Bulldozer* | *Vibratory Roller* | *Highest Vibration Levels* | | |
| R1 | 591 | 16.8 | 37.8 | 44.8 | 45.8 | 52.8 | 52.8~~45.8~~ | 80 | No |
| R2 | 66 | 45.4 | 66.4 | 73.4 | 74.4 | 81.4 | 81.4~~74.4~~ | 80 | Yes~~No~~ |
| **R3** | **21** | **60.3** | **81.3** | **88.3** | **89.3** | **96.3** | **96.3~~89.3~~** | **80** | **Yes** |
| **R4** | **33** | **54.4** | **75.4** | **82.4** | **83.4** | **90.4** | **90.4~~83.4~~** | **80** | **Yes** |

**Table 13-6. Unmitigated Construction Equipment Vibration Levels**

| Receiver [1] | Distance to Const. Activity (Feet)[2] | Receiver Vibration Levels (VdB)[3] | | | | | | Threshold (VdB)[4] | Threshold Exceeded?[5] |
|---|---|---|---|---|---|---|---|---|---|
| | | *Small Bulldozer* | *Jack-hammer* | *Loaded Trucks* | *Large Bulldozer* | *Vibratory Roller* | *Highest Vibration Levels* | | |
| R5 | 69 | 44.8 | 65.8 | 72.8 | 73.8 | 80.8 | 80.8~~73.8~~ | 80 | Yes~~No~~ |
| R6 | 108 | 38.9 | 59.9 | 66.9 | 67.9 | 74.9 | 74.9~~67.9~~ | 80 | No |
| R7 | 125 | 37.0 | 58.0 | 65.0 | 66.0 | 73.0 | 73.0~~66.0~~ | 80 | No |
| R8 | 160 | 33.8 | 54.8 | 61.8 | 62.8 | 69.8 | 69.8~~62.8~~ | 80 | No |

**Source:** ~~Appendix E~~Appendix E-1, E-2.
**Notes**:
1 Receiver locations are shown on Figure 13-2.
2 Distance from receiver locations to the source of the nearest construction activity.
3 Based on the Vibration Source Levels of Construction Equipment in ~~Appendix E~~Appendix E-1, E-2.
4 Does the peak vibration exceed the vibration thresholds?
5 Does the vibration level exceed the FTA acceptable vibration level?

At distances ranging from 21 to 591 feet from the project construction activity, construction vibration velocity levels are expected to range from 33.8~~45.8~~ to ~~89.3~~90.4 VdB and will exceed the FTA 80 VdB threshold for human annoyance at receiver locations R3 and R4 (Figure 13-2). These impacts would be potentially significant, however implementation of a 75~~50~~-foot vibration buffer zone from sensitive receiver locations R2, R3, ~~and~~ R4, and R5 (**MM-NOI-1**) would reduce vibration levels to R2, R3, R4, and R5 ~~R3 and R4~~ to 79.7~~78.0~~ VdB and would not exceed the FTA 80 VdB threshold.

Vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the project site perimeter. Additionally, construction of the project site would be restricted the daytime hours between 7:00 a.m. and 6:00 p.m. Monday to Saturday with City of Rancho Mirage requirements thereby eliminating potential vibration impacts during the sensitive evening and nighttime hours. With this in consideration in addition to the implementation of **MM-NOI-1**, impacts would be **less than significant**.

c). ***No Impact.*** The project site is not located within the vicinity of a private airstrip or an airport land use plan, nor is it located within 2 miles of a public airport or public use airport. The closest airport to the project site is Palm Springs Airport, which is located approximately 4 miles north of the project site. The people residing or working in the project area would not be subject to excessive airport- or plane-related noise levels. Therefore, there would be **no impact**.

## 13.3 Mitigation Measures

**MM-NOI-1** During proposed project construction, the applicant shall require that vibratory rollers, large-loaded trucks and dozers, or jackhammers (greater than 80,000 pounds) shall not

be used within 75~~50~~ ~~feet~~ feet of occupied sensitive receptors locations R2 through R5~~along the entire southern property line~~. Instead, small rubber-tired or alternative equipment shall be used within this area during proposed project construction to reduce vibration effects. If all mobile equipment used during proposed project construction are less than 80,000 pounds, then the 75~~50~~-foot buffer mitigation is not required.




SOURCE: Urban Crossroads 2020

**FIGURE 13-1**

Noise Measurement Locations

Ritz-Carlton Rancho Mirage Initial Study

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SOURCE: Urban Crossroads 2020

**FIGURE 13-2**

Noise Measurement Locations

Ritz-Carlton Rancho Mirage Initial Study

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# 14. POPULATION AND HOUSING

| **POPULATION AND HOUSING** – Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | ☐ | ☐ | ☒ | ☐ |
| b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |

## 14.1 Setting

This section evaluates the proposed project's consistency with applicable plans, policies, and regulations as they relate to population and housing. Data sources for this section include Southern California Association of Governments (SCAG) and the City of Rancho Mirage General Plan – Housing Element.

## 14.2 Discussion of Impacts

a) ***Less-than-Significant Impact:*** The proposed project would involve the construction of 106 residential suites, hotel villas, event spaces, commercial spaces, and an amenity space totaling 236,748 square feet. Although the 106 residential suites are anticipated to be treated as a condo hotel unit in which residents are allowed to live at the residence only during a specified time frame, the residential units will be analyzed as typical dwelling units would for the purpose of this analysis.

The Southern California Association of Governments (SCAG) is a metropolitan planning organization that represents the Counties of Ventura, Los Angeles, San Bernardino, Orange, Riverside, and Imperial. SCAG reported the City's population to be 18,739 persons as of 2018 (SCAG 2019a). In 2018 the City had a total of 14,492 housing units, and in 2017 the City had a total of 16,902 jobs (SCAG 2019a). By 2045, SCAG projected the City to have a population of 25,200 persons and 21,200 jobs (SCAG 2020). These numbers are reflected in Table 14-1, Existing and Projected Population, Household, and Employment Growth in the City of Rancho Mirage. According to the City of Rancho Mirage's General Plan – Housing Element (City of Rancho Mirage 2022), the 2021 - 2029 Regional Housing Needs Allocation (RHNA) determined that the City has been assigned a total of 1,746 housing units.

The proposed project would construct 106 residential units. As stated earlier, these residential units would operate similar to time-share properties and therefore future residents would not be in the proposed residential units year-round. Because the proposed residential units are not typical residential units and residents cannot occupy them year-round, theses housing units do not count towards the RHNA housing unit determination.

SCAG's Local Profile Report for the City of Rancho Mirage indicated that the City's average household size was two persons per dwelling unit as of 2018 (SCAG 2019a). Using these assumptions, implementation of the proposed project would have the potential to increase the City's population by 216 persons. This population increase would comply with SCAG's projected population increase for the City (Table 14-1, Existing and Projected Population, Household, and Employment Growth in the City of Rancho Mirage).

The proposed project involves the construction of residential suites, hotel villas, event space, a commercial area, restaurant, and amenities such as a pool terrace. Additionally, the proposed project is not a large employment center that would encourage people to move to the area for work.

**Table 14-1. Existing and Projected Population, Household, and Employment Growth in the City of Rancho Mirage**

| | 2016 | 2045 |
|---|---|---|
| Population | 18,200 | 25,200 |
| Households | 9,000 | 13,000 |
| Employment | 16,600 | 21,200 |

**Source:** SCAG 2020,

The anticipated population growth and employment growth as a result of the proposed project are aligned with the City's growth projects. Further, the proposed project would generally connect to existing utilities and infrastructure located adjacent to the project site. The proposed project would not construct new or extend existing utilities or infrastructure into areas not currently served by such improvements (see Section 19, Utilities and Service Systems, for a detailed analysis of potential utilities or infrastructure related to the project). Thus, the proposed project would not indirectly induce substantial unplanned population growth and impacts would be **less than significant**.

***c) No Impact:*** The project site is a vacant, graded plot of land with no existing structures present. The proposed project would neither displace existing housing nor necessitate the construction of replacement housing. Therefore, **no impacts** would occur.

## 14.3 Mitigation Measures

No mitigation measures required.

15. PUBLIC SERVICES

| PUBLIC SERVICES – | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | | | | |
| Fire protection? | ☐ | ☐ | ☒ | ☐ |
| Police protection? | ☐ | ☐ | ☒ | ☐ |
| Schools? | ☐ | ☐ | ☒ | ☐ |
| Parks? | ☐ | ☐ | ☐ | ☒ |
| Other public facilities? | ☐ | ☐ | ☐ | ☒ |

## 15.1 Setting

***Fire Protection***

Fire services for the City of Rancho Mirage are provided through a cooperative agreement with the State of California (Cal-Fire) and the County of Riverside Fire Department (RCFD) (City of Rancho Mirage n.d.a.). Cal-Fire/Riverside County Fire Department is an all risk, full-service fire department and has two fire stations located in City of Rancho Mirage (City of Rancho Mirage 2017).

***Police Protection***

Twenty-four hour police protection is provided to the City of Rancho Mirage on a contractual basis by the Riverside County Sheriff's Department (RCSD) (City of Rancho Mirage 2017). As of 2017, the City had one officer per 786 resident, which exceeds the commonly accepted ratio of one officer per 1,000 residents (City of Rancho Mirage 2017).

***Schools***

The City is located in the Palm Springs Unified School District (PSUSD) and the Desert Sands Unified School District (DSUSD) (City of Rancho Mirage 2006). There is one public school and three private schools in the City (City of Rancho Mirage 2006). The public school is Rancho Mirage Elementary School. The three private schools are Palm Valley school (pre-kindergarten through 12th grade), Marywood Country Day School (pre-kindergarten to 6th grade), and Rancho Mirage Children's School (pre-kindergarten to 4th grade).

***Parks***

Guided by the Parks Master Plan, the City has expanded its parks and trail system throughout Rancho Mirage to adapt to the growing population. Currently, there are six parks, including a mix of mini and local parks (City of Rancho Mirage 2017). There are no existing recreational opportunities on site.

## 15.2 Discussion of Impacts

a) ***Fire protection?***

***Less-than-Significant Impact:*** The closest fire station to the project site is Fire Station No. 50 (70801 Highway 111), located approximately 2.7 miles southeast of the site. In addition to the two fire stations, five other County operated fire stations are located close to the City (City of Rancho Mirage 2017).

Once operational, Cal-Fire/RCFD would continue to serve the project site. Additionally, as discussed in Threshold 14(a), the proposed project would not result in substantial unplanned population growth in the City. Although the proposed project would potentially result in a slight increase in calls for service to the project site in comparison to the existing conditions, this increase is expected to be nominal and not to result in the need for new facilities. Additionally, the proposed project would pay the City's fire tax to help fund fire protection services and development impact fees per Section 3.29.120 of the City's Municipal Code (City of Rancho Mirage 2017). Overall, it is anticipated that the proposed project would be adequately served by existing Cal-Fire/RCFD facilities, equipment, and personnel. Therefore, the proposed project would require the construction nor expansion of fire protection service facilities and impacts would be **less than significant**.

***Police protection?***

***Less-than-Significant Impact:*** Although the proposed project would potentially result in a slight increase in calls for service to the project site in comparison to existing conditions, this increase is expected to be nominal and not result in the need for new police facilities. Overall, it is anticipated that the proposed project would be adequately served by existing police facilities, equipment, and personnel. Therefore, the proposed project would not require the construction nor expansion of police protection facilities and impacts would be **less than significant**.

***Schools?***

***Less-than-Significant Impact:*** The project site is located within the boundaries of the PSUSD. Buildout of the proposed project would result in expanded hotel facilities, commercial space,

event space, and amenity space. The proposed Residences at Ritz Carlton only allows a limited and non-permanent (not year-round) stay for potential residences, and the proposed residence units are expected to serve as vacation and second homes. Because the residences do not function as typical dwelling units, the proposed project is not expected to result in student generation.

The proposed project would pay all applicable statutory school developer fees, which would be used for the potential construction and reconstruction of school facilities to accommodate students from new developments (PSUSD 2022). However, because the proposed project would not generate students the project would result in the need for expanded or new school facilities. Therefore, impacts would be **less than significant**.

***Parks?***

***No Impact:*** As further discussed in Section 16, Recreation, the proposed project would not result in substantial population growth in the City. The number of employees hired to construct and operate the proposed hotel would be minimal. As such, an increase in patronage at park facilities is not expected. In addition, the number of hotel guests visiting existing parks would be minimal, as the proposed project would provide open space and recreation facilities. Future hotel patrons would be more inclined to use hotel facilities rather than community parks. **No impacts** associated with the construction or expansion of park facilities would occur.

***Other public facilities?***

***No Impact:*** The proposed project would not result in substantial population growth in the City. The number of employees hired to construct and operate the proposed hotel would be minimal. As such, a substantial increase in patronage at libraries, community centers, and other public facilities is not expected. Therefore, **no impacts** associated with the construction or expansion of public facilities would occur.

## 15.3 Mitigation Measures

No mitigation measures required.

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16. RECREATION

| RECREATION – | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☒ | ☐ |
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment? | ☐ | ☐ | ☒ | ☐ |

## 16.1 Setting

The majority of the 16.13-acre project site is currently vacant and lies south and east of the existing Ritz-Carlton Rancho Mirage Hotel. Guided by the Parks Master Plan, the City has expanded its parks and trail system throughout Rancho Mirage to adapt to the growing population. There are no existing recreational opportunities on site.

## 16.2 Discussion of Impacts

a) ***Less-than-Significant Impact:*** As discussed earlier, the proposed project will provide approximately 35% open space made up of landscape areas, pools, water features, and paths. Figure 1-9a and 1-9b shows the proposed landscape plan for the Residences at Ritz Carlton and the Sky Mesa Recreational Area, respectively. A desert landscape design is proposed throughout the project site including water cascades, multiple pools, rock escarpments, and fountains. Visitors and residents would be using the proposed and existing hotel facilities provided on site.

As discussed in Section 14, Population and Housing, the proposed project would not result in substantial population growth in the City that would increase the use of existing parks and recreational facilities such that substantial physical deterioration of recreational facilities would occur or be accelerated. Therefore, substantial physical deterioration of these facilities would not occur or be accelerated with implementation of the proposed project; impacts would be **less than significant**.

b) ***Less-than-Significant Impact***: The proposed project would not result in substantial population growth in the City. Further, the proposed project would not promote or indirectly induce new development that would require the construction or expansion of recreational facilities. Because

the proposed project would not result in substantial population growth in the City, it would not increase the demand for recreational facilities. As such, impacts would be **less than significant**.

## 16.3 Mitigation Measures

No mitigation measures required.

# 17. TRANSPORTATION

| **TRANSPORTATION** – Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities? | ☐ | ☒ | ☐ | ☐ |
| b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)? | ☐ | ☐ | ☒ | ☐ |
| c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☐ | ☐ | ☒ | ☐ |
| d) Result in inadequate emergency access? | ☐ | ☐ | ☒ | ☐ |

## 17.1 Setting

This section is based upon the Ritz-Carlton Residences Traffic Impact Analysis (traffic report) and Vehicle Miles Travelled (VMT) Analysis (VMT analysis) prepared by Urban Crossroads. The traffic report is included as Appendix F1 and F2 to this Initial Study, respectively. Additionally, a parking assessment was prepared by Urban Crossroads. The parking assessment is included as Appendix G of this Initial Study. Background and methodologies regarding the traffic analysis and the parking assessment are found in Appendix F and G, respectively.

As discussed in the Traffic Report prepared for this Initial Study (Appendix F), consistent with County of Riverside traffic study guidelines, the study area includes any intersection of "Collector" or higher classification street, with "Collector" or higher classification streets, at which the project will add 50 or more peak hours trips. There are three main intersections analyzed in the Traffic Report. A map of the three intersections is presented in Figure 17-1.

1. Frank Sinatra Dr. and Dwy. 1
2. Frank Sinatra Dr. and Dwy. 2
3. Highway 111 and Frank Sinatra Dr.

Frank Sinatra Drive is an east-west major collector running through the City. Most of the Frank Sinatra Drive is constructed to its ultimate design standards with a 100-foot right-of-way. However, Frank Sinatra Drive, west of Highway 111, is designated as a two-lane roadway in the General Plan. Highway 111 is the major

arterial connecting most of the commercial centers of the Coachella Valley. As a major arterial, the route runs north-west to south-east diagonally within the study area. Highway 111 provides three through travel lines in each direction. Highway 111 is designated as a Riverside County CMP roadway.

The Traffic Report analyzed six different scenarios: Existing (2019) Conditions, E + P (Existing plus Project) Conditions, Existing plus Ambient Growth plus Project (EAP) (2023) Conditions, Existing plus Ambient Growth plus Project Plus Cumulative (EAPC) (2023) Conditions, Horizon Year (2040) Without Project, Horizon Year (2040) With Project. Each scenario are described further below:

- Existing Conditions: Existing physical conditions have been disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared. Existing conditions are discussed in Section 17.1.2.
- E+P Conditions: The E+P analysis determines circulation system deficiencies that would occur on the existing roadway system in the scenario of the project being placed upon Existing conditions. The E+P scenario is analyzed in Section 17.2.2.
- EAP Conditions: The EAP (2023) traffic conditions analyses determine potential traffic impacts based on a comparison of the EAP traffic conditions to Existing conditions. To account for background traffic growth, an ambient growth factor from Existing conditions of 6.12% (2 percent per year over 3 years, compounded annually) for 2023 conditions is included for EAP traffic conditions. Consistent with County of Riverside traffic study guidelines, the EAP analysis is intended to identify "Opening Year" deficiencies associated with the development of the project based on the expected background growth within the study area. The EAP (2023) traffic conditions are analyzed in Section 17.2.3.
- EAPC Conditions: The EAPC (2023) traffic conditions analyses determine the potential near-term cumulative circulation system deficiencies. Background traffic for these analysis scenarios follow the same ambient growth methodology described above for EAP traffic conditions. However, EAPC traffic conditions also include the addition of cumulative development traffic. The comprehensive list of cumulative development projects was compiled from information provided by the City of Rancho Mirage and Cathedral City. The EAPC (2023) traffic conditions are analyzed in Section 17.2.4.
- Horizon Year (2040) Conditions: Traffic projections for Horizon Year (2040) with project conditions were derived from the Riverside Transportation Analysis Model (RivTAM) modified to represent buildout of the City of Rancho Mirage. The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the City's Development Impact Fee (DIF) program, or other approved funding mechanisms can accommodate the long-range cumulative traffic at the target level of service (LOS) identified by the City of Rancho Mirage. The Horizon Year (2040) traffic conditions are analyzed in Section 17.2.5.

  The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the Transportation Uniform Mitigation Fee (TUMF), or other approved funding mechanism (e.g., Community Facilities District, etc.) can accommodate the long-range cumulative traffic at the target Level of Service (LOS) identified in the City of Rancho Mirage General Plan. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-TUMF) are identified as such. Each of these regional transportation fee programs are discussed in more detail in Appendix F.

## Methodologies

### *Level of Service*

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

### *Intersection Capacity Analysis*

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control.

#### ***Signalized Intersections***

The City of Rancho Mirage require signalized intersection operations analysis based on the methodology described in the HCM 6th Edition. Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 17-1, Signalized Intersection Description of LOS.

**Table 17-1. Signalized Intersection Description of LOS**

| Description | Average Control Delay (Seconds), V/C ≤ 1.0 | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Operations with very low delay occurring with favorable progression and/or short cycle length. | 0 to 10.00 | A | F |
| Operations with low delay occurring with good progression and/or short cycle lengths. | 10.01 to 20.00 | B | F |
| Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. | 20.01 to 35.00 | C | F |
| Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable. | 35.01 to 55.00 | D | F |

**Table 17-1. Signalized Intersection Description of LOS**

| Description | Average Control Delay (Seconds), V/C ≤ 1.0 | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay. | 55.01 to 80.00 | E | F |
| Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths | 80.01 and up | F | F |

**Source**: Appendix F.

Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network. All signalized study area intersections have also utilized the Synchro software.

***Unsignalized Intersections***

The City of Rancho Mirage require the operations of unsignalized intersections be evaluated using the methodology described in the HCM 6th Edition. The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 17-2, Unsignalized Intersection Description of LOS).

**Table 17-2. Unsignalized Intersection Description of LOS**

| Description | Average Control Delay Per Vehicle (Seconds) | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Little or no delays. | 0 to 10.00 | A | F |
| Short traffic delays. | 10.01 to 15.00 | B | F |
| Average traffic delays. | 15.01 to 25.00 | C | F |
| Long traffic delays. | 25.01 to 35.00 | D | F |
| Very long traffic delays. | 35.01 to 50.00 | E | F |
| Extreme traffic delays with intersection capacity exceeded. | > 50.00 | F | F |

**Source:** Appendix F.

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

### *Traffic Signal Warrant Analysis Methodology*

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TIA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD), for all study area intersections.

The signal warrant criteria for existing conditions are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CAMUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing study area intersections for all analysis scenarios. Warrant 3 is appropriate to use for this TIA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets.

Traffic signal warrant analyses were performed for all of the following unsignalized study area intersections: Frank Sinatra Drive and Driveway 1, and Frank Sinatra Drive and Driveway 2 (see Figure 17-1).

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

### *Queuing Analysis*

A queuing analysis has been conducted for all intersections and project driveways. The 95th percentile queuing of vehicles has been assessed along these roadways to determine potential queuing issues at the intersections.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential impacts/needs of the intersections with traffic added from the proposed project. The 50th percentile maximum queue is the maximum back of queue on a typical cycle during the peak hour, while the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes during the peak hour. In other words, if traffic were observed for 100 cycles, the 95th percentile queue would be the queue experienced with the 95th busiest cycle (or 5% of the time). The 50th percentile or average queue represents the typical queue length for peak hour traffic conditions, while the 95th percentile queue is derived from the average queue plus 1.65 standard deviations. The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations.

### *Minimum Level of Service (LOS)*

Per Goal 1, Policy 1 of the City of Rancho Mirage General Plan (City of Rancho Mirage 2017g), the following LOS will be utilized for study area intersections located within the City: Require development to achieve a peak hour LOS D or better at intersections and roadway segments.

### *Deficiency Criteria*

To determine whether the addition of project traffic at a study intersection would result in a deficiency, the following will be utilized:

- A deficiency occurs at study area intersections if the pre-project condition is at or better than LOS D (i.e., acceptable LOS), and the addition of project trips causes the peak hour LOS of the study area intersection to operate at unacceptable LOS (i.e., LOS E or F). Per the County of Riverside traffic study guidelines, for intersections currently operating at unacceptable LOS (LOS E or F), a deficiency would occur if the project contributes 50 or more peak hour trips to pre-project traffic conditions.

## Existing Conditions

This section provides a summary of the existing circulation network, the City of Rancho Mirage General Plan Circulation Network, and a review of existing peak hour intersection operations, traffic signal warrant, and queuing analyses.

### *Existing Circulation Network*

The study area analyzed in Appendix F includes a total of three intersections as shown in Figure 17-1. Exhibit 3-1 in Appendix F illustrates the study area intersections and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

### *City of Rancho Mirage General Plan Circulation Element*

A brief description of each roadway including existing and planned roadway width is provided below:

- Frank Sinatra Drive is an east-west major collector running through the City of Rancho Mirage. Most of Frank Sinatra Drive is constructed to its ultimate design standards with a 100-foot right-of-way. However, Frank Sinatra Drive, west of Highway 111, is designated as a two-lane roadway in the General Plan (City of Rancho Mirage 2017g).
- Highway 111 is the major arterial connecting most of the commercial centers of the Coachella Valley. As a major arterial, the route runs north-west to south-east diagonally within the study area. Highway 111 provides three through travel lanes in each direction. Highway 111 is designated as a Riverside County CMP roadway.

### *Truck Routes*

The City of Rancho Mirage designated truck route map is shown on Exhibit 3-4 in Appendix F. Highway 111 is identified as designated truck route.

### *Transit Service*

The City of Rancho Mirage and is currently served by the SunLine Transit Agency (STA), a public transit agency serving various jurisdictions throughout Coachella Valley. Transit service is reviewed and updated by STA periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. It should also be noted that SunDial service provides special services for the disabled and seniors (60+).

### *Bicycle and Pedestrian Facilities*

Existing bicycle and pedestrian facilities within City are shown on Exhibit 3-6 in Appendix F. The General Plan identifies that Pedestrian and other non-motor circulation is encouraged in the City wherever possible (City of Rancho Mirage 2017g).

### *Existing (2019) Traffic Counts*

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in December 2019. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)
- Saturday Mid-day Peak Hour (peak hour between 10:00 AM and 2:00 PM)

The weekday AM, weekday PM, and Saturday mid-day peak hour count data is representative of typical peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix F. These raw turning volumes have been flow conserved between intersections with limited access, no access and where there are currently no uses generating traffic.

Existing weekday average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-7 in Appendix F. Existing ADT volumes are based upon factored intersection peak hour counts collected by Urban Crossroads, Inc.

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 16.06 percent. As such, the above equation utilizing a factor of 6.23 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 16.06 percent (i.e.,

1/0.01606 = 6.23) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses.

### *Existing Conditions Intersection Operations Analysis*

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented above. The intersection operations analysis results are summarized in Table 17-3, Intersection Analysis for Existing (2019) Conditions, which indicates that all existing study area intersections are currently operating at an acceptable LOS (i.e., LOS D or better) during one or more of the peak hours. The intersection operations analysis worksheets are included in Appendix F.

### *Existing Conditions Traffic Signal Warrants Analysis*

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. For Existing (2019) traffic conditions, no existing study area intersections appear to currently warrant a traffic signal based on peak hour traffic flows (see Appendix F).

### *Queuing Analysis*

A queuing analysis was performed for study area intersection to assess vehicle queues along the roadways. Existing (2019) queuing analysis findings are presented in Table 17-4, Peak Hour Queuing Summary for Existing (2019) Conditions.

As shown on Table 17-4, Peak Hour Queuing Summary for Existing (2019) Conditions, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the 95$^{th}$ percentile peak hour traffic flows. Worksheets for Existing (2019) conditions queuing analysis are provided in Appendix F.

**Table 17-3. Intersection Analysis for Existing (2019) Conditions**

| # | Intersection | Traffic Control | Intersection approach Lanes[1] | | | | | | | | | | | | Delay[2] (secs.) | | | Level of Service | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | NB | | | SB | | | EB | | | WB | | | Weekday | | | Weekday | | |
| | | | L | T | R | L | T | R | L | T | R | L | T | R | AM | PM | SAT | AM | PM | SAT |
| 1 | Frank Sinatra Dr. and Dwy. 1 | — | Future Intersection | | | | | | | | | | | | — | — | — | — | — | — |
| 2 | Frank Sinatra Dr. and Dwy. 2 | CSS | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 9.0 | 9.4 | 9.7 | A | A | A |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 1 | 3 | 1 | 2 | 3 | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 19.9 | 19.2 | 18.1 | B | B | B |

**Source:** Appendix F.
**Notes:**
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; CSS = Cross-street Stop; TS = Traffic Signal.
L = Left; T = Through; R = Right

1 When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

2 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

**Table 17-4. Peak Hour Queuing Summary for Existing (2019) Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | 90th Percentile Queue (Feet)[1] | | | Acceptable?[2] | | |
|---|---|---|---|---|---|---|---|---|
| | | | *AM* | *PM* | *SAT* | *AM* | *PM* | *SAT* |
| **Frank Sinatra Dr. and Dwy. 1** | — | — | ***Future Intersection*** | | | | | |
| **Frank Sinatra Dr. and Dwy. 2** | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes |
| | WBL/R | 200 | 34 | 28 | 45 | Yes | Yes | Yes |
| **Hwy. 111 and Frank Sinatra Dr.** | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes |
| | EBT/R | 270 | 41 | 74 | 51 | Yes | Yes | Yes |

**Source:** Appendix F.
**Notes:**
[1] Minimum queue length for the approach reported.
[2] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

## 17.2 Discussion of Impacts

a) ***Less-than-Significant Impact with Mitigation.*** As discussed above in Section 17.1.1, Methodologies, roadways in Rancho Mirage must operate at an LOS of D or higher. The TIA (Appendix F) analyzed six traffic conditions, described in detail under 17.1, Setting.

Analysis of Existing (2019) Traffic Conditions, E+P Traffic Conditions, EAP (2023) Traffic Conditions, EAPC (2023) Traffic Conditions, and Horizon Year (2040) With and Without Project Traffic Conditions indicate that the study area intersections are currently operating at an acceptable LOS during one or more of the peak hours.

For E+P Traffic Conditions, EAP (2023) Traffic Conditions, EAPC (2023) Traffic Conditions, and Horizon Year (2040) With and Without Project Traffic Conditions, there are no deficient intersections that require improvement because there are no weekday peak hour queuing issues.

However, for E+P Traffic Conditions, EAP (2023) Traffic Conditions, and Horizon Year (2040) With Project Traffic Conditions, the Highway 111 and Frank Sinatra Drive study intersection would operate at unacceptable weekend special event 95th percentile traffic flows and therefore would require improvements to northbound lane movements and eastbound lane movements at the Highway 111 and Frank Sinatra Drive intersection (**MM-TRA-1**; **MM-TRA-2**). The proposed project would have a **less-than-significant impact with mitigation incorporated.** The analysis for these conclusions are presented below.

### Project Trip Generation

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific proposed project is therefore based

upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

Weekday trip generation rates used to estimate project traffic and a summary of the proposed project's weekday trip generation are shown in Table 17-5, Project Trip Generation Summary – Typical Operations. The weekend special event trip generation summary is shown in Table 17-6, Project Trip Generation Summary – Weekend Special Event. The trip generation rates are based upon data collected by the Institute of Transportation Engineers (ITE) for Multifamily Housing (Low-Rise) (ITE Land Use Code 220) and Quality Restaurant (ITE Land Use Code 931) land uses in their published Trip Generation Manual, 10th Edition, 2017. The ITE Trip Generation Manual does not provide trip generation rates for a venue since the use is very specific. As such, vehicle trips are calculated based on a maximum allowable occupancy of 0.8 per parking space.

**Table 17-5. Project Trip Generation Summary – Typical Operations**

| Land Use | ITE LU Code | Units[1] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* | |
| ***Project Trip Generation Rates:[2]*** | | | | | | | | | |
| Multifamily House (Low-Rise) | 220 | DU | 0.11 | 0.35 | 0.46 | 0.35 | 0.21 | 0.56 | 7.32 |
| Quality Restaurant | 931 | TSF | 0.49 | 0.24 | 0.73 | 5.23 | 2.57 | 7.80 | 83.84 |

| Land Use | Quantity | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* | |
| ***Project Trip Generation Summary:*** | | | | | | | | | |
| Ritz-Carlton Residences | 106 | DU | 11 | 38 | 49 | 37 | 22 | 59 | 776 |
| Sky Mesa Restaurant | 6.966 | TSF | 3 | 2 | 5 | 36 | 18 | 54 | 586 |
| Internal Capture (50%)[3] | | | -2 | -1 | -3 | -18 | -9 | -27 | -294 |
| | | **Total** | **12** | **39** | **51** | **55** | **31** | **86** | **1,068** |

**Source**: Appendix F.
**Notes**:
1 DU = Dwelling Units; TSF = Thousand Square Feet.
2 Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).
3 Internal capture reduction of 50% has been applied as a significant portion of the patrons would be internal to the existing hotel.

**Table 17-6. Project Trip Generation Summary – Weekend Special Event**

| Land Use | ITE LU Code | Units[2] | Arrival Peak Hour | | | Departure Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* |
| ***Project Trip Generation Rates:[1]*** | | | | | | | | |
| Multifamily Housing (Low-Rise) | 220 | DU | 0.35 | 0.35 | 0.70 | 0.35 | 0.35 | 0.70 |
| Quality Restaurant | 931 | TSF | 6.30 | 4.38 | 10.68 | 6.30 | 4.38 | 10.68 |
| Venue | Not Available | | | | | | | |

| Land Use | Quantity | Units[2] | Arrival Peak Hour | | | Departure Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* |
| ***Project Trip Generation Summary:*** | | | | | | | | |
| Ritz-Carlton Residences | 106 | DU | 37 | 37 | 74 | 37 | 37 | 74 |
| Sky Mesa Restaurant | 6.966 | TSF | 44 | 31 | 75 | 44 | 31 | 75 |
| Internal Capture (50%)[3] | | | -22 | -16 | -38 | -22 | -16 | -38 |
| Venue[4] | 381 | Spaces | 295 | 10 | 305 | 10 | 295 | 305 |
| | | **Total** | **354** | **62** | **416** | **69** | **347** | **416** |

**Source:** Appendix F.
**Notes**:
1 Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).
2 DU = Dwelling Units; TSF = thousand Square Feet
3 Internal capture reduction of 50% has been applied as a significant portion of the patrons would be internal to the existing hotel.
4 Vehicle trips are calculated based on a maximum allowable occupancy of 0.8 per parking space.

As shown on Table 17-5, Project Trip Generation Summary – Typical Operations, the project is anticipated to generate a net total of 1,068 trip-ends per day, 51 AM peak hour trips and 86 PM peak hour trips.

It should be noted that the venue will generate trips outside the weekday AM and PM peak hours. As shown on Table 17-6, Project Trip Generation Summary – Weekend Special Event, the proposed project (special event) is anticipated to generate a net total of 416 weekend peak hour trips.

### Project Trip Distribution

The trip distributions have been developed based on past work experience in the vicinity of the project site and refined to reflect the roadway network and the surrounding uses in the vicinity of the project as they exist today. Trip distribution patterns for the proposed project are shown in Appendix F.

### Modal Split

Although the use of public transit, walking, and/or bicycling have the potential to reduce project-related traffic, such reductions have not been taken into considerations in this traffic study in order to provide a conservative analysis of the proposed project's potential to contribute to circulation system deficiencies.

### Trip Assignment

The assignment of traffic from the proposed project area to the adjoining roadway system is based upon the proposed project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the proposed project. Based on the identified project traffic generation and trip distribution patterns, proposed project weekday ADT, weekday AM peak hour, and weekday PM peak hour peak hour intersection turning movement volumes are shown in Appendix F. Proposed

project (Special Event) weekend arrival and departure peak hour intersection turning movement volumes are also shown in Appendix F.

## Cumulative Growth Traffic

### *Ambient Growth Rate*

Future year traffic forecasts have been based upon background (ambient) growth at 8.24 percent (2 percent per year over 4 years) for EAP and EAPC traffic conditions. The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies, for EAPC traffic conditions.

### *Cumulative Development Traffic*

California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Rancho Mirage.

Appendix F contains the cumulative development location map, and a summary of cumulative development projects and their proposed land uses are shown. If applicable, the traffic generated by individual cumulative projects was manually added to the Opening Year Cumulative forecasts to ensure that traffic generated by the listed cumulative development projects in Appendix F are reflected as part of the background traffic. Trip generation rates used to estimate cumulative development project traffic and a summary of the cumulative development project's weekday trip generation are shown in Table 17-7, Cumulative Development Project Trip Generation Summary.

**Table 17-7. Cumulative Development Project Trip Generation Summary**

| Land Use | ITE LU Code | Units[1] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily | SAT Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* | | *In* | *Out* | *Total* |
| ***Project Trip Generation Rates:[2]*** | | | | | | | | | | | | |
| Single-Family Detached Housing | 210 | DU | 0.19 | 0.56 | 0.74 | 0.62 | 0.37 | 0.99 | 9.44 | 0.50 | 0.43 | 0.93 |
| Hotel | 310 | Rooms | 0.28 | 0.19 | 0.47 | 0.31 | 0.29 | 0.60 | 8.36 | 0.40 | 0.32 | 0.72 |
| Shopping Center | 820 | TSF | 0.58 | 0.36 | 0.94 | 1.83 | 1.98 | 3.81 | 37.75 | 2.34 | 2.16 | 4.50 |
| **Land Use** | **Quantity** | **Units[1]** | **AM Peak Hour** | | | **PM Peak Hour** | | | **Weekday Daily** | **SAT Peak Hour** | | |
| | | | ***In*** | ***Out*** | ***Total*** | ***In*** | ***Out*** | ***Total*** | | ***In*** | ***Out*** | ***Total*** |
| ***Project Trip Generation Summary:*** | | | | | | | | | | | | |
| **Mirada Villas – SFDU (75% Built)** | 9 | DU | 2 | 5 | 7 | 6 | 3 | 9 | 86 | 5 | 4 | 9 |
| ***Horizon Pacific Rancho Cove MSA Consulting*** | | | | | | | | | | | | |
| Commercial | 20,000 | TSF | 12 | 7 | 19 | 37 | 40 | 77 | 756 | 47 | 43 | 90 |
| Hotel | 100 | Rooms | 28 | 19 | 47 | 31 | 29 | 60 | 836 | 40 | 32 | 72 |
| SFDU | 35 | DU | 6 | 19 | 25 | 22 | 13 | 35 | 332 | 18 | 15 | 33 |
| | | **Total** | **46** | **45** | **91** | **90** | **82** | **172** | **1,924** | **105** | **90** | **195** |
| **Ken Catanzarite – SFDU** | 20 | DU | 4 | 11 | 15 | 12 | 7 | 19 | 190 | 10 | 9 | 19 |
| | | **Total** | **52** | **61** | **113** | **108** | **92** | **200** | **2,200** | **120** | **103** | **223** |

**Source:** Appendix F.
**Notes**:
[1] DU = Dwelling Units; TSF = Thousand Square Feet.
[2] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).

### *Near-Term Traffic Forecasts*

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast EAP (2023) and EAPC (2023) traffic conditions. An ambient growth factor of 2% per year accounts for background (area-wide) traffic increases that occur over time up to the year 2023 from the year 2019 (compounded 2% per year growth over a 4-year period). Proposed project traffic is added to assess both forecast EAP (2023) and EAPC (2023) traffic conditions. Traffic volumes generated by cumulative development projects are not included in the EAP (2023) traffic conditions.

The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- EAP (2023)
  - Existing 2019 volumes
  - Ambient growth traffic (8.24%)
- EAPC (2023)
  - Existing 2019 volumes
  - Ambient growth traffic (8.24%)
  - Cumulative Development Traffic
  - Typical Weekday or Saturday Special Event Project Traffic

The average growth rate is estimated at approximately 3.44%, compounded annually between Existing (2019) and EAPC (2023) traffic conditions. The annual growth rate at each individual intersection is not lower than 3.24% compounded annually to as high as 3.63% compounded annually over the same time period. Therefore, the annual growth rate utilized for the purposes of this analysis would appear to conservatively approximate the anticipated regional growth in traffic volumes in the City of Rancho Mirage for EAPC (2023) traffic conditions, especially when considered along with the addition of project-related traffic.

### Horizon Year (2040) Volume Development

Traffic projections for Horizon Year (2040) without proposed project conditions were derived from the Riverside Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing for study area intersections located within the County of Riverside. The version of the RivTAM used for traffic reflects the local input in the adopted 2016 SCAG RTP within the County of Riverside.

The traffic forecasts reflect the area-wide growth anticipated between Existing (2019) conditions and Horizon Year (2040) traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year (2040) peak hour forecasts were refined using the model derived long range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location in December 2019. The RivTAM has a base (validation) year of 2012 and

a horizon (future forecast) year of 2040. The difference in model volumes (2040-2012) defines the growth in traffic over the 28-year period.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year (2040) forecasts. Horizon Year (2040) turning volumes were compared to EAPC (2023) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between EAPC (2023) and Horizon Year (2040) traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2019) and EAPC (2023) conditions. Adjustments have not been made to study area intersections that may be affected by new future roadway connections, where travel patterns would likely get affected and forecasts may potentially decrease from the EAPC conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year (2040) peak hour forecasts.

The future Horizon Year (2040) Without Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis. Post-processing worksheets for Horizon Year (2040) without Project traffic conditions are provided in Appendix F.

### E+P Traffic Conditions

This section discusses the traffic forecasts for Existing Plus Project (E+P) traffic conditions and the resulting peak hour intersection operations, traffic signal warrant, and queuing analyses.

### Roadway Improvements

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1 in Appendix F, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the proposed project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

### E+P Traffic Volume Forecasts

This scenario includes Existing traffic volumes plus project traffic. E+P weekday ADT, weekday AM and weekday PM peak hour intersection turning movement volumes are shown on Appendix F. Weekend special event peak hour intersection turning movement volumes are shown in Appendix F, as well.

### E+P Intersection Operations Analysis

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 17.1.1 Methodologies of this Initial Study. The intersection analysis results are summarized in Table 17-8, Intersection Analysis for E+P Conditions, which indicate that there are no intersections operating at an unacceptable LOS with the addition of Project traffic. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix F.

**Table 17-8. Intersection Analysis for E+P Conditions**

| # | Intersection | Traffic Control[1] | Existing (2019) | | | | | | E+P | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. and Dwy. 1 | --/CSS | *Future Intersection* | | | | | | 8.5 | 8.5 | 8.6 | 10.3 | A | A | A | B |
| 2 | Frank Sinatra Dr. and Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.2 | 10.2 | 15.5 | 15.8 | A | B | C | C |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 20.6 | 20.0 | 23.0 | 26.1 | C | C | C | C |

**Source:** Appendix F.
**Notes:**
1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
2 CSS = Cross-street Stop; TS = Traffic Signal.
3 Arr = Arrival Peak Hour; Dep = Departure Peak Hour.

### E+P Traffic Signal Warrants Analysis

Traffic signal warrants for E+P traffic conditions are based on planning level (ADT) and peak hour intersection volumes. For E+P traffic conditions, no study area intersections are anticipated to warrant a traffic signal (Appendix F).

### E+P Queuing Analysis

A queuing analysis was performed for study area intersections to assess vehicle queues that may potentially impact peak hour operations. Queuing analysis findings are presented in Table 17-9, Peak Hour Queuing Summary for E+P Conditions. It is important to note that lengths are consistent with the measured distance between the intersection and the end of the storage area.

**Table 17-9. Peak Hour Queuing Summary for E+P Conditions**

| # | Intersection | Traffic Control[1] | Existing (2019) | | | | | | E+P | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | SAT | Weekday | | SAT | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | | AM | PM | | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. and Dwy. 1 | —/CSS | Future Intersection | | | | | | 8.5 | 8.5 | 8.6 | 10.3 | A | A | A | B |
| 2 | Frank Sinatra Dr. and Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.2 | 10.2 | 15.5 | 15.8 | A | B | C | C |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 20.6 | 20.0 | 23.0 | 26.1 | C | C | C | C |

| Intersection | Movement | Available Stacking Distance (Feet) | Existing (2019) | | | | | | E+P | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet)[4] | | | Acceptable?[5] | | | 95th Percentile Queue (Feet)[4] | | | | Acceptable?[5] | | | |
| | | | Weekday | | SAT | Weekday | | SAT | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | | AM | PM | | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| Frank Sinatra Dr. and Dwy. 1 | SBL/T | 200 | Future Intersection | | | | | | 0 | 0 | 36 | 0 | Yes | Yes | Yes | Yes |
| | WBL/R | 100 | | | | | | | 46 | 46 | 44 | 89 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. and Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes | 0 | 14 | 9 | 39 | Yes | Yes | Yes | Yes |
| | WBL/R | 200 | 34 | 28 | 45 | Yes | Yes | Yes | 37 | 34 | 45 | 37 | Yes | Yes | Yes | Yes |
| Hwy. 111 and Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes | 72 | 1012 | **368[2]** | 118 | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 0 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes | 51 | 70 | 67 | **233[2]** | Yes | Yes | Yes | **No** |
| | EBT/R | 270 | 41 | 74 | 51 | Yes | Yes | Yes | 151 | 92 | 101 | **325** | Yes | Yes | Yes | **No** |

**Source**: Appendix F.
**Notes**:
[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = Cross-street Stop; TS = Traffic Signal.
3 Arr = Arrival Peak Jour; Dep = Departure Peak Hour.
4 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

As shown on Table 17-9, Peak Hour Queuing Summary for E+P Conditions, and consistent with Existing (2019) conditions, there are no potential queuing issues anticipated during the weekday peak 95th percentile traffic flows for E+P traffic conditions. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 and Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 and Frank Sinatra Dr. (#3) – EBL movement

Worksheets for E+P conditions queuing analysis are provided in Appendix F. No improvement strategies have been recommended for study area intersections as there no deficient intersections for E+P traffic conditions. As shown previously on Table 17-9, there are no weekday peak hour queuing issues anticipated at the study area intersections for E+P traffic conditions. However, it is recommended that the following improvements be implemented to accommodate E+P weekend special event 95$^{th}$ percentile traffic flows (**MM-TRA-1**, **MM-TRA-2**). Therefore, impacts would be **less than significant with mitigation incorporated**.

### EAP (2023) Traffic Conditions

This section discusses the methods used to develop Existing plus Ambient Growth plus Project (EAP) (2023) traffic conditions and the resulting peak hour intersection operations, traffic signal warrant, and queuing analyses.

### Roadway Improvements

The lane configurations and traffic controls assumed to be in place for EAP conditions are consistent with those shown in Appendix F, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the proposed project to provide site access are also assumed to be in place for EAP conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

### EAP (2023) Traffic Volume Forecasts

To account for background traffic growth, an ambient growth from Existing conditions of 8.24% (2 percent per year over 4 years, compounded annually) is included for EAP traffic conditions. Cumulative development projects are not included as part of the EAP analysis. EAP weekday ADT, weekday AM, and weekday PM peak hour intersection turning movement volumes are shown in Appendix F. Weekend special event peak hour intersection turning movement volumes are also shown in Appendix F.

### EAP (2023) Intersection Operations Analysis

EAP peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 17.1.1, Methodologies, of this Initial Study. The intersection analysis results are summarized in Table 17-10, Intersection Analysis for EAP (2023) Conditions, which indicate that there are no intersections operating at an unacceptable LOS with the addition of ambient growth and proposed project traffic. The intersection operations analysis worksheets for EAP traffic conditions are included in Appendix F

### EAP (2023) Traffic Signal Warrants Analysis

Traffic signal warrants for EAP traffic conditions are based on planning level (ADT) and peak hour intersection volumes. For EAP traffic conditions, no study area intersections are anticipated to warrant a traffic signal (Appendix F).

### EAP (2023) Queuing Analysis

A queuing analysis was performed for study area intersections that may potentially impact peak hour operations. Queuing analysis findings are presented in Table 17-11. It is important to note that lengths are consistent with the measured distance between the intersection and the end of the storage area. As shown on Table 17-11 and consistent with Existing (2019) conditions, there are no potential queuing issues anticipated during the peak 95$^{th}$ percentile traffic flows for EAP (2023) traffic conditions. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95$^{th}$ percentile peak hour traffic flow:

- Hwy. 111 and Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 and Frank Sinatra Dr. (#3) – EBL movement

Worksheets for EAP (2023) conditions queuing analysis are provided in Appendix F.

**Table 17-10. Intersection Analysis for EAP (2023) Conditions**

| # | Intersection | Traffic Control[1] | Existing (2019) | | | | | | EAP (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. and Dwy. 1 | --/CSS | *Future Intersection* | | | | | | 8.6 | 8.5 | 8.7 | 10.3 | A | A | A | B |
| 2 | Frank Sinatra Dr. and Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.2 | 10.3 | 15.8 | 16.1 | A | B | C | C |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 21.5 | 20.8 | 24.1 | 28.3 | C | C | C | C |

**Source:** Appendix F.
**Notes**:
[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
[2] CSS = Cross-street Stop; TS = Traffic Signal.
[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour.

**Table 17-11. Peak Hour Queuing Summary for EAP (2023) Conditions**

| Intersection | Movement | Available Stacking Dist. (Feet) | Existing (2019) | | | | | | EAP (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet)[1] | | | Acceptable?[1] | | | 95th Percentile Queue (Feet)[1] | | | | Acceptable?[2] | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| Frank Sinatra Dr. and Dwy. 1 | SBL / R | 200 | Future Intersection | | | | | | 0 | 18 | 27 | 9 | Yes | Yes | Yes | Yes |
| | WBL / R | 100 | | | | | | | 44 | 44 | 48 | 96 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. and Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes | 10 | 22 | 0 | 33 | Yes | Yes | Yes | Yes |
| | WBL / R | 200 | 34 | 28 | 45 | Yes | Yes | Yes | 24 | 32 | 54 | 42 | Yes | Yes | Yes | Yes |
| Hwy. 111 and Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes | 75 | 108[2] | 376[2] | 125[2] | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 39 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes | 53 | 74 | 70 | 238[2] | Yes | Yes | Yes | **No** |
| | EBT / R | 270 | 41 | 74 | 51 | Yes | Yes | Yes | 62 | 96 | 106 | 330 | Yes | Yes | Yes | **No** |

**Source:** Appendix F.
**Notes:**
1 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
2 Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
3 Arr = Arrival Peak Hour; Dep = Departure Peak Hour.

No improvement strategies have been recommended for study area intersections as there no deficient intersections for EAP (2023) traffic conditions. As shown previously on Table 17-11, there are no weekday peak hour queuing issues anticipated at the study area intersections for EAP (2023) traffic conditions. However, it is recommended that the following improvements be implemented to accommodate EAP (2023) weekend special event 95th percentile traffic flows (**MM-TRA-1; MM-TRA-2**). Therefore, impacts would be **less than significant** with **mitigation incorporated**.

### EAPC (2023) Traffic Conditions

This section discusses the methods used to develop Existing Plus Ambient Growth Plus Cumulative Projects Plus Project (EAPC) (2023) traffic conditions and the resulting peak hour intersection operations, traffic signal warrant, and queuing analyses.

### Roadway Improvements

The lane configurations and traffic controls assumed to be in place for EAPC conditions are consistent with those shown previously on Exhibit 3-1 in Appendix F, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the proposed project to provide site access are also assumed to be in place for EAPC conditions only (e.g., intersection and roadway improvements at the proposed project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for EAPC conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

### EAPC (2023) Traffic Volume Forecasts

To account for background traffic growth, other known cumulative development projects in the study area were included in addition to an ambient growth from Existing conditions of 8.24% (2 percent per year over 4 years, compounded annually) for EAPC traffic conditions. EAPC weekday ADT, weekday AM, and weekday PM peak hour intersection turning movement volumes, as well as weekend peak hour intersection turning movement volumes are shown in Appendix F.

### EAPC (2023) Intersection Operations Analysis

EAPC peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 17.1.1, Methodologies, of this Initial Study. The intersection analysis results are summarized in Table 17-12, Intersection Analysis for EACP (2023) Conditions, which indicate that there are no intersections operating at an unacceptable LOS with the addition of ambient growth, cumulative projects, and proposed project traffic. The intersection operations analysis worksheets for EAPC traffic conditions is included in Appendix F.

**Table 17-12. Intersection Analysis for EACP (2023) Conditions**

| # | Intersection | Traffic Controls[1] | Existing (2019) | | | | | | EAPC (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Delay[2] (secs.)* | | | *Level of Service* | | | *Delay[2] (secs.)* | | | | *Level of Service* | | | |
| | | | *Weekday* | | | *Weekday* | | | *Weekday* | | *Saturday* | | *Weekday* | | *Saturday* | |
| | | | *AM* | *PM* | *SAT* | *AM* | *PM* | *SAT* | *AM* | *PM* | *Arr[3]* | *Dep[3]* | *AM* | *PM* | *Arr[3]* | *Dep[3]* |
| 1 | Frank Sinatra Dr. and Dwy. 1 | -- / CSS | ***Future Intersection*** | | | | | | 8.6 | 8.6 | 8.7 | 10.4 | A | A | A | B |
| 2 | Frank Sinatra Dr. Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.3 | 10.4 | 16.0 | 16.3 | A | B | C | C |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 21.7 | 21.3 | 24.9 | 30.5 | C | C | C | C |

**Source:** Appendix F.
**Notes**:
[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
[2] CSS = Cross-street Stop; TS = Traffic Signal.
[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour.

### EAPC (2023) Traffic Signal Warrants Analysis

Traffic signal warrants for EAPC traffic conditions are based on planning level (ADT) and peak hour intersection volumes. For EAPC traffic conditions, no study area intersections are anticipated to warrant a traffic signal (Appendix F).

### EAPC (2023) Queuing Analysis

A queuing analysis was performed for study area intersections that may potentially impact peak hour operations. Queuing analysis findings are presented in Table17-13, Peak Hour Queuing Summary for EAPC (2023) Conditions. It is important to note that lengths are consistent with the measured distance between the intersection and the end of the storage area. As shown on Table 17-13, Peak Hour Queuing Summary for EAPC (2023) Conditions, and consistent with Existing (2019) conditions, there are no potential queuing issues anticipated during the peak weekday 95$^{th}$ percentile traffic flows for EAPC (2023) traffic conditions. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95$^{th}$ percentile peak hour traffic flow:

- Hwy. 111 and Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 and Frank Sinatra Dr. (#3) – EBL movement

Worksheets for EAPC (2023) conditions queuing analysis are provided in Appendix F.

**Table 17-13. Peak Hour Queuing Summary for EAPC (2023) Conditions**

| Intersection | Movement | Available Stacking Dist. (Feet) | Existing (2019) | | | | | | EAPC (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet)[1] | | | Acceptable?[1] | | | 95th Percentile Queue (Feet)[1] | | | | Acceptable?[2] | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| Frank Sinatra Dr. and Dwy. 1 | SBL / R | 200 | Future Intersection | | | | | | 9 | 0 | 30 | 0 | Yes | Yes | Yes | Yes |
| | WBL / R | 100 | | | | | | | 44 | 45 | 43 | 79 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. and Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes | 0 | 0 | 21 | 34 | Yes | Yes | Yes | Yes |
| | WBL / R | 200 | 34 | 28 | 45 | Yes | Yes | Yes | 28 | 29 | 40 | 48 | Yes | Yes | Yes | Yes |
| Hwy. 111 and Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes | 77 | 113[2] | 3379[2] | 131[2] | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 0 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes | 57 | 86[2] | 82[2] | 251[2] | Yes | Yes | Yes | **No** |
| | EBT / R | 270 | 41 | 74 | 51 | Yes | Yes | Yes | 64 | 99 | 109 | 336 | Yes | Yes | Yes | **No** |

**Source:** Appendix F.
**Notes:**
1 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
2 Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
3 Arr = Arrival Peak Hour; Dep = Departure Peak Hour.

No improvement strategies have been recommended for study area intersections as there no deficient intersections for EAPC (2023) traffic conditions. As shown previously on Table 17-13, Peak Hour Queuing Summary for EAPC (2023) Conditions, there are no weekday peak hour queuing issues anticipated at the study area intersections for EAPC (2023) traffic conditions. However, it is recommended that the following improvements be implemented to accommodate EAPC (2023) weekend special event 95th percentile traffic flows (**MM-TRA-1; MM-TRA-2**). Therefore, impacts would be **less than significant with mitigation incorporated**.

### Horizon Year (With and Without Project) (2040) Traffic Analysis

This section discusses the methods used to develop Horizon Year Without and With Project and the resulting intersection operations, traffic signal warrants, and queuing analysis.

### Roadway Improvements

The lane configurations and traffic controls assumed to be in place for Horizon Year conditions are consistent with those shown previously on Exhibit 3-1 in Appendix F, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the proposed project to provide site access are also assumed to be in place for Horizon Year With Project conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

### Horizon Year Without Project Traffic Volume Forecasts

This scenario includes the refined post-process volumes obtained from the RivTAM (see Appendix F for a detailed discussion on the post-processing methodology). The weekday ADT, weekday AM, and weekday PM peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions, as well as the weekend peak hour intersection turning movement volumes are shown in Appendix F.

### Intersection Operation Analysis

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) Without Project conditions with roadway and intersection geometrics consistent with Existing conditions. As shown in Table 17-14, Intersection Analysis for Horizon Year (2020) Conditions, no study area intersections are anticipated to operate at unacceptable levels of service under Horizon Year (2040) Without and With Project conditions. With the addition of proposed project traffic, no additional study area intersections are anticipated to operate at unacceptable levels of service.

**Table 17-14. Intersection Analysis for Horizon Year (2040) With and Without Project Conditions**

| # | Intersection | Traffic Controls[1] | 2040 Without Project | | | | | | 2040 With Project | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Delay[2] (secs.)* | | | *Level of Service* | | | *Delay[2] (secs.)* | | | | *Level of Service* | | | |
| | | | *Weekday* | | | *Weekday* | | | *Weekday* | | *Saturday* | | *Weekday* | | *Saturday* | |
| | | | *AM* | *PM* | *SAT* | *AM* | *PM* | *SAT* | *AM* | *PM* | *Arr[3]* | *Dep[3]* | *AM* | *PM* | *Arr[3]* | *Dep[3]* |
| 1 | Frank Sinatra Dr. and Dwy. 1 | — / CSS | ***Future Intersection*** | | | | | | 8.6 | 8.6 | 8.7 | 10.4 | A | A | A | B |
| 2 | Frank Sinatra Dr. Dwy. 2 | CSS | 9.1 | 9.7 | 10.0 | A | A | B | 9.3 | 10.5 | 16.3 | 16.7 | A | B | C | C |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 22.7 | 22.6 | 20.3 | C | C | C | 23.2 | 23.2 | 27.1 | 34.1 | C | C | C | C |

**Source:** Appendix F.
**Notes:**
[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
[2] CSS = Cross-street Stop; TS = Traffic Signal.
[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour.

The intersection operations analysis worksheets for Horizon Year (2040) Without Project conditions are included in Appendix F of this Initial Study. The intersection operations analysis worksheets for Horizon Year (2040) With Project conditions are included in Appendix F of this Initial Study.

### Traffic Signal Warrants Analysis

A traffic signal warrant analysis was performed at the unsignalized driveways for Horizon Year (2040) Without and With Project traffic conditions. No study area intersections are anticipated to warrant a traffic signal under Horizon Year (2040) Without and With Project traffic conditions. Traffic signal warrants worksheets for Horizon Year (2040) Without and With Project conditions are provided in Appendix F.

### Queuing Analysis

A queuing analysis was performed for the study area intersections to assess vehicle queues along the roadways. Horizon Year (2040) Without and With Project queuing analysis findings are presented in Table 17-15, Peak Hour Queuing Summary for Horizon Year (2040) Conditions.

As shown on Table 17-15, Peak Hour Queuing Summary for Horizon Year (2040) Conditions, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday and weekend 95$^{th}$ percentile peak hour traffic flows for Horizon Year (2040) Without Project.

With the addition of proposed project traffic, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday 95$^{th}$ percentile peak hour traffic flows. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95$^{th}$ percentile peak hour traffic flow:

- Hwy. 111 and Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 and Frank Sinatra Dr. (#3) – EBL movement

Worksheets for Horizon Year (2040) Without and With Project conditions queuing analysis are provided in Appendix F. The study area intersections are anticipated to operate at an acceptable LOS for Horizon Year (2040) Without Project conditions. The study area intersections are anticipated to continue to operate at an acceptable LOS with the addition of proposed project traffic. As such, no improvements have been recommended for Horizon Year (2040) traffic conditions.

**Table 17-15. Peak Hour Queuing Summary for Horizon Year (2040) Conditions**

| Intersection | Movement | Available Stacking Dist. (Feet) | 2040 Without Project | | | | | | 2040 With Project | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet)[1] | | | Acceptable?[1] | | | 95th Percentile Queue (Feet)[1] | | | | Acceptable?[2] | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| Frank Sinatra Dr. and Dwy. 1 | SBL / R | 200 | Future Intersection | | | | | | 10 | 24 | 37 | 15 | Yes | Yes | Yes | Yes |
| | WBL / R | 100 | | | | | | | 47 | 49 | 46 | 89 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. and Dwy. 2 | SBL | 220 | 0 | 0 | 14 | Yes | Yes | Yes | 0 | 10 | 14 | 51 | Yes | Yes | Yes | Yes |
| | WBL / R | 200 | 31 | 36 | 40 | Yes | Yes | Yes | 37 | 31 | 44 | 46 | Yes | Yes | Yes | Yes |
| Hwy. 111 and Frank Sinatra Dr. | NBL | 260 | 75 | 68 | 97 | Yes | Yes | Yes | 83 | 121[2] | 392[2] | 146[2] | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 43 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 46 | 75 | 51 | Yes | Yes | Yes | 61 | 97[2] | 74 | 246[2] | Yes | Yes | Yes | **No** |
| | EBT / R | 270 | 48 | 89 | 75 | Yes | Yes | Yes | 68 | 107 | 115 | 343 | Yes | Yes | Yes | **No** |

**Source:** Appendix F.
**Notes:**
1 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
2 Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
3 Arr = Arrival Peak Hour; Dep = Departure Peak Hour.

As shown previously on Table 17-15, there are no weekday peak hour queuing issues anticipated at the study area intersections for Horizon Year (2040) traffic conditions. However, it is recommended that the following improvements be implemented to accommodate Horizon Year (2040) With Project Traffic Conditions weekend special event 95th percentile traffic flows (**MM-TRA-1; MM-TRA-2**). Therefore, impacts would be **less than significant with mitigation incorporated**.

b) ***Less-than-Significant Impact.*** On June 18, 2020, the City adopted its own set of VMT thresholds and guidelines titled *Transportation Analysis Policy for the City of Rancho Mirage* (City VMT Guidelines). The guidelines were updated on February 18, 2021 by the City to remain consistent with County and State policies regarding criteria for determining the significance of transportation impacts of projects. The City VMT Guidelines Section I.A, Project Screening, provides details on appropriate screening thresholds that can be used to identify when a proposed land use project is anticipated to result in a less than significant impact without conducting a more detailed VMT analysis. Screening thresholds are broken into three types:

- Project Type Screening
- Low VMT Area Screening
- Transit Priority Area (TPA) Screening

A land use project need only meet one of the above screening thresholds to result in a less-than-significant impact. Refer to Appendix F2 for additional details regarding VMT screening thresholds.

The proposed 6,273 square foot restaurant within the Sky Mesa Recreation Area component of the proposed project is well within the 50,000 square foot threshold for local serving retail and anticipated to provide an additional dining option to hotel guests and the local community. The swimming pool and adjacent open space within the Sky Mesa Recreation Area are also expected to be complementary components to hotel guests and would therefore also meet the intent of the local serving screening criteria. Therefore, the Sky Mesa Recreation Area meets the Project Type Screening criteria and impacts would be **less than significant**.

The Ritz Carlton Residences component of the proposed project would not be deemed as a local serving use, and would generate daily vehicle trips in excess of the 110 trips per day threshold for project type screening as described in the City VMT Guidelines. It also does not meet the Low VMT Area or Transit Priority Area Screening criteria. Therefore, further analysis of potential VMT impacts is provided.

### Project Generated VMT

The Riverside Transportation Analysis Model (RIVTAM) is a useful tool to estimate VMT as it considers interaction between different land uses based on socio-economic data such as population, households, and employment. The City Guidelines state that both proposed project generated VMT and proposed project effect on VMT should be calculated for the traffic analysis zone (TAZ) in which the proposed project is located.

Proposed project generated VMT was calculated using the City of Rancho Mirage General Plan Update version of RIVTAM, with adjustments to socio-economic data. As detailed in

Appendix F2, the proposed project generated VMT per resident is calculated to be 8.60 for baseline conditions.

The thresholds of significance used to measure a potential VMT impact are described by project type in Section I.B., Thresholds of Significance, of the City VMT Guidelines. Thresholds for determination of significant transportation impact for residential uses are described as VMT per resident which is:

- 15 percent below the Citywide per resident VMT, OR
- 15 percent below the regional VMT per resident.

As the City is currently still in development of their Citywide per resident VMT value for purposes of determining a proposed project generated VMT impact, the regional VMT per resident value (15.2) was utilized instead. At 8.60 VMT per resident, the proposed project generated VMT per resident would not exceed the City's threshold of 15 percent below the regional VMT per resident. Proposed project generated VMT is **less than significant**.

### Project Effect on VMT

Consistent with City VMT Guidelines Section I.B., VMT Analysis for Non-Screened Projects, in addition to project generated VMT, there is also a requirement to evaluate a project's effect on VMT. A project's effect on VMT is calculated using the "boundary method", which includes all vehicle trips with one or both trip-ends within the designated boundary of interest (e.g., the City of Rancho Mirage). As detailed in Appendix F2 and shown on Table 17-16, the proposed project is not forecast to cause an increase in citywide VMT per service population as compared to without the proposed project. Therefore, impacts would be **less than significant.**

**Table 17-16. Rancho Mirage Citywide Vehicle Miles Travelled per Service Population**

| | Cumulative Year 2040 Without Project | Cumulative Year 2040 With Project |
|---|---|---|
| Population | 26,821 | 27,049 |
| Employment | 21,694 | 21,694 |
| Service Population | 48,515 | 48,733 |
| Vehicle Miles Travelled | 838,759 | 840,179 |
| Vehicle Miles Travelled per Service Population | 17.29 | 17.22 |

**Source**: Appendix F2.

c) ***Less-than-Significant Impact.*** All proposed project circulation improvements would be designed and constructed to City standards, and therefore, would not result in design hazards. Site access improvements are shown on Figure 17-2. Therefore, it would not increase hazards due to an incompatible use, and impacts would be **less than significant**.

d) ***Less-than-Significant Impact.*** Fire apparatus access throughout the development would include roads that meet the Fire Code requirements for width, grade, clearance, dead-end length, and turnarounds. Therefore, the proposed project's access is considered consistent with City Fire Code requirements. Impacts to emergency access would be **less than significant**.

## *17.3 Mitigation Measures:*

**MM-TRA-1** **Hwy. 111 and Frank Sinatra Dr. (#3) –** Prior to operation of the proposed project, the Applicant shall increase the turn lane capacity from 260' to 400' for the North Bound Lane movement.

**MM-TRA-2** **Hwy. 111 and Frank Sinatra Dr. (#3) –** Prior to operation of the proposed project, the Applicant shall increase turn lane capacity from 170' to 250' for the East Bound Lane movement.

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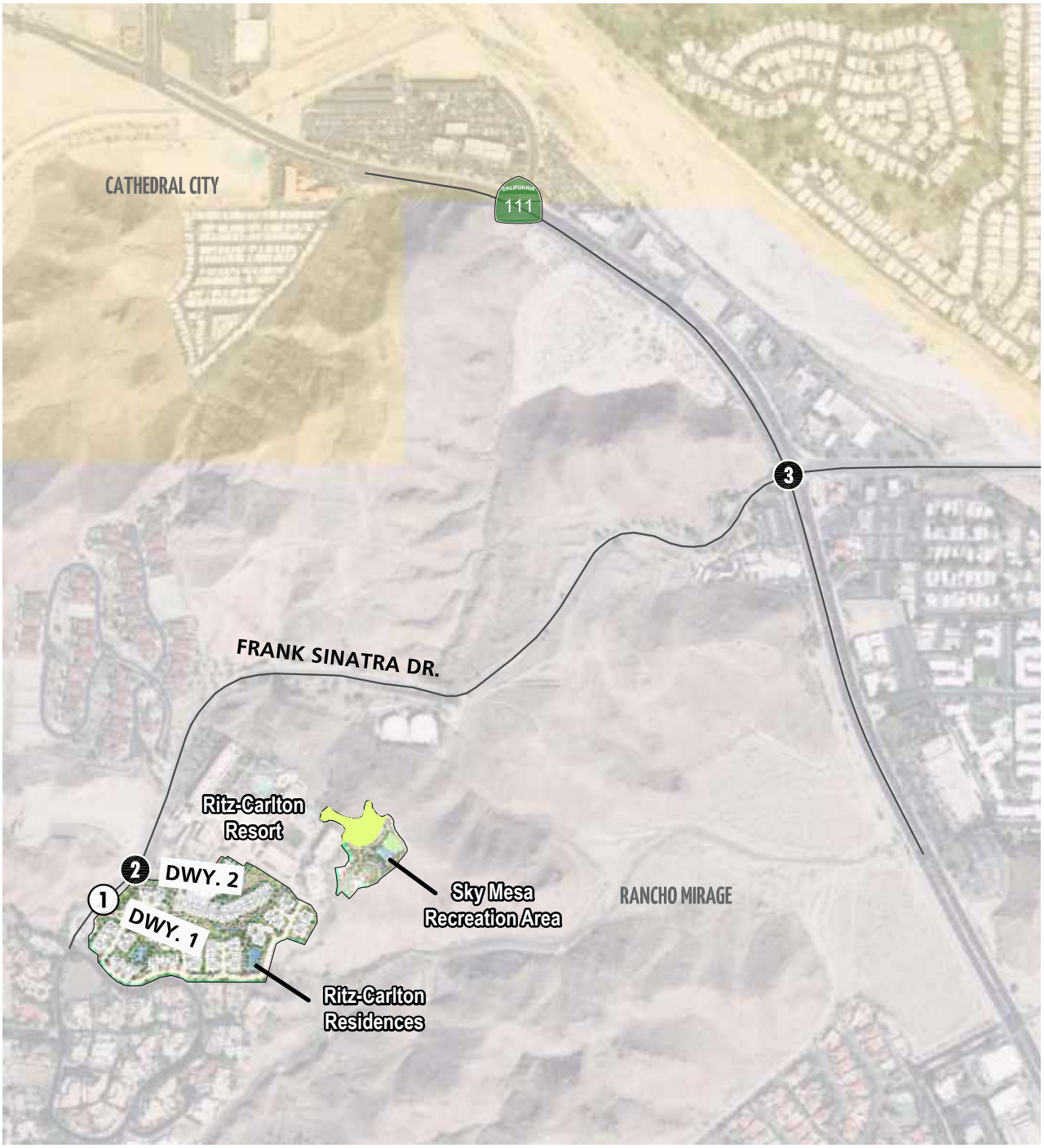


SOURCE: Urban Crossroads 2020

**FIGURE 17-1**

Traffic Impact Analysis (TIA) Study Intersections

Ritz-Carlton Rancho Mirage Initial Study

DUDEK

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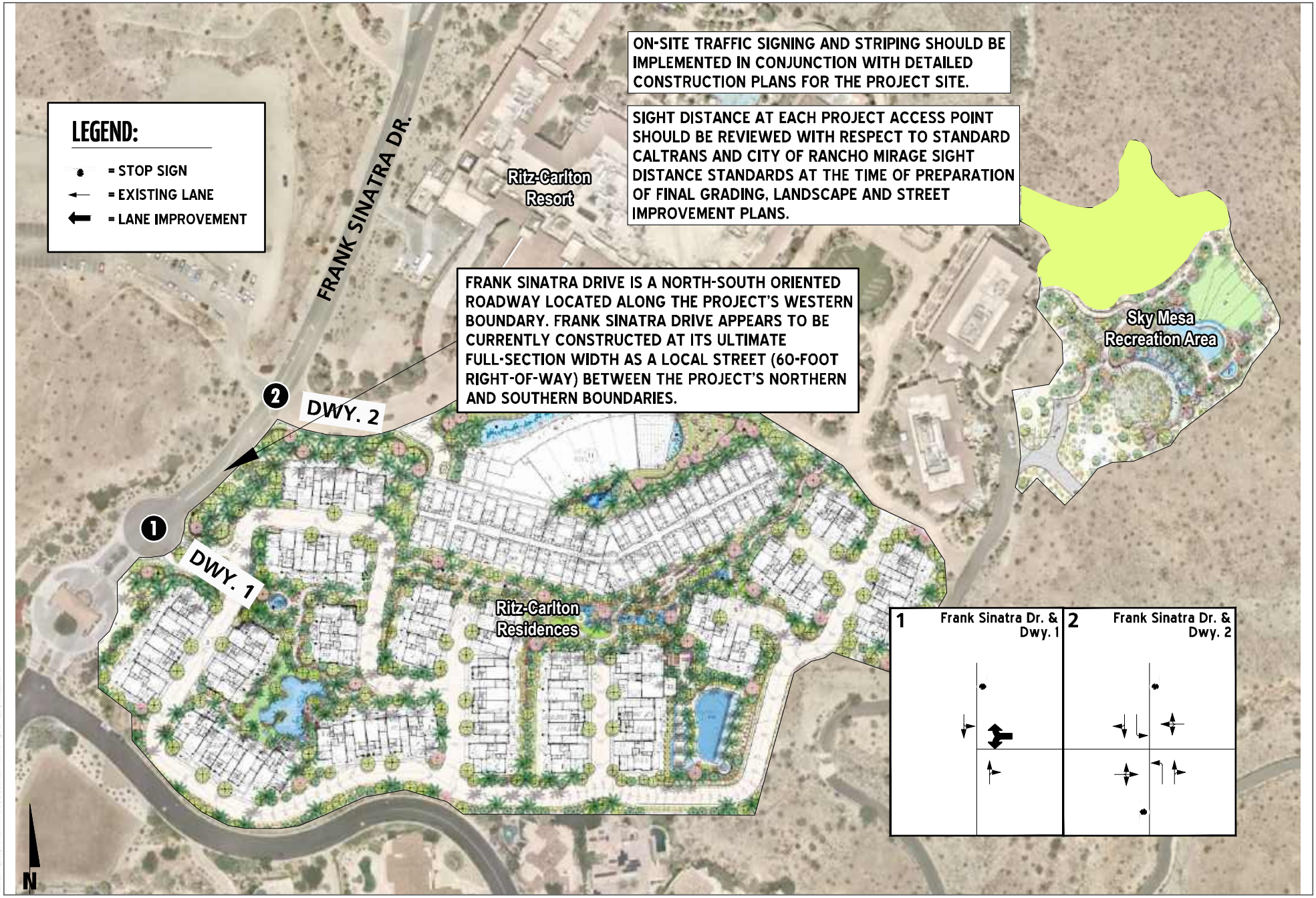


SOURCE: Urban Crossroads 2020

**FIGURE 17-2**

Site Adjacent Roadway and Site Access Recommendations

Ritz-Carlton Rancho Mirage IS/MND

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18. TRIBAL CULTURAL RESOURCES

| **TRIBAL CULTURAL RESOURCES** – Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or | ☐ | ☒ | ☐ | ☐ |
| b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe? | ☐ | ☒ | ☐ | ☐ |

## 18.1 Setting

The Residences at Ritz Carlton portion of the project site was previously included in a cultural resources survey completed by CRM TECH in 2006. The 2006 study consisted of a historical/archaeological resources records search, historical background research, Native American consultation, and a systematic field survey. The records search determined that a segment of a prehistoric trail has been recorded in 1979 as extending into the 39-acre area covered in the 2006 study, however a field survey revealed that the segment of the original trail was no longer extant. The 2006 study concluded that there were no cultural resources in the area surveyed, and no evidence of archaeological deposits were found during the monitoring program.

An updated historical/archaeological resources survey was prepared by CRM TECH in September of 2019. The 2019 study includes a survey and analysis on both the proposed Residences at Ritz Carlton and Sky Mesa Recreational Area, updates to the 2006 records search and the historical background research, further consultation with Native American representatives, and a systematic field survey at intensive and reconnaissance levels as appropriate. This section is based upon the 2019 Historical/Archaeological Resources Survey (cultural report) prepared by CRM TECH in September 2019. The cultural report is included as Appendix C to this Initial Study. Background and methodologies regarding the cultural resources analysis are found in Appendix C.

## 18.2 Discussion of Impacts

a) ***Less-than-Significant Impact with Mitigation Incorporated.*** Refer to Section 5, Cultural Resources, for a discussion on historical resources. Impacts would be less than significant with the incorporation of mitigation measure **MM-CUL-1** and **MM-CUL-2**.

b) ***Less-than-Significant Impact with Mitigation Incorporated.*** On November 21, 2021, pursuant to Senate Bill (SB (18) and Assembly Bill (AB) 52, the City sent letters initiating consultation processes to tribal groups identified by the NAHC as having or potentially having traditional lands or cultural places located within the boundaries of the City and/or have formally requested notification under AB 52. To date, the City has received the following responses:

- The Quechan Indian Tribe responded on December 1, 2021, deferring to other tribes.
- The Morongo Band of Mission Indians responded on January 26, 2022, indicating that the proposed project is not located within their traditionally affiliated boundaries and encouraged consultation with other tribes.
- The Agua Caliente Band of Cahuilla Indians (ACBCI) responded on January 24, 2022, requested formal consultation under AB 52. The City engaged in government to government consultation with ACBCI concerning tribal cultural resources. On March 1, 2022, ACBCI sent a letter to the City stating that their concerns have been addressed and formally concluded AB 52 consultation.

As a result of consultation, the City has determined that potentially significant impacts to tribal cultural resources would be reduced to a level below significance with the incorporation of mitigation measures **MM-CUL-1** and **MM-CUL-2.**

## 18.3 Mitigation Measures

**MM-CUL-1** Prior to the issuance of a grading permit or ground disturbing activities, the Applicant/Owner shall enter into a Tribal Cultural Resources Agreement and Repatriation Agreement with Agua Caliente Band of Cahuilla Indians (ACBCI). The purpose of the agreement shall be to formalize protocols and procedures between the Applicant/Owner and the Tribe for protection, treatment, and repatriation of Native American human remains, funerary objects, cultural and /or religious, ceremonial items, and other Tribal Cultural resources.

A Qualified Archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, and an ACBCI Native American monitor shall be present for

initial ground-disturbing activities associated with the current proposed project– that may occur in areas of native soil. Both the Qualified Archaeologist and ACBCI Native American monitors may temporally halt or divert ground disturbing activities if potential archaeological or Tribal Cultural resources are discovered during construction activities. stop ground-disturbing activities in order to assess any discoveries in the field.~~in the event unanticipated discoveries are made. The monitors may stop ground-disturbing activities in order to assess any discoveries in the field.~~

In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 50 feet of the find shall immediately stop until a Qualified Archaeologist can evaluate the significance of the find and determine whether additional study is warranted. Depending on the significance of the find under the California Environmental Quality Act (CEQA) and the CEQA Guidelines (California Public Resources Code, Section 21082; 14 CCR 15064.5(f)), the Qualified Archaeologist may exhaust the data potential of the find through the process of field level recordation and then allow work to continue. Isolates are clearly non-significant archaeological resources (as determined by the Qualified archaeologist, in consultation with the Native American monitor) will be minimally documented in the field. ~~-~~If the discovery proves significant under CEQA, additional work such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted. In the event that curation of archaeological resources is required by the superseding regulatory agency, curation shall be conducted by an approved local facility in Riverside County, and curation shall be guided by California State Historical Resources Commission's Guidelines for the Curation of Archaeological Collections. The Applicant/Owner shall be responsible for all curation costs and provide the City written documentation from the curation facility that the curation have been completed.

If ~~Native American c~~ Tribal Cultural resources (i.e., prehistoric or ethnohistoric-period artifacts, food remains, or features associated with Native Americans) are exposed during proposed project-related ground disturbance, the actions identified by the Agua Caliente Band of Cahuilla Indians in a preexisting agreement for unanticipated discovery shall be followed~~contacted~~. This agreement may require ~~group shall be asked to provide the services of a trained~~ the Native American Monitor to return to site ~~consultant~~ to monitor ground-disturbing work in the area containing the Native American cultural resources. This monitoring would occur on an as-needed basis and would be intended to ensure that Native American concerns are taken into account during the construction process.

**MM-CUL-2** If human remains are discovered during construction of the proposed project, California Health and Safety Code, Section 7050.5, states that further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner shall be contacted. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within two working days of notification of discovery, the appropriate treatment and disposition of the human remains.

Pursuant to California Public Resources Code, Section 5097.98, if the remains are thought to be Native American, the County Coroner will notify the Native American Heritage Commission, which will then notify the most likely descendent. At this time, the person who discovered the remains will contact the City of Rancho Mirage (City) so that they may work with the most likely descendent on the respectful treatment and disposition of the remains. Further provisions of the California Public Resources Code, Section 5097.98, are to be followed as applicable.

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## 19. UTILITIES AND SERVICE SYSTEMS

| **UTILITIES AND SERVICE SYSTEMS** – Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects? | ☐ | ☐ | ☒ | ☐ |
| b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years? | ☐ | ☐ | ☒ | ☐ |
| c) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ☒ | ☐ |
| d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals? | ☐ | ☐ | ☒ | ☐ |
| e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste? | ☐ | ☐ | ☐ | ☒ |

## 19.1 Setting

According to The Lodge at Rancho Mirage Hotel Expansion Project 2006 DEIR, the project site is located the boundaries of the following providers: Coachella Valley Water District (CVWD), Southern California Edison (SCE), the Southern California Gas Company (SCG). The City contracts with Burrtec for waste and recycling services. Additionally, telephone service is provided to the proposed project by Verizon, and cable television service is provided by Spectrum. Both Verizon and Spectrum have facilities located in the proposed project vicinity and on the existing hotel property that can be extended to serve the proposed project.

The facilities, infrastructure, and capacity of each of these service providers to provide services to the proposed project are discussed below.

A portion of this section is based upon the Drainage Study prepared by Tory R. Walker Engineering in September 2019. The Drainage Study is included as Appendix D to his Initial Study. Background and methodologies regarding the drainage analysis are found be Appendix D.

## 19.2 Discussion of Impacts

a, b, c) ***Less-than-Significant Impact.***

### Water

The CVWD would provide domestic water services to the proposed project (City of Rancho Mirage 2017). The CVWD's service area encompasses approximately 640,000 acres within Riverside County and in portions of northern Imperial and northeastern San Diego counties (CVWD 2016). As of 2015, the CVWD's domestic water system provided approximately 93,000 acre-feet of water per year to 212,871 residents through 107,358 active meters (CVWD 2016).

According to the City's General Plan – Public Services and Facilities Element, all drinking or domestic water comes from the Whitewater River Subbasin, which is shared by the CVWD, the Desert Water Agency (DWA), Myoma Dunes Mutual Water Company, the cities of Indio and Coachella, and multiple private groundwater producers (CVWD 2016). The CVWD domestic water system serving Rancho Mirage includes 57 wells and nine reservoir tanks (City of Rancho Mirage 2017). The average urban water use in Coachella Valley by CVWD was 800 gallons per day (gpd) per connection (City of Rancho Mirage 2017). In 1964, the DWA estimated that approximately 28.8 million acre-feet (AF) of water was stored in Whitewater River subbasin.

The proposed project totals 236,748 square feet, or approximately 5.5 acres. According to CalEEMod calculations provided in ~~Appendix A~~Appendix A-1, the proposed project is anticipated to use approximately 21 Mgal/year, equivalent to 64.5 AF per year (1 Mgal = 3.07 AF). The proposed project's projected water demand would not exceed the 28.8 million AF capacity of the Whitewater River Subbasin (CVWD 2016) and the proposed project would be aligned with the projected water demands for Coachella Valley (Table 19-1, Water Demand Projections).

The proposed project would be adequately served by the CVWD and the proposed project would not require or result in the relocation or construction of new or expanded water facilities. Therefore, impacts would be **less than significant**.

**Table 19-1. Water Demand Projections**

| | 2015 | 2025 | 2035 | 2045 |
|---|---|---|---|---|
| **Total Urban Water Demand (AFY)** | 263,200 | 348,900 | 440,800 | 539,300 |

**Source**: CVWMP 2012.

### Wastewater

The CVWD would provide sewer services to the proposed project (City of Rancho Mirage 2017). Existing sewer lines 6- to 10-inches in diameter would serve the project site (City of Rancho Mirage 2017). The CVWD wastewater reclamation system collects and treats approximately 18.3 million gallons per day (MGD). There are five water reclamation plants (WRP) that are owned and operated by the CVWD (CVWD 2019). Rancho Mirage is served by the closest WRP, located on 43-000 Cook Street, Palm Desert, Riverside County, California 92211 (CVWD 2019). This WRP treatment facility provides a secondary level of wastewater treatment and has a design capacity of 150,000 gallons per day (gpd), and the existing average influent flow is 20,000 gpd (CVWD 2019).

According to the City's General Plan Public Services and Utility Element, approximately 6.3 billion gallons of wastewater are treated yearly and the CVWD would be able to increase its wastewater treatment capacity as the Coachella Valley's population grows. As discussed in Section 14, Population and Housing, the proposed project is not anticipated to substantially increase population in Coachella Valley because it would expand existing hotel facilities and would not construct permanent homes. The proposed project is not anticipated to require or result in the relocation of construction of new or expanded wastewater facilities. The influent flows as reported in the 2019 Sanitary Sewer Management Plan are approximately 20,000 gpd, which is well below the treatment capacity of 150,000 gpd. Additionally, there are current expansion and improvement plants to the wastewater collection system and reclamation plants, which would increase the system's capacity to treat wastewater (City of Rancho Mirage 2017). Therefore, wastewater generation from the proposed project would be adequately served by existing treatment facilities and infrastructure and impacts would be **less than significant.**

### Stormwater

The proposed project would develop a site with existing hardscape and engineered drainage facilities. While the proposed project would alter the amount of impervious surfaces on the project site compared to the existing condition, the increase would not be substantial. The proposed project would include landscaped areas that would allow for infiltration. The site would be designed to mimic existing drainage patterns and would not substantially alter the existing drainage pattern such that it would necessitate the construction of new stormwater drainage facilities. Therefore, impacts would be **less than significant**.

### Electric, Natural Gas, and Telecommunication Facilities

Southern California Edison (SCE) provides electric power services to the City (City of Rancho Mirage 2017). Southern California Gas (SCG) provides natural gas services to the City (City of Rancho Mirage 2017). Multiple companies, such as AT&T and Spectrum, provide telecommunication services to the City (City of Rancho Mirage 2017).

#### *Construction*

As discussed in Section 6, Energy, temporary electric power would be used during construction for as-necessary lighting and electric equipment. A substantial amount of natural gas would not be required during the construction phase of the proposed project. Petroleum usage via diesel usage from generated trips during construction would consume 15,773 gallons of gasoline and 108,282 gallons of diesel over the construction period, which is negligible when compared to the 44.62 billion gallons of petroleum that would be consumed in California over the course of the construction period.

#### *Operation*

Energy consumption for proposed project operation are presented in the CalEEMod outputs in ~~Appendix A~~Appendix A-1. According to these estimations, the proposed project would consume approximately 1,999,034 kilowatt-hours (kWh) per year during operation. For comparison, in 2017 the total residential and non-residential electricity demand in Riverside County was 16,256,705,411 kWh (CEC 2018). Although not accounted for in the modeling, energy consumption of the proposed project would also be reduced through installation of high-efficiency lighting. For these reasons, electricity consumption during operation would not be considered substantial enough to warrant new or expanded electrical facilities.

Proposed project operation would require natural gas for various purposes, including water heating, natural gas appliances and energy generator routing testing. Natural gas consumption associated with operation is based on the CalEEMod outputs (see ~~Appendix A~~Appendix A-1). According to these estimations, the proposed project would consume approximately 4,330,242 kilo-British Thermal Units (kBtu) per year. For comparison, in 2017 the non-residential natural gas use within Riverside County was 39,844,317,732 kBtu (CEC 2018). Since the proposed project would comply with applicable Title 24 requirements the proposed project would not require a substantial amount of natural gas that would require new or expanded facilities.

Petroleum use would increase during proposed project operation as a result of residences, restaurant customers, venue attendees, deliveries, and employees commuting to the site, although the use would not be substantial and would diminish over time due to efficiency increases.

#### *Summary*

The proposed project would connect to existing electric, natural gas, and telecommunication lines and facilities within and adjacent to the project site. The proposed project does not propose uses that would be expected to generate an excessive need for these facilities such that construction or relocation would be required. Therefore, impacts would be **less than significant**.

d) ***Less-than-Significant Impact***: The proposed project would produce waste during construction and operation, typical of a normal hotel expansion development. The proposed project does not include any uses that would otherwise generate excessive solid waste during either construction or the operational life of the proposed project. Construction would be a short-term and a temporary source of waste. Operation would result in a long-term source for solid waste (per the project's CalEEMod output, the project is estimated to generate approximately 191 tons of solid waste per year).

The City contracts Burrtec to manage and dispose of solid waste (City of Rancho Mirage 2017). The solid waste would be taken to Edom Hill Transfer Station, located in Cathedral City approximately 3 miles north of the City of Rancho Mirage (City of Rancho Mirage 2017). The Edom Hill transfer station has a maximum permitted throughput of 3,500 tons per day and a permitted capacity of 3,500 tons per day for general waste (City of Rancho Mirage 2017). The solid waste is transferred from Edom Hill transfer station to Lamb Canyon Sanitary Landfill, which has a maximum permitted throughput of 500 tons per day, a maximum permitted capacity of approximately 38 million cubic yards, and a remaining capacity of approximately 19 million cubic yards (CalRecycle n.d.a.). Given the estimated remaining capacity and the continued state and local efforts and regulations to reduce waste streams to landfills, the proposed project would be adequately served by existing landfills. Impacts would be **less than significant.**

d) ***No Impact***: During construction and operation, the proposed project would be required to comply with applicable federal, state, and local regulations regarding the proper disposal of solid waste, including the City of Rancho Mirage Municipal Code as it relates to solid waste and recycling. Therefore, **no impact** would occur.

## 19.3 Mitigation Measures

No mitigation measures required.

Intentionally left blank

## 20. WILDFIRE

| **WILDFIRE** – If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Substantially impair an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☐ | ☒ |
| b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire? | ☐ | ☐ | ☒ | ☐ |
| c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment? | ☐ | ☐ | ☒ | ☐ |
| d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes? | ☐ | ☐ | ☒ | ☐ |

### 20.1 Setting

The project site is not located in or near state responsibility areas (SRA), and near lands are also not located in or near SRAs. The project site is located within a local responsibility area (LRA). According to Exhibit 27 of the City's General Plan Safety Element, the project site is located within a moderate fire threat zone and is adjacent to a high fire threat zone (City of Rancho Mirage 2017). However, the City's General Plan Safety Element also notes that "the historical record indicates that the wildland fire hazard in Rancho Mirage is relatively low" (City of Rancho Mirage 2017).

### 20.2 Discussion of Impacts:

a) ***No Impact.*** The City of Rancho Mirage operates an Emergency Preparedness Commission that provides resources to reduce future disaster damages and enhance disaster

preparedness, response, and recovery (City of Rancho Mirage n.d.b.). Additionally, the City of Rancho Mirage participates in the Riverside County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) (City of Rancho Mirage 2017). The City of Rancho Mirage has two main evacuation routes, I-10 and Highway 111 (City of Rancho Mirage 2017). Multiple fire hazard goals, policies and programs presented in the general plan would establish emergency preparedness and procedure in the case of wildfires. The proposed project would not impair access to identified evacuation routes, as discussed in Section 17 Transportation. The proposed project would not substantially impair adopted emergency responses plans or emergency evacuation plans and therefore there would be **no impact**.

b) ***Less-than-significant Impact***. As discussed earlier, the project site is not located in or near an SRA and is located within a moderate fire threat zone (City of Rancho Mirage 2017). The project site is not located within the Santa Ana Wildfire Threat Index map, and therefore proposed project occupants would not be exposed to potential pollutant concentrations originating from uncontrolled spread of wildfire due to prevailing Santa Ana Winds (Santa Ana Wildfire Treat Index n.d.a.). All fire protection codes present in the City of Rancho Mirage's municipal code would be adhered to and would lessen potential exposure of proposed project occupants to pollutants resulting from wildfire spread. Therefore, impacts would be **less than significant**.

c) ***Less-than-significant Impact.*** The proposed project would not require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risks or that may result in temporary or ongoing impacts to the environment. As discussed in Section 19, Utilities and Service Systems, the proposed project would connect to existing infrastructure. New inlet roads would be constructed as part of the proposed project and would follow all setback and fire code regulations established by the City of Rancho Mirage and the County of Riverside. Therefore, impacts would be **less than significant.**

d) ***Less-than-significant Impact.*** As discussed in Section 10, Hydrology and Water Quality, the proposed project would not be located within a 100-year flood hazard area (City of Rancho Mirage 2017). Additionally, although the proposed project would increase the amount of impervious surface at the site compared to existing conditions, this increase would not be significant. According to Exhibit 24 of the City's General Plan Safety Element, the project site is located in an area where "numerous rock falls and landscapes expected to occur during an earthquake" (City of Rancho Mirage 2017); however, compliance with the City's General Plan policies and the California Building Code (CBC) (discussed in Section 7, Geology and Soils) would mitigate the potential landslide impacts to a level less than significant. Therefore, the proposed project would not expose people or structures to significant risks, including downslope or downstream flooding or landsides, as a result of runoff, post-fire slope instability, or drainage changes. Impacts would be **less than significant.**

## 20.3 Mitigation Measures:

No mitigation measures required.

21. MANDATORY FINDINGS OF SIGNIFICANCE

| MANDATORY FINDINGS OF SIGNIFICANCE | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | ☐ | ☒ | ☐ | ☐ |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? | ☐ | ☒ | ☐ | ☐ |
| c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☒ | ☐ | ☐ |

## 21.1 Discussion of Impacts

a) ***Less-than-Significant Impact with Mitigation Incorporated.*** As discussed in Section 4, Biological Resources, the proposed project would cause potential significant impacts to special status wildlife. However, with incorporation of **MM-BIO-1 through MM-BIO-6**, all potentially significant

impacts would be reduced to a level below significance. The proposed project would not substantially degrade the quality of the environment as it would be developed in land that has already been graded. Additionally, the proposed project would not substantially degrade the quality of the environment, impact fish or wildlife species, or plant communities.

As discussed in Section 5, Cultural Resources, potential impacts regarding inadvertent discovery of cultural resources could occur during construction of the proposed project. However, implementation of **MM-CUL-1** and **MM-CUL-2** would ensure that impacts would be less then significant. Overall, impacts would be **less than significant with the incorporation of mitigation**.

b) ***Less-than-Significant Impact with Mitigation Incorporated.*** As provided in the analysis of this Initial Study, the proposed project would not result in significant impacts to aesthetics, agriculture and forestry resources, air quality, biological resources, cultural resources, energy, geology and soils, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation, tribal cultural resources, utilities and service systems, and wildfire. Mitigation measures recommended for biological resources, cultural resources, traffic, geology and soils, and noise would reduce impacts to below a level of significance.

The proposed project would incrementally contribute to cumulative impacts for projects occurring within the City. With mitigation, however, implementation of the proposed project would not result in any residual significant impacts that could contribute to a cumulative impact. In addition, other related projects would presumably be bound by their applicable lead agency to (1) comply with the all applicable federal, state, and local regulatory requirements; and (2) incorporate all feasible mitigation measures, consistent with CEQA, to further ensure that their potentially cumulative impacts would be reduced to less-than-significant levels.

In the absence of residually significant impacts, the incremental accumulation of effects would not be cumulatively considerable and would be **less than significant with incorporation of mitigation.**

c) ***Less-than-Significant Impact with Mitigation Incorporated.*** The potential for adverse direct or indirect impacts to human beings was considered throughout the above analysis in this Initial Study. Based on this evaluation, there is no substantial evidence that construction or operation of the proposed project with the proposed mitigation measures incorporated would result in a substantial adverse effect on human beings.

## 21.2 Mitigation Measures

Refer to **MM-BIO-1 through MM-BIO-6, MM-CUL-1**, **MM-CUL-2**, **MM-NOI-1**, **MM-TRA-1**, and **MM-TRA-2**.

**Table 21.2-1: Mitigation Monitoring and Reporting Program**

| Mitigation Measure | Responsible Agency | Timing | Verification |
|---|---|---|---|

| | | | |
|---|---|---|---|
| | | | **(Date and Initials)** |
| **AESTHETICS** | | | |
| **N/A** | | | |
| **AGRICULTURAL RESOURCES** | | | |
| **N/A** | | | |
| **AIR QUALITY** | | | |
| **MM-AQ-1 Construction Equipment – Use of Tier 4 Engines** Prior to the commencement of construction activities for the project, the applicant shall require its construction contractor to use California Air Resources Board (CARB)-certified Tier 4 engines for all diesel-powered equipment pieces that are 75 horsepower or greater throughout all phases of construction.<br><br>In the event of changed circumstances (e.g., changes in the availability of specific types of construction equipment), the applicant may submit a request to the City to apply an equivalent method of achieving project-generated construction emissions that fall below the numeric cancer risk standards established by the South Coast Air Quality Management District (SCAQMD). Documentation using industry-standard emission estimation methodologies shall be furnished to the City demonstrating that estimated project-generated construction emissions would not exceed the applicable SCAQMD cancer risk threshold with the alternate construction method(s). If the documentation demonstrates that project-generated construction emissions will remain below the applicable SCAQMD cancer risk threshold, then the City may approve the alternate construction method(s), at the City's discretion.<br><br>Required construction equipment fleet and methodologies approved by the City shall be included in the contract specifications for the applicant's construction contractor. | Project Applicant, City of Rancho Mirage- Planning Division | Prior to and during project constructio n | |
| **BIOLOGICAL RESOURCES** | | | |
| **MM-BIO-1: Coachella Valley Multiple Species Habitat Conservation Plan Fee Payment.** As a | Project Applicant, City | Prior to constructio | |

| | | | |
|---|---|---|---|
| signatory to the Coachella Valley Multiple Species Habitat Conservation Plan, the City of Rancho Mirage shall require a local development mitigation fee prior to the issuance of building permits for the proposed use on the project site at the rates applicable at the time of payment of the fee as set forth in the most recent fee schedule. The project applicant shall be required to provide documentation to the City of Rancho Mirage confirming the payment of the local development mitigation fee. | of Rancho Mirage- Building/Planning Division, Coachella Valley Conservation Commission | n and issuance of grading permit | |
| **MM-BIO-2: Coachella Valley Multiple Species Habitat Conservation Plan Land Use Adjacency Guidelines.** The project applicant shall implement the following Land Use Adjacency Guidelines (Coachella Valley Multiple Species Habitat Conservation Plan [CVMSHCP], Section 4.5) to minimize and avoid indirect effects from development adjacent to conservation areas (i.e., Santa Rosa and San Jacinto Mountains Conservation Area), where applicable:<br><br>• **Drainage**: Proposed Development adjacent to or within a Conservation Area shall incorporate plans to ensure that the quantity and quality of runoff discharged to the adjacent Conservation Area is not altered in an adverse way when compared with existing conditions. Stormwater systems shall be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials, or other elements that might degrade or harm biological resources or ecosystem processes within the adjacent Conservation Area.<br>• **Toxics**: Land uses proposed adjacent to or within a Conservation Area that use chemicals or generate | Project Applicant, City of Rancho Mirage- Planning Division, Coachella Valley Conservation Commission | During project construction and operation | |

| | | | | |
|---|---|---|---|---|
| | bioproducts such as manure that are potentially toxic or may adversely affect wildlife and plant species, habitat, or water quality shall incorporate measures to ensure that application of such chemicals does not result in any discharge to the adjacent Conservation Area.<br>• **Lighting**: For proposed development adjacent to or within a Conservation Area, lighting shall be shielded and directed toward the developed area. Landscape shielding or other appropriate methods shall be incorporated in project designs to minimize the effects of lighting adjacent to or within the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual. The City of Rancho Mirage and Project proponent shall avoid or limit the use of artificial lighting at night during the hours of dawn and dusk when many wildlife species are most active and ensure use of LED lighting with a correlated color temperature of 3,000 Kelvins or less.<br>• **Noise**: Proposed development adjacent to or within a Conservation Area that generates noise in excess of 75 A-weighted decibels sound equivalent level hourly shall incorporate setbacks, berms, or walls, as appropriate, to minimize the effects of noise on the adjacent Conservation Area in accordance with the | | | |

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| | guidelines to be included in the Implementation Manual.<br>• **Invasives**: Invasive, non-native plant species shall not be incorporated in the landscape for land uses adjacent to or within a Conservation Area. Landscape treatments within or adjacent to a Conservation Area shall incorporate native plant materials to the maximum extent feasible; recommended native species are listed in Table 4-112 [CVMSHCP, Section 4.5.5]. The plants listed in Table 4-113 shall not be used within or adjacent to a Conservation Area. This list may be amended from time to time through a Minor Amendment with Wildlife Agency Concurrence.<br>• **Barriers**: Land uses adjacent to or within a Conservation Area shall incorporate barriers in individual project designs to minimize unauthorized public access, domestic animal predation, illegal trespass, or dumping in a Conservation Area. Such barriers may include native landscaping, rocks/boulders, fencing, walls and/or signage. Existing fencing separating the Big Horn Reserve Land (i.e., adjacent Conservation Area) from the proposed Project site was previously installed to prevent Peninsular bighorn sheep from entering and grazing on the Ritz Carlton Hotel property (i.e., Project). The project shall maintain a fence, or functionally equivalent structure throughout | | | |

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|---|---|---|---|
| the lifetime of the project. Therefore, necessary barriers (i.e., fencing) is currently in place.<br>• **Grading/Land Development**: Manufactured slopes associated with site development shall not extend into adjacent land in a Conservation Area. | | | |
| **MM-BIO-3**: **Nesting Birds**. To maintain compliance with the Migratory Bird Treaty Act and California Fish and Game Code, regardless of the time of year, if ground-disturbing and/or vegetation clearance activities are scheduled to occur ~~during the avian nesting season (typically February 15 through August 31)~~, a qualified biologist shall conduct a pre-construction nesting bird survey within the project impact footprint and a 500-foot buffer where legal access is granted around the disturbance footprint. Surveys shall be conducted within 3 days prior to initiation of ground-disturbing activities.<br><br>If an active nest is detected during the nesting bird survey, avoidance buffers shall be implemented as determined by a qualified biologist (typically 300 feet for passerines and 500 feet for raptors and special-status species). The buffer shall be of a distance to ensure avoidance of adverse effects to the nesting bird by accounting for topography, ambient conditions, species, nest location, and activity type. All nests shall be monitored as determined by the qualified biologist until nestlings have fledged and dispersed or it is confirmed that the nest has been unsuccessful or abandoned. The qualified biologist shall halt all construction activities within proximity to an active nest if it is determined that the activities are harassing the nest and may result in nest abandonment or take. The qualified biologist shall also have the authority to require implementation of avoidance measures related to noise, vibration, or light pollution if indirect impacts are resulting in harassment of the nest. | Project Applicant, City of Rancho Mirage -Planning Divisions, a Qualified Biologist | Three days prior to initiation of ground-disturbing activities | |

| | | | |
|---|---|---|---|
| **MM-BIO-4: Burrowing Owl**. Pre-construction surveys for burrowing owls shall be completed within areas of suitable habitat (i.e., flatter portions of the site) in accordance with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012), with the first survey no less than 14 days prior to initiation of project-related activities, and the second within 24 hours of project-related activities. If ~~an~~burrowing owls or~~—~~ active burrowing owl burrows are~~is~~ detected, ~~the~~ qualified biologist shall coordinate with CDFW and prepare a Burrowing Owl Plan that shall be submitted to CDFW and USFWS for review and approval prior to commencing Project activities. The Burrowing Owl Plan shall describe proposed avoidance, minimization, mitigation, and monitoring actions. The Burrowing Owl Plan shall include the number and location of occupied burrow sites, acres of burrowing owl habitat that will be impacted, details of site monitoring, and details on proposed buffers and other avoidance measures if avoidance is proposed. If impacts to occupied burrowing owl habitat or burrow cannot be avoided, the Burrowing Owl Plan shall also describe minimization and relocation actions that will be implemented. Proposed implementation of burrow exclusion and closure should only be considered as a last resort, after all other options have been evaluated as exclusion is not in itself an avoidance, minimization, or mitigation method and has the possibility to result in take. If impacts to occupied burrows cannot be avoided, information shall be provided regarding adjacent or nearby suitable habitat available to owls along with proposed relocation actions. The Project proponent shall implement the Burrowing Owl Plan following CDFW and USFWS review and approval. ~~within 500 feet of the impact footprint, avoidance and minimization measures shall be implemented in accordance with the *Staff Report on Burrowing Owl Mitigation* guidelines or agreed upon by the California Department of Fish and Wildlife, including implementation of a non-disturbance buffer and monitoring of the nest to ensure activities are not adversely affecting the nest. If the project will occur within this zone, then work must occur outside the nesting season, or until it can be shown that the birds have finished nesting, at which point passive relocation may occur.~~ | Project Applicant, City of Rancho Mirage- Planning Division, a Qualified Biologist | The first survey no less than 14 days prior to initiation of project-related activities, and the second within 24 hours of project-related activities. | |

| | | | |
|---|---|---|---|
| **MM-BIO-5: General Avoidance and Minimization Measures**. The following avoidance and minimization measures shall be implemented during project construction activities:<br>• To prevent inadvertent entrapment of special-status wildlife during construction, all excavated steep-walled holes or trenches more than 2 feet deep shall be covered with plywood or similar materials at the close of each working day, or be provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped wildlife. If trapped animals are observed, escape ramps or structures shall be installed immediately to allow escape. | Project Applicant, City of Rancho Mirage - Planning Division, | During construction | |
| **MM-BIO-6: Desert Tortoise.** Because the project is located outside of a Conservation Area but within the 50,272 acres of naturally occurring desert tortoise habitat anticipated to be impacted under the Coachella Valley Multiple Species Habitat Conservation Plan, the project applicant shall notify the U.S. Fish and Wildlife Service 45 days prior to the issuance of a grading permit to allow for the potential salvage of adult tortoises within this notification time period. | Project Applicant, City of Rancho Mirage- Planning Division, and a Qualified Biologist | 45 days prior to the issuance of a grading permit | |
| **CULTURAL RESOURCES** | | | |
| **MM-CUL-1:** Prior to the issuance of a grading permit or ground disturbing activities, the Applicant/Owner shall enter into a Tribal Cultural Resources Agreement and Repatriation Agreement with Agua Caliente Band of Cahuilla Indians (ACBCI). The purpose of the agreement shall be to formalize protocols and procedures between the Applicant/Owner and the Tribe for protection, treatment, and repatriation of Native American human remains, funerary objects, cultural and /or religious, ceremonial items, and other Tribal Cultural resources. A Qualified Archaeologist, meeting the Secretary of the | Project Applicant, City of Rancho Mirage- - Planning Division, A Qualified Archaeologist, a Native American monitor | During project construction | |

| | | | |
|---|---|---|---|
| Interior's Professional Qualification Standards, and an ACBCI Native American monitor shall be present for initial ground-disturbing activities associated with the current proposed project that may occur in areas of native soil. Both the Qualified Archaeologist and ACBCI Native American monitors may temporally halt or divert ground disturbing activities if potential archaeological or Tribal Cultural resources are discovered during construction activities in order to assess any discoveries in the field. ~~in the event unanticipated discoveries are made.~~ The monitors may stop ground-disturbing activities in order to assess any discoveries in the field.<br><br>In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 50 feet of the find shall immediately stop until a Qualified Archaeologist can evaluate the significance of the find and determine whether additional study is warranted. Depending on the significance of the find under the California Environmental Quality Act (CEQA) and the CEQA Guidelines (California Public Resources Code, Section 21082; 14 CCR 15064.5(f)), the Qualified Archaeologist may exhaust the data potential of the find through the process of field level recordation and then allow work to continue. Isolates are clearly non-significant archaeological resources (as determined by the Qualified archaeologist, in consultation with the Native American monitor) will be minimally documented in the field. If the discovery proves significant under CEQA, additional work such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted. In the event that curation of archaeological resources is required by the superseding regulatory agency, curation shall be conducted by an approved local facility in Riverside County, and curation shall be guided by California State Historical Resources Commission's Guidelines for the Curation of Archaeological Collections. The Applicant/Owner shall be responsible for all curation costs and provide the City written documentation from the | | | |

| | | | |
|---|---|---|---|
| curation facility that the curation have been completed.<br><br>If ~~Native American c~~ Tribal Cultural resources (i.e., prehistoric or ethnohistoric-period artifacts, food remains, or features associated with Native Americans) are exposed during proposed project-related ground disturbance, the actions identified by the Agua Caliente Band of Cahuilla Indians in a preexisting agreement for unanticipated discover shall be followed~~contacted~~. This agreement may require ~~group shall be asked to provide the services of a trained~~ the Native American Monitor to return to the site ~~consultant~~ to monitor ground-disturbing work in the area containing the Native American cultural resources. This monitoring would occur on an as-needed basis and would be intended to ensure that Native American concerns are taken into account during the construction process. | | | |
| **MM-CUL-2:** If human remains are discovered during construction of the proposed project, California Health and Safety Code, Section 7050.5, states that further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner shall be contacted. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within two working days of notification of discovery, the appropriate treatment and disposition of the human remains.<br><br>Pursuant to California Public Resources Code, Section 5097.98, if the remains are thought to be Native American, the County Coroner will notify the Native American Heritage Commission, which will then notify the most likely descendent. At this time, the person who discovered the remains will contact the City of Rancho Mirage (City) so that they may work with the most likely descendent on the respectful treatment and disposition of the remains. Further provisions of the California Public Resources Code, Section 5097.98, are to be followed as applicable. | Project Applicant, City of Rancho Mirage, A Qualified Archaeologist, County Coroner (if applicable) | During project construction | |
| **GEOLOGY AND SOILS** | | | |
| **N/A** | | | |
| **GREENHOUSE GAS EMISSIONS** | | | |

| | | | |
|---|---|---|---|
| **N/A** | | | |
| **HAZARDS AND HAZARDOUS MATERIALS** | | | |
| **N/A** | | | |
| **HYDROLOGY AND WATER QUALITY** | | | |
| **N/A** | | | |
| **LAND USE AND PLANNING** | | | |
| **N/A** | | | |
| **MINERAL RESOURCES** | | | |
| **N/A** | | | |
| **NOISE** | | | |
| **MM-NOI-1:** During proposed project construction, the applicant shall require that vibratory rollers, large-loaded trucks and dozers, or jackhammers (greater than 80,000 pounds) shall not be used within 75~~50~~ feet of occupied sensitive receptors locations R2 through R5~~along the entire southern property line~~. Instead, small rubber-tired or alternative equipment shall be used within this area during proposed project construction to reduce vibration effects. If all mobile equipment used during proposed project construction are less than 80,000 pounds, then the 75~~50~~ foot buffer mitigation is not required. | Project Applicant, City of Rancho Mirage- Planning Division | During project construction | |
| **POPULATION AND HOUSING** | | | |
| **N/A** | | | |
| **PUBLIC SERVICES** | | | |
| **N/A** | | | |
| **RECREATION** | | | |
| **N/A** | | | |
| **TRANSPORTATION/TRAFFIC** | | | |
| **MM-TRA-1: Hwy. 111 and Frank Sinatra Dr. (#3) –** Prior to operation of the proposed project, the Applicant shall increase the turn lane capacity from 260' to 400' for the North Bound Lane movement. | Project Applicant, City of Rancho Mirage- City Engineer | Prior to operation | |
| **MM-TRA-2: Hwy. 111 and Frank Sinatra Dr. (#3) –** Prior to operation of the proposed project, the Applicant shall increase turn lane capacity from 170' to 250' for the East Bound Lane movement. | Project Applicant, City of Rancho Mirage- City Engineer | Prior to operation | |
| **TRIBAL CULTURAL RESOURCES** | | | |

| |
|---|
| See **MM-CUL-1** and **MM-CUL-2** above. |
| **UTILITIES AND SERVICE SYSTEMS** |
| **N/A** |

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# **Appendix A-1**
Air Quality and GHG Technical Report

# Air Quality and Greenhouse Gas Emissions Analysis Technical Report
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# Acronyms and Abbreviations

| Acronym/Abbreviation | Definition |
|---|---|
| °C | degrees Celsius |
| °F | degrees Fahrenheit |
| µg/m$^3$ | micrograms per cubic meter |
| AB | Assembly Bill |
| amsl | above mean sea level |
| AQMP | Air Quality Management Plan |
| CAAQS | California Ambient Air Quality Standards |
| CalEEMod | California Emissions Estimator Model |
| CALGreen | California's Green Building Standards |
| CalRecycle | California Department of Resources Recycling and Recovery |
| CAP | climate action plan |
| CARB | California Air Resources Board |
| CEC | California Energy Commission |
| CEQA | California Environmental Quality Act |
| $CH_4$ | methane |
| CNRA | California Natural Resources Agency |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalent |
| CPUC | California Public Utilities Commission |
| CY | cubic yard |
| DPM | diesel particulate matter |
| EO | Executive Order |
| EPA | U.S. Environmental Protection Agency |
| GHG | greenhouse gas |
| GWP | global warming potential |
| HAP | hazardous air pollutant |
| HFC | hydrofluorocarbon |
| HRA | health risk assessment |
| LCFS | Low Carbon Fuel Standard |
| LOS | level of service |
| LST | localized significance thresholds |
| mph | miles per hour |
| MPO | metropolitan planning organization |
| MMT | million metric ton |
| MT | metric ton |
| $N_2O$ | nitrous oxide |
| NAAQS | National Ambient Air Quality Standards |
| $NF_3$ | nitrogen trifluoride |
| NHTSA | National Highway Traffic Safety Administration |
| NO | nitric oxide |
| $NO_2$ | nitrogen dioxide |
| $NO_x$ | oxides of nitrogen |
| $O_3$ | ozone |

| Acronym/Abbreviation | Definition |
|---|---|
| PFC | perfluorocarbon |
| $PM_{10}$ | particulate matter with an aerodynamic diameter less than or equal to 10 microns |
| $PM_{2.5}$ | particulate matter with an aerodynamic diameter less than or equal to 2.5 microns |
| ppb | parts per billion |
| ppm | parts per million |
| ROG | Reactive Organic Gas |
| RPS | Renewables Portfolio Standard |
| RTP | regional transportation plan |
| SB | Senate Bill |
| SBCCOG | South Bay Cities Council of Governments |
| SCAB | South Coast Air Basin |
| SCAG | Southern California Association of Governments |
| SCAQMD | South Coast Air Quality Management District |
| SCE | Southern California Edison |
| SCS | sustainable communities strategy |
| $SF_6$ | sulfur hexafluoride |
| $SO_2$ | sulfur dioxide |
| $SO_x$ | sulfur oxides |
| SRA | source-receptor area |
| TAC | toxic air contaminant |
| TIS | traffic impact study |
| VOC | volatile organic compound |
| ZNE | zero net energy |
| ZEV | Zero-Emissions Vehicle |

# Executive Summary

The purpose of this technical report is to assess the potential air quality and greenhouse gas (GHG) emissions impacts associated with implementation of the proposed Ritz-Carlton Rancho Mirage Project (project) located within the City of Rancho Mirage (City). This assessment uses the significance thresholds in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.). Construction and operational criteria air pollutant and GHG emissions were estimated using the California Emissions Estimator Model (CalEEMod)Version 2020.4.0 and California Air Resources Board (CARB) Emission Factors version 2017 (EMFAC2017).

## Project Overview

The purpose of the proposed project is to construct residential suites and hotel villas, event space, commercial, and amenity space at 68900 Frank Sinatra Drive in the City of Rancho Mirage. The project site is located in the City of Rancho Mirage (City), in Riverside County. The proposed site is an approximate 16.48-acre parcel of previously graded land.

The residential suites, event space, and commercial area would be located within Building A-1. This new building would provide an approximately 23,843-square-foot indoor event space (Venue) and 3,960-square-foot exterior entertaining and garden spaces. The building would also house 48 residential suites over underground parking for the both the suites and the event space along with additional parking for the existing hotel. Building A-1 would be three stories with a maximum height of 30 feet, 3 inches.

The project also includes 58 proposed hotel villas with private garages across 15 buildings (Buildings B-2 to B-7) to the south and east of Building A-1. The hotel villas would be two stories. These residential suites and hotel villas would be comprised of a mix of one-, two-, and three-bedroom units.

The project would include 510 parking spaces. Including a parking structure where 381 spaces serve the residential suites, event space, commercial uses, and additional spaces for the existing hotel. The hotel villas would have either one- or two-car private garages totaling 86 spaces. An additional 43 spaces are provided as tandem parking in front of the one-car garages.

The project site is located within the Salton Sea Air Basin and is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). Construction and operational criteria air pollutant and GHG emissions were estimated using CalEEMod, consistent with the SCAQMD guidance.

## Air Quality

The air quality impact analysis evaluated the potential for adverse impacts to air quality due to construction and operational emissions resulting from the project. Impacts were evaluated for their significance based on the SCAQMD mass daily criteria air pollutant thresholds of significance (SCAQMD 1993, 2019). Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. Criteria air pollutants include ozone ($O_3$), nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), particulate matter with an aerodynamic diameter less than or equal to 10 microns ($PM_{10}$), particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and lead. Pollutants that are evaluated include volatile organic compounds (VOCs) (also referred to as reactive organic gases), oxides of nitrogen ($NO_x$), CO, sulfur oxides ($SO_x$), $PM_{10}$, and $PM_{2.5}$. VOCs and $NO_x$ are important because they are precursors to $O_3$.

*Air Quality Plan Consistency*

SCAQMD has established two criteria to evaluate the potential for the proposed project to conflict with the applicable air quality plan, which is the SCAQMD 2016 Air Quality Management Plan (AQMP) (SCAQMD 2017a). Regarding Consistency Criterion No. 1, the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations as supported in the analysis presented in this technical report, which demonstrates that estimated project-generated construction and operational emissions would not exceed the SCAQMD mass daily emissions thresholds.

Regarding Consistency Criterion No. 2, the site is currently zoned Resort Hotel (Rs-H) and Open Space: Mountain Reserve (MR) in the General Plan (City of Rancho Mirage 2017). The proposed hotel suites and villas are located on the Rs-H zoned property and therefore consistent with the General Plan designation. This designation allows for the development of hotels and destination resorts with limited, ancillary commercial uses, such as spas, recreational facilities, restaurants, lounges, and small retail shops that directly support the primary use. The Sky Mesa is located on the MR zoned portion of the project site, which is assigned to public lands or property subject to conservation easements in the Santa Rosa Mountains. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation. A Conditional Use Permit (CUP) would be proposed for the MR portion of the project site to include the event space, restaurant, and amenities proposed for the Sky Mesa. However, the proposed uses for the project site are consistent with the existing land use designations, and no changes in land use designations would be required

SCAG reported the City's population to be 18,739 persons as of 2018 (SCAG 2019). In 2018, the City had a total of 14,492 housing units, and in 2017, the City had a total of 16,902 jobs (SCAG 2019). By 2040, SCAG projected the City to have a population of 25,000 persons and 20,500 jobs (SCAG 2016). According to the City's General Plan Housing Element (City of Rancho Mirage 2017), the 2014–2021 Regional Housing Needs Allocation (RHNA) determined that the City needed a total of 95 housing units. The proposed project would construct 108 residential units. However, these residential units would operate similar to time-share properties and therefore future residents would not be in the proposed residential units year-round. Because the proposed residential units are not typical residential units that residents cannot occupy year-round, theses housing units do not count towards the RHNA housing unit determination. SCAG's Local Profile Report for the City of Rancho Mirage indicated that the City's average household size was two persons per dwelling unit as of 2018 (SCAG 2019). Using these assumptions, implementation of the proposed project would have the potential to increase the City's population by 216 persons. This population increase would comply with SCAG's projected population increase for the City. Accordingly, the proposed project is consistent with the SCAG RTP/SCS forecasts used in the SCAQMD AQMP development. Thus, the project would not conflict with Consistency Criterion No. 2. Based on these considerations, impacts related to the project's potential to conflict with or obstruct implementation of the applicable air quality plan would be less than significant.

Based on these considerations, impacts related to the project's potential to conflict with or obstruct implementation of the applicable air quality plan would be less than significant.

*Construction Criteria Air Pollutant Emissions*

Construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and VOC off-gassing) and off-site sources (i.e., on-road haul trucks, vendor trucks, and worker vehicle trips). Estimated maximum daily construction emissions would not exceed the SCAQMD significance thresholds for VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, or $PM_{2.5}$ during construction.

*Operational Criteria Air Pollutant Emissions*

Operational year 2024 was assumed based on input from the applicant. Operation of the project would generate operational criteria air pollutants from mobile sources (vehicles), area sources (consumer product use, architectural coatings, and landscape maintenance equipment), and energy (natural gas). Estimated maximum daily operational emissions would not exceed the SCAQMD operational significance thresholds for VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, or $PM_{2.5}$.

*Exposure of Sensitive Receptors*

SCAQMD recommends the evaluation of localized $NO_2$, CO, $PM_{10}$, and $PM_{2.5}$ impacts as a result of construction activities to sensitive receptors in the immediate vicinity of a project site. As such, a localized emissions impact analysis has been prepared that compares project-generated emissions during construction to SCAQMD localized significance thresholds (LSTs) to determine potential impacts to nearby sensitive receptors during construction of the project. The impacts were analyzed using methods consistent with those in SCAQMD's Final LST Methodology (2009). In summary, construction activities would not generate emissions in excess of the SCAQMD site-specific LSTs; therefore, site-specific construction impacts during construction of the project would be less than significant.

Operation of the project would not expose sensitive receptors to localized high concentrations of CO or contribute traffic volumes to intersections that would cause a CO hotspot. The proposed project would not generate traffic that would contribute to potential adverse traffic impacts that may result in the formation of CO hotspots. In addition, due to continued improvement in vehicular emissions at a rate faster than the rate of vehicle growth and/or congestion, the potential for CO hotspots in the SSAB is steadily decreasing. Based on these considerations, the proposed project potential CO hotspot impacts would be less than significant.

*Other Emissions (Odors)*

Potential odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment, architectural coatings, and asphalt pavement application, which would disperse rapidly from the project site and generally occur at magnitudes that would not affect substantial numbers of people. Impacts associated with odors during construction would be less than significant.

Land uses and industrial operations associated with odor complaints include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding (SCAQMD 1993). The proposed project entails operation of residential suites and hotel villas, event space, commercial, and amenity space, which has not been identified by SCAQMD as a land use typically associated with odor complaints. Therefore, the proposed project operations would result in an odor impact that is less than significant.

*Cumulative Impacts*

The potential for the project to result in a cumulatively considerable impact, per the SCAQMD guidance and thresholds, is based on the project's potential to exceed the project-specific daily thresholds. As discussed previously, maximum construction and operational emissions would not exceed the SCAQMD significance thresholds for VOCs, $NO_x$, CO, $SO_x$, $PM_{10}$, or $PM_{2.5}$. Therefore, the project would not result in a cumulatively considerable increase in criteria air pollutants.

Greenhouse Gas Emissions

Global climate change is primarily considered a cumulative impact, but must also be evaluated on a project-level under CEQA. A project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHG emissions. GHGs are gases that absorb infrared radiation in the

atmosphere. Principal GHGs regulated under state and federal law and regulations include carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$). GHG emissions are measured in metric tons of $CO_2$ equivalent (MT $CO_2e$), which account for weighted global warming potential factors for $CH_4$ and $N_2O$.

*Project-Generated Construction and Operational Greenhouse Gas Emissions*

The threshold applied to assess the potential for the project to generate GHG emissions either directly or indirectly that may have a significant impact on the environment was the SCAQMD threshold of 3,000 MT $CO_2e$ per year. Pursuant to SCAQMD recommendation, construction emissions were amortized over a 30-year project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies (SCAQMD 2008).

Construction of the project would result in GHG emissions primarily associated with use of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. Total project-generated GHG emissions during construction were estimated to be 888 MT $CO_2e$ over the construction period. Estimated project-generated construction emissions amortized over 30 years would be approximately 30 MT $CO_2e$ per year.

The project would generate operational GHG emissions from area sources (landscape maintenance), energy sources (natural gas and electricity), mobile sources, solid waste, and water supply and wastewater treatment. Estimated annual project-generated operational GHG emissions and amortized construction emissions would be approximately 2,363 MT $CO_2e$ per year. As such, the annual operational GHG emissions with amortized construction emissions would not exceed the SCAQMD threshold of 3,000 MT $CO_2e$ per year. Therefore, the project-generated GHG emissions would result in a less than significant impact.

*Consistency with Applicable Greenhouse Gas Reduction Plans*

The proposed project would not interfere with implementation of any of the GHG reduction goals for 2030 or 2050, described herein, because the project would not exceed the SCAQMD's draft interim threshold of 3,000 MT $CO_2e$ per year (SCAQMD 2008). This threshold was established based on the goal of AB 32 to reduce statewide GHG emissions to 1990 levels by 2020. Because the proposed project would not exceed the threshold, this analysis provides support for the conclusion that the project would not impede the state's trajectory toward the above-described statewide GHG reduction goals for 2030 or 2050. In addition, the project would comply with laws and regulations that would reduce GHG emissions.

In addition, since the specific path to compliance for the state in regards to the long-term goals will likely require development of technology or other changes that are not currently known or available, specific additional mitigation measures for the project would be speculative and cannot be identified at this time. The proposed project's consistency would assist in meeting the City's contribution to GHG emission reduction targets in California. With respect to future GHG targets under SB 32 and EO S-3-05, CARB has also made clear its legal interpretation that it has the requisite authority to adopt whatever regulations are necessary, beyond the AB 32 horizon year of 2020, to meet SB 32's 40% reduction target by 2030 and EO S-3-05's 80% reduction target by 2050; this legal interpretation by an expert agency provides evidence that future regulations will be adopted to continue the state on its trajectory toward meeting these future GHG targets.

As described herein, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and no mitigation is required. This impact would be less than significant.

# 1 Introduction

## 1.1 Report Purpose and Scope

The purpose of this technical report is to assess the potential air quality and greenhouse gas (GHG) emissions impacts associated with implementation of the proposed Ritz-Carlton Rancho Mirage Project (project). This assessment uses the significance thresholds in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.), and is based on the emissions-based significance thresholds recommended by the South Coast Air Quality Management District (SCAQMD) and other applicable thresholds of significance.

This introductory section provides a description of the proposed project and location. Section 2, Air Quality, describes the air quality–related environmental setting, regulatory setting, existing air quality conditions, and thresholds of significance and analysis methodology, and presents an air quality impact analysis per Appendix G of the CEQA Guidelines. Section 3, Greenhouse Gas Emissions, follows the same format as Section 2 and similarly describes the GHG emissions–related environmental setting, regulatory setting, existing climate changes conditions, and thresholds of significance and analysis methodology, and presents a GHG emissions impact analysis per Appendix G of the CEQA Guidelines. Section 4, References Cited, includes a list of the sources cited in this technical report.

## 1.2 Regional and Local Setting

The approximately 16.48-acre project site is located at 68900 Frank Sinatra Drive approximately 0.85 miles southwest of the intersection with State Route 111 in the City of Rancho Mirage, Riverside County (Assessor's Parcel Numbers 689-330-026, -028 and 689-020-012, -014). The majority of the 16.48-acre project site is currently vacant and lies south and east of the existing Ritz-Carlton Rancho Mirage Hotel.

The proposed project site is vacant with dirt covering the majority of the site. The entire project site has been rough graded. An asphalt dead-end road has been constructed on the property as a temporary construction access point for the hotel to the north. A shipping container and construction equipment remain on the project site from construction staging activities during previous development on the hotel property. As mentioned above, the existing Ritz-Carlton Rancho Mirage Hotel is to the north and west of the project site with a hotel service access road immediately bordering the property. Another hotel service access road borders the project site to the northeast, which leads to the proposed Sky Mesa Recreation Area. To the south is Mirada Circle and the Mirada single-family residential development. Confronting the project site across Frank Sinatra Drive to the northwest is a rough graded but undeveloped parcel.

The project site is situated on all or portions of Assessor's Parcel Numbers 689330026, -28, -34, which have a General Plan Land Use designation of Commercial: Resort Hotel (Rs-H) and also on parcels 689020012, -14 carrying an Open Space: Mountain Reserve (MR) designation. The project site is located within the Salton Sea Air Basin (SSAB), in Riverside County.

# 1.3 Project Description

The purpose of the proposed project is to construct residential suites and hotel villas, event space, commercial, and amenity space at 68900 Frank Sinatra Drive in the City of Rancho Mirage. The project site is located in the City of Rancho Mirage (City), in Riverside County. The proposed site is an approximate 16.48-acre parcel of previously graded land.

The residential suites, event space, and commercial area would be located within Building A-1. This new building would provide an approximately 23,843-square-foot indoor event space (Venue) and 3,960-square-foot exterior entertaining and garden spaces. The building would also house 48 residential suites over underground parking for the both the suites and the event space along with additional parking for the existing hotel. Building A-1 would be three stories with a maximum height of 30 feet, 3 inches.

The project also includes 58 proposed hotel villas with private garages across 15 buildings (Buildings B-2 to B-7) to the south and east of Building A-1. The hotel villas would be two stories. These residential suites and hotel villas would be comprised of a mix of one-, two-, and three- bedroom units.

The project would include 510 parking spaces. Including a parking structure where 381 spaces serve the residential suites, event space, commercial uses, and additional spaces for the existing hotel. The hotel villas would have either one- or two-car private garages totaling 86 spaces. An additional 43 spaces are provided as tandem parking in front of the one-car garages.

# 2 Air Quality

## 2.1 Environmental Setting

The project site is located within the Salton Sea Air Basin (SSAB). The Riverside County portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward to the Palo Verde Valley. The Coachella Valley Planning Area is a federal nonattainment area that is part of a sub-region of Riverside County in the SSAB that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east.

### 2.1.1 Meteorological and Topographical Conditions

The primary factors that determine air quality are the locations of air pollutant sources and the amount of pollutants emitted. Meteorological and topographical conditions, however, are also important. Factors such as wind speed and direction, air temperature gradients and sunlight, and precipitation and humidity interact with physical landscape features to determine the movement and dispersal of air pollutants. Meteorological and topographical factors that affect air quality in the SSAB are described below.

**Climate**

The SSAB includes the central portion of Riverside County (Coachella Valley) and all of Imperial County. The Riverside County portion of the SSAB is under the jurisdiction of the SCAQMD. The SSAB is generally very flat and bordered to the west by the Peninsular Mountain range and to the east by the Chocolate, Orocopia, and Cargo Muchacho Mountains. The Riverside County portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. The federal nonattainment area (known as the Coachella Valley Planning Area) is a subregion of Riverside County and the SSAB that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (SCAQMD 2017).

The SSAB is a continental, desert region with a climate characterized by low annual rainfall, low humidity, hot days, and cool nights. Temperatures exceed 100°F during the summer with daily highs near 110°F during July and August. The mean temperature in the summer is 89°F, while the mean temperature in the winter is 57°F (SCAQMD 2017). Rainfall in the area varies considerably, although precipitation normally occurs November through April. A semi-permanent high-pressure zone blocks mid-latitude storms and causes sunny skies most of the time in the SSAB. The high-pressure zone tends to be weaker in the winter, and it is during this time that the SSAB usually receives its average 2.8 inches of annual precipitation. The Peninsular Mountains to the west block coastal influence, such as cool and damp marine air that traverses inland from the Pacific Ocean. The geographic barriers and atmospheric conditions often limit the amount of precipitation for the area.

The Coachella Valley is impacted by pollutant transport from the South Coast Air Basin (SCAB). Ozone in the atmosphere of the Riverside County portion of SSAB is both directly transported from the SCAB and formed principally from ozone precursors (hydrocarbons and $NO_x$[1]) emitted upwind. In addition, pollutant transport occurs to the Antelope Valley, Mojave Desert, Ventura County, and San Diego County. The mountains to the east act as physical barriers to the dispersion of airborne contaminants. The Coachella Valley is exposed to frequent gusty winds; with stronger tending to occur in the western portion of the valley, while lighter winds tend to occur in the

[1] $NO_x$ is a general term pertaining to compounds of nitric oxide (NO), nitrogen dioxide ($NO_2$) and other oxides of nitrogen.

east half of the valley. The pollutant transport pathway from the SCAB to the SSAB is through the San Gorgonio Pass (sometimes referred to as the Banning Pass) to the Coachella Valley.

### Sunlight

The presence and intensity of sunlight are prerequisites for the formation of photochemical smog. Under the influence of the ultraviolet radiation of sunlight, certain "primary" pollutants (mainly reactive hydrocarbons and oxides of nitrogen ($NO_x$)) react to form "secondary" pollutants (primarily oxidants). Since this process is time dependent, secondary pollutants can be formed many miles downwind of the emission sources. Southern California has abundant sunshine, which drives the photochemical reactions that form pollutants such as ozone ($O_3$) and a substantial portion of fine particulate matter ($PM_{2.5}$, particles less than 2.5 microns in diameter). In the SSAB, high concentrations of $O_3$ are normally recorded during the late spring, summer, and early autumn months, when more intense sunlight drives enhanced photochemical reactions. Due to the prevailing daytime winds and time-delayed nature of photochemical smog, oxidant concentrations are highest in the inland areas of Southern California.

### Temperature Inversions

Under ideal meteorological conditions and irrespective of topography, pollutants emitted into the air mix and disperse into the upper atmosphere. However, the Southern California region frequently experiences temperature inversions, in which pollutants are trapped and accumulate close to the ground. The inversion—a layer of warm, dry air overlaying cool, moist marine air—is a normal condition in coastal Southern California. The cool, damp, and hazy sea air capped by coastal clouds is heavier than the warm, clear air, which acts as a lid through which the cooler marine layer cannot rise. The height of the inversion is important in determining pollutant concentration. When the inversion is approximately 2,500 feet above mean sea level (amsl), the sea breezes carry the pollutants inland to escape over the mountain slopes or through the passes. At a height of 1,200 feet amsl, the terrain prevents the pollutants from entering the upper atmosphere, resulting in the pollutants settling in the foothill communities. Below 1,200 feet amsl, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer over the entire coastal basin. Usually, inversions are lower before sunrise than during the daylight hours.

Mixing heights for inversions are lower in the summer and inversions are more persistent, being partly responsible for the high levels of $O_3$ observed during summer months in the SSAB. Smog in Southern California is generally the result of these temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long periods, allowing them to form secondary pollutants by reacting in the presence of sunlight. The SSAB has a limited ability to disperse these pollutants due to typically low wind speeds and the surrounding mountain ranges.

As with other cities within the SSAB, the City is susceptible to air inversions, which trap a layer of stagnant air near the ground where pollutants are further concentrated. These inversions produce haziness caused by moisture, suspended dust, and a variety of chemical aerosols emitted by trucks, automobiles, furnaces, and other sources. Elevated concentrations of particulate matter less than 10 microns in diameter ($PM_{10}$) and $PM_{2.5}$ can occur in the SSAB throughout the year but occur most frequently in fall and winter. Although there are some changes in emissions by day-of-week and season, the observed variations in pollutant concentrations are primarily the result of seasonal differences in weather conditions.

The Coachella Valley has limited local $NO_x$ emissions to help scavenge the ozone at night. This elevated overnight ozone contributes to an early morning bump in the Coachella Valley ozone concentrations, starting around 8 a.m. Pacific Standard Time, with the ample sunlight and strong overnight temperature inversions in the desert. Ozone

concentrations in this area reach an initial peak before noon and then drop slightly with increased mixing in the early afternoon, before climbing to the daily peak as the normal onshore flow reaches the Coachella Valley through the San Gorgonio Pass, transporting new ozone from the South Coast Air Basin (SCAQMD 2013).

## 2.1.2 Pollutants and Effects

### 2.1.2.1 Criteria Air Pollutants

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include $O_3$, nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), $PM_{10}$, $PM_{2.5}$, and lead. These pollutants, as well as toxic air contaminants (TACs), are discussed in the following paragraphs.[2] In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants.

**Ozone.** $O_3$ is a strong-smelling, pale blue, reactive, toxic chemical gas consisting of three oxygen atoms. It is a secondary pollutant formed in the atmosphere by a photochemical process involving the sun's energy and $O_3$ precursors. These precursors are mainly $NO_x$ and volatile organic compounds (VOCs). The maximum effects of precursor emissions on $O_3$ concentrations usually occur several hours after they are emitted and many miles from the source. Meteorology and terrain play major roles in $O_3$ formation, and ideal conditions occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. $O_3$ exists in the upper atmosphere $O_3$ layer (stratospheric ozone) and at the Earth's surface in the troposphere (ozone).[3] The $O_3$ that the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) regulate as a criteria air pollutant is produced close to the ground level, where people live, exercise, and breathe. Ground-level $O_3$ is a harmful air pollutant that causes numerous adverse health effects and is thus considered "bad" $O_3$. Stratospheric, or "good," $O_3$ occurs naturally in the upper atmosphere, where it reduces the amount of ultraviolet light (i.e., solar radiation) entering the Earth's atmosphere. Without the protection of the beneficial stratospheric $O_3$ layer, plant and animal life would be seriously harmed.

$O_3$ in the troposphere causes numerous adverse health effects; short-term exposures (lasting for a few hours) to $O_3$ at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes (EPA 2013). These health problems are particularly acute in sensitive receptors such as the sick, the elderly, and young children.

**Nitrogen Dioxide.** NO2 is a brownish, highly reactive gas that is present in all urban atmospheres. The major mechanism for the formation of $NO_2$ in the atmosphere is the oxidation of the primary air pollutant nitric oxide (NO), which is a colorless, odorless gas. $NO_x$ plays a major role, together with VOCs, in the atmospheric reactions that produce $O_3$. $NO_x$ is formed from fuel combustion under high temperature or pressure. In addition, $NO_x$ is an important precursor to acid rain

[2] The descriptions of the criteria air pollutants and associated health effects are based on the U.S. Environmental Protection Agency's Criteria Air Pollutants (EPA 2018a) and the California Air Resources Board's Glossary of Air Pollutant Terms (CARB 2019a).

[3] The troposphere is the layer of the Earth's atmosphere nearest to the surface of the Earth. The troposphere extends outward about 5 miles at the poles and about 10 miles at the equator.

and may affect both terrestrial and aquatic ecosystems. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers.

$NO_2$ can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections (EPA 2016).

**Carbon Monoxide.** CO is a colorless, odorless gas formed by the incomplete combustion of hydrocarbon, or fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the project location, automobile exhaust accounts for the majority of CO emissions. CO is a nonreactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions—primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, which is a typical situation at dusk in urban areas from November to February. The highest levels of CO typically occur during the colder months of the year, when inversion conditions are more frequent.

In terms of adverse health effects, CO competes with oxygen, often replacing it in the blood, reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can include dizziness, fatigue, and impairment of central nervous system functions.

**Sulfur Dioxide.** $SO_2$ is a colorless, pungent gas formed primarily from incomplete combustion of sulfur-containing fossil fuels. The main sources of $SO_2$ are coal and oil used in power plants and industries; as such, the highest levels of $SO_2$ are generally found near large industrial complexes. In recent years, $SO_2$ concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of $SO_2$ and limits on the sulfur content of fuels.

$SO_2$ is an irritant gas that attacks the throat and lungs and can cause acute respiratory symptoms and diminished ventilator function in children. When combined with particulate matter, $SO_2$ can injure lung tissue and reduce visibility and the level of sunlight. $SO_2$ can also yellow plant leaves and erode iron and steel.

**Particulate Matter.** Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and $PM_{10}$ represent fractions of particulate matter. Coarse particulate matter ($PM_{10}$) consists of particulate matter that is 10 microns or less in diameter and is about 1/7 the thickness of a human hair. Major sources of $PM_{10}$ include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. Fine particulate matter ($PM_{2.5}$) consists of particulate matter that is 2.5 microns or less in diameter and is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., from motor vehicles and power generation and industrial facilities), residential fireplaces, and woodstoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides ($SO_x$), $NO_x$, and VOCs.

$PM_{2.5}$ and $PM_{10}$ pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and $PM_{10}$ can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly or be absorbed into the bloodstream, causing damage elsewhere in the body. Additionally, these substances can

transport adsorbed gases such as chlorides or ammonium into the lungs, also causing injury. Whereas $PM_{10}$ tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissue. Suspended particulates also damage and discolor surfaces on which they settle and produce haze and reduce regional visibility.

People with influenza, people with chronic respiratory and cardiovascular diseases, and the elderly may suffer worsening illness and premature death as a result of breathing particulate matter. People with bronchitis can expect aggravated symptoms from breathing in particulate matter. Children may experience a decline in lung function due to breathing in $PM_{10}$ and $PM_{2.5}$ (EPA 2009).

**Lead.** Lead in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline; the manufacturing of batteries, paints, ink, ceramics, and ammunition; and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phaseout of leaded gasoline reduced the overall inventory of airborne lead by nearly 95%. With the phaseout of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emissions sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient (IQ) performance, psychomotor performance, reaction time, and growth. Children are highly susceptible to the effects of lead.

**Sulfates.** Sulfates are the fully oxidized form of sulfur, which typically occur in combination with metals or hydrogen ions. Sulfates are produced from reactions of $SO_2$ in the atmosphere. Sulfates can result in respiratory impairment, as well as reduced visibility.

**Vinyl Chloride.** Vinyl chloride is a colorless gas with a mild, sweet odor, which has been detected near landfills, sewage plants, and hazardous waste sites, due to the microbial breakdown of chlorinated solvents. Short-term exposure to high levels of vinyl chloride in air can cause nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure through inhalation can cause liver damage, including liver cancer.

**Hydrogen Sulfide.** Hydrogen sulfide is a colorless and flammable gas that has a characteristic odor of rotten eggs. Sources of hydrogen sulfide include geothermal power plants, petroleum refineries, sewers, and sewage treatment plants. Exposure to hydrogen sulfide can result in nuisance odors, as well as headaches and breathing difficulties at higher concentrations.

**Visibility-Reducing Particles.** Visibility-reducing particles are any particles in the air that obstruct the range of visibility. Effects of reduced visibility can include obscuring the viewshed of natural scenery, reducing airport safety, and discouraging tourism. Sources of visibility-reducing particles are the same as for $PM_{2.5}$ described above.

**Reactive Organic Gases.** Hydrocarbons are organic gases that are formed from hydrogen and carbon and sometimes other elements. Hydrocarbons that contribute to formation of $O_3$ are referred to and regulated as ROG. Combustion engine exhaust, oil refineries, and fossil-fueled power plants are the sources of hydrocarbons. Other sources of hydrocarbons include evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint.

The primary health effects of ROG result from the formation of $O_3$ and its related health effects. High levels of ROG in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of hydrocarbons, such as benzene, are considered TACs. There are no separate health standards for ROG as a group.

#### 2.1.2.2 Non-Criteria Air Pollutants

**Toxic Air Contaminants.** A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute and/or chronic non-cancer health effects. A toxic substance released into the air is considered a TAC. TACs are identified by federal and state agencies based on a review of available scientific evidence. In the state of California, TACs are identified through a two-step process that was established in 1983 under the Toxic Air Contaminant Identification and Control Act. This two-step process of risk identification and risk management and reduction was designed to protect residents from the health effects of toxic substances in the air. In addition, the California Air Toxics "Hot Spots" Information and Assessment Act, Assembly Bill (AB) 2588, was enacted by the legislature in 1987 to address public concern over the release of TACs into the atmosphere. The law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years.

Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources, such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources, such as automobiles; and area sources, such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and noncarcinogenic effects. Noncarcinogenic effects typically affect one or more target organ systems and may be experienced on either short-term (acute) or long-term (chronic) exposure to a given TAC.

**Diesel Particulate Matter.** Diesel particulate matter (DPM) is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is composed of two phases, gas and particle, both of which contribute to health risks. More than 90% of DPM is less than 1 micrometer in diameter (about 1/70th the diameter of a human hair), and thus is a subset of $PM_{2.5}$ (CARB 2016a). DPM is typically composed of carbon particles ("soot," also called black carbon, or BC) and numerous organic compounds, including over 40 known cancer-causing organic substances. Examples of these chemicals include polycyclic aromatic hydrocarbons, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene (CARB 2016a). The CARB classified "particulate emissions from diesel-fueled engines" (i.e., DPM) (17 CCR 93000) as a TAC in August 1998. DPM is emitted from a broad range of diesel engines: on-road diesel engines of trucks, buses, and cars and off-road diesel engines including locomotives, marine vessels, and heavy-duty construction equipment, among others. Approximately 70% of all airborne cancer risk in California is associated with DPM (CARB 2000). To reduce the cancer risk associated with DPM, CARB adopted a diesel risk reduction plan in 2000 (CARB 2000). Because it is part of $PM_{2.5}$, DPM also contributes to the same non-cancer health effects as $PM_{2.5}$ exposure. These effects include premature death; hospitalizations and emergency department visits for exacerbated chronic heart and lung disease, including asthma; increased respiratory symptoms; and decreased lung function in children. Several studies suggest that exposure to DPM may also facilitate development of new allergies (CARB 2016a). Those most vulnerable to non-cancer health effects are children, whose lungs are still developing, and the elderly, who often have chronic health problems.

**Odorous Compounds.** Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., coffee roaster). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. In a phenomenon known as odor fatigue, a person can become desensitized to almost any odor, and recognition may only occur with an alteration in the intensity. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors.

**Valley Fever.** Coccidioidomycosis, more commonly known as "valley fever," is an infection caused by inhalation of the spores of the *Coccidioides immitis* fungus, which grows in the soils of the southwestern United States. The ecologic factors that appear to be most conducive to survival and replication of the spores are high summer temperatures, mild winters, sparse rainfall, and alkaline, sandy soils.

Riverside County is not considered a highly endemic region for valley fever as the latest report from the California Department of Public Health listed Riverside County as having 2.7 cases per 100,000 people (CDPH 2019).

Even if present at a site, earth-moving activities may not result in increased incidence of valley fever. Propagation of *Coccidioides immitis* is dependent on climatic conditions, with the potential for growth and surface exposure highest following early seasonal rains and long dry spells. *Coccidioides immitis* spores can be released when filaments are disturbed by earth-moving activities, although receptors must be exposed to and inhale the spores to be at increased risk of developing valley fever. Moreover, exposure to *Coccidioides immitis* does not guarantee that an individual will become ill—approximately 60% of people exposed to the fungal spores are asymptomatic and show no signs of an infection (USGS 2000).

### 2.1.3 Sensitive Receptors

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. People most likely to be affected by air pollution include children, the elderly, athletes, and people with cardiovascular and chronic respiratory diseases. Facilities and structures where these air pollution-sensitive people live or spend considerable amounts of time are known as sensitive receptors. Land uses where air pollution-sensitive individuals are most likely to spend time include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities (sensitive sites or sensitive land uses) (CARB 2005). The SCAQMD identifies sensitive receptors as residences, schools, playgrounds, childcare centers, long-term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes (SCAQMD 1993). Residential land uses are located to the south of the proposed project site. The closest off-site sensitive receptors to the project site include residences located approximately 25 meters (82 feet) south of the project's limits of construction.

## 2.2 Regulatory Setting

### 2.2.1 Federal Regulations

#### 2.2.1.1 Criteria Air Pollutants

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. EPA is responsible for implementing most aspects of the Clean Air Act, including setting National

Ambient Air Quality Standards (NAAQS) for major air pollutants; setting hazardous air pollutant (HAP) standards; approving state attainment plans; setting motor vehicle emission standards; issuing stationary source emission standards and permits; and establishing acid rain control measures, stratospheric $O_3$ protection measures, and enforcement provisions. Under the Clean Air Act, NAAQS are established for the following criteria pollutants: $O_3$, CO, $NO_2$, $SO_2$, $PM_{10}$, $PM_{2.5}$, and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The NAAQS (other than for $O_3$, $NO_2$, $SO_2$, $PM_{10}$, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for $O_3$, $NO_2$, $SO_2$, $PM_{10}$, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a state implementation plan that demonstrates how those areas will attain the standards within mandated time frames.

#### 2.2.1.2 Hazardous Air Pollutants

The 1977 federal Clean Air Act amendments required EPA to identify national emission standards for hazardous air pollutants to protect public health and welfare. HAPs include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Under the 1990 federal Clean Air Act Amendments, which expanded the control program for HAPs, 189 substances and chemical families were identified as HAPs.

### 2.2.2 State Regulations

#### 2.2.2.1 Criteria Air Pollutants

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. Air quality is considered "in attainment" if pollutant levels are continuously below the CAAQS and violate the standards no more than once each year. The CAAQS for $O_3$, CO, $SO_2$ (1-hour and 24-hour), $NO_2$, $PM_{10}$, and $PM_{2.5}$ and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. The NAAQS and CAAQS are presented in Table 1.

**Table 1. Ambient Air Quality Standards**

| Pollutant | Averaging Time | California Standards[a] | National Standards[b] | |
|---|---|---|---|---|
| | | *Concentration[c]* | *Primary[c,d]* | *Secondary[c,e]* |
| | 1 hour | 0.09 ppm (180 μg/m$^3$) | — | |

## Table 1. Ambient Air Quality Standards

| Pollutant | Averaging Time | California Standards[a] | National Standards[b] | |
|---|---|---|---|---|
| | | *Concentration[c]* | *Primary[c,d]* | *Secondary[c,e]* |
| $O_3$ | 8 hours | 0.070 ppm (137 µg/m³) | 0.070 ppm (137 µg/m³)[f] | Same as primary standard[f] |
| $NO_2$[g] | 1 hour | 0.18 ppm (339 µg/m³) | 0.100 ppm (188 µg/m³) | Same as primary standard |
| | Annual arithmetic mean | 0.030 ppm (57 µg/m³) | 0.053 ppm (100 µg/m³) | |
| CO | 1 hour | 20 ppm (23 mg/m³) | 35 ppm (40 mg/m³) | None |
| | 8 hours | 9.0 ppm (10 mg/m³) | 9 ppm (10 mg/m³) | |
| $SO_2$[h] | 1 hour | 0.25 ppm (655 µg/m³) | 0.075 ppm (196 µg/m³) | — |
| | 3 hours | — | — | 0.5 ppm (1,300 µg/m³) |
| | 24 hours | 0.04 ppm (105 µg/m³) | 0.14 ppm (for certain areas)[g] | — |
| | Annual | — | 0.030 ppm (for certain areas)[g] | — |
| $PM_{10}$[i] | 24 hours | 50 µg/m³ | 150 µg/m³ | Same as primary standard |
| | Annual arithmetic mean | 20 µg/m³ | — | |
| $PM_{2.5}$[i] | 24 hours | — | 35 µg/m³ | Same as primary standard |
| | Annual arithmetic mean | 12 µg/m³ | 12.0 µg/m³ | 15.0 µg/m³ |
| Lead[j,k] | 30-day average | 1.5 µg/m³ | — | — |
| | Calendar quarter | — | 1.5 µg/m³ (for certain areas)[k] | Same as primary standard |
| | Rolling 3-month average | — | 0.15 µg/m³ | |
| Hydrogen sulfide | 1 hour | 0.03 ppm (42 µg/m³) | — | — |
| Vinyl chloride[j] | 24 hours | 0.01 ppm (26 µg/m³) | — | — |
| Sulfates | 24- hours | 25 µg/m³ | — | — |
| Visibility reducing particles | 8 hour (10:00 a.m. to 6:00 p.m. PST) | Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to the number of particles when the relative humidity is less than 70% | — | — |

**Source:** CARB 2016b.

**Notes:** $O_3$ = ozone; ppm = parts per million by volume; µg/m³ = micrograms per cubic meter; $NO_2$ = nitrogen dioxide; CO = carbon monoxide; mg/m³= milligrams per cubic meter; $SO_2$ = sulfur dioxide; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; PST = Pacific Standard Time.

[a] California standards for $O_3$, CO, $SO_2$ (1-hour and 24-hour), $NO_2$, suspended particulate matter ($PM_{10}$, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than $O_3$, $NO_2$, $SO_2$, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The $O_3$ standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For $PM_{10}$, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National primary standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[e] National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] On October 1, 2015, the national 8-hour $O_3$ primary and secondary standards were lowered from 0.075 to 0.070 ppm.

[g] To attain the national 1-hour standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[h] On June 2, 2010, a new 1-hour $SO_2$ standard was established, and the existing 24-hour and annual primary standards were revoked. To attain the national 1-hour standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 $SO_2$ national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

[i] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m³ to 12.0 µg/m³. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m³, as was the annual secondary standard of 15 µg/m³. The existing 24-hour $PM_{10}$ standards (primary and secondary) of 150 µg/m³ were also retained. The form of the annual primary and secondary standards is the annual mean averaged over 3 years.

[j] CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[k] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

#### 2.2.2.2 Toxic Air Contaminants

The state Air Toxics Program was established in 1983 under AB 1807 (Tanner). The California TAC list identifies more than 700 pollutants, of which carcinogenic and noncarcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. In accordance with AB 2728, the state list includes the (federal) HAPs. In 1987, the Legislature enacted the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) to address public concern over the release of TACs into the atmosphere. AB 2588 law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years. TAC emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment (HRA), and if specific thresholds are exceeded, the facility operator is required to communicate the results to the public in the form of notices and public meetings.

In 2000, CARB approved a comprehensive diesel risk reduction plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines (CARB 2000). The regulation is anticipated to result in an 80% decrease in statewide diesel health risk in 2020 compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-

Ignition (Diesel) Engines and Equipment program. These regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment. There are several Airborne Toxic Control Measures that reduce diesel emissions, including In-Use Off-Road Diesel-Fueled Fleets (13 CCR 2449 et seq.) and In-Use On-Road Diesel-Fueled Vehicles (13 CCR 2025).

#### California Health and Safety Code Section 41700

This section of the Health and Safety Code states that a person shall not discharge from any source whatsoever quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or that endanger the comfort, repose, health, or safety of any of those persons or the public; or that cause, or have a natural tendency to cause, injury or damage to business or property. This section also applies to sources of objectionable odors.

## 2.2.3 Local Regulations

### 2.2.3.1 South Coast Air Quality Management District

The SCAQMD is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the Riverside County portion of the SSAB, where the project is located. The SCAQMD operates monitoring stations in the SSAB, develops rules and regulations for stationary sources and equipment, prepares emissions inventory and air quality management planning documents, and conducts source testing and inspections. The SCAQMD's Air Quality Management Plans (AQMPs) include control measures and strategies to be implemented to attain state and federal ambient air quality standards in the SSAB. The SCAQMD then implements these control measures as regulations to control or reduce criteria pollutant emissions from stationary sources or equipment.

The most recent is the 2016 AQMP (SCAQMD 2017), adopted by the SCAQMD governing board on March 3, 2017. The 2016 AQMP is a regional blueprint for achieving air quality standards and healthful air. The 2016 AQMP represents a new approach, focusing on available, proven, and cost-effective alternatives to traditional strategies while seeking to achieve multiple goals in partnership with other entities promoting reductions in GHGs and toxic risk, as well as efficiencies in energy use, transportation, and goods movement (SCAQMD 2017). Because mobile sources are the principal contributor to the SSAB's air quality challenges, the SCAQMD has been and will continue to be closely engaged with CARB and the EPA, who have primary responsibility for these sources. The 2016 AQMP recognizes the critical importance of working with other agencies to develop funding and other incentives that encourage the accelerated transition of vehicles, buildings, and industrial facilities to cleaner technologies in a manner that benefits not only air quality but also local businesses and the regional economy. These "win-win" scenarios are key to implementation of this 2016 AQMP with broad support from a wide range of stakeholders.

On April 18, 2003, the EPA approved the 2003 Coachella Valley State Implementation Plan (2003 CVSIP), which addressed future-year attainment of the annual average $PM_{10}$ NAAQS with a 2006 attainment deadline. This federal standard was revoked, effective December 15, 2006. Since 2007, annual average $PM_{10}$ concentrations have met the revoked federal annual standard (50 µg/m$^3$). The 2003 CVSIP also addressed continued attainment of the 24-hour $PM_{10}$ federal standard, except for uncontrollable natural events. The 2016 AQMP does not include new modeling efforts for $PM_{10}$. Since the mid-1990s, peak 24-hour average PM10 concentrations have not exceeded the current federal standard (150 µg/m$^3$) other than on days with windblown dust from natural events, which can be excluded upon EPA concurrence consistent with the Exceptional Event Rules and prior policies. The $PM_{10}$ data

from the Coachella Valley monitors shows attainment of the $PM_{10}$ 24-hour NAAQS after the removal of the flagged high-wind exceptional events, for which SCAQMD supporting documentation will be submitted and subsequent EPA approval will be required. However, the EPA has requested that SCAQMD conduct additional ambient monitoring in the southeastern portion of the Coachella Valley before the redesignation can be considered. This new station has been in operation since 2013 in the community of Mecca, and redesignation will be revisited upon analysis of the required three full years of data.

The previous AQMP was the 2012 AQMP, which was adopted in February 2013 (SCAQMD 2013). The 2012 AQMP proposed policies and measures to achieve federal and state standards for improved air quality in the SSAB and those portions of the SSAB (formerly named the Southeast Desert Air Basin) that are under SCAQMD jurisdiction. The 2012 AQMP is designed to meet applicable federal and state requirements for $O_3$ and particulate matter. The 2012 AQMP documents that attainment of the federal 24-hour $PM_{2.5}$ standard is impracticable by 2015, and SSAB should be classified as a "serious" nonattainment area along with the appropriate federal requirements. The 2012 AQMP includes the planning requirements to meet the 1-hour $O_3$ standard. The 2012 AQMP demonstrates attainment of the federal 24-hour $PM_{2.5}$ standard by 2014 in the SSAB through adoption of all feasible measures. Finally, the 2012 AQMP updates the EPA-approved 8-hour $O_3$ control plan with new measures designed to reduce reliance on the Clean Air Act Section 182(e)(5) long-term measures for $NO_x$ and VOC reductions. The 2012 AQMP reduction and control measures, which are outlined to mitigate emissions, are based on existing and projected land use and development. The EPA, with a final ruling on April 14, 2016, approved the Clean Air Act planning requirements for the 24-hour $PM_{2.5}$ standard portion and on September 3, 2014, approved the 1-hour $O_3$ Clean Air Act planning requirements.

### Applicable Rules

Emissions that would result from mobile, area, and stationary sources during construction and operation of the project are subject to the rules and regulations of SCAQMD. The SCAQMD rules applicable to the project may include the following:

- **Rule 401 – Visible Emissions:** This rule establishes the limit for visible emissions from stationary sources.
- **Rule 402 – Nuisance:** This rule prohibits the discharge of air pollutants from a facility that cause injury, detriment, nuisance, or annoyance to the public or damage to business or property.
- **Rule 403 – Fugitive Dust:** This rule requires fugitive dust sources to implement best available control measures for all sources and prohibits all forms of visible particulate matter from crossing any property line. SCAQMD Rule 403 is intended to reduce $PM_{10}$ emissions from any transportation, handling, construction, or storage activity that has the potential to generate fugitive dust.
- **Rule 403.1** Rule 403.1 requires a Fugitive Dust Control Plan approved by South Coast AQMD or an authorized local government agency prior to initiating any construction/ earth-moving activity. These requirements are only applicable to construction projects with 5,000 or more square feet of surface area disturbance and therefore applicable to the proposed project.
- **Rule 431.2 – Sulfur Content of Liquid Fuels:** The purpose of this rule is to limit the sulfur content in diesel and other liquid fuels for the purpose of reducing the formation of $SO_x$ and particulates during combustion and of enabling the use of add-on control devices for diesel-fueled internal combustion engines. The rule applies to all refiners, importers, and other fuel suppliers such as distributors, marketers, and retailers, as well as to users of diesel, low-sulfur diesel, and other liquid fuels for stationary-source applications in the SCAQMD. The rule also affects diesel fuel supplied for mobile sources.

- **Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines:** This rule applies to stationary and portable engines rated at greater than 50 horsepower (hp). The purpose of Rule 1110.2 is to reduce $NO_x$, VOCs, and CO emissions from engines. Emergency engines, including those powering standby generators, are generally exempt from the emissions and monitoring requirements of this rule because they have permit conditions that limit operation to 200 hours or less per year as determined by an elapsed operating time meter.
- **Rule 1113 – Architectural Coatings:** This rule requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

#### 2.2.3.2 Coachella Valley Association of Governments

The City is within the jurisdiction of the Coachella Valley Association of Governments (CVAG), which participates in regional planning with the Southern California Association of Governments (SCAG). CVAG is, among other things, the regional transportation planning agency coordinating government services in the Coachella Valley. As the recognized transportation planning agency with the Riverside County Transportation Commission, it is CVAG's responsibility to prepare and adopt a Regional Transportation Plan (RTP) for the Coachella Valley. This is accomplished through the creation of the Transportation Project Prioritization Study (TPPS), which identifies and prioritizes transportation projects in the region. The CVAG developed its first TPPS in 1989, with subsequent report updates in 1993, 1999, 2005, and 2010. The most recent version was adopted on June 26, 2017 (CVAG 2017). The TPPS includes growth projections for cities within the Coachella Valley. The projects and growth projections within the TPPS are fed into a larger regional planning effort by the SCAG. SCAG recently released its 2016 RTP, which includes the majority of projects seen within the TPPS. The SCAQMD 2016 AQMP applies the updated SCAG growth forecasts assumed in the 2016 RTP/SCS. Responding to the context of the RTP guidelines and California state legislation, CVAG's Active Transportation Plan, also within the TPPS, was designed to be completed simultaneously with the TPPS and Regional Arterial Cost Estimate documents. Together, this family of documents serves as CVAG's RTP, listing all regionally significant transportation projects, including roadway projects, active transportation projects, and other improvement projects that have been identified to benefit regional circulation within the Coachella Valley. The CVAG also developed fugitive dust ordinances that include (1) dust control plans for each construction project needing a grading permit; (2) plans to pave or chemically treat unpaved surfaces if daily vehicle trips exceed 150; (3) imposition of 15 mph speed limits for unpaved surfaces if daily vehicle trips do not exceed 150; (4) paving or chemical treatment of unpaved parking lots; and (5) actions to discourage use of unimproved property by off-highway vehicles.

SCAG has developed Connect SoCal, the 2020-2045 RTP/SCS, which is a long-range visioning plan that balances future mobility and housing needs with economic, environmental and public health goals. Connect SoCal charts a path toward a more mobile, sustainable and prosperous region by making connections between transportation networks, between planning strategies and between the people whose collaboration can improve the quality of life for Southern Californians. Connect SoCal embodies a collective vision for the region's future and is developed with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura. Connect SoCal was adopted by the regional council on September 3, 2020.

### 2.2.3.3 City of Rancho Mirage

As discussed in the City's General Plan (City of Rancho Mirage 2017), policies pertaining to improving air quality are addressed in Chapter 6, Air Quality Element. The Air Quality Element is intended to protect the public's health and welfare by implementing measures that allow the South Coast Air Basin to attain Federal and State air quality standards. To achieve this goal, the Element sets forth a number of programs to reduce current pollution emissions and to require new development to include measures to comply with air quality standards.

Goals directly applicable to air quality are described below.

**GOAL AQ 1**

Preservation and enhancement of regional air quality for the protection of the health and welfare of the community as a whole.

**POLICY AQ 1.1**

The City shall coordinate and cooperate with CVAG and SCAQMD in the ongoing monitoring and management of major pollutants affecting Rancho Mirage and the region, with particular focus on PM10.

**PROGRAM AQ 1.1A**

Participate, through CVAG and SCAQMD, in the monitoring of all air pollutants of regional concern on a continuous basis, and maintain records of trends in regional air quality. Provide all required reporting for inclusion in SCAQMD's annual report.

**PROGRAM AQ 1.1B**

Make SCAQMD's Air Quality Management manual available to encourage and facilitate self-regulation to the greatest extent practical.

**PROGRAM AQ 1.1C**

Coordinate with developers and encourage the phasing and staging of development to assure the lowest construction related pollutant emission levels practical. Impose mitigation measures, including the use of water trucks and temporary irrigation systems, as well as other measures that will effectively limit fugitive dust emissions resulting from construction or other site disturbance.

**PROGRAM AQ 1.1D**

Maintain and operate a street sweeping program for public roadways to minimize litter and PM10 emissions.

**PROGRAM AQ 1.1E**

Encourage private development to utilize street sweeping services for private roadways.

POLICY AQ 1.2

The City shall promote the development of pedestrian-oriented retail centers, as well as community wide multi use trails and bike paths, dedicated bike lanes, and other desirable alternatives to motor vehicle traffic.

POLICY AQ 1.3

The City shall promote the appropriate and cost-effective development and coordination of mass transit/ shuttle service linking residential, shopping, resort, and commercial centers of Rancho Mirage, and participate with CVAG, the Southern California Association of Governments, and public and private service providers to improve and optimize regional transportation services.

POLICY AQ 1.4

The City shall encourage the use of clean alternative energy sources for transportation, heating, and cooling whenever practical.

PROGRAM AQ 1.4A

Consider the use of compressed natural gas and electric powered vehicles, as well as other alternative and/or renewable energy sources to the extent cost-effective.

PROGRAM AQ 1.4B

Require the installation of electric vehicle charging stations, as a ratio of total required parking, for new commercial projects.

POLICY AQ 1.5

The City shall review all development proposals for potential adverse effects on air quality and require mitigation of any significant impacts.

PROGRAM AQ 1.5A

Conduct an initial study and, as appropriate, require detailed air quality analyses for all applications that have the potential to adversely affect air quality.

PROGRAM AQ 1.5B

Require projects with the potential to generate significant levels of air pollutants to incorporate air pollution mitigation in their design and operation, and to utilize the most advanced technological methods feasible.

PROGRAM AQ 1.5C

To the extent feasible, monitor the effectiveness of transportation management programs of employers, which may include coordinated carpooling, off-peak shift times, employee flex time, and other components.

As future demand warrants, promote and support the development of a "Park and Ride" program to decrease existing and future traffic levels in the community.

**PROGRAM AQ 1.5D**

Require all building, both residential and commercial, to be electric vehicle charging station ready.

**PROGRAM AQ 1.6D**

The City shall require air quality studies for projects that are proposed within 500 feet of I-10, and which include sensitive receptors.

**POLICY AQ 1.6**

The City shall strive towards achieving a level-of-service C (see Circulation Element) on all roadways to improve traffic flow, minimize idling time, and reduce air emissions.

# 2.3 Regional and Local Air Quality Conditions

## 2.3.1 Coachella Valley Portion of the Salton Sea Air Basin Attainment Designation

Pursuant to the 1990 federal Clean Air Act amendments, EPA classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutant, based on whether the NAAQS have been achieved. Generally, if the recorded concentrations of a pollutant are lower than the standard, the area is classified as "attainment" for that pollutant. If an area exceeds the standard, the area is classified as "nonattainment" for that pollutant. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated as "unclassified" or "unclassifiable." The designation of "unclassifiable/attainment" means that the area meets the standard or is expected to be meet the standard despite a lack of monitoring data. Areas that achieve the standards after a nonattainment designation are redesignated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the standards. The California Clean Air Act, like its federal counterpart, called for the designation of areas as "attainment" or "nonattainment," but based on CAAQS rather than the NAAQS. Table 2 depicts the current attainment status of the project site with respect to the NAAQS and CAAQS, and outlines attainment classifications for the criteria pollutants.

**Table 2. Coachella Valley Portion of the Salton Sea Air Basin Attainment Classification**

| Pollutant | Designation/Classification | |
|---|---|---|
| | *Federal Standards* | *State Standards* |
| Ozone ($O_3$) – 1 hour | No federal standard | Nonattainment |
| Ozone ($O_3$) – 8 hour | Severe nonattainment | Nonattainment |
| Nitrogen dioxide ($NO_2$) | Unclassifiable/attainment | Attainment |
| Carbon monoxide (CO) | Unclassifiable/attainment | Attainment |
| Sulfur dioxide ($SO_2$) | Unclassifiable/attainment | Attainment |

**Table 2. Coachella Valley Portion of the Salton Sea Air Basin Attainment Classification**

| Pollutant | Designation/Classification | |
|---|---|---|
| | *Federal Standards* | *State Standards* |
| Coarse particulate matter ($PM_{10}$) | **Serious nonattainment** | **Nonattainment** |
| Fine particulate matter ($PM_{2.5}$) | Unclassifiable/attainment | Attainment |
| Lead (Pb) | Unclassifiable/attainment | Attainment |
| Hydrogen sulfide | No federal standard | Unclassified |
| Sulfates | No federal standard | Attainment |
| Visibility-reducing particles | No federal standard | Unclassified |
| Vinyl chloride | No federal standard | No designation |

**Sources:** SCAQMD 2017.
**Notes: Bold text** = not in attainment; attainment = meets the standards; attainment/maintenance = achieve the standards after a nonattainment designation; nonattainment = does not meet the standards; unclassified or unclassifiable = insufficient data to classify; unclassifiable/attainment = meets the standard or is expected to be meet the standard despite a lack of monitoring data.

In summary, the SSAB is designated as a nonattainment area for federal and state $O_3$ standards and federal and state $PM_{10}$ standards. The SSAB is designated as an attainment area for federal and state CO, $PM_{2.5}$, $NO_2$, and $SO_2$ standards.

Despite the current nonattainment status, air quality within the SSAB has generally improved since the inception of air pollutant monitoring in 1976. This improvement is mainly due to lower-polluting on-road motor vehicles, more stringent regulation of industrial sources, and the implementation of emission reduction strategies by the SCAQMD. This trend toward cleaner air has occurred in spite of continued population growth. Despite this growth, air quality has improved significantly over the years, primarily due to the impacts of the region's air quality control program. $PM_{10}$ levels have declined almost 50% since 1990, and $PM_{2.5}$ levels have also declined 50% since measurements began in 1999 (SCAQMD 2013). Similar improvements are observed with $O_3$, although the rate of $O_3$ decline has slowed in recent years.

### 2.3.2 Local Ambient Air Quality

CARB, air districts, and other agencies monitor ambient air quality at approximately 250 air quality monitoring stations across the state. SCAQMD monitors local ambient air quality in the region of the project site. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The most recent background ambient air quality data from 2017 to 2019 are presented in Table 3. The Palm Springs monitoring station, located at 590 Racquet Club Road, Palm Springs, California, is the nearest air quality monitoring station to the project site, located approximately 12.6 miles northwest of the project site. The data collected at this station are considered representative of the air quality experienced in the project vicinity. Air quality data for $O_3$, CO, $NO_2$, $PM_{10}$, and $PM_{2.5}$ from the Palm Springs monitoring station are provided in Table 3. Because $SO_2$ measurements are not monitored at the Palm Springs monitoring station, the measurements were taken from the Rubidoux monitoring station (1588 Mission Boulevard, Rubidoux, California, approximately 69 miles northwest of the project site). The number of days exceeding the ambient air quality standards is also shown in Table 3.

## Table 3. Local Ambient Air Quality Data

| Monitoring Station | Unit | Averaging Time | Agency/ Method | Ambient Air Quality Standard | Measured Concentration by Year | | | Exceedances by Year | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *2017* | *2018* | *2019* | *2017* | *2018* | *2019* |
| ***Ozone ($O_3$)*** | | | | | | | | | | |
| Palm Springs | ppm | Maximum 1-hour concentration | State | 0.09 | 0.113 | 0.111 | 0.100 | 18 | 11 | 5 |
| | ppm | Maximum 8-hour concentration | State | 0.070 | 0.097 | 0.099 | 0.084 | 63 | 58 | 34 |
| | | | Federal | 0.070 | 0.097 | 0.099 | 0.085 | 57 | 56 | 39 |
| ***Nitrogen Dioxide ($NO_2$)*** | | | | | | | | | | |
| Palm Springs | ppm | Maximum 1-hour concentration | State | 0.18 | 0.043 | 0.043 | 0.041 | 0 | 0 | 0 |
| | | | Federal | 0.100 | 0.043 | 0.043 | 0.041 | 0 | 0 | 0 |
| | ppm | Annual concentration | State | 0.030 | 0.007 | 0.007 | 0.00726 | 0 | 0 | 0 |
| | | | Federal | 0.053 | 0.0065 | 0.0068 | 0.00726 | 0 | 0 | 0 |
| ***Carbon Monoxide (CO)*** | | | | | | | | | | |
| Palm Springs | ppm | Maximum 1-hour concentration | State | 20 | 1 | 1.1 | 1.3 | 0 | 0 | 0 |
| | | | Federal | 35 | 1 | 1.1 | 1.3 | 0 | 0 | 0 |
| | ppm | Maximum 8-hour concentration | State | 9.0 | 0.4 | 0.8 | 0.7 | 0 | 0 | 0 |
| | | | Federal | 9 | 0.4 | 0.8 | 0.7 | 0 | 0 | 0 |
| ***Sulfur Dioxide ($SO_2$)*** | | | | | | | | | | |
| Rubidoux | ppm | Maximum 1-hour concentration | Federal | 0.075 | 0.0025 | 0.0017 | 0.0018 | 0 | 0 | 0 |
| | ppm | Maximum 24-hour concentration | Federal | 0.14 | 0.0012 | 0.0009 | 0.0009 | 0 | 0 | 0 |
| | ppm | Annual concentration | Federal | 0.030 | 0.00029 | 0.00045 | 0.00042 | 0 | 0 | 0 |
| ***Coarse Particulate Matter ($PM_{10}$)[b]*** | | | | | | | | | | |
| Palm Springs | µg/m³ | Maximum 24-hour concentration | State | 50 | 60.5 | 37.4 | 51.8 | – | 0 | 6 |
| | | | Federal | 150 | 105.6 | 422.3 | 75.6 | 0 | 2 | 0 |
| | µg/m³ | Annual concentration | State | 20 | ND | 20.1 | 19.9 | – | – | – |
| ***Fine Particulate Matter ($PM_{2.5}$)[b]*** | | | | | | | | | | |
| Palm Springs | µg/m³ | Maximum 24-hour concentration | Federal | 35 | 14.5 | 30.2 | 15.5 | 0 | 0 | 0 |
| | µg/m³ | Annual concentration | State | 12 | 6.0 | 6.0 | 6.0 | 0 | – | – |
| | | | Federal | 12.0 | 6.0 | 6.0 | 6.0 | 0 | – | – |

**Sources:** CARB 2016b; EPA 2018b.

**Notes:** ppm = parts per million by volume; ND = insufficient data available to determine the value; -- = not available; μg/m³ = micrograms per cubic meter.
Data taken from CARB iADAM (CARB 2020) and EPA AirData (http://www.epa.gov/airdata/) represent the highest concentrations experienced over a given year.
Exceedances of federal and state standards are only shown for $O_3$ and particulate matter. Daily exceedances for particulate matter are estimated days because $PM_{10}$ and $PM_{2.5}$ are not monitored daily. All other criteria pollutants did not exceed federal or state standards during the years shown. There is no federal standard for 1-hour ozone, annual $PM_{10}$, or 24-hour $SO_2$, nor is there a state 24-hour standard for $PM_{2.5}$.

[a] Mean does not satisfy minimum data completeness criteria.

[b] Measurements of $PM_{10}$ and $PM_{2.5}$ are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.

# 2.4 Significance Criteria and Methodology

## 2.4.1 Thresholds of Significance

The significance criteria used to evaluate the project impacts to air quality is based on the recommendations provided in Appendix G of the CEQA Guidelines. For the purposes of this air quality analysis, a significant impact would occur if the project would (14 CCR 15000 et seq.):

1. Conflict with or obstruct implementation of the applicable air quality plan.
2. Result in a cumulatively considerable new increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.
3. Expose sensitive receptors to substantial pollutant concentrations.
4. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) indicates that, where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to determine whether the project would have a significant impact on air quality.

The SCAQMD has established Air Quality Significance Thresholds, as revised in April 2019, that set forth quantitative emission significance thresholds below which a project would not have a significant impact on ambient air quality under existing and cumulative conditions. The quantitative air quality analysis provided herein applies the SCAQMD thresholds identified in Table 4 to determine the potential for the project to result in a significant impact under CEQA.

**Table 4. SCAQMD Air Quality Significance Thresholds**

| Criteria Pollutants Mass Daily Thresholds | | |
|---|---|---|
| *Pollutant* | *Construction (Pounds per Day)* | *Operation (Pounds per Day)* |
| VOCs | 75 | 55 |
| $NO_x$ | 100 | 55 |
| CO | 550 | 550 |
| $SO_x$ | 150 | 150 |
| $PM_{10}$ | 150 | 150 |
| $PM_{2.5}$ | 55 | 55 |
| Lead[a] | 3 | 3 |

## Table 4. SCAQMD Air Quality Significance Thresholds

| Criteria Pollutants Mass Daily Thresholds | | |
|---|---|---|
| *Pollutant* | *Construction (Pounds per Day)* | *Operation (Pounds per Day)* |
| *TACs and Odor Thresholds* | | |
| TACs[b] | Maximum incremental cancer risk ≥ 10 in 1 million<br>Chronic and acute hazard index ≥ 1.0 (project increment) | |
| Odor | Project creates an odor nuisance pursuant to SCAQMD Rule 402 | |
| *Ambient Air Quality Standards for Criteria Pollutants[c]* | | |
| $NO_2$ 1-hour average<br>$NO_2$ annual arithmetic mean | SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards:<br>0.18 ppm (state)<br>0.030 ppm (state) and 0.0534 ppm (federal) | |
| CO 1-hour average<br>CO 8-hour average | SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards:<br>20 ppm (state) and 35 ppm (federal)<br>9.0 ppm (state/federal) | |
| $PM_{10}$ 24-hour average<br><br>$PM_{10}$ annual average | 10.4 μg/m³ (construction)[d]<br>2.5 μg/m³ (operation)<br>1.0 μg/m³ | |
| $PM_{2.5}$ 24-hour average | 10.4 μg/m³ (construction)[d]<br>2.5 μg/m³ (operation) | |

**Source:** SCAQMD 2019.
**Notes:** SCAQMD = South Coast Air Quality Management District; VOC = volatile organic compounds; $NO_x$ = oxides of nitrogen; CO = carbon monoxide; $SO_x$ = sulfur oxides; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; TAC = toxic air contaminant; $NO_2$ = nitrogen dioxide; ppm = parts per million by volume; μg/m³ = micrograms per cubic meter.
GHG emissions thresholds for industrial projects, as added in the March 2015 revision to the SCAQMD Air Quality Significance Thresholds, were not include included in Table 4 as they are addressed within the GHG emissions analysis and not the air quality study.

[a] The phaseout of leaded gasoline started in 1976. Since gasoline no longer contains lead, the project is not anticipated to result in impacts related to lead; therefore, it is not discussed in this analysis.
[b] TACs include carcinogens and noncarcinogens.
[c] Ambient air quality standards for criteria pollutants are based on SCAQMD Rule 1303, Table A-2, unless otherwise stated.
[d] Ambient air quality threshold are based on SCAQMD Rule 403.
[e] For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.

The evaluation of whether the project would conflict with or obstruct implementation of the applicable air quality plan (Impact AQ-1) is based on the SCAQMD CEQA Air Quality Handbook (SCAQMD 1993), Chapter 12, Sections 12.2 and 12.3. The first criterion assesses if the project would result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay the timely attainment of air quality standards of the interim emissions reductions specified in the AQMP, which is addressed in detail in Section 2.5.2, Threshold AQ-2, of this report. The second criterion is if the project would exceed the assumptions in the AQMP or increments based on the year of project buildout and phase, as discussed further in Section 2.5.1, Threshold AQ-1, of this report.

To evaluate the potential for the project to result in a cumulatively considerable new increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (Threshold AQ-2), this analysis applies the SCAQMD's construction and operational criteria pollutants mass daily thresholds, as shown in Table 4. A project would result in a cumulatively considerable new increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air

quality standard, if the project's construction or operational emissions would exceed the SCAQMD VOC or $NO_x$ thresholds shown in Table 4. These emissions-based thresholds for $O_3$ precursors are intended to serve as a surrogate for an "ozone significance threshold" (i.e., the potential for adverse $O_3$ impacts to occur). This approach is used because $O_3$ is not emitted directly (see the discussion of $O_3$ and its sources in Section 2.1.2, Pollutants and Effects), and the effects of an individual project's emissions of $O_3$ precursors (VOC and $NO_x$) on $O_3$ levels in ambient air cannot be determined through air quality models or other quantitative methods.

The assessment of the project's potential to expose sensitive receptors to substantial pollutant concentrations (Section 2.5.3, Threshold AQ-3) includes a localized significance threshold (LST) analysis and CO hotspot assessment, as recommended by the SCAQMD. For project sites of 5 acres or less, the SCAQMD LST Methodology (2009) includes lookup tables that can be used to determine the maximum allowable daily emissions that would satisfy the localized significance criteria (i.e., the emissions would not cause an exceedance of the applicable concentration limits for $NO_2$, CO, $PM_{10}$, and $PM_{2.5}$) without performing project-specific dispersion modeling. Although the proposed development area of the site is greater than 5 acres (estimated to be 16.48 acres), the project would disturb less than 5 acres in 1 day, as discussed in detail in the following text, so it is appropriate to use the lookup tables for the LST evaluation.

The LST significance thresholds for $NO_2$ and CO represent the allowable increase in concentrations above background levels in the vicinity of a project that would not cause or contribute to an exceedance of the relevant ambient air quality standards, while the threshold for $PM_{10}$ represents compliance with Rule 403 (Fugitive Dust). The LST significance threshold for $PM_{2.5}$ is intended to ensure that construction emissions do not contribute substantially to existing exceedances of the $PM_{2.5}$ ambient air quality standards. The allowable emission rates depend on the following parameters:

1. Source-receptor area (SRA) in which the project is located
2. Size of the project site
3. Distance between the project site and the nearest sensitive receptor (e.g., residences, schools, hospitals)

The project site is located in SRA 30 (Coachella Valley). The SCAQMD provides guidance for applying California Emissions Estimator Model (CalEEMod) to the LSTs. LST pollutant screening level concentration data is currently published for 1-, 2-, and 5-acre sites for varying distances. The maximum number of acres disturbed on the peak day was estimated using the "Fact Sheet for Applying CalEEMod to Localized Significance Thresholds" (SCAQMD 2011), which provides estimated acres per 8-hour day for crawler tractors, graders, rubber-tired dozers, and scrapers. Based on the construction schedule, it was assumed that one grader, one rubber-tired dozer, two scrappers and two crawler tractors (CalEEMod category: tractor/loader/backhoes) would be used based on the applicant provide construction equipment schedule. CalEEMod default values assume that during an 8-hour day, graders, rubber-tired dozers and crawler tractors can each disturb a maximum of 0.5 acres and scrapers each disturb one acre. This results in a total of 4 acres disturbed per day from the equipment.

The nearest sensitive-receptor land use (a residence) is located approximately of 25 meters (82 feet) south of the project's limits of construction. As such, the LST receptor distance was assumed to be 25 meters (82 feet). Because threshold values at 4 acres are not directly provided in look up table, thresholds were determined thought interpolation between thresholds provided for 2 acres and 5 acres. The LST values from the SCAQMD lookup tables for SRA 30 for a 4-acre project site and a receptor distance of 25 meters (82 feet) are shown in Table 5.

**Table 5. Localized Significance Thresholds for Source-Receptor Area 30 (Coachella Valley)**

| Pollutant | Threshold (Pounds per Day) |
|---|---|
| $NO_2$ | 266.33 |
| CO | 1,961 |
| $PM_{10}$ | 11.67 |
| $PM_{2.5}$ | 7.00 |

**Source:** SCAQMD 2009.
**Notes:** $NO_2$ = nitrogen dioxide; CO = carbon monoxide; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter.
LST thresholds were determined based on the values for 4-acre site at a distance of 25 meters (82 feet) from the nearest sensitive receptor.

The potential for the project to result in an odor impact (Section 2.5.4, Threshold AQ-4) is based on the project's land use type and operational activity, and the potential for the project to create an odor nuisance pursuant to SCAQMD Rule 402.

## 2.4.2 Approach and Methodology

### 2.4.2.1 Construction Emissions

Construction of the proposed Project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (e.g., off-road construction equipment, soil disturbance, VOC off-gassing from architectural coatings and asphalt pavement application) and off-site sources (e.g., vendor trucks, haul trucks, and worker vehicle trips). Specifically, entrained dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, resulting in $PM_{10}$ and $PM_{2.5}$ emissions. Internal combustion engines used by construction equipment, haul trucks, vendor trucks (i.e., delivery trucks), and worker vehicles would result in emissions of VOC, $NO_x$, CO, $PM_{10}$, and $PM_{2.5}$. Construction emissions can vary substantially from day to day depending on the level of activity; the specific type of operation; and, for dust, the prevailing weather conditions.

Application of architectural coatings, such as exterior paint and other finishes, and application of asphalt pavement would also produce VOC emissions. VOC off-gassing emissions result from evaporation of solvents contained in surface coatings such as in paints and primers used during construction of the facility. CalEEMod calculates the VOC evaporative emissions from application of surface coatings based on the VOC emissions factor, the building square footage, and the assumed fraction of surface area. No-VOC paint, defined as paint with a VOC content of 5 grams/liter or less, is proposed for the project.

The proposed project would be required to comply with SCAQMD Rule 403 (Fugitive Dust) to control dust emissions generated during any dust-generating activities. Standard construction practices that would be employed to reduce fugitive dust emissions include watering of the active dust areas up to two times per day, depending on weather conditions. Rule 403.1 is a supplemental rule to Rule 403 and is applicable to man-made sources of fugitive dust in Coachella Valley. Rule 403.1 requires a Fugitive Dust Control Plan approved by South Coast AQMD or an authorized local government agency prior to initiating any construction/ earth-moving activity. These requirements are only applicable to construction projects with 5,000 or more square feet of surface area disturbance and therefore applicable to the proposed project.

Emissions from the construction phase of the proposed project were estimated using CalEEMod version 2020.04.0. For a conservative emission estimation, construction is assumed to begin in February 1, 2023, and conclude in November of 2024. In the event actual construction proceeds longer into year 2024, this analysis provides a conservative approach resulting in slightly higher daily emissions and annual emissions. A detailed depiction of expected construction schedules, including information regarding phasing, equipment used during each phase, trucks, and worker vehicles, is provided in Appendix A, CalEEMod Output Files.

General construction equipment modeling assumptions are provided in Table 6. The applicant provided project specific values for equipment mix for all construction phase. Equipment horsepower, and load factors were based on CalEEMod defaults. The project site is currently vacant and site preparation included clearing and grubbing has previously been performed and as such is not part of this analysis.

During the grading phase of construction, it is anticipated that approximately 6,920 cubic yards of material would be exported and no material would be imported. For the analysis, it was generally assumed that heavy-duty construction equipment would be operating at the site 5 days per week. Detailed construction equipment modeling assumptions are provided in Appendix A.

## Table 6. Construction Scenario Assumptions

| | One-Way Vehicle Trips | | | Equipment | | | Schedule | |
|---|---|---|---|---|---|---|---|---|
| Construction Phase | *Average Daily Worker Trips* | *Average Daily Vendor Truck Trips* | *Total Haul Truck Trips* | *Types* | *Quantity* | *Usage Hours* | *Start Date* | *Finish Date* |
| Grading | 10 | 8 | 692 | Graders | 1 | 8 | 2/1/2023 | 3/21/2023 |
| | | | | Rubber-Tired Dozers | 1 | 8 | | |
| | | | | Tractors/ Loaders/ Backhoes | 2 | 8 | | |
| | | | | Scrapers | 2 | 8 | | |
| | | | | Excavator | 2 | 8 | | |
| Building Construction | 50 | 46 | 60 | Cranes | 1 | 7 | 3/22/2023 | 8/20/2024 |
| | | | | Forklifts | 3 | 8 | | |
| | | | | Generator Sets | 1 | 8 | | |
| | | | | Tractors/ Loaders/ Backhoes | 3 | 7 | | |
| | | | | Welders | 1 | 8 | | |
| Paving | 20 | 20 | 197 | Pavers | 2 | 8 | 8/21/2024 | 9/17/2024 |
| | | | | Paving Equipment | 2 | 8 | | |
| | | | | Rollers | 2 | 8 | | |

**Table 6. Construction Scenario Assumptions**

| | One-Way Vehicle Trips | | | Equipment | | | Schedule | |
|---|---|---|---|---|---|---|---|---|
| Construction Phase | *Average Daily Worker Trips* | *Average Daily Vendor Truck Trips* | *Total Haul Truck Trips* | *Types* | *Quantity* | *Usage Hours* | *Start Date* | *Finish Date* |
| Architectural Coating / Finish Phase | 70 | 60 | 380 | Air Compressors | 1 | 6 | 9/18/2024 | 10/15/2024 |

**Notes:** See Appendix A for details.
Two one-way trips will be assumed per worker, per haul truck, and per vendor truck

### 2.4.2.2 Operational Emissions

Operation of the proposed project would produce VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, and $PM_{2.5}$ emissions associated with vehicular traffic, area sources (consumer products, architectural coatings, landscaping equipment), energy sources (natural gas, appliances, and space and water heating), and stationary sources (emergency generator). CalEEMod was used to estimate daily emissions from these operational sources including modelling the emissions of a 1,200 hp) diesel-fired emergency generator based on 1 hour per day and 50 hours per year of operation per SCAQMD Rule 1470, which limits emergency generators to 50 hours of use per year for maintenance and testing. CalEEMod default emission factors were used for the proposed generator, corresponding with the install dates.

#### Area Sources

CalEEMod was used to estimate operational emissions from area sources, including emissions from consumer product use, architectural coatings, and landscape maintenance equipment. Emissions associated with natural gas usage in space heating, water heating, and stoves are calculated in the building energy use module of CalEEMod, as described in the following text.

Consumer products are chemically formulated products used by household and institutional consumers, including detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products. Other paint products, furniture coatings, or architectural coatings are not considered consumer products (CAPCOA 2017). Consumer product VOC emissions are estimated in CalEEMod based on the floor area of residential and nonresidential buildings and on the default factor of pounds of VOC per building square foot per day. For parking lot land uses, CalEEMod estimates VOC emissions associated with use of parking surface degreasers based on a square footage of parking surface area and pounds of VOC per square foot per day.

VOC off-gassing emissions result from evaporation of solvents contained in surface coatings such as in paints and primers using during building maintenance. CalEEMod calculates the VOC evaporative emissions from application of residential and nonresidential surface coatings based on the VOC emission factor, the building square footage, the assumed fraction of surface area, and the reapplication rate. The VOC emission factor is based on the VOC content of the surface coatings, and SCAQMD's Rule 1113 (Architectural Coatings) governs the VOC content for interior and exterior coatings. The model default reapplication rate of 10% of area per year

is assumed. Consistent with CalEEMod defaults, it is assumed that the non-residential surface area for painting equals 2.0 times the floor square footage, with 75% assumed for interior coating and 25% assumed for exterior surface coating. For the parking surface area, the architectural coating area is assumed to be 6% of the total square footage, consistent with the supporting CalEEMod studies provided as an appendix to the CalEEMod User's Guide (CAPCOA 2017).

Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers. The emissions associated from landscape equipment use are estimated based on CalEEMod default values for emission factors (grams per residential dwelling unit per day and grams per square foot of nonresidential building space per day) and number of summer days (when landscape maintenance would generally be performed) and winter days.

#### Energy Sources

As represented in CalEEMod, energy sources include emissions associated with building electricity and natural gas usage (non-hearth). Electricity use would contribute indirectly to criteria air pollutant emissions; however, the emissions from electricity use are only quantified for GHGs in CalEEMod, since criteria pollutant emissions occur at the site of the power plant, which is typically off site. For energy use from residential and nonresidential buildings, CalEEMod energy intensity values (natural gas usage per square foot per year) assumptions were based on the California Commercial End-Use Survey database. CalEEMod default values for energy consumption were applied for the project analysis.

#### Mobile Sources

The proposed project would generate criteria pollutant emissions from mobile sources (vehicular traffic). On-road vehicular emissions associated with the proposed project operation were modeled using trip generation rates for the Ritz-Carlton residences, Sky Mesa Restaurant, and weekend special events at the project venue space estimated by Urban Crossroads (2020a). The venue space was modeled in CalEEMod as an arena. Additional modeled land uses include the parking garage with elevator, swimming pools, driveway parking and paved roads.

## 2.5 Impact Analysis

### 2.5.1 Threshold AQ-1

***Would the project conflict with or obstruct implementation of the applicable air quality plan?***

As previously discussed, the project site is located within the SSAB under the jurisdiction of the SCAQMD, which is the local agency responsible for administration and enforcement of air quality regulations for the area. The SCAQMD has established criteria for determining consistency with the AQMP, currently the 2016 AQMP, in Chapter 12, Sections 12.2 and 12.3, in the SCAQMD CEQA Air Quality Handbook (SCAQMD 1993). The criteria are as follows (SCAQMD 1993):

> **Consistency Criterion No. 1:** The proposed project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay the timely attainment of air quality standards of the interim emissions reductions specified in the AQMP.

**Consistency Criterion No. 2:** The proposed project will not exceed the assumptions in the AQMP or increments based on the year of project buildout and phase.

### Consistency Criterion No. 1

Section 2.5.2, Threshold AQ-2, evaluates the project's potential impacts in regards to CEQA Guidelines Appendix G Threshold 2 (will the project result in a cumulatively considerable new increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard). As discussed in Section 2.5.2, the project would not result in a significant and unavoidable impact associated with the violation of an air quality standard. Because the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, the project would not conflict with Consistency Criterion No. 1 of the SCAQMD CEQA Air Quality Handbook.

### Consistency Criterion No. 2

While striving to achieve the NAAQS and CAAQS for $O_3$ and $PM_{10}$ through a variety of air quality control measures, the 2016 AQMP also accommodates planned growth in the SSAB. Projects are considered consistent with, and would not conflict with or obstruct implementation of, the AQMP if the growth in socioeconomic factors (e.g., population, employment) is consistent with the underlying regional plans used to develop the AQMP (per Consistency Criterion No. 2 of the SCAQMD CEQA Air Quality Handbook).

The potential of the proposed project to exceed the assumptions in the AQMP or increments based on the year of project buildout and phase is primarily assessed by determining consistency between the proposed project's land use designations and its potential to generate population growth. In general, projects are considered consistent with, and not in conflict with or obstruct implementation of, the AQMP if the growth they produce in socioeconomic factors is consistent with the underlying regional plans used to develop the AQMP (SCAQMD 1993).

The project site is currently zoned Resort Hotel (Rs-H) and Open Space: Mountain Reserve (MR) in the General Plan (City of Rancho Mirage 2017). The proposed hotel suites and villas are located on the Rs-H zoned property and therefore consistent with the General Plan designation. This designation allows for the development of hotels and destination resorts with limited, ancillary commercial uses, such as spas, recreational facilities, restaurants, lounges, and small retail shops that directly support the primary use. The Sky Mesa is located on the MR zoned portion of the project site, which is assigned to public lands or property subject to conservation easements in the Santa Rosa Mountains. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation. Under existing conditions, the Sky Mesa portion of the project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning to encompass the Sky Mesa portion of the site, which is a privately owned property and not public land. Per the description of allowable uses for Rs-H outlined above, the Sky Mesa Recreation Area would be consistent with Rs-H zone. With future approval and adoption of the zone change by City Council, the proposed project would not conflict with the City's General Plan with regard to allowable land uses.

SCAG reported the City's population to be 18,739 persons as of 2018 (SCAG 2019). In 2018, the City had a total of 14,492 housing units, and in 2017, the City had a total of 16,902 jobs (SCAG 2019). By 2040, SCAG projected the City to have a population of 25,000 persons and 20,500 jobs (SCAG 2016). According to the City's General Plan Housing Element (City of Rancho Mirage 2017), the 2014–2021 RHNA determined that the City needed a total of

95 housing units. The proposed project would construct 106 residential units. However, these residential units would operate similar to time-share properties and therefore future residents would not be in the proposed residential units year-round. Because the proposed residential units are not typical residential units that residents cannot occupy year-round, theses housing units do not count towards the RHNA housing unit determination. SCAG's Local Profile Report for the City of Rancho Mirage indicated that the City's average household size was two persons per dwelling unit as of 2018 (SCAG 2019). Using these assumptions, implementation of the proposed project would have the potential to increase the City's population by 216 persons. This population increase would comply with SCAG's projected population increase for the City. Accordingly, the proposed project is consistent with the SCAG RTP/SCS forecasts used in the SCAQMD AQMP development.

#### Summary

As described previously, the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, and would not conflict with Consistency Criterion No. 1. Implementation of the project would be not exceed the demographic growth forecasts for the City; therefore, the project would also be consistent with the SCAQMD 2016 AQMP, which based future emission estimates on the SCAG 2016 RTP/SCS. Thus, the project would not conflict with Consistency Criterion No. 2. Based on these considerations, impacts related to the project's potential to conflict with or obstruct implementation of the applicable air quality plan would be **less than significant**.

### 2.5.2 Threshold AQ-2

***Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable Federal or State ambient air quality standard?***

A quantitative analysis was conducted to determine whether proposed activities might result in emissions of criteria air pollutants that may cause exceedances of the NAAQS or CAAQS, or cumulatively contribute to existing nonattainment of ambient air quality standards. Criteria air pollutants include ozone ($O_3$), nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide, particulate matter with an aerodynamic diameter less than or equal to 10 microns ($PM_{10}$; course particulate matter), particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$; fine particulate matter), and lead. Pollutants that are evaluated herein include volatile organic compounds (VOCs) and oxides of nitrogen ($NO_x$), which are important because they are precursors to $O_3$, as well as CO, sulfur oxides ($SO_x$), $PM_{10}$, and $PM_{2.5}$.

As discussed in Section 2.3.1, Coachella Valley Portion of the Salton Sea Air Basin Attainment Designation, the SSAB has been designated as a federal and state nonattainment area for $O_3$ and $PM_{10}$. The nonattainment status is the result of cumulative emissions from various sources of air pollutants and their precursors within the SSAB including motor vehicles, off-road equipment, and commercial and industrial facilities.

#### Construction

Construction of the proposed project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (e.g., off-road construction equipment, soil disturbance, VOC off-gassing from architectural coatings and asphalt pavement application) and off-site sources (e.g., vendor trucks, haul trucks, and worker vehicle trips). Specifically, entrained dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, resulting in $PM_{10}$ and $PM_{2.5}$ emissions. Internal combustion engines used by construction equipment, haul trucks, vendor trucks (i.e., delivery trucks), and worker vehicles would result in

emissions of VOC, $NO_x$, CO, $PM_{10}$, and $PM_{2.5}$. Construction emissions can vary substantially from day to day depending on the level of activity; the specific type of operation; and, for dust, the prevailing weather conditions.

Application of architectural coatings, such as exterior paint and other finishes, and application of asphalt pavement would also produce VOC emissions. VOC off-gassing emissions result from evaporation of solvents contained in surface coatings such as in paints and primers used during construction of the facility. CalEEMod calculates the VOC evaporative emissions from application of surface coatings based on the VOC emissions factor, the building square footage, and the assumed fraction of surface area. No-VOC paint, defined as paint with a VOC content of 5 grams/liter or less, is proposed for the project.

Emissions from the construction phase of the proposed project were estimated using CalEEMod version 2020.04.0 For a conservative emission estimation, construction is assumed to begin in February 1, 2023 and conclude in November of 2024. In the event actual construction proceeds longer into year 2024, this analysis provides a conservative approach resulting in slightly higher daily emissions and annual emissions. A detailed depiction of expected construction schedules—including information regarding phasing, equipment used during each phase, trucks, and worker vehicles—is provided in Appendix A.

During the grading phase of construction, it is anticipated that approximately 6,920 cubic yards of material would be exported and no material would be imported. For the analysis, it was generally assumed that heavy-duty construction equipment would be operating at the site 5 days per week. Detailed construction equipment modeling assumptions are provided in Appendix A.

Table 7 shows the estimated maximum daily construction emissions associated with the construction phase of the proposed project.

### Table 7. Estimated Maximum Daily Construction Emissions - Unmitigated

| Year | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$[a] | $PM_{2.5}$[a] |
|---|---|---|---|---|---|---|
| | *pounds per day* | | | | | |
| 2023 | 3.39 | 35.53 | 28.73 | 0.07 | 4.10 | 2.05 |
| 2024 | 6.15 | 30.88 | 40.98 | 0.10 | 4.50 | 2.03 |
| **Maximum Daily Emissions** | **6.15** | **35.53** | **40.98** | **0.10** | **4.50** | **2.05** |
| *SCAQMD Threshold* | *75* | *100* | *550* | *150* | *150* | *55* |
| Threshold exceeded? | No | No | No | No | No | No |

**Source:** SCAQMD 2019.
**Notes:** VOC = volatile organic compound; $NO_x$ = oxides of nitrogen; CO = carbon monoxide; $SO_x$ = sulfur oxides; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District.
See Appendix A for detailed results.
[a] These estimates reflect control of fugitive dust required by SCAQMD Rule 403, specifically, watering of active site areas two times per day.

As shown in Table 7, daily construction emissions would not exceed the SCAQMD significance thresholds for VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, or $PM_{2.5}$ during construction. Construction-generated emissions would be temporary and would not represent a long-term source of criteria air pollutant emissions. As such, impacts would be less than significant.

#### Operations

Operation of the proposed project would produce VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, and $PM_{2.5}$ emissions associated with vehicular traffic, area sources (consumer products, architectural coatings, landscaping equipment), energy sources (natural gas,

appliances, and space and water heating), and stationary sources (emergency generator). CalEEMod was used to estimate daily emissions from these operational sources including modelling the emissions of a 1,200 hp) diesel-fired emergency generator based on 1-hour per day and 50-hours per year of operation per SCAQMD Rule 1470, which limits emergency generators to 50-hours of use per year for maintenance and testing. CalEEMod default emission factors were used for the proposed generator, corresponding with the install dates.

On-road vehicular emissions associated with the proposed project operation were modeled using trip generation rates for the Ritz-Carlton residences, Sky Mesa Restaurant, and weekend special events at the project venue space estimated by Urban Crossroads (2020a). The venue space was modeled in CalEEMod as an arena. Additional modeled land uses include the parking garage with elevator, swimming pools, driveway parking and paved roads. Emissions from energy sources also include natural gas combustion for appliances and space and water heating. CalEEMod defaults were also used for area sources (landscape maintenance equipment, consumer products, and architectural coatings for maintenance of buildings).

Table 8 summarizes the maximum daily area, energy, mobile, and stationary (emergency generator) emissions of criteria pollutants that would be generated by the development of the proposed project and how emissions compare to the SCAQMD thresholds of significance. As shown, the increase in all criteria pollutants are below SCAQMD thresholds. The values shown are the maximum summer or winter daily emissions (i.e., foreseeable worst case) results from CalEEMod. Details of the emission calculations are provided in Appendix B, SCAQMD Risk Tool Files.

## Table 8. Estimated Maximum Daily Operational Emissions

| Emission Source | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| | *(Pounds per Day)* | | | | | |
| ***Proposed Project*** | | | | | | |
| Area | 3.23 | 0.10 | 8.80 | <0.01 | 0.05 | 0.05 |
| Energy | 0.13 | 1.12 | 0.77 | 0.01 | 0.09 | 0.09 |
| Mobile | 5.29 | 7.37 | 52.23 | 0.12 | 12.46 | 3.39 |
| Stationary | 1.97 | 8.81 | 5.02 | 0.01 | 0.29 | 0.30 |
| **Total** | **10.62** | **17.40** | **66.82** | **0.14** | **12.89** | **3.83** |
| *SCAQMD Threshold* | *75* | *100* | *550* | *150* | *150* | *55* |
| Threshold Exceeded? | No | No | No | No | No | No |

**Notes:** VOC = volatile organic compound; $NO_x$ = oxides of nitrogen; CO = carbon monoxide; $SO_x$ = sulfur oxides; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter.
Area sources = consumer product use, architectural coatings, and landscape maintenance equipment. Energy sources = natural gas. Mobile sources = motor vehicles. Stationary sources = emergency generator.
See Appendix A for detailed results. The values shown are the maximum summer or winter daily emissions results from CalEEMod.

As shown in Table 8, maximum daily operational emissions of VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, and $PM_{2.5}$ generated by the proposed project would not exceed the SCAQMD's significance thresholds.

As previously discussed, the SSAB has been designated as a federal and state nonattainment area for $O_3$ and $PM_{10}$. The nonattainment status is the result of cumulative emissions from various sources of air pollutants and their precursors within the SSAB, including motor vehicles, off-road equipment, and commercial and industrial facilities. Construction and operational activities of the proposed project would generate VOC and $NO_x$ emissions (precursors to $O_3$) and emissions of $PM_{10}$. However, as indicated in Tables 7 and 8, project-generated emissions would not exceed the SCAQMD emission-based significance thresholds for VOCs, $NO_x$, or $PM_{10}$.

Cumulative localized impacts would potentially occur if a project were to occur concurrently with another off-site project. Schedules for potential future projects near the project area are currently unknown; therefore, potential impacts associated with two or more simultaneous projects would be considered speculative.[4] However, future projects would be subject to CEQA and would require air quality analysis and, where necessary, mitigation. Criteria air pollutant emissions associated with construction activity of future projects would be reduced through implementation of control measures required by the SCAQMD. Cumulative $PM_{10}$ emissions would be reduced because all future projects would be subject to SCAQMD Rule 403 (Fugitive Dust), which sets forth general and specific requirements for all sites in the SCAQMD. In addition, cumulative VOC emissions would be subject to SCAQMD Rule 1113 (Architectural Coatings).

Therefore, the proposed project would not result in a cumulatively considerable increase in emissions of nonattainment pollutants, and impacts would be less than significant during construction and operation.

### Health Effects of Criteria Air Pollutants

Construction of the proposed project would generate criteria air pollutant emissions; however, the project would not exceed the SCAQMD mass-emission thresholds.

Health effects associated with $O_3$ include respiratory symptoms, worsening of lung disease leading to premature death, and damage to lung tissue (CARB 2019b). VOCs and $NO_x$ are precursors to $O_3$, for which the SSAB is designated as nonattainment with respect to the NAAQS and CAAQS. Thus, existing $O_3$ levels in the SSAB are at unhealthy levels during certain periods. The contribution of VOCs and $NO_x$ to regional ambient $O_3$ concentrations is the result of complex photochemistry. The increases in $O_3$ concentrations in the SSAB due to $O_3$ precursor emissions tend to be found downwind from the source location to allow time for the photochemical reactions to occur. However, the potential for exacerbating excessive $O_3$ concentrations would also depend on the time of year that the VOC emissions would occur because exceedances of the $O_3$ NAAQS and CAAQS tend to occur between May and October when solar radiation is highest. The holistic effect of a single project's emissions of $O_3$ precursors is speculative due to the lack of quantitative methods to assess this impact. Nonetheless, because the proposed project would not involve construction or operational activities that would result in $O_3$ precursor emissions (VOC or $NO_x$) in excess of the SCAQMD thresholds, the project is not anticipated to substantially contribute to regional $O_3$ concentrations and the associated health impacts.

Exposure to $NO_2$ and $NO_x$ can irritate the lungs, cause bronchitis and pneumonia, lower resistance to respiratory infections, and enhance allergic responses (CARB 2019c). Project construction and operation would not exceed the SCAQMD $NO_x$ threshold, and existing ambient $NO_2$ concentrations are below the NAAQS and CAAQS. Thus, implementation of the proposed project is not expected to exceed the $NO_2$ standards or contribute to associated health effects.

Health effects associated with CO include chest pain in patients with heart disease, headache, light-headedness, and reduced mental alertness (CARB 2019d). CO tends to be a localized impact associated with congested intersections. CO hotspots were discussed previously as a less than significant impact. Thus, the proposed project's CO emissions would not contribute to the health effects associated with this pollutant.

[4] The CEQA Guidelines state that if a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact (14 CCR 15145).

Particulate matter exposure has been linked to a variety of problems, including premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing (EPA 2009). The SSAB is designated as nonattainment for $PM_{10}$ under the NAAQS and CAAQS. Implementation of the proposed project would not generate emissions of $PM_{10}$ or $PM_{2.5}$ that would exceed the SCAQMD's thresholds. Accordingly, the proposed project's $PM_{10}$ and $PM_{2.5}$ emissions are not expected to cause an increase in related regional health effects for these pollutants.

In summary, the proposed project would not result in a potentially significant contribution to regional concentrations of nonattainment pollutants, and would not result in a significant contribution to the adverse health impacts associated with those pollutants. Therefore, impacts would be **less than significant**.

### 2.5.3 Threshold AQ-3

***Would the project expose sensitive receptors to substantial pollutant concentrations?***

#### Localized Significance Thresholds

A localized significance threshold (LST) analysis was performed to evaluate localized air quality impacts to sensitive receptors in the immediate vicinity of the proposed project as a result of proposed project activities. The impacts were analyzed using methods consistent with those in the SCAQMD (2008) Final Localized Significance Threshold Methodology. The proposed project is located within SRA 30 (Coachella Valley).

The greatest on-site daily emissions of NOx, CO, $PM_{10}$, and $PM_{2.5}$ generated during construction occurred during the grading period of the proposed project construction. Based on the construction schedule, it was assumed that one grader, one rubber-tired dozer, two scrappers and two crawler tractors (CalEEMod category: tractor/loader/backhoes) would be used based on the applicant provide construction equipment schedule. CalEEMod default values assume that during an 8-hour day, graders, rubber-tired dozers and crawler tractors can each disturb a maximum of 0.5 acres and scrapers each disturb 1 acre. This results in a total of 4 acres disturbed per day from the equipment. The SCAQMD LST values for 2 acres and 5 acres within SRA 30, with a nearby receptor distance of 25 meters (82 feet), were used to interpolate values for the proposed project's 4-acre disturbance per day.

Project construction activities would result in temporary sources of on-site criteria air pollutant emissions associated with construction equipment exhaust and dust-generating activities. According to the Final Localized Significance Threshold Methodology, "off-site mobile emissions from the project should not be included in the emissions compared to the LSTs" (SCAQMD 2009). Trucks and worker trips associated with the proposed project are not expected to cause substantial air quality impacts to sensitive receptors along off-site roadways since emissions would be relatively brief in nature and would cease once the vehicles pass through the main streets. Therefore, off-site emissions from trucks and worker vehicle trips are not included in the LST analysis. For the on-site portions of operation of trucks and worker vehicles, trips were limited to 1,000 feet (assumed on-site distance). The maximum daily on-site construction emissions generated during construction of the proposed project is presented in Table 9, and compared to the SCAQMD localized significance criteria for SRA 30 to determine whether project-generated on-site construction emissions would result in potential LST impacts.

## Table 9. Construction Localized Significance Thresholds Analysis

| Year | $NO_2$ | CO | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|
| | *pounds per day (on site)* | | | |
| 2023 | 34.76 | 28.30 | 3.77 | 1.95 |
| 2024 | 26.29 | 34.86 | 1.20 | 1.09 |
| **Maximum Daily On Site Emissions** | **34.76** | **34.86** | **3.77** | **1.95** |
| *SCAQMD LST Criteria* | *266.33* | *1,961.00* | *11.67* | *7.00* |
| Threshold Exceeded? | No | No | No | No |

**Source:** SCAQMD 2008.
**Notes:** $NO_2$ = nitrogen dioxide; CO = carbon monoxide; $PM_{10}$ = particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District; LST = localized significance threshold.
See Appendix B for detailed results. Localized significance thresholds are shown for a 4-acre project site and a distance of 25 meters (82 feet) to the nearest sensitive receptor.

As shown in Table 9, proposed construction activities would not generate emissions in excess of site-specific LSTs; therefore, localized impacts of the proposed project would be less than significant.

### Health Impacts of Toxic Air Contaminants

Toxic air contaminants (TACs) are defined as substances that may cause or contribute to an increase in deaths or in serious illness, or that may pose a present or potential hazard to human health. As discussed under the LST analysis, the nearest sensitive receptors are single family residential dwellings adjacent and south of the proposed project site.

Health effects from carcinogenic air toxics are usually described in terms of cancer risk. The SCAQMD recommends an incremental cancer risk threshold of 10 in 1 million. "Incremental cancer risk" is the net increased likelihood that a person continuously exposed to concentrations of TACs resulting from a project over a 9-, 30-, and 70-year exposure period will contract cancer based on the use of standard Office of Environmental Health Hazard Assessment (OEHHA) risk-assessment methodology (OEHHA 2015). In addition, some TACs have non-carcinogenic effects. The SCAQMD recommends a Hazard Index of 1 or more for acute (short-term) and chronic (long-term) non-carcinogenic effects.[5] TACs that would potentially be emitted during construction activities associated with development of the proposed project would be diesel particulate matter.

Diesel particulate matter emissions would be emitted from heavy equipment operations and heavy-duty trucks. Heavy-duty construction equipment is subject to a California Air Resources Board (CARB) Airborne Toxics Control Measure for in-use diesel construction equipment to reduce diesel particulate emissions. As described for the LST analysis, $PM_{10}$ (representative of diesel particulate matter) exposure would be minimal. According to the OEHHA, health risk assessments (which determine the exposure of sensitive receptors to toxic emissions) should be based on a 30-year exposure period for the maximally exposed individual resident. However, such assessments should also be limited to the period/duration of activities associated with the project. The duration of the proposed construction activities would constitute a small percentage of the total 30-year exposure period. The construction period for the proposed project would be approximately 22 months, after which construction-related TAC emissions

[5] Non-cancer adverse health risks are measured against a hazard index, which is defined as the ratio of the predicted incremental exposure concentrations of the various non-carcinogens from the project to published reference exposure levels that can cause adverse health effects.

would cease. Due to this relatively short period of exposure and minimal particulate emissions on site, TACs generated during construction would not be expected to result in concentrations causing significant health risks.

Following completion of on-site construction activities, the proposed project would not involve routine operational activities that would generate TAC emissions other than intermittent maintenance and testing of the natural diesel-fired emergency generator, which would be limited to 50 hours per year. SCAQMD Rule 1470 limits operation of emergency generators to 50 hours per year for maintenance and testing). Due to this relatively short period of exposure, small engine size of the emergency generator (1,200 hp), and minimal on-site particulate emissions from other sources, TACs generated during operation would not result in concentrations causing significant health risks as demonstrated through SCAQMD' Risk Assessment Tool for Rule 1401 and 212, (Version 8.1). The Risk Assessment Tool, a spreadsheet program, was used to perform a screening level evaluation of the cancer and non-cancer health effects of the emergency generator emissions pursuant to Rule 1401, see Appendix B for program results. As shown in Appendix B, the emergency generator passes Tier II Maximum Individual Cancer Risk (MICR).

For the reasons described above, the project would not result in substantial TAC exposure to sensitive receptors in the vicinity of the proposed project, and impacts would be less than significant. No mitigation is required.

### Local Carbon Monoxide Concentrations

Traffic-congested roadways and intersections have the potential to generate localized high levels of CO. Localized areas where ambient concentrations exceed federal and/or state standards for CO are termed CO "hotspots." CO transport is extremely limited and disperses rapidly with distance from the source. Under certain extreme meteorological conditions, however, CO concentrations near a congested roadway or intersection may reach unhealthy levels, affecting sensitive receptors. Typically, high CO concentrations are associated with severely congested intersections operating at an unacceptable level of service (LOS) (LOS E or worse is unacceptable). Projects contributing to adverse traffic impacts may result in the formation of a CO hotspot. Additional analysis of CO hotspot impacts would be conducted if a project would result in a significant impact or contribute to an adverse traffic impact at a signalized intersection that would potentially subject sensitive receptors to CO hotspots.

The Code of Federal Regulations (CFR) Procedures for Determining Localized CO, $PM_{10}$, and $PM_{2.5}$ Concentrations (hot-spot analysis), states that "CO, $PM_{10}$, and $PM_{2.5}$ hot-spot analyses are not required to consider construction-related activities, which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established 'Guideline' methods. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site" (40 CFR 93.123[c][5]). While project construction would involve on-road vehicle trips from trucks and workers during construction, construction activities are considered temporary. As a result, the proposed construction activities would not require a project-level construction hotspot analysis.

Projects contributing to adverse traffic impacts may result in the formation of CO hotspots. To verify that the proposed project would not cause or contribute to a violation of the CO standard, a screening evaluation of the potential for CO hotspots was conducted. The traffic impact study for the proposed project evaluated whether there would be a decrease in the LOS (i.e., increased congestion) at the intersections affected by the proposed project. The potential for CO hotspots was evaluated based on the results of the traffic impact study. The California Department of Transportation Institute of Transportation Studies Transportation Project-Level Carbon Monoxide Protocol (CO Protocol) (Caltrans 2010) was followed for this analysis. CO hotspots are typically evaluated when (1) the LOS of an intersection decreases to LOS E or worse; (2) signalization and/or channelization is added to an

intersection; and (3) sensitive receptors such as residences, schools, and hospitals are located in the vicinity of the affected intersection or roadway segment.

The proposed project's traffic impact study (Urban Crossroads 2020a) evaluated three intersections including Frank Sinatra Drive and Driveway, 1, Frank Sinatra Drive and Driveway, 2, and Highway 111 and Frank Sinatra Drive. As determined by the traffic impact study, the addition of project traffic to study area intersections did not result in deficient intersection LOS operations. Therefore, further analysis is not required. Accordingly, the proposed project would not generate traffic that would contribute to potential adverse traffic impacts that may result in the formation of CO hotspots. In addition, due to continued improvement in vehicular emissions at a rate faster than the rate of vehicle growth and/or congestion, the potential for CO hotspots in the SSAB is steadily decreasing. Based on these considerations, the proposed project would result in a less than significant impact to air quality with regard to potential CO hotspots. No mitigation is required.

### 2.5.4 Threshold AQ-4

***Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?***

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source; the wind speeds and direction; and the sensitivity of receiving location each contribute to the intensity of the impact. Although offensive odors seldom cause physical harm, they can be annoying and cause distress among the public and generate citizen complaints.

Odors would be potentially generated from vehicles and equipment exhaust emissions during construction of the proposed project. Potential odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment, architectural coatings, and asphalt pavement application. Such odors would disperse rapidly from the proposed project site and generally occur at magnitudes that would not affect substantial numbers of people. Therefore, impacts associated with odors during construction would be less than significant.

Land uses and industrial operations associated with odor complaints include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding (SCAQMD 1993). The proposed project includes operation of hotel facilities, and restaurant spaces, which are not anticipated to generate odors and does not result in operation of the types of land uses listed in SCAQMD's screening criteria. For the reasons described above, project construction and operation would result in an odor impact that would be less than significant.

# 3 Greenhouse Gas Emissions

## 3.1 Environmental Setting

### 3.1.1 Climate Change Overview

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind patterns, lasting for an extended period (decades or longer). The Earth's temperature depends on the balance between energy entering and leaving the planet's system. Many factors, both natural and human, can cause changes in Earth's energy balance, including variations in the sun's energy reaching Earth, changes in the reflectivity of Earth's atmosphere and surface, and changes in the greenhouse effect, which affects the amount of heat retained by Earth's atmosphere (EPA 2017).

The greenhouse effect is the trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. The greenhouse effect traps heat in the troposphere through a threefold process as follows: Short-wave radiation emitted by the Sun is absorbed by the Earth, the Earth emits a portion of this energy in the form of long-wave radiation, and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and toward the Earth. The greenhouse effect is a natural process that contributes to regulating the Earth's temperature and creates a pleasant, livable environment on the Earth. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and causing the Earth's surface temperature to rise.

The scientific record of the Earth's climate shows that the climate system varies naturally over a wide range of time scales and that, in general, climate changes prior to the Industrial Revolution in the 1700s can be explained by natural causes, such as changes in solar energy, volcanic eruptions, and natural changes in GHG concentrations. Recent climate changes, in particular the warming observed over the past century, however, cannot be explained by natural causes alone. Rather, it is extremely likely that human activities have been the dominant cause of that warming since the mid-twentieth century and is the most significant driver of observed climate change (IPCC 2013; EPA 2017). Human influence on the climate system is evident from the increasing GHG concentrations in the atmosphere, positive radiative forcing, observed warming, and improved understanding of the climate system (IPCC 2013). The atmospheric concentrations of GHGs have increased to levels unprecedented in the last 800,000 years, primarily from fossil fuel emissions and secondarily from emissions associated with land use changes (IPCC 2013). Continued emissions of GHGs will cause further warming and changes in all components of the climate system, which is discussed further in Section 3.3.2, Potential Effects of Climate Change.

### 3.1.2 Greenhouse Gases

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. As defined in California Health and Safety Code section 38505(g) for purposes of administering many of the state's primary GHG emissions reduction programs, GHGs include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride ($SF_6$), and nitrogen trifluoride ($NF_3$) (see also 14 CCR 15364.5).[6] Some GHGs, such as $CO_2$, $CH_4$, and $N_2O$ are emitted into the atmosphere through natural processes and

[6] Climate forcing substances include GHGs and other substances such as black carbon and aerosols. This discussion focuses on the seven GHGs identified in the California Health and Safety Code Section 38505, because impacts associated with other climate forcing substances are not evaluated herein.

human activities. Of these gases, $CO_2$ and $CH_4$ are emitted in the greatest quantities from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than $CO_2$, include fluorinated gases, such as HFCs, PFCs, and $SF_6$, which are associated with certain industrial products and processes. The following paragraphs provide a summary of the most common GHGs and their sources.[7]

**Carbon Dioxide.** $CO_2$ is a naturally occurring gas and a by-product of human activities and is the principal anthropogenic GHG that affects the Earth's radiative balance. Natural sources of $CO_2$ include respiration of bacteria, plants, animals, and fungus; evaporation from oceans; volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate $CO_2$ are from the combustion of fuels such as coal, oil, natural gas, and wood and changes in land use.

**Methane.** $CH_4$ is produced through both natural and human activities. $CH_4$ is a flammable gas and is the main component of natural gas. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

**Nitrous Oxide.** $N_2O$ is produced through natural and human activities, mainly through agricultural activities and natural biological processes, although fuel burning and other processes also create $N_2O$. Sources of $N_2O$ include soil cultivation practices (microbial processes in soil and water), especially the use of commercial and organic fertilizers, manure management, industrial processes (such as in nitric acid production, nylon production, and fossil-fuel-fired power plants), vehicle emissions, and using $N_2O$ as a propellant (such as in rockets, racecars, and aerosol sprays).

**Fluorinated Gases.** Fluorinated gases (also referred to as F-gases) are synthetic powerful GHGs emitted from many industrial processes. Fluorinated gases are commonly used as substitutes for stratospheric $O_3$-depleting substances (e.g., CFCs, HCFCs, and halons). The most prevalent fluorinated gases include the following:

- **Hydrofluorocarbons:** HFCs are compounds containing only hydrogen, fluorine, and carbon atoms. HFCs are synthetic chemicals used as alternatives to $O_3$-depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are used in manufacturing.
- **Perfluorocarbons:** PFCs are a group of human-made chemicals composed of carbon and fluorine only. These chemicals were introduced as alternatives, with HFCs, to the ozone depleting substances. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing. Since PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere, these chemicals have long lifetimes, ranging between 10,000 and 50,000 years.
- **Sulfur Hexafluoride:** $SF_6$ is a colorless gas soluble in alcohol and ether and slightly soluble in water. $SF_6$ is used for insulation in electric power transmission and distribution equipment, semiconductor manufacturing, the magnesium industry, and as a tracer gas for leak detection.
- **Nitrogen Trifluoride:** $NF_3$ is used in the manufacture of a variety of electronics, including semiconductors and flat panel displays.

[7] The descriptions of GHGs are summarized from the IPCC Fourth Assessment Report (2007), CARB's "Glossary of Terms Used in GHG Inventories" (2018a), and EPA's "Climate Change" (2017).

**Chlorofluorocarbons.** CFCs are synthetic chemicals that have been used as cleaning solvents, refrigerants, and aerosol propellants. CFCs are chemically unreactive in the lower atmosphere (troposphere), and the production of CFCs was prohibited in 1987 due to the chemical destruction of stratospheric $O_3$.

**Hydrochlorofluorocarbons**. HCFCs are a large group of compounds, whose structure is very close to that of CFCs—containing hydrogen, fluorine, chlorine, and carbon atoms—but including one or more hydrogen atoms. Like HFCs, HCFCs are used in refrigerants and propellants. HCFCs were also used in place of CFCs for some applications; however, their use in general is being phased out.

**Black Carbon.** Black carbon is a component of $PM_{2.5}$, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting. Black carbon is a short-lived substance that varies spatially, which makes it difficult to quantify the global warming potential (GWP). Diesel exhaust emissions are a major source of black carbon and are TACs that have been regulated and controlled in California for several decades to protect public health. In relation to declining DPM as a result of CARB's regulations pertaining to diesel engines, diesel fuels, and burning activities, CARB estimates that annual black carbon emissions in California have reduced by 70% between 1990 and 2010, with 95% control expected by 2020 (CARB 2014).

**Water Vapor.** The primary source of water vapor is evaporation from the ocean, with additional vapor generated by sublimation (change from solid to gas) from ice and snow, evaporation from other water bodies, and transpiration from plant leaves. Water vapor is the most important, abundant, and variable GHG in the atmosphere and maintains a climate necessary for life.

**Ozone.** Tropospheric $O_3$, which is created by photochemical reactions involving gases from both natural sources and human activities, acts as a GHG. Stratospheric $O_3$, which is created by the interaction between solar ultraviolet radiation and molecular oxygen, plays a decisive role in the stratospheric radiative balance. Depletion of stratospheric $O_3$, due to chemical reactions that may be enhanced by climate change, results in an increased ground-level flux of ultraviolet-B radiation.

**Aerosols.** Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light.

### 3.1.3 Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (EPA 2017). The Intergovernmental Panel on Climate Change (IPCC) developed the GWP concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram of a trace substance relative to that of 1 kilogram of a reference gas (IPCC 2014). The reference gas used is $CO_2$; therefore, GWP-weighted emissions are measured in metric tons of $CO_2$ equivalent (MT $CO_2$e).

The current version of CalEEMod (Version 2020.04.0) assumes that the GWP for $CH_4$ is 25 (so emissions of 1 MT of $CH_4$ are equivalent to emissions of 25 MT of $CO_2$), and the GWP for $N_2O$ is 298, based on the IPCC's Fourth Assessment Report (IPCC 2007). The GWP values identified in CalEEMod were applied to the project.

# 3.2 Regulatory Setting

## 3.2.1 Federal Regulations

**Massachusetts v. EPA.** In *Massachusetts v. EPA* (April 2007), the U.S. Supreme Court directed the EPA administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In December 2009, the administrator signed a final rule with the following two distinct findings regarding GHGs under Section 202(a) of the federal Clean Air Act:

- The Administrator found that elevated concentrations of GHGs—$CO_2$, $CH_4$, $N_2O$, HFCs, PFCs, and $SF_6$—in the atmosphere threaten the public health and welfare of current and future generations. This is the "endangerment finding."
- The Administrator further found the combined emissions of GHGs—$CO_2$, $CH_4$, $N_2O$, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the Clean Air Act.

**Energy Independence and Security Act of 2007.** The Energy Independence and Security Act of 2007 (December 2007), among other key measures, would do the following, which would aid in the reduction of national GHG emissions:

- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
- Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020, and directs National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.
- Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy-efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

**Federal Vehicle Standards.** In 2007, in response to the *Massachusetts v. EPA* U.S. Supreme Court ruling, the Bush Administration issued Executive Order (EO) 13432 directing the EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the NHTSA issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016 (75 FR 25324–25728).

In 2010, President Obama issued a memorandum directing the Department of Transportation, Department of Energy, EPA, and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards projected to achieve 163 grams/mile of $CO_2$ in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021 (77 FR 62624–63200), and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for $CO_2$ emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6%–23% over the 2010 baselines (76 FR 57106–57513).

In August 2016, the EPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types of sizes of buses and work trucks. The final standards are expected to lower carbon dioxide emissions by approximately 1.1 billion MT and reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program (EPA and NHTSA 2016).

In August 2018, EPA and NHTSA proposed to amend certain fuel economy and GHG standards for passenger cars and light trucks and establish new standards for model years 2021 through 2026. Compared to maintaining the post-2020 standards now in place, the 2018 proposal would increase U.S. fuel consumption by about half a million barrels per day (2%–3% of total daily consumption, according to the Energy Information Administration) and would impact the global climate by 3/1000th of 1°C by 2100 (EPA and NHTSA 2018). California and other states have stated their intent to challenge federal actions that would delay or eliminate GHG reduction measures and have committed to cooperating with other countries to implement global climate change initiatives. Thus, the timing and consequences of the 2018 federal proposal are speculative at this time.

On September 27, 2019, EPA and NHTSA published the "Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program." (84 Fed. Reg. 51,310), which became effective November 26, 2019. The Part One Rule revokes California's authority to set its own GHG emissions standards and set zero-emission vehicle mandates in California. On March 31, 2020, the EPA and NHTSA issued Part Two of the SAFE Rule, which will go into effect 60 days after being published in the Federal Register. The Part Two Rule sets $CO_2$ emissions standards and corporate average fuel economy standards for passenger vehicles and light duty trucks for model years 2021 through 2026. This issue is evolving as California and 22 other states, as well as the District of Columbia and four cities, filed suit against the EPA and a petition for reconsideration of the rule on November 26, 2019. The litigation is not expected to be resolved for at least several months.

**Clean Power Plan and New Source Performance Standards for Electric Generating Units.** On October 23, 2015, EPA published a final rule (effective December 22, 2015) establishing the Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (80 FR 64510–64660), also known as the Clean Power Plan. These guidelines prescribe how states must develop plans to reduce GHG emissions from existing fossil-fuel-fired electric

generating units. The guidelines establish $CO_2$ emission performance rates representing the best system of emission reduction for two subcategories of existing fossil-fuel-fired electric generating units: (1) fossil-fuel-fired electric utility steam-generating units, and (2) stationary combustion turbines. Concurrently, the EPA published a final rule (effective October 23, 2015) establishing Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (80 FR 64661–65120). The rule prescribes $CO_2$ emission standards for newly constructed, modified, and reconstructed affected fossil-fuel-fired electric utility generating units. The U.S. Supreme Court stayed implementation of the Clean Power Plan pending resolution of several lawsuits.

### 3.2.2 State Regulations

The statewide GHG emissions regulatory framework is summarized below by category: state climate change targets, building energy, renewable energy and energy procurement, mobile sources, solid waste, water, and other state regulations and goals. The following text describes executive orders, legislation, regulations, and other plans and policies that would directly or indirectly reduce GHG emissions and/or address climate change issues.

#### State Climate Change Targets

The state has taken a number of actions to address climate change. These include executive orders, legislation, and CARB plans and requirements. These are summarized below.

**EO S-3-05.** EO S-3-05 (June 2005) established California's GHG emissions reduction targets and laid out responsibilities among the state agencies for implementing the EO and for reporting on progress toward the targets. This EO established the following targets:

- By 2010, reduce GHG emissions to 2000 levels
- By 2020, reduce GHG emissions to 1990 levels
- By 2050, reduce GHG emissions to 80% below 1990 levels

EO S-3-05 also directed the California Environmental Protection Agency to report biannually on progress made toward meeting the GHG targets and the impacts to California due to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry. The Climate Action Team was formed, which subsequently issued reports from 2006 to 2010.

**AB 32.** In furtherance of the goals established in EO S-3-05, the Legislature enacted AB 32 (Núñez and Pavley). The bill is referred to as the California Global Warming Solutions Act of 2006 (September 27, 2006). AB 32 provided initial direction on creating a comprehensive multiyear program to limit California's GHG emissions at 1990 levels by 2020 and initiate the transformations required to achieve the state's long-range climate objectives.

**EO B-18-12.** EO B-18-12 (April 2012) directed state agencies, departments, and other entities under the governor's executive authority to take action to reduce entity-wide GHG emissions by at least 10% by 2015 and 20% by 2020, as measured against a 2010 baseline. EO B-18-12 also established goals for existing state buildings for reducing grid-based energy purchases and water use.

**EO B-30-15.** EO B-30-15 (April 2015) identified an interim GHG reduction target in support of targets previously identified under S-3-05 and AB 32. EO B-30-15 set an interim target goal of reducing GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing

GHG emissions to 80% below 1990 levels by 2050 as set forth in S-3-05. To facilitate achieving this goal, EO B-30-15 called for CARB to update the Scoping Plan to express the 2030 target in terms of million metric tons (MMT) $CO_2e$. The EO also called for state agencies to continue to develop and implement GHG emission reduction programs in support of the reduction targets.

**Senate Bill (SB) 32 and AB 197.** SB 32 and AB 197 (enacted in 2016) are companion bills. SB 32 codified the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40% below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, in order to provide ongoing oversight over implementation of the state's climate policies. AB 197 also added two members of the Legislature to the Board as nonvoting members; requires CARB to make available and update (at least annually via its website) emissions data for GHGs, criteria air pollutants, and TACs from reporting facilities; and, requires CARB to identify specific information for GHG emissions reduction measures when updating the Scoping Plan.

**CARB's 2007 Statewide Limit**. In 2007, in accordance with California Health and Safety Code, Section 38550, CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline (427 MMT $CO_2e$).

**CARB's Climate Change Scoping Plan**. One specific requirement of AB 32 is for CARB to prepare a "scoping plan" for achieving the maximum technologically feasible and cost-effective GHG emission reductions by 2020 (Health and Safety Code, Section 38561(a)), and to update the plan at least once every 5 years. In 2008, CARB approved the first scoping plan. The Climate Change Scoping Plan: A Framework for Change (Scoping Plan) included a mix of recommended strategies that combined direct regulations, market-based approaches, voluntary measures, policies, and other emission reduction programs calculated to meet the 2020 statewide GHG emission limit and initiate the transformations needed to achieve the state's long-range climate objectives. The key elements of the Scoping Plan include the following (CARB 2008):

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
2. Achieving a statewide renewable energy mix of 33%
3. Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions
4. Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets
5. Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard (LCFS) (17 CCR 95480 et seq.)
6. Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation

The Scoping Plan also identified local governments as essential partners in achieving California's goals to reduce GHG emissions because they have broad influence and, in some cases, exclusive authority over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Specifically, the Scoping Plan encouraged local governments to adopt a reduction goal for municipal operations and for community emissions to reduce GHGs by approximately 15% from then levels (2008) by 2020. Many local governments developed community-scale local GHG reduction plans based on this Scoping Plan recommendation.

In 2014, CARB approved the first update to the Scoping Plan. The First Update to the Climate Change Scoping Plan: Building on the Framework (First Update) defined the state's GHG emission reduction priorities for the next 5 years and laid the groundwork to start the transition to the post-2020 goals set forth in EO S-3-05 and EO B-16-2012 (CARB 2014). The First Update concluded that California is on track to meet the 2020 target but recommended a 2030 mid-term GHG reduction target be established to ensure a continuum of action to reduce emissions. The First Update recommended a mix of technologies in key economic sectors to reduce emissions through 2050 including energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings and industrial machinery; decarbonizing electricity and fuel supplies; and, the rapid market penetration of efficient and clean energy technologies. As part of the First Update, CARB recalculated the state's 1990 emissions level, using more recent GWPs identified by the Intergovernmental Panel on Climate Change, from 427 MMT $CO_2e$ to 431 MMT $CO_2e$.

In 2015, as directed by EO B-30-15, CARB began working on an update to the Scoping Plan to incorporate the 2030 target of 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing GHG emissions to 80% below 1990 levels by 2050 as set forth in S-3-05. The Governor called on California to pursue a new and ambitious set of strategies, in line with the five climate change pillars from his inaugural address, to reduce GHG emissions and prepare for the unavoidable impacts of climate change. In the summer of 2016, the Legislature affirmed the importance of addressing climate change through passage of Senate Bill 32 (SB 32) (Pavley, Chapter 249, Statutes of 2016).

In December 2017, CARB adopted California's 2017 Climate Change Scoping Plan (2017 Scoping Plan) for public review and comment (CARB 2017a). The 2017 Scoping Plan builds on the successful framework established in the initial Scoping Plan and First Update, while identifying new, technologically feasible and cost-effective strategies that will serve as the framework to achieve the 2030 GHG target as established by SB 32 and define the state's climate change priorities to 2030 and beyond. The strategies' known commitments include implementing renewable energy and energy efficiency (including the mandates of SB 350), increased stringency of the LCFS, measures identified in the Mobile Source and Freight Strategies, measures identified in the proposed Short-Lived Climate Pollutant (SLCP) Plan, and increased stringency of SB 375 targets. To fill the gap in additional reductions needed to achieve the 2030 target, it recommends continuing the Cap-and-Trade Program.

For local governments, the 2017 Scoping Plan replaced the initial Scoping Plan's 15% reduction goal with a recommendation to aim for a community-wide goal of no more than 6 MT $CO_2e$ per capita by 2030 and no more than 2 MT $CO_2e$ per capita by 2050, which are consistent with the state's long-term goals. These goals are also consistent with the Under 2 Memorandum of Understanding (Under 2 2019) and the Paris Agreement (UNFCCC 2019), which are developed around the scientifically based levels necessary to limit global warming below 2°C. The 2017 Scoping Plan recognized the benefits of local government GHG planning (e.g., through CAPs) and provide more information regarding tools CARB is working on to support those efforts. It also recognizes the CEQA streamlining provisions for project level review where there is a legally adequate CAP.[8]

When discussing project-level GHG emissions reduction actions and thresholds in the context of CEQA, the 2017 Scoping Plan states that "achieving no net additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective for new development" for project-level CEQA analysis, but also recognizes that

[8] *Sierra Club v. County of Napa* (2004) 121 Cal.App.4th 1490; *San Francisco Tomorrow et al. v. City and County of San Francisco* (2015) 229 Cal.App.4th 498; *San Franciscans Upholding the Downtown Specific Plan v. City & County of San Francisco* (2002) 102 Cal.App.4th 656; *Sequoyah Hills Homeowners Assn. V. City of Oakland* (1993) 23 Cal.App.4th 704, 719.

such a standard may not be appropriate or feasible for every development project. The 2017 Scoping Plan further provides that "the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA."

**CARB's Regulations for the Mandatory Reporting of Greenhouse Gas Emissions.** CARB's Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (17 CCR 95100–95157) incorporated by reference certain requirements that EPA promulgated in its Final Rule on Mandatory Reporting of Greenhouse Gases (40 CFR, Part 98). Specifically, Section 95100(c) of the Mandatory Reporting Regulation incorporated those requirements that EPA promulgated in the Federal Register on October 30, 2009; July 12, 2010; September 22, 2010; October 28, 2010; November 30, 2010; December 17, 2010; and April 25, 2011. In general, entities subject to the Mandatory Reporting Regulation that emit over 10,000 MT $CO_2e$ per year are required to report annual GHGs through the California Electronic GHG Reporting Tool. Certain sectors, such as refineries and cement plants, are required to report regardless of emission levels. Entities that emit more than the 25,000 MT $CO_2e$ per year threshold are required to have their GHG emission report verified by a CARB-accredited third party.

**SB 605 and SB 1383.** SB 605 (2014) requires CARB to complete a comprehensive strategy to reduce emissions of SLCPs in the state; and SB 1383 (2016) requires CARB to approve and implement that strategy by January 1, 2018. SB 1383 also establishes specific targets for the reduction of SLCPs (40% below 2013 levels by 2030 for methane and HFCs, and 50% below 2013 levels by 2030 for anthropogenic black carbon), and provides direction for reductions from dairy and livestock operations and landfills. Accordingly, and as mentioned above, CARB adopted its Short-Lived Climate Pollutant Reduction Strategy (SLCP Reduction Strategy) in March 2017. The SLCP Reduction Strategy establishes a framework for the statewide reduction of emissions of black carbon, methane, and fluorinated gases (CARB 2017b).

**EO B-55-18.** EO B-55-18 (September 2018) establishes a statewide policy for the state to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter. The goal is an addition to the existing statewide targets of reducing the state's GHG emissions. CARB will work with relevant state agencies to ensure that future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal.

### Building Energy

**Title 24, Part 6.** Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically established Building Energy Efficiency Standards that are designed to ensure new and existing buildings in California achieve energy efficiency and preserve outdoor and indoor environmental quality. These energy efficiency standards are reviewed every few years by the Building Standards Commission and the California Energy Commission (CEC) (and revised if necessary) (California Public Resources Code, Section 25402[b][1]). The regulations receive input from members of industry, as well as the public, with the goal of "reducing of wasteful, uneconomic, inefficient, or unnecessary consumption of energy" (California Public Resources Code, Section 25402). These regulations are carefully scrutinized and analyzed for technological and economic feasibility (California Public Resources Code, Section 25402[d]) and cost effectiveness (California Public Resources Code, Sections 25402[b][2] and [b][3]). As a result, these standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and help preserve the environment.

The 2016 Title 24 standards are the currently applicable building energy efficiency standards, and became effective on January 1, 2017. The 2019 Title 24 Building Energy Efficiency Standards, which will be effective January 1, 2020, will further reduce energy used and associated GHG emissions compared to current standards. In general, single-family residences built to the 2019 standards are anticipated to use approximately 7% less energy due to energy efficiency measures than those built to the 2016 standards; once rooftop solar electricity generation is factored in, single-family residences built under the 2019 standards will use approximately 53% less energy than those under the 2016 standards (CEC 2018). Nonresidential buildings built to the 2019 standards are anticipated to use an estimated 30% less energy than those built to the 2016 standards (CEC 2018).

The 2019 Title 24 standards focus on building energy efficiency and ensuring solar electricity generated on site is used on site. "Looking beyond the 2019 standards, the most important energy characteristic for a building will be that it produces and consumes energy at times that are appropriate and responds to the needs of the grid, which reduces the building's emissions" (CEC 2018). In furtherance of that characteristic, the 2019 standards require that new homes include solar photovoltaic to meet the home's expected annual electric needs, and also encourage demand-responsive technologies including battery storage, heat-pump water heaters, and improving buildings' thermal envelopes through high performance attics, walls, and windows. These smarter homes perform better and affect the grid less, which reduces the buildings' GHG emissions.

**Title 24, Part 11**. In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CALGreen, and establishes minimum mandatory standards as well as voluntary standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality.

The 2019 Title 24 Building Energy Efficiency Standards became effective January 1, 2020, will further reduce energy used and associated GHG emissions compared to current standards. Nonresidential buildings built to the 2019 standards are anticipated to use an estimated 30% less energy than those built to the 2016 standards (CEC 2018).

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The California Public Utilities Commission, CEC, and CARB also have a shared, established goal of achieving zero net energy (ZNE) performance for new construction in California. The key policy timelines include: (1) all new residential construction in California will be ZNE by 2020, and (2) all new commercial construction in California will be ZNE by 2030.[9]

**Title 20.** Title 20 of the California Code of Regulations requires manufacturers of appliances to meet state and federal standards for energy and water efficiency. The CEC certifies an appliance based on a manufacturer's demonstration that the appliance meets the standards. New appliances regulated under Title 20 include refrigerators, refrigerator-freezers, and freezers; room air conditioners and room air-conditioning heat pumps; central air conditioners; spot air conditioners; vented gas space heaters; gas pool heaters; plumbing fittings and plumbing fixtures; fluorescent lamp ballasts; lamps; emergency lighting; traffic signal modules; dishwaters; clothes washers and dryers; cooking products; electric motors; low voltage dry-type distribution transformers; power

[9] See for example, CPUC (2013). It is expected that achievement of the zero net energy goal will occur via revisions to the Title 24 standards.

supplies; televisions and consumer audio and video equipment; and battery charger systems. Title 20 presents protocols for testing each type of appliance covered under the regulations and appliances must meet the standards for energy performance, energy design, water performance, and water design. Title 20 contains three types of standards for appliances: federal and state standards for federally regulated appliances, state standards for federally regulated appliances, and state standards for non-federally regulated appliances.

**Senate Bill 1.** SB 1. SB 1 (Murray) (August 2006) established a $3 billion rebate program to support the goal of the state to install rooftop solar energy systems with a generation capacity of 3,000 megawatts through 2016. SB 1 added sections to the California Public Resources Code, including Chapter 8.8 (California Solar Initiative), that require building projects applying for ratepayer-funded incentives for photovoltaic systems to meet minimum energy efficiency levels and performance requirements. Section 25780 established that it is a goal of the state to establish a self-sufficient solar industry. The goals included establishing solar energy systems as a viable mainstream option for both homes and businesses within 10 years of adoption, and placing solar energy systems on 50% of new homes within 13 years of adoption. SB 1, also termed "Go Solar California," was previously titled "Million Solar Roofs."

**AB 1470 (Solar Water Heating).** This bill established the Solar Water Heating and Efficiency Act of 2007. The bill makes findings and declarations of the Legislature relating to the promotion of solar water heating systems and other technologies that reduce natural gas demand. The bill defines several terms for purposes of the act. The bill required the commission to evaluate the data available from a specified pilot program, and, if it made a specified determination, to design and implement a program of incentives for the installation of 200,000 solar water heating systems in homes and businesses throughout the state by 2017.

**AB 1109.** Enacted in 2007, AB 1109 required the CEC to adopt minimum energy efficiency standards for general-purpose lighting to reduce electricity consumption by 50% for indoor residential lighting and by 25% for indoor commercial lighting.

### Renewable Energy and Energy Procurement

**SB 1078.** SB 1078 (Sher) (September 2002) established the Renewables Portfolio Standard (RPS) program, which required an annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. This goal was subsequently accelerated, requiring utilities to obtain 20% of their power from renewable sources by 2010 (see SB 107, EO S-14-08, and S-21-09).

**SB 1368.** SB 1368 (September 2006), required CEC to develop and adopt regulations for GHG emission performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by CPUC.

**EO S-14-08.** EO S-14-08 (November 2008) focused on the contribution of renewable energy sources to meet the electrical needs of California while reducing the GHG emissions from the electrical sector. This EO required that all retail suppliers of electricity in California serve 33% of their load with renewable energy by 2020. Furthermore, the EO directed state agencies to take appropriate actions to facilitate reaching this target. The California Natural Resources Agency (CNRA), through collaboration with CEC and the California Department of Fish and Game (now the California Department of Fish and Wildlife), was directed to lead this effort.

**EO S-21-09 and SB X1-2.** EO S-21-09 (September 2009) directed CARB to adopt a regulation consistent with the goal of EO S-14-08 by July 31, 2010. CARB was further directed to work with CPUC and CEC to ensure that the regulation builds upon the RPS program and was applicable to investor-owned utilities, publicly owned utilities,

direct access providers, and community choice providers. Under this order, CARB was to give the highest priority to those renewable resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health and can be developed the most quickly in support of reliable, efficient, cost-effective electricity system operations. On September 23, 2010, CARB initially approved regulations to implement a Renewable Electricity Standard. However, this regulation was not finalized because of subsequent legislation (SB X1-2, Simitian, statutes of 2011) signed by Governor Brown in April 2011.

SB X1 2 expanded the RPS by establishing a renewable energy target of 20% of the total electricity sold to retail customers in California per year by December 31, 2013, and 33% by December 31, 2020, and in subsequent years. Under the bill, a renewable electrical generation facility is one that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation (30 megawatts or less), digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current, and that meets other specified requirements with respect to its location.

SB X1-2 applies to all electricity retailers in the state including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities must meet the renewable energy goals listed above.

**SB 350.** SB 350 (October 2015) further expanded the RPS by establishing a goal of 50% of the total electricity sold to retail customers in California per year by December 31, 2030. In addition, SB 350 included the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses on which an energy-efficiency program is focused) of retail customers through energy conservation and efficiency. The bill also requires CPUC, in consultation with CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal.

**SB 100.** SB 100 (2018) increased the standards set forth in SB 350 establishing that 44% of the total electricity sold to retail customers in California per year by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030, be secured from qualifying renewable energy sources. SB 100 states that it is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100% of the retail sales of electricity to California. This bill requires that the achievement of 100% zero-carbon electricity resources do not increase the carbon emissions elsewhere in the western grid and that the achievement not be achieved through resource shuffling.

### Mobile Sources

**AB 1493.** AB 1493 (Pavley) (July 2002) was enacted in a response to the transportation sector accounting for more than half of California's $CO_2$ emissions. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles that are primarily used for noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30%.

**Heavy-Duty Diesel**. CARB adopted the final Heavy Duty Truck and Bus Regulation, Title 13, Division 3, Chapter 1, Section 2025, on December 31, 2014 to reduce DPM (black carbon) and $NO_x$ emissions from heavy-duty diesel vehicles. The rule requires DPM filters be applied to newer heavier trucks and buses by January 1, 2012, with older

vehicles required to comply by January 1, 2015. The rule will require nearly all diesel trucks and buses to be compliant with the 2010 model year engine requirement by January 1, 2023. CARB also adopted an Airborne Toxic Control Measure to limit idling of diesel-fueled commercial vehicles on December 12, 2013. This rule requires diesel-fueled vehicles with gross vehicle weights greater than 10,000 pounds to idle no more than 5 minutes at any location (13 CCR 2485).

**EO S-1-07.** EO S-1-07 (January 2007, implementing regulation adopted in April 2009) sets a declining LCFS for GHG emissions measured in $CO_2e$ grams per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020 (17 CCR 95480 et seq.). The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered.

**SB 375.** SB 375 (Steinberg) (September 2008) addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. SB 375 requires CARB to adopt regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035 and to update those targets every 8 years. SB 375 requires the state's 18 regional metropolitan planning organizations (MPOs) to prepare a sustainable communities strategy (SCS) as part of their RTP that will achieve the GHG reduction targets set by CARB. If a MPO is unable to devise an SCS to achieve the GHG reduction target, the MPO must prepare an alternative planning strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

Pursuant to Government Code, Section 65080(b)(2)(K), an SCS does not (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it. Nonetheless, SB 375 makes regional and local planning agencies responsible for developing those strategies as part of the federally required metropolitan transportation planning process and the state-mandated housing element process. In 2010, CARB adopted the SB 375 targets for the regional MPOs. The targets for CVAG are a 10.5% reduction in emissions per capita by 2020 and a 15.4% reduction by 2035.

**Advanced Clean Cars Program and Zero-Emissions Vehicle Program.** The Advanced Clean Cars program (January 2012) is a new emissions-control program for model years 2015 through 2025. The program combines the control of smog- and soot-causing pollutants and GHG emissions into a single coordinated package. The package includes elements to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide the fuels for clean cars (CARB 2012). To improve air quality, CARB has implemented new emission standards to reduce smog-forming emissions beginning with 2015 model year vehicles. It is estimated that in 2025 cars will emit 75% less smog-forming pollution than the average new car sold today. To reduce GHG emissions, CARB, in conjunction with EPA and NHTSA, adopted new GHG standards for model year 2017 to 2025 vehicles; the new standards are estimated to reduce GHG emissions by 34% in 2025. The Zero-Emissions Vehicle (ZEV) program will act as the focused technology of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of ZEVs and plug-in hybrid electric vehicles in the 2018 to 2025 model years.

**EO B-16-12.** EO B-16-12 (March 2012) required that state entities under the governor's direction and control support and facilitate the rapid commercialization of ZEVs. It ordered CARB, CEC, CPUC, and other relevant agencies to work with the Plug-In Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to help achieve benchmark goals by 2015, 2020, and 2025. On a statewide basis, EO B-16-12 established a target reduction of GHG emissions from the transportation sector equaling 80% less than 1990 levels

by 2050. This directive did not apply to vehicles that have special performance requirements necessary for the protection of the public safety and welfare.

**AB 1236.** AB 1236 (October 2015) (Chiu) required a city, county, or city and county to approve an application for the installation of electric vehicle charging stations, as defined, through the issuance of specified permits unless the city or county makes specified written findings based upon substantial evidence in the record that the proposed installation would have a specific, adverse impact upon the public health or safety, and there is no feasible method to satisfactorily mitigate or avoid the specific, adverse impact. The bill provided for appeal of that decision to the planning commission, as specified. The bill provided that the implementation of consistent statewide standards to achieve the timely and cost-effective installation of electric vehicle charging stations is a matter of statewide concern. The bill required electric vehicle charging stations to meet specified standards. The bill required a city, county, or city and county with a population of 200,000 or more residents to adopt an ordinance, by September 30, 2016, that created an expedited and streamlined permitting process for electric vehicle charging stations, as specified. The bill also required a city, county, or city and county with a population of less than 200,000 residents to adopt this ordinance by September 30, 2017.

### Water

**EO B-29-15.** In response to the ongoing drought in California, EO B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013. The term of the EO extended through February 28, 2016, although many of the directives have become permanent water-efficiency standards and requirements. The EO includes specific directives that set strict limits on water usage in the state. In response to EO B-29-15, the California Department of Water Resources has modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, significantly increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas.

**EO B-37-16.** Issued May 2016, EO B-37-16 directs the State Water Resources Control Board (Water Board) to adjust emergency water conservation regulations through the end of January 2017 to reflect differing water supply conditions across the state. The Water Board must also develop a proposal to achieve a mandatory reduction of potable urban water usage that builds off the mandatory 25% reduction called for in EO B-29-15. The Water Board and Department of Water Resources will develop new, permanent water use targets that build upon the existing state law requirements that the state achieve 20% reduction in urban water usage by 2020. EO B-37-16 also specifies that the Water Board will permanently prohibit water-wasting practices such as hosing off sidewalks, driveways, and other hardscapes; washing automobiles with hoses not equipped with a shut-off nozzle; using non-recirculated water in a fountain or other decorative water feature; watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation; and irrigating ornamental turf on public street medians.

**EO B-40-17.** EO B-40-17 (April 2017) lifted the drought emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne. It also rescinds EO B-29-15, but expressly states that EO B-37-16 remains in effect and directs the Water Board to continue development of permanent prohibitions on wasteful water use.

### Solid Waste

**AB 939 and AB 341.** In 1989, AB 939, known as the Integrated Waste Management Act (California Public Resources Code, Sections 40000 et seq.), was passed because of the increase in waste stream and the decrease in landfill capacity. The

statute established the California Integrated Waste Management Board, which oversees a disposal reporting system. AB 939 mandated a reduction of waste being disposed where jurisdictions were required to meet diversion goals of all solid waste through source reduction, recycling, and composting activities of 25% by 1995 and 50% by the year 2000.

AB 341 (Chapter 476, Statutes of 2011 [Chesbro]) amended the California Integrated Waste Management Act of 1989 to include a provision declaring that it is the policy goal of the state that not less than 75% of solid waste generated be source-reduced, recycled, or composted by the year 2020, and annually thereafter. In addition, AB 341 required the California Department of Resources Recycling and Recovery (CalRecycle) to develop strategies to achieve the state's policy goal.

### Other State Actions

**SB 97.** SB 97 (Dutton) (August 2007) directed the Governor's Office of Planning and Research (OPR) to develop guidelines under CEQA for the mitigation of GHG emissions. In 2008, the OPR issued a technical advisory as interim guidance regarding the analysis of GHG emissions in CEQA documents. The advisory indicated that the lead agency should identify and estimate a project's GHG emissions, including those associated with vehicular traffic, energy consumption, water usage, and construction activities (OPR 2008). The advisory further recommended that the lead agency determine significance of the impacts and impose all mitigation measures necessary to reduce GHG emissions to a level that is less than significant. CNRA adopted the CEQA Guidelines amendments in December 2009, and they became effective in March 2010.

Under the amended CEQA Guidelines, a lead agency has the discretion to determine whether to use a quantitative or qualitative analysis or apply performance standards to determine the significance of GHG emissions resulting from a particular project (14 CCR 15064.4[a]). The CEQA Guidelines require a lead agency to consider the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4[b]). The CEQA Guidelines also allow a lead agency to consider feasible means of mitigating the significant effects of GHG emissions, including reductions in emissions through the implementation of project features or off-site measures. The adopted amendments do not establish a GHG emission threshold, instead allowing a lead agency to develop, adopt, and apply its own thresholds of significance or those developed by other agencies or experts. CNRA also acknowledges that a lead agency may consider compliance with regulations or requirements implementing AB 32 in determining the significance of a project's GHG emissions (CNRA 2009a).

With respect to GHG emissions, the CEQA Guidelines state that lead agencies should "make a good faith effort, to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions (14 CCR 15064.4[a]). The CEQA Guidelines note that an agency may identify emissions by either selecting a "model or methodology" to quantify the emissions or by relying on "qualitative analysis or other performance based standards" (14 CCR 15064.4[a]). Section 15064.4(b) states that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment: (1) the extent to which a project may increase or reduce GHG emissions as compared to the existing environmental setting; (2) whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4[b]).

**EO S-13-08.** EO S-13-08 (November 2008) is intended to hasten California's response to the impacts of global climate change, particularly sea-level rise. Therefore, the EO directs state agencies to take specified actions to

assess and plan for such impacts. The final 2009 California Climate Adaptation Strategy report was issued in December 2009 (CNRA 2009b), and an update, Safeguarding California: Reducing Climate Risk, followed in July 2014 (CNRA 2014). To assess the state's vulnerability, the report summarizes key climate change impacts to the state for the following areas: Agriculture, Biodiversity and Habitat, Emergency Management, Energy, Forestry, Ocean and Coastal Ecosystems and Resources, Public Health, Transportation, and Water. Issuance of the Safeguarding California: Implementation Action Plans followed in March 2016 (CNRA 2016). In January 2018, the CNRA released the Safeguarding California Plan: 2018 Update, which communicates current and needed actions that state government should take to build climate change resiliency (CNRA 2018a).

## 3.2.3 Local Regulations

### 3.2.3.1 South Coast Air Quality Management District

Air districts typically act in an advisory capacity to local governments in establishing the framework for environmental review of air pollution impacts under CEQA. This may include recommendations regarding significance thresholds, analytical tools to estimate emissions and assess impacts, and mitigations for potentially significant impacts. Although air districts will also address some of these issues on a project-specific basis as responsible agencies, they may provide general guidance to local governments on these issues (SCAQMD 2008). As discussed in Section 3.4.1, Thresholds of Significance, SCAQMD has recommended numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development projects; however, these thresholds were not adopted. See Section 2.2.3.1, South Coast Air Quality Management District, for additional discussion on SCAQMD.

### 3.2.3.2 Southern California Association of Governments

SB 375 requires MPOs to prepare an SCS in their RTP. As the CVAG is not a MPO, the SCAG is the MPO for the Coachella Valley and the project area. The SCAG Regional Council adopted the 2012 RTP/SCS in April 2012 (SCAG 2012), and the 2016–2040 RTP/SCS (2016 RTP/SCS) was adopted in April 2016 (SCAG 2016). Both the 2012 and 2016 RTP/SCSs establish a development pattern for the region that, when integrated with the transportation network and other policies and measures, would reduce GHG emissions from transportation (excluding goods movement). Specifically, the 2012 RTP/SCS links the goals of sustaining mobility with the goals of fostering economic development; enhancing the environment; reducing energy consumption; promoting transportation-friendly development patterns; and encouraging all residents affected by socioeconomic, geographic, and commercial limitations to be provided with fair access. The 2012 and 2016 RTP/SCSs do not require that local general plans, specific plans, or zoning be consistent with it but provide incentives for consistency for governments and developers. The current SCAQMD AQMP (2016 AQMP) is based on the SCAG 2016 RTP/SCS demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry) developed by SCAG for their 2016–2040 RTP/SCS, the SCAG 2016 RTP/SCS. The SCAG 2016 RTP/SCS takes into account demographic growth forecasts developed by CVAG.

### 3.2.3.3 City of Rancho Mirage

The City has not adopted a comprehensive climate action plan, and there is currently no local guidance that would be applicable to the proposed project. The City addresses GHG-reducing goals in the March 2013, Sustainability Plan and Energy Action Plan. However, while the Sustainability Plan provides GHG reduction goals, they do not

extend beyond year 2020. At this time, no mandatory GHG plans, policies, regulations, or finalized agency guidelines would apply to the proposed project.

#### City of Rancho Mirage Energy Action Plan

The City's Energy Action Plan (ePlan) provides a roadmap of actions within the City's Municipal operations, to help reduce energy consumption, to reduce operation costs and increase energy awareness. The ePlan's goals focuses on three areas: retrofit and expansion of municipal facilities, upgrading the municipal fleet and consideration of municipal programs and actions that will help reduce municipal and community-wide energy use and GHG emissions.

#### City of Rancho Mirage Sustainability Plan

In March 2013, the City adopted the 2013 Sustainability Action Plan: Leadership in Energy Efficiency (Sustainability Plan) in order to set GHG reduction goals and measures. The Sustainability Plan is a framework for the documenting and implementation of policies and programs that will reduce the City's GHG emissions, working towards the statewide target of 1990 levels by 2020, set by AB 32.

# 3.3 Greenhouse Gas Inventories and Climate Change Conditions

## 3.3.1 Sources of Greenhouse Gas Emissions

### 3.3.1.1 Global Inventory

Anthropogenic GHG emissions worldwide in 2017 (the most recent year for which data is available) totaled approximately 50,860 MMT of $CO_2e$, excluding land use change and forestry (PBL 2018). Six countries—China, the United States, the Russian Federation, India, Japan, and Brazil—and the European community accounted for approximately 65% of the total global emissions, or approximately 33,290 MMT $CO_2e$ (PBL 2018).

### 3.3.1.2 National and State Inventories

Per the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2017, total U.S. GHG emissions were approximately 6,457 MMT $CO_2e$ in 2017 (EPA 2019). The largest source of $CO_2$, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 93.2% of $CO_2$ emissions in 2017 (4,912.0 MMT $CO_2e$). Relative to the 1990 emissions level, gross U.S. GHG emissions in 2017 were 1.3% higher; however, the gross emissions are down from a high of 15.7% above the 1990 level that occurred in 2007. GHG emissions decreased from 2016 to 2017 by 0.5% (35.5 MMT $CO_2e$) and, overall, net emissions in 2017 were 13% below 2005 levels (EPA 2019).

According to California's 2000–2016 GHG emissions inventory (2018 edition), California emitted 429.4 MMT $CO_2e$ in 2016, including emissions resulting from out-of-state electrical generation (CARB 2018b). The sources of GHG emissions in California include transportation, industrial uses, electric power production from both in-state and out-of-state sources, commercial and residential uses, agriculture, high-GWP substances, and recycling and waste. The California GHG emission source categories (as defined in CARB's 2008 Scoping Plan) and their relative contributions in 2016 are presented in Table 10.

**Table 10. Greenhouse Gas Emissions Sources in California**

| Source Category | Annual GHG Emissions (MMT $CO_2e$) | Percent of Total[a] |
|---|---|---|
| Transportation | 169.38 | 39% |
| Industrial uses[b] | 89.61 | 21% |
| Electricity generation[c] | 68.58 | 16% |
| Residential and commercial uses | 39.36 | 9% |
| Agriculture | 33.84 | 8% |
| High GWP substances | 19.78 | 5% |
| Recycling and waste | 8.81 | 2% |
| **Totals** | **429.40** | **100%** |

**Source:** CARB 2018b.
**Notes:** GHG = greenhouse gas; MMT $CO_2e$ = million metric tons of carbon dioxide equivalent; GWP = global warming potential. Emissions reflect 2016 California GHG inventory.

[a] Percentage of total has been rounded and total may not sum due to rounding.
[b] The Aliso Canyon natural gas leak event released 1.96 MMT $CO_2e$ of unanticipated emissions in 2015 and 0.53 MMT $CO_2e$ in 2016. These leak emissions will be fully mitigated according to legal settlement and are tracked separately from routine inventory emissions.
[c] Includes emissions associated with imported electricity, which account for 26.28 MMT $CO_2e$.

Between 2000 and 2016, per capita GHG emissions in California have dropped from a peak of 14.0 MT per person in 2001 to 10.8 MT per person in 2016, representing a 23% decrease. In addition, total GHG emissions in 2016 were approximately 12 MMT $CO_2e$ less than 2015 emissions. The declining trend in GHG emissions, coupled with programs that will continue to provide additional GHG reductions going forward, demonstrates that California will continue to reduce emissions below the 2020 target of 431 MT $CO_2e$ (CARB 2018b).

The City developed a GHG emission inventory in March 2013 as part of the Rancho Mirage Sustainability Plan. The inventory provides a detailed analysis of the City's carbon footprint showing the sources and sectors of emissions. In 2010, the City emitted 277,698 metric tons of $CO_2e$. The largest portion of the emission, over 43%, came from the electricity used to power the City's homes, businesses, resorts, fountains and streetlights. The transportation sector made up approximately 33% of the emissions.

### 3.3.2 Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. The 2014 Intergovernmental Panel on Climate Change Synthesis Report (IPCC 2014) indicated that warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. Signs that global climate change has occurred include warming of the atmosphere and ocean, diminished amounts of snow and ice, and rising sea levels (IPCC 2014).

In California, climate change impacts have the potential to affect sea-level rise, agriculture, snowpack and water supply, forestry, wildfire risk, public health, and electricity demand and supply. The primary effect of global climate change has been a rise in average global tropospheric temperature. The primary effect of global climate change has been a rise in average global tropospheric temperature. Reflecting the long-term warming trend since pre-industrial times, observed mean surface temperature for the decade 2006–2015 was 0.87°C (likely between 0.75°C and 0.99°C) higher than the average over the 1850–1900 period (IPCC 2018). Scientific modeling predicts

that continued emissions of GHGs at or above current rates would induce more extreme climate changes during the twenty-first century than were observed during the twentieth century. Human activities are estimated to have caused approximately 1.0°C (1.8°F) of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C (1.4°F to 2.2°F) (IPCC 2018). Global warming is likely to reach 1.5°C (2.7°F) between 2030 and 2052 if it continues to increase at the current rate (IPCC 2018).

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California. The Office of Environmental Health Hazard Assessment identified various indicators of climate change in California, which are scientifically based measurements that track trends in various aspects of climate change. Many indicators reveal discernible evidence that climate change is occurring in California and is having significant, measurable impacts in the state. Changes in the state's climate have been observed, including an increase in annual average air temperature with record warmth from 2012 to 2016, more frequent extreme heat events, more extreme drought, a decline in winter chill, an increase in cooling degree days and a decrease in heating degree days, and an increase in variability of statewide precipitation (OEHHA 2018).

Warming temperatures and changing precipitation patterns have altered California's physical systems—the ocean, lakes, rivers and snowpack—upon which the state depends. Winter snowpack and spring snowmelt runoff from the Sierra Nevada and southern Cascade Mountains provide approximately one-third of the state's annual water supply. Impacts of climate on physical systems have been observed such as high variability of snow-water content (i.e., amount of water stored in snowpack), decrease in snowmelt runoff, glacier change (loss in area), rise in sea levels, increase in average lake water temperature and coastal ocean temperature, and a decrease in dissolved oxygen in coastal waters (OEHHA 2018).

Impacts of climate change on biological systems, including humans, wildlife, and vegetation, have also been observed, including climate change impacts on terrestrial, marine, and freshwater ecosystems. As with global observations, species responses include those consistent with warming: elevational or latitudinal shifts in range, changes in the timing of key plant and animal life cycle events, and changes in the abundance of species and in community composition. Humans are better able to adapt to a changing climate than plants and animals in natural ecosystems. Nevertheless, climate change poses a threat to public health as warming temperatures and changes in precipitation can affect vector-borne pathogen transmission and disease patterns in California as well as the variability of heat-related deaths and illnesses. In addition, since 1950, the area burned by wildfires each year has been increasing.

The CNRA has released four California Climate Change Assessments (2006, 2009, 2012, and 2018), which have addressed the following: acceleration of warming across the state, more intense and frequent heat waves, greater riverine flows, accelerating sea-level rise, more intense and frequent drought, more severe and frequent wildfires, more severe storms and extreme weather events, shrinking snowpack and less overall precipitation, and ocean acidification, hypoxia, and warming. To address local and regional governments need for information to support action in their communities, the Fourth Assessment (2018) includes reports for nine regions of the state, including the Inland Deserts Region, where the project is located. Key projected climate changes for the Inland Deserts Region include the following (CNRA 2018b):

1. Extremely high maximum temperatures are expected to occur in the Inland Deserts.
2. The fate of the Salton Sea is a critical determinant of future environmental quality.
3. Renewable energy development will have big impacts on the economy and infrastructure.

4. Continuing current land use/development patterns (i.e., housing development in the region to compensate for lack of development on the coast) will require increased energy for cooling to compensate for a rise in extreme high temperatures.
5. Higher temperatures will exacerbate water stress in an already very water-limited region.
6. Changing water availability is a key determinant of the future for ecological and agricultural systems.
7. Population in the Inland Deserts is highly vulnerable to the effects of climate change.
8. Tourism is a major economic driver that is likely to be threatened by a changing climate.

# 3.4 Significance Criteria and Methodology

## 3.4.1 Thresholds of Significance

The significance criteria used to evaluate the project's GHG emissions impacts are based on the recommendations provided in Appendix G of the CEQA Guidelines. For the purposes of this GHG emissions analysis, the project would have a significant environmental impact if it would (14 CCR 15000 et seq.):

1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Global climate change is a cumulative impact; a proposed project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. In addition, while GHG impacts are recognized exclusively as cumulative impacts (CAPCOA 2008), GHG emissions impacts must also be evaluated on a proposed project-level under CEQA.

#### SCAQMD

Neither the State of California nor the SCAQMD has adopted emission-based thresholds of significance for GHG emissions under CEQA. However, in October 2008, the SCAQMD proposed recommended numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development proposed projects as presented in its Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold (SCAQMD 2008). This guidance document, which builds on the previous guidance prepared by the CAPCOA, explored various approaches for establishing a significance threshold for GHG emissions. The draft interim CEQA thresholds guidance document was not adopted or approved by the Governing Board.

The SCAQMD formed a GHG CEQA Significance Threshold Working Group to work with SCAQMD staff on developing GHG CEQA significance thresholds until statewide significance thresholds or guidelines are established. From December 2008 to September 2010, the SCAQMD hosted working group meetings and revised the draft threshold proposal several times, although it did not officially provide these proposals in a subsequent document. The SCAQMD has continued to consider adoption of significance thresholds for residential and general land use development proposed projects. The most recent proposal, issued in September 2010, uses the following tiered approach to evaluate potential GHG impacts from various uses (SCAQMD 2010):

**Tier 1** Determine if CEQA categorical exemptions are applicable. If not, move to Tier 2.

**Tier 2** Consider whether or not the proposed project is consistent with a locally adopted GHG reduction plan that has gone through public hearing and CEQA review, that has an approved inventory, includes monitoring, etc. If not, move to Tier 3.

**Tier 3** Consider whether the project generates GHG emissions in excess of screening thresholds for individual land uses. The 10,000 MT $CO_2e$ per year threshold for industrial uses would be recommended for use by all lead agencies. Under option 1, separate screening thresholds are proposed for residential projects (3,500 MT $CO_2e$ per year), commercial projects (1,400 MT $CO_2e$ per year), and mixed-use projects (3,000 MT $CO_2e$ per year). Under option 2, a single numerical screening threshold of 3,000 MT $CO_2e$ per year would be used for all non-industrial projects. If the project generates emissions in excess of the applicable screening threshold, move to Tier 4.

**Tier 4** Consider whether the project generates GHG emissions in excess of applicable performance standards for the project service population (population plus employment). The efficiency targets were established based on the goal of AB 32 to reduce statewide GHG emissions to 1990 levels by 2020. The 2020 efficiency targets are 4.8 MT $CO_2e$ per service population for project level analyses and 6.6 MT $CO_2e$ per service population for plan level analyses. If the project generates emissions in excess of the applicable efficiency targets, move to Tier 5.

**Tier 5** Consider the implementation of CEQA mitigation (including the purchase of GHG offsets) to reduce the project efficiency target to Tier 4 levels.

However, neither SCAQMD or Rancho Mirage adopted these thresholds and therefor the quantitative analysis provided herein is provided for informational purposes only. In the absence of an adopted quantitative thresholds, GHGs are evaluated in the context of policy consistency.

## 3.4.2 Approach and Methodology

### 3.4.2.1 Construction Emissions

CalEEMod Version 2020.4.0 was used to estimate potential project-generated GHG emissions during construction. Construction of the project would result in GHG emissions primarily associated with use of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. All details for construction criteria air pollutants discussed in Section 2.4.2.1, Construction Emissions, are also applicable for the estimation of construction-related GHG emissions. As such, see Section 2.4.2.1 for a discussion of construction emissions calculation methodology and assumptions.

### 3.4.2.2 Operational Emissions

CalEEMod Version 2020.04.0 was used to estimate potential project-generated operational GHG emissions from area sources (natural gas combustion and landscape maintenance), electrical generation (including electrical generation associated with water supply and wastewater treatment), and solid waste. GHG emissions would also be generated through intermittent maintenance and testing of the diesel emergency generator, limited to 50 hours per year. CalEEMod was used to calculate the annual GHG emissions. GHG emission estimates were based on the mobile source, area source, and energy (natural gas) operational assumptions described in Section 2.4.2.2, within

the air quality analysis. CalEEMod default values were used to estimate GHG emissions associated with energy (electricity) consumption, solid waste, and water and wastewater.

Emissions from each category—area sources, energy sources, mobile sources, solid waste, and water supply and wastewater treatment—is discussed in the following text with respect to the proposed project. For additional details, see Section 2.4.2, Approach and Methodology, for a discussion of operational emission calculation methodology and assumptions, specifically for mobile sources. Operational year 2024 was assumed to be the first year of operation following completion of construction.

### Area Sources

CalEEMod was used to estimate GHG emissions from the project's area sources, which include operation of gasoline-powered landscape maintenance equipment, which produce minimal GHG emissions. See Section 2.4.2.2 for a discussion of landscaping equipment emissions calculations. Consumer product use and architectural coatings result in VOC emissions, which are analyzed in air quality analysis only, and little to no GHG emissions.

### Energy Sources

The estimation of operational energy emissions was based on CalEEMod land use defaults and units or total area (i.e., square footage) of the proposed project's land uses. For buildings, CalEEMod energy intensity value (electricity or natural gas usage per square foot per year) assumptions were based on the California Commercial End-Use Survey database. Emissions are calculated by multiplying the energy use by the utility carbon intensity (pounds of GHGs per kilowatt-hour for electricity or 1,000 British thermal units for natural gas) for $CO_2$ and other GHGs. Annual natural gas (non-hearth) and electricity emissions were estimated in CalEEMod using the emissions factors for Southern California Edison (SCE), which would be the energy source provider for the proposed project. CalEEMod default energy intensity factors ($CO_2$, $CH_4$, and $N_2O$ mass emissions per kilowatt-hour) for SCE is based on the value for SCE's energy mix identified in SCE's 2018 corporate sustainability report.

### Mobile Sources

All details for criteria air pollutants discussed in Section 2.4.2.2 are also applicable for the estimation of operational mobile source GHG emissions.

Regulatory measures related to mobile sources include Assembly Bill (AB) 1493 (Pavley) and related federal standards. AB 1493 required that CARB establish GHG emission standards for automobiles, light-duty trucks, and other vehicles determined by CARB to be vehicles that are primarily used for noncommercial personal transportation in the state. In addition, the NHTSA and EPA have established corporate fuel economy standards and GHG emission standards, respectively, for automobiles and light-, medium-, and heavy-duty vehicles. Implementation of these standards and fleet turnover (replacement of older vehicles with newer ones) will gradually reduce emissions from the proposed project's motor vehicles. The effectiveness of fuel economy improvements was evaluated for motor vehicles in 2023 to the extent it was captured in EMFAC2017. In addition, the Low Carbon Fuel Standard calls for a 10% reduction in the "carbon intensity" of motor vehicle fuels by 2020.

#### Solid Waste

The project would generate solid waste, and therefore, result in $CO_2e$ emissions associated with landfill off-gassing. CalEEMod default values for solid waste generation were used to estimate GHG emissions associated with solid waste.

#### Water and Wastewater

Supply, conveyance, treatment, and distribution of water for the project require the use of electricity, which would result in associated indirect GHG emissions. Similarly, wastewater generated by the project requires the use of electricity for conveyance and treatment, along with GHG emissions generated during wastewater treatment. Water consumption estimates for both indoor and outdoor water use and associated electricity consumption from water use and wastewater generation were estimated using CalEEMod default values.

# 3.5 Impact Analysis

## 3.5.1 Threshold GHG-1

***Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?***

#### Construction Emissions

Construction of the project would result in GHG emissions, which are primarily associated with use of off-road construction equipment, on-road vendor trucks, and worker vehicles. The SCAQMD (2008) Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold recommends that, "construction emissions be amortized over a 30-year project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies."

CalEEMod was used to calculate the annual GHG emissions based on the construction scenario described in Section 2.4.2.1. Construction of the project is anticipated last a total of approximately 22 months. On-site sources of GHG emissions include off-road equipment and off-site sources including vendor trucks and worker vehicles. Table 11 presents construction emissions for the project from on-site and off-site emission sources

**Table 11. Estimated Annual Construction GHG Emissions**

| Year | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
|---|---|---|---|---|
| | *Metric Tons per Year* | | | |
| 2023 | 571.69 | 0.13 | 0.01 | 579.09 |
| 2024 | 562.96 | 0.08 | 0.03 | 572.69 |
| | | | **Total** | **1151.78** |
| | | | **Amortized Over 30 Years** | **38.39** |

**Source:** See Appendix B for complete results.
**Notes:** GHG = greenhouse gas; CO2 = carbon dioxide; CH4 = methane; N2O = nitrous oxide; CO2e = carbon dioxide equivalent

As shown in Table 11, the estimated total GHG emissions in 2023 through 2024 would be approximately 1,152 MT $CO_2e$. Amortized over 30 years, construction GHG emissions would be approximately 38 MT $CO_2e$ per year. In addition, as with project-generated construction criteria air pollutant emissions, GHG emissions generated during proposed construction activities would be short term, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions.

Because there is no separate GHG threshold for construction, the evaluation of significance is discussed in the operational emissions analysis in the following text.

### Operational Emissions

Operation of the proposed project would generate GHG emissions through motor vehicle trips to and from the project site; landscape maintenance equipment operation; energy use (natural gas and generation of electricity consumed by the project); solid waste disposal; and generation of electricity associated with water supply, treatment, and distribution; wastewater treatment; and natural gas consumed by the emergency generator. GHG emissions would also be generated through intermittent maintenance and testing of the diesel emergency generator, limited to 50 hours per year. CalEEMod was used to calculate the annual GHG emissions. GHG emission estimates were based on the mobile source, area source, and energy (natural gas) operational assumptions described in Section 2.4.2.2 within the air quality analysis. CalEEMod default values were used to estimate GHG emissions associated with energy (electricity) consumption, solid waste, and water and wastewater.

The estimated operational (2024) project-generated GHG emissions from area sources, energy usage, motor vehicles, solid waste generation, water usage and wastewater generation, and stationary sources are shown in Table 12.

## Table 12. Estimated Annual Operational GHG Emissions

| Emission Source | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
|---|---|---|---|---|
| | *Metric Tons per Year* | | | |
| ***Proposed Project*** | | | | |
| Area | 1.80 | 0.00 | 0.00 | 1.85 |
| Energy | 555.64 | 0.03 | 0.01 | 558.68 |
| Mobile | 1,507.92 | 0.08 | 0.07 | 1,531.81 |
| Stationary | 22.85 | 0.00 | 0.00 | 22.93 |
| Solid waste | 38.80 | 2.29 | 0.00 | 96.13 |
| Water supply and wastewater | 66.95 | 0.03 | 0.02 | 72.63 |
| | | | **Total** | **2,284.03** |
| | | | *Amortized Construction Emissions* | *38* |
| | | | **Operation + Amortized Construction Total** | **2,322.42** |

**Notes:** $CO_2$ = carbon dioxide; $CH_4$ = methane; $N_2O$ = nitrous oxide; $CO_2e$ = carbon dioxide equivalent
See Appendix B for detailed results. These emissions reflect operational year 2024

As shown in Table 12, estimated annual net project-generated GHG emissions would be approximately 2,284 MT $CO_2e$ per year as a result of proposed project operations only. Estimated annual project-generated operational emissions in 2024 (2,284MT $CO_2e$ per year) plus amortized project construction emissions (38 MT $CO_2e$ per year) would be approximately 2,322 MT $CO_2e$ per year.

## 3.5.2 Threshold GHG-2

***Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?***

### Project Consistency with the Scoping Plan

As discussed in Section 3.2.2, Potential Effects of Climate Change, the Scoping Plan (approved by CARB in 2008 and updated in 2014 and 2017) provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. The Scoping Plan is not directly applicable to specific projects, nor is it intended to be used for project-level evaluations.[10] Under the Scoping Plan, however, there are several state regulatory measures aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified in the Scoping Plan. Most of these measures focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (i.e., hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., LCFS), among others.

The Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32 and establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. To the extent that these regulations are applicable to the project, its inhabitants, or uses, the project would comply with all regulations adopted in furtherance of the Scoping Plan to the extent required by law.

### Compliance with Applicable Laws and Regulations

Table 13 identifies laws and regulations currently in effect that reduce project-related GHG emissions. Because GHG laws and regulations continue to expand under California's climate leadership efforts, including most recently the enactment of SB 100 (2018), Table 13 presents a snapshot of these GHG laws and regulations. Since additional GHG laws and regulations are likely to apply, and listed laws and regulations are likely to continue to evolve, the scope of GHG laws and regulations applicable to GHG-emissions related to the project is anticipated to expand over time and result in lower-than-predicted GHG emissions.

**Table 13. Greenhouse Gas-Related Laws and Regulations**

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| *Building Components/Facility Operations* | | |
| Roofs/Ceilings/Insulation | California Energy Code (Title 24, Part 6) | The project must comply with efficiency standards regarding roofing, ceilings, and insulation (See Title 24, Part 6 Compliance Manual at Section 3.2.2.) |
| Flooring | CALGreen Code (Title 24, Part 11) | The project must comply with efficiency standards regarding flooring materials. For example, for 80% of floor area receiving "resilient flooring," the flooring must meet |

[10] The Final Statement of Reasons for the amendments to the CEQA Guidelines reiterates the statement in the Initial Statement of Reasons that "[t]he Scoping Plan may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan" (CNRA 2009a).

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| | | applicable installation and material requirements contained in CALGreen Code Section 5.504.4.6. |
| Windows and Doors (Fenestration) | California Energy Code | The project must comply with fenestration efficiency requirements. For example, the choice of windows, glazed doors, and any skylights for the project must conform to energy consumption requirements affecting size, orientation, and types of fenestration products used. (See Title 24, Part 6 Compliance Manual, Section 3.3.) |
| Building Walls/Insulation | CALGreen Code<br>California Energy Code | The project must comply with efficiency requirements for building walls and insulation.<br>Exterior Walls: Must meet requirements in current edition of California Energy Code, and comply with Section 5.407.1, which required weather-resistant exterior wall and foundation envelope as required by California Building Code Section 1403.2. Construction must also meet requirements contained in Title 24, Part 6, which vary by material of the exterior walls. (See Title 24, Part 6 Compliance Manual, Part 3.2.3.)<br>Demising (Interior) Walls: Mandatory insulation requirements for demising walls (which separate conditioned from non-conditions space) differ by the type of wall material used. (*Id*. at 3.2.4.)<br>Door Insulation: There are mandatory requirements for air infiltration rates to improve insulation efficiency; they differ according to the type of door. (*Id*. at 3.2.5.)<br>Flooring Insulation: There are mandatory requirements for insulation that depend on the material and location of the flooring. (*Id*. at 3.2.6.) |
| Finish Materials | CALGreen Code | The project must comply with pollutant control requirements for finish materials. For example, materials including adhesives, sealants, caulks, paints and coatings, carpet systems, and composite wood products must meet requirements in CALGreen Code to ensure pollutant control. (CALGreen Code Section 5.504.4.) |
| Wet Appliances (Toilets/Faucets/Urinals, Dishwasher/Clothes Washer/Water Heater) | CALGreen Code<br>California Energy Code<br>Appliance Efficiency Regulations (Title 20 Standards) | Wet appliances associated with the project must meet various efficiency requirements. For example:<br>Toilets/Faucets/Urinals: Use associated with the project is subject to new maximum rates for toilets, urinals, and faucets effective July 1, 2018:<br>• Water closets maximum flush volume 1.28 gallons per flush<br>• Showerheads maximum flow rate 2.0 gallons per minute (gpm) at 80 pounds per square inch (psi)<br>• Wash fountains 1.8 gpm/20 (rim space inches at 60 psi)<br>• Metering faucets 0.20 gallons/cycle<br>• Lavatory faucets 0.5 gpm at 60 psi |

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| | | • Kitchen faucets and aerators 1.8 gpm with optional temporary flow of 2.2 gpm at 60 psi<br>• Wall mounted urinals 0.125 gallons per flush<br>• Floor mounted urinals 0.5 gallons per flush<br>(CALGreen Code Section 5.303.)<br>Water Heaters: Use associated with the project is subject to appliance efficiency requirements for water heaters. (Title 20 Standards, Sections 1605.1(f), 1605.3(f).)<br>Dishwasher/Clothes Washer: Use associated with the project is subject to appliance efficiency requirements for dishwashers and clothes washers. (Title 20 Standards, Sections 1605.1(o)–(q), 1605.3(o)–(q).) |
| Dry Appliances (Refrigerator/Freezer, Heater/Air Conditioner, Clothes Dryer) | Title 20 Standards CALGreen Code | Dry appliances associated with the project must meet various efficiency requirements. For example:<br>Refrigerator/Freezer: Use associated with the project is subject to appliance efficiency requirements for refrigerators and freezers. (Title 20 Standards, Sections 1605.1(a), 1605.3(a).)<br>Heater/Air Conditioner: Use associated with the project is subject to appliance efficiency requirements for heaters and air conditioners. (Title 20 Standards, Sections 1605.1(b)–(e), 1605.3(b)–(e) as applicable.)<br>Clothes Dryer: Use associated with the project is subject to appliance efficiency requirements for clothes dryers. (Title 20 Standards, Section 1605.1(q).) |
| | CALGreen Code | Installations of HVAC, refrigeration and fire suppression equipment must comply with CALGreen Code Sections 5.508.1.1 and 508.1.2, which prohibits CFCs, halons, and certain HCFCs and HFCs. |
| Lighting | Title 20 Standards | Lighting associated with the project will be subject to energy efficiency requirements contained in Title 20 Standards.<br>General Lighting: Indoor and outdoor lighting associated with the project must comply with applicable appliance efficiency regulations (Title 20 Standards, Sections 1605.1(j),(k),(n), 1605.3(j),(k),(n).)<br>Emergency lighting and self-contained lighting: the project must also comply with applicable appliance efficiency regulations (Title 20 Standards, Sections 1605.1(l), 1605.3(l).) |
| | California Energy Code | Lighting associated with the project will also be subject to energy efficiency requirements contained in Title 24, Part 6, which contains energy standards for non-residential indoor lighting and outdoor lighting. (See Title 24 Part 6 Compliance Manual, at Sections 5, 6.)<br>Mandatory lighting controls for indoor lighting include, for example, regulations for automatic shut-off, automatic daytime controls, demand responsive controls, and |

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| | | certificates of installation. (Id. at Section 5.) Regulations for outdoor lighting include, for example, creation of lighting zones, lighting power requirements, a hardscape lighting power allowance, requirements for outdoor incandescent and luminaire lighting, and lighting control functionality. (Id. at Section 6.) |
| | AB 1109 | Lighting associated with the project will be subject to energy efficiency requirements adopted pursuant to AB 1109.<br>Enacted in 2007, AB 1109 required the CEC to adopt minimum energy efficiency standards for general purpose lighting, to reduce electricity consumption 50% for indoor residential lighting and 25% for indoor commercial lighting. |
| Bicycle and Vehicle Parking | CALGreen Code | The project will be required to provide compliant bicycle parking, fuel-efficient vehicle parking, and electric vehicle charging spaces (CALGreen Code Sections 5.106.4, 5.106.5.2, 5.106.5.3) |
| Landscaping | CALGreen Code | The CALGreen Code includes outdoor water efficiency provisions in Section 5.304. |
| | EO B-29-15 | The project is also subject to emissions reduction requirements to be achieved by implementation of EO B-29-15.<br>This emergency EO directs the Department of Water Resources to lead a statewide initiative to replace 50 million square feet of lawns and ornamental turf with drought tolerant landscapes. The order also directed the departments to update the Model Water Efficient Landscaping Ordinance, which they did in 2015. |
| | Model Water Efficient Landscaping Ordinance | The model ordinance promotes efficient landscaping in new developments and establishes an outdoor water budget for new and renovated landscaped areas that are 500 square feet or larger. (CCR, Title 23, Division 2, Chapter 2.7.) |
| | Cap-and-Trade Program | Transportation fuels used in landscape maintenance equipment (e.g., gasoline) would be subject to the Cap-and-Trade Program. (See “Energy Use,” below.) |
| Refrigerants | CARB Management of High GWP Refrigerants for Stationary Sources | Any refrigerants associated with the project will be subject to CARB standards. CARB’s Regulation for the Management of High GWP Refrigerants for Stationary Sources 1) reduces emissions of high-GWP refrigerants from leaky stationary, non-residential refrigeration equipment; 2) reduces emissions resulting from the installation and servicing of stationary refrigeration and air conditioning appliances using high-GWP refrigerants; and 3) requires verification GHG emission reductions. (CCR, Title 17, Division 3, Chapter 1, Subchapter 10, Article 4, Subarticle 5.1, Section 95380 et seq.) |

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| Consumer Products | CARB High GWP GHGs in Consumer Products | All consumer products associated with the project will be subject to CARB standards. CARB's consumer products regulations set VOC limits for numerous categories of consumer products, and limits the reactivity of the ingredients used in numerous categories of aerosol coating products (CCR, Title 17, Division 3, Chapter 1, Subchapter 8.5.) |
| *Construction* | | |
| Use of Off-Road Diesel Engines, Vehicles, and Equipment | CARB In-Use Off-Road Diesel Vehicle Regulation | Any relevant vehicle or machine use associated with the project will be subject to CARB standards.<br>The CARB In-Use-Off-Road Diesel Vehicle Regulation applies to certain off-road diesel engines, vehicles, or equipment greater than 25 horsepower. The regulation: 1) imposes limits on idling, requires a written idling policy, and requires a disclosure when selling vehicles; 2) requires all vehicles to be reported to CARB (using the Diesel Off-Road Online Reporting System) and labeled; 3) restricts the adding of older vehicles into fleets starting on January 1, 2014; and 4) requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (i.e., exhaust retrofits).<br>The requirements and compliance dates of the Off-Road regulation vary by fleet size, as defined by the regulation. |
| | Cap-and-Trade Program | Transportation fuels (e.g., gasoline) used in equipment operation would be subject to the Cap-and-Trade Program. (See "Energy Use," below.) |
| Pollutant Control | CALGreen Code | If an HVAC system is used during construction, the project must use return air filters with a MERV of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 5.2.1-1992. All filters must be replaced immediately prior to occupancy. (CALGreen Code Section 5.504.1.) |
| Greening New Construction | CALGreen Code | All new construction, including the project, must comply with CALGreen Code, as discussed in more detail throughout this table.<br>Adoption of the mandatory CALGreen Code standards for construction has been essential for improving the overall environmental performance of new buildings; it also sets voluntary targets for builders to exceed the mandatory requirements. |
| Construction Waste | CALGreen Code | The project will be subject to CALGreen Code requirements for construction waste reduction, disposal, and recycling, such as a requirement to recycle and/or salvage for reuse a minimum of 65% of the non-hazardous construction waste in accordance with Section 5.408.1.1, 5.408.1.2, or 5.408.1.3; or meet a local construction and demolition |

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| | | waste management ordinance, whichever is more stringent. |
| Worker, vendor and truck vehicle trips (on-road vehicles) | Cap-and-Trade Program | Transportation fuels (e.g., gasoline) used in worker, vendor and truck vehicle trips would be subject to the Cap-and-Trade Program. (See "Energy Use," below.) |
| *Solid Waste* | | |
| Solid Waste Management | Landfill Methane Control Measure | Waste associated with the project will be disposed per state requirements for landfills, material recovery facilities, and transfer stations. Per the statewide GHG emissions inventory, the largest emissions from waste management sectors come from landfills, and are in the form of $CH_4$. In 2010, CARB adopted a regulation that reduces emissions from methane in landfills, primarily by requiring owners and operators of certain uncontrolled municipal solid waste landfills to install gas collection and control systems, and requires existing and newly installed gas and control systems to operate in an optimal manner. The regulation allows local air districts to voluntarily enter into a memorandum of understanding with CARB to implement and enforce the regulation and to assess fees to cover costs of implementation. |
| | Mandatory Commercial Recycling (AB 341) | AB 341 will require the project, if it generates four cubic yards or more of commercial solid waste per week, to arrange for recycling services, using one of the following: self-haul; subscribe to a hauler(s); arranging for pickup of recyclable materials; subscribing to a recycling service that may include mixed waste processing that yields diversion results comparable to source separation. The project will also be subject to local commercial solid waste recycling program required to be implemented by each jurisdiction under AB 341. |
| | CALGreen Code | The project will be subject to CALGreen Code requirement to provide areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling (CALGreen Code Section 5.410.1) |
| *Energy Use* | | |
| Electricity/Natural Gas Generation | Cap-and-Trade Program | Electricity and natural gas usage associated with the project will be subject to the Cap-and-Trade Program. The rules came into effect on January 1, 2013, applying to large electric power plants and large industrial plants. In 2015, importers and distributors of fossil fuels were added to the Cap-and-Trade Program in the second phase. Specifically, on January 1, 2015, cap-and-trade compliance obligations were phased in for suppliers of natural gas, reformulated gasoline blendstock for oxygenate blending (RBOB), distillate fuel oils, and liquefied petroleum gas that |

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| | | meet or exceed specified emissions thresholds. The threshold that triggers a cap-and-trade compliance obligation for a fuel supplier is 25,000 MT or more of $CO_2e$ annually from the GHG emissions that would result from full combustion or oxidation of quantities of fuels (including natural gas, RBOB, distillate fuel oil, liquefied petroleum gas, and blended fuels that contain these fuels) imported and/or delivered to California. |
| Renewable Energy | California RPS (SB X1-2, SB 350, and SB 100) | Energy providers associated with the project will be required to comply with RPS set by SB X1 2, SB 350, and SB 100.<br>SB X1 2 requires investor-owned utilities, publicly-owned utilities, and electric service providers to increase purchases of renewable energy such that at least 33% of retail sales are procured from renewable energy resources by December 31, 2020. In the interim, each entity was required to procure an average of 20% of renewable energy for the period of January 1, 2011 through December 31, 2013; and will be required to procure an average of 25% by December 31, 2016, and 33% by 2020.<br>SB 350 requires retail sellers and publicly owned utilities to procure 50% of their electricity from eligible renewable energy resources by 2030.<br>SB 100 increased the standards set forth in SB 350 establishing that 44% of the total electricity sold to retail customers in California per year by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030, be secured from qualifying renewable energy sources. SB 100 states that it is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100% of the retail sales of electricity to California by 2045. |
| | Million Solar Roofs Program (SB 1) | The project will participate in California's energy market, which is affected by implementation of the Million Solar Roofs Program.<br>As part of Governor Schwarzenegger's Million Solar Roofs Program, California has set a goal to install 3,000 megawatts of new, solar capacity through 2016. The Million Solar Roofs Program is a ratepayer-financed incentive program aimed at transforming the market for rooftop solar systems by driving down costs over time. |
| | California Solar Initiative- Thermal Program | The project will participate in California's energy market, which is affected by implementation of the California Solar Initiative -Thermal Program. The program offers cash rebates of up to $4,366 on solar water heating systems for single-family residential customers. Multifamily and Commercial properties qualify for rebates of up to $800,000 on solar water heating systems and eligible solar |

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| | | pool heating systems qualify for rebates of up to $500,000. Funding for the California Solar Initiative-Thermal program comes from ratepayers of PG&E, Southern California Edison, Southern California Gas Company, and San Diego Gas & Electric. The rebate program is overseen by the CPUC as part of the California Solar Initiative. |
| | Waste Heat and Carbon Emissions Reduction Act (AB 1613, AB 2791) | The project will participate in California's energy market, which is affected by implementation of the Waste Heat and Carbon Emissions Reduction Act.<br>Originally enacted in 2007 and amended in 2008, this act directed the CEC, CPUC, and CARB to implement a program that would encourage the development of new combined heat and power systems in California with a generating capacity of not more than 20 megawatts, to increase combined heat and power use by 30,000 gigawatt-hour. The CPUC publicly owned electric utilities, and CEC duly established policies and procedures for the purchase of electricity from eligible combined heat and power systems. CEC guidelines require combined heat and power systems to be designed to reduce waste energy; have a minimum efficiency of 60%; have $NO_x$ emissions of no more than 0.07 pounds per megawatt-hour; be sized to meet eligible customer generation thermal load; operate continuously in a manner that meets expected thermal load and optimizes efficient use of waste heat; and be cost effective, technologically feasible, and environmentally beneficial. |
| *Vehicular/Mobile Sources* | | |
| General | CVAG's RTP / SCAG's 2016 RTP/SCS | As set forth below, the project complies with the applicable, polices of, the CVAG's RTP / SCAG's 2016 RTP/SCS. |
| Fuel | Low Carbon Fuel Standard (LCFS)/ EO S-01-07 | Vehicle trips associated with the project will be subject to LCFS (EO S-01-07), which requires a 10% or greater reduction in the average fuel carbon intensity by 2020 with a 2010 baseline for transportation fuels in California regulated by CARB. The program establishes a strong framework to promote the low carbon fuel adoption necessary to achieve the Governor's 2030 and 2050 GHG goals. |
| | Cap-and-Trade Program | Use of gasoline associated with the project will be subject to the Cap-and-Trade Program.<br>The rules came into effect on January 1, 2013, applying to large electric power plants and large industrial plants. In 2015, importers and distributors of fossil fuels were added to the Cap-and-Trade Program in the second phase. Specifically, on January 1, 2015, cap-and-trade compliance obligations were phased in for suppliers of natural gas, RBOB, distillate fuel oils, and liquefied petroleum gas that meet or exceed specified emissions thresholds. The |

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| | | threshold that triggers a cap-and-trade compliance obligation for a fuel supplier is 25,000 MT or more of $CO_2e$ annually from the GHG emissions that would result from full combustion or oxidation of quantities of fuels (including natural gas, RBOB, distillate fuel oil, liquefied petroleum gas, and blended fuels that contain these fuels) imported and/or delivered to California. |
| Automotive Refrigerants | CARB Regulation for Small Containers of Automotive Refrigerant | Vehicles associated with the project will be subject to CARB's Regulation for Small Containers of Automotive Refrigerant. (CCR, Title 17, Division 3, Chapter 1, Subchapter 10, Article 4, Subarticle 5, Section 95360 et seq.) The regulation applies to the sale, use, and disposal of small containers of automotive refrigerant with a GWP greater than 150. The regulation achieves emission reductions through implementation of four requirements: 1) use of a self-sealing valve on the container, 2) improved labeling instructions, 3) a deposit and recycling program for small containers, and 4) an education program that emphasizes best practices for vehicle recharging. This regulation went into effect on January 1, 2010 with a 1-year sell-through period for containers manufactured before January 1, 2010. The target recycle rate is initially set at 90%, and rises to 95% beginning January 1, 2012. |
| Light-Duty Vehicles | AB 1493 (or the Pavley Standard) | Cars that drive to and from the project will be subject to AB 1493, which directed CARB to adopt a regulation requiring the maximum feasible and cost effective reduction of GHG emissions from new passenger vehicles.<br>Pursuant to AB 1493, CARB adopted regulations that establish a declining fleet average standard for $CO_2$, $CH_4$, $N_2O$, and HFCs (air conditioner refrigerants) in new passenger vehicles and light-duty trucks beginning with the 2009 model year and phased-in through the 2016 model year. These standards are divided into those applicable to lighter and those applicable to heavier portions of the passenger vehicle fleet.<br>The regulations will reduce "upstream" smog-forming emissions from refining, marketing, and distribution of fuel. |
| | Advanced Clean Car and ZEV Programs | Cars that drive to and from the project will be subject to the Advanced Clean Car and ZEV Programs.<br>In January 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot and global warming gases and requirements for greater numbers of zero-emission vehicles into a single package of standards called Advanced Clean Cars. By 2025, new automobiles will emit 34% fewer global warming gases and 75% fewer smog-forming emissions. |

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| | | The ZEV program will act as the focused technology of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of ZEVs and plug-in hybrid electric vehicles in the 2018–2025 model years. |
| | Tire Inflation Regulation | Cars that drive to and from the project will be subject to the CARB Tire Inflation Regulation, which took effect on September 1, 2010, and applies to vehicles with a gross vehicle weight rating of 10,000 pounds or less.<br>Under this regulation, automotive service providers must, inter alia, check and inflate each vehicle's tires to the recommended tire pressure rating, with air or nitrogen, as appropriate, at the time of performing any automotive maintenance or repair service, and to keep a copy of the service invoice for a minimum of three years, and make the vehicle service invoice available to the CARB, or its authorized representative upon request. |
| | EPA and NHTSA GHG and CAFE standards. | Mobile sources that travel to and from the project would be subject to EPA and NHTSA GHG and CAFE standards for passenger cars, light-duty trucks, and medium-duty passenger vehicles. (75 FR 25324–25728 and 77 FR 62624–63200.) |
| Medium- and Heavy-Duty Vehicles | CARB In-Use On-Road Heavy-Duty Diesel Vehicles Regulation (Truck and Bus Regulation) | Any heavy-duty trucks associated with the project will be subject to CARB standards.<br>The regulation requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Newer heavier trucks and buses must meet PM filter requirements. Lighter and older heavier trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent.<br>The regulation applies to nearly all privately and federally owned diesel fueled trucks and buses and to privately and publicly owned school buses with a gross vehicle weight rating greater than 14,000 pounds. |
| | CARB In-Use Off-Road Diesel Vehicle Regulation | Any relevant vehicle or machine use associated with the project will be subject to CARB standards.<br>The CARB In-Use-Off-Road Diesel Vehicle Regulation applies to certain off-road diesel engines, vehicles, or equipment greater than 25 horsepower. The regulations: 1) imposes limits on idling, requires a written idling policy, and requires a disclosure when selling vehicles; 2) requires all vehicles to be reported to CARB (using the Diesel Off-Road Online Reporting System) and labeled; 3) restricts the adding of older vehicles into fleets starting on January 1, 2014; and 4) requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (i.e., exhaust retrofits). |

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| | | The requirements and compliance dates of the Off-Road regulation vary by fleet size, as defined by the regulation. |
| | Heavy-Duty Vehicle GHG Emission Reduction Regulation | Any relevant vehicle or machine use associated with the project will be subject to CARB standards.<br>The CARB Heavy-Duty Vehicle GHG Emission Reduction Regulation applies to heavy-duty tractors that pull 53-foot or longer box-type trailers. (CCR, Title 17, Division 3, Chapter 1, Subchapter 10, Article 4, Subarticle 1, Section 95300 et seq.) Fuel efficiency is improved through improvements in tractor and trailer aerodynamics and the use of low rolling resistance tires. |
| | EPA and NHTSA GHG and CAFE standards. | Mobile sources that travel to and from the project would be subject to EPA and NHTSA GHG and CAFE standards for medium- and heavy-duty vehicles. (76 FR 57106–57513.) |
| *Water Use* | | |
| Water Use Efficiency | Emergency State Water Board Regulations | Water use associated with the project will be subject to emergency regulations.<br>On May 18, 2016, partially in response to EO B-27-16, the State Water Board adopted emergency water use regulations (CCR, title 23, Section 864.5 and amended and re-adopted Sections 863, 864, 865, and 866). The regulation directs the State Water Board, Department of Water Resources, and CPUC to implement rates and pricing structures to incentivize water conservation, and calls upon water suppliers, homeowners' associations, California businesses, landlords and tenants, and wholesale water agencies to take stronger conservation measures. |
| | EO B-37-16 | Water use associated with the project will be subject to Emergency EO B-37-16, issued May 9, 2016, which directs the State Water Resources Control Board to adjust emergency water conservation regulations through the end of January 2017 to reflect differing water supply conditions across the state.<br>The Water Board must also develop a proposal to achieve a mandatory reduction of potable urban water usage that builds off the mandatory 25% reduction called for in EO B-29-15. The Water Board and Department of Water Resources will develop new, permanent water use targets to which the project will be subject.<br>The Water Board will permanently prohibit water-wasting practices such as hosing off sidewalks, driveways, and other hardscapes; washing automobiles with hoses not equipped with a shut-off nozzle; using non-recirculated water in a fountain or other decorative water feature; watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation; and irrigating ornamental turf on public street medians. |

## Table 13. Greenhouse Gas-Related Laws and Regulations

| Project Component | Applicable Laws/ Regulations | GHG Reduction Measures Required for Project |
|---|---|---|
| | EO B-40-17 | EO B-40-17 lifted the drought emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne. It also rescinds EO B-29-15, but expressly states that EO B-37-16 remains in effect and directs the State Water Resources Control Board to continue development of permanent prohibitions on wasteful water use to which the project will be subject. |
| | SB X7-7 | Water provided to the project will be affected by SB X7-7's requirements for water suppliers.<br>SB X7-7, or the Water Conservation Act of 2009, requires all water suppliers to increase water use efficiency. It also requires, among other things, that the Department of Water Resources, in consultation with other state agencies, develop a single standardized water use reporting form, which would be used by both urban and agricultural water agencies. |
| | CALGreen Code | The project is subject to CALGreen Code's water efficiency standards for indoor and outdoor water use (CALGreen Code, Section 5.303, 5.304.) |
| | California Water Code, Division 6, Part 2.10, Sections 10910–10915. | Development and approval of the project requires the development of a project-specific Water Supply Assessment. |
| | Cap-and-Trade Program | Electricity usage associated with water and wastewater supply, treatment and distribution would be subject to the Cap-and-Trade Program. |
| | California RPS (SB X1-2, SB 350, SB 100) | Electricity usage associated with water and wastewater supply, treatment and distribution associated with the project will be required to comply with RPS set by SB X1-2, SB 350, and SB 100. |

Notes: gpm = gallons per minute; psi = pounds per square inch; GHG = greenhouse gas; AB = Assembly Bill; SB = Senate Bill; EO = Executive Order; HVAC = heating, ventilation, and air conditioning; CFC = chlorofluorocarbons; HFCs = hydrofluorocarbons; HCFCs = hydrochlorofluorocarbons; CEC = California Energy Commission; CCR = California Code of Regulations; CARB = California Air Resources Board; GWP = global warming potential; VOC = volatile organic compounds; MERV = Minimum Efficiency Reporting Value; ASHRAE = American Society of Heating, Refrigerating and Air-Conditioning Engineers; $CH_4$ = methane; $CO_2e$ = carbon dioxide equivalent; RBOB = reformulated blendstock for oxygenate blending; RPS = renewable portfolio standard; CPUC = California Public Utilities Commission; SCE = Southern California Edison; $NO_x$ = oxides of nitrogen; SCAG = Southern California Association of Governments; RTP = regional transportation plan; SCS = sustainable communities strategy; LCFS = low carbon fuel standard; $CO_2$ = carbon dioxide; $N_2O$ = nitrous oxide; ZEV = zero-emissions vehicle; EPA = Environmental Protection Agency; NHTSA = National Highway Traffic Safety Administration; CAFE = corporate average fuel economy; PM = particulate matter; FR = Federal Register.

As described above, the project's GHG emissions (both on and off site) are regulated by many GHG reduction mandates. Compliance with these GHG reduction legal requirements is appropriately assumed to occur under CEQA (*Oakland Heritage Alliance v. City of Oakland* [2011] 195 Cal. App. 4th 884, 906; *Center for Biological Diversity v. Department of Fish & Wildlife* [2015] 234 Cal. App. 4th 214, 244-45).

### City of Rancho Mirage Energy Action Plan

The City's ePlan provides a roadmap of actions within the City's Municipal operations, to help reduce energy consumption, to reduce operation costs and increase energy awareness. The ePlan's goals focuses on three areas: retrofit and expansion of municipal facilities, upgrading the municipal fleet and consideration of municipal programs and actions that will help reduce municipal and communitywide energy use and GHG emissions.

### City of Rancho Mirage Sustainability Plan

In March 2013, the City adopted the 2013 Sustainability Action Plan: Leadership in Energy Efficiency (Sustainability Plan) in order to set GHG reduction goals and measures. The Sustainability Plan is a framework for the documenting and implementation of policies and programs that will reduce the City's GHG emissions, working towards the statewide target of 1990 levels by 2020, set by AB 32.

The City addresses GHG-reducing goals in the March 2013, Sustainability Plan and Energy Action Plan. However, while the Sustainability Plan provides GHG reduction goals, they do not extend beyond year 2020. Nevertheless, the proposed project would not interfere with implementation of the City's sustainability goals, because it would not exceed the SCAQMD's recommended threshold of 3,000 MT $CO_2e$ per year. In addition, the proposed project does not prevent the City from promoting sustainability and energy efficiency goals to reduce the City's carbon footprint.

### Project Consistency with CVAG's RTP / SCAG's 2016 RTP/SCS/ Connect SoCal, the 2020-2045 RTP/SCS

The City is within the jurisdiction of CVAG, which participates in regional planning with SCAG. CVAG is, among other things, the regional transportation planning agency coordinating government services in the Coachella Valley. As the recognized transportation planning agency with the Riverside County Transportation Commission, it is CVAG's responsibility to prepare and adopt an RTP for the Coachella Valley. This is accomplished through the creation of the TPPS, which identifies and prioritizes transportation projects in the region. The CVAG developed its first TPPS in 1989, with subsequent report updates in 1993, 1999, 2005, and 2010. The most recent version was adopted on June 26, 2017 (CVAG 2017). The TPPS includes growth projections for cities within the Coachella Valley. The projects and growth projections within the TPPS are fed into a larger regional planning effort by the SCAG. SCAG recently released its 2016 RTP, which includes the majority of projects seen within the TPPS. The SCAQMD 2016 AQMP applies the updated SCAG growth forecasts assumed in the 2016 RTP/SCS. Responding to the context of the RTP guidelines and California state legislation, CVAG's Active Transportation Plan, also within the TPPS, was designed to be completed simultaneously with the TPPS and Regional Arterial Cost Estimate documents. Together, this family of documents serves as CVAG's RTP, listing all regionally significant transportation projects, including roadway projects, active transportation projects, and other improvement projects that have been identified to benefit regional circulation within the Coachella Valley. The CVAG also developed fugitive dust ordinances that include (1) dust control plans for each construction project needing a grading permit; (2) plans to pave or chemically treat unpaved surfaces if daily vehicle trips exceed 150; (3) imposition of 15 mph speed limits for unpaved surfaces if daily vehicle trips do not exceed 150; (4) paving or chemical treatment of unpaved parking lots; and (5) actions to discourage use of unimproved property by off-highway vehicles.

SCAG's 2016 RTP/SCS is a regional growth-management strategy that targets per capita GHG reduction from passenger vehicles and light-duty trucks in the Southern California region pursuant to Senate Bill 375. In addition to demonstrating the region's ability to attain and exceed the GHG emission-reduction targets set forth by CARB, the 2016 RTP/SCS outlines a series of actions and strategies for integrating the transportation network with an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation

demands. Thus, successful implementation of the 2016 RTP/SCS would result in more complete communities with a variety of transportation and housing choices, while reducing automobile use. With regard to individual developments, such as the proposed project, the strategies and policies set forth in the 2016 RTP/SCS can be grouped into the following three categories: (1) reduction of vehicle trips and VMT; (2) increased use of alternative fuel vehicles; and (3) improved energy efficiency. The project's consistency with these three strategy categories is presented below.

*Consistency with VMT Reduction Strategies and Policies*

The proposed project's consistency with this aspect of the 2016 RTP/SCS is demonstrated via the project's land use characteristics and consistency with the regional growth forecast assumed in the 2016 RTP/SCS for the City. According to the City's General Plan Housing Element (City of Rancho Mirage 2017), the 2014–2021 RHNA determined that the City needed a total of 95 housing units. The project would construct 106 residential units. However, these residential units would operate similar to time-share properties and therefore future residents would not be in the proposed residential units year-round. Because the proposed residential units are not typical residential units that residents cannot occupy year-round, theses housing units do not count towards the RHNA housing unit determination. SCAG's Local Profile Report for the City of Rancho Mirage indicated that the City's average household size was two persons per dwelling unit as of 2018 (SCAG 2019). Using these assumptions, implementation of the project would have the potential to increase the City's population by 216 persons. This population increase would comply with SCAG's projected population increase for the City. Accordingly, the proposed project is consistent with the SCAG RTP/SCS forecasts used in the SCAQMD AQMP development. Therefore, vehicle trip generation as a result of the proposed project are concluded to have been anticipated in the SCAG 2016 RTP/SCS growth projections because the proposed project site would be accommodated by the City's predicted projections.

*Increased Use of Alternative Fueled Vehicles Policy Initiative*

The second goal of the 2016 RTP/SCS, with regard to individual development projects such as the proposed project, is to increase alternative fueled vehicles to reduce per capita GHG emissions. This 2016 RTP/SCS policy initiative focuses on accelerating fleet conversion to electric or other near zero-emission technologies. The proposed project would comply with the applicable 2016 CALGreen standards. The proposed project includes 829 parking spaces total (Urban Crossroads 2020b).

*Energy Efficiency Strategies and Policies*

The third important focus within the 2016 RTP/SCS, for individual developments such as the proposed project, involves improving energy efficiency (e.g., reducing energy consumption) to reduce GHG emissions. The 2016 RTP/SCS goal is to actively encourage and create incentives for energy efficiency, where possible. The proposed project would comply with the applicable 2016 CALGreen standards.

Based on the analysis above, the proposed project would be consistent with the SCAG 2016 RTP/SCS

SCAG has developed Connect SoCal, the 2020-2045 RTP/SCS, which is a long-range visioning plan that balances future mobility and housing needs with economic, environmental and public health goals. Connect SoCal charts a path toward a more mobile, sustainable and prosperous region by making connections between transportation networks, between planning strategies and between the people whose collaboration can improve the quality of life for Southern Californians. Connect SoCal embodies a collective vision for the region's future and is developed with input from local

governments, county transportation commissions, tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura.

On September 3, 2020, Connect SoCal was adopted by SCAG's Regional Council. Connect SoCal is a long-range visioning plan that builds upon and expands land use and transportation strategies established over several planning cycles to increase mobility options and achieve a more sustainable growth pattern. The major goals of the Connect SoCal are outlined in Table 8-4, Project Consistency with the SCAG Connect SoCal RTP/SCS, along with the Project's consistency with them.

### Table 8-4. Project Consistency with the SCAG Connect SoCal RTP/SCS

| RTP/SCS Measure | Proposed Project Potential to Conflict |
|---|---|
| Encourage regional economic prosperity and global competitiveness. | Not applicable. The proposed project would not inhibit SCAG from encouraging regional economic prosperity and global competitiveness. |
| Improve mobility, accessibility, reliability, and travel safety for people and goods. | Not applicable. The proposed project would not inhibit SCAG from strengthening the regional transportation network for goods movement. |
| Enhance the preservation, security, and resilience of the regional transportation system. | Not applicable. The proposed project would not inhibit SCAG from enhancing the resilience of the regional transportation system. |
| Increase person and goods movement and travel choices within the transportation system. | Not applicable. The proposed project would not inhibit SCAG from increasing person and goods movement and travel choices within the transportation system. |
| Reduce greenhouse gas emissions and improve air quality. | No conflict. The proposed project would result in criteria air pollutant and GHG emissions during construction and operation. However, as presented in Section 3.2, the proposed project would not exceed the SCAQMD mass daily significance thresholds during construction or operation. GHG emissions would be reduced through compliance with applicable CALGreen standards. |
| Support healthy and equitable communities. | No conflict. A desert landscape design is proposed throughout the project site including water cascades, multiple pools, rock escarpments, and fountains. Landscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network. |
| Adapt to a changing climate and support an integrated regional development pattern and transportation network. | Not applicable. The Proposed Project would not inhibit SCAG from supporting an integrated regional development pattern and transportation network. |
| Leverage new transportation technologies and data-driven solutions that result in more efficient travel. | Not applicable. The Proposed Project would not inhibit SCAG from leveraging technology for the transportation system. |
| Encourage development of diverse housing types in areas that are supported by multiple transportation options. | Not applicable. The Proposed Project does not include housing and would not inhibit SCAG from encouraging development of diverse housing types. |
| Promote conservation of natural and agricultural lands and restoration of habitats. | No conflict. The proposed project site is vacant with dirt covering the majority of the site. The proposed project will provide approximately 35% open space made up of landscape areas, pools, water features, and paths. A desert landscape design is proposed throughout the project site |

Table 8-4. Project Consistency with the SCAG Connect SoCal RTP/SCS

| RTP/SCS Measure | Proposed Project Potential to Conflict |
|---|---|
| | including water cascades, multiple pools, rock escarpments, and fountains. Landscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network. The proposed plant palette would comprise of native, drought-tolerant plantings, consistent with the existing hotel landscaping and surrounding areas. |

**Source:** SCAG 2020.

As shown in Table 8-4, the project would be consistent with all applicable measures within the SCAG Connect SoCal RTP/SCS.

### Consistency with Executive Order S-3-05 and Senate Bill 32

- **EO S-3-05.** This EO establishes the following goals: GHG emissions should be reduced to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050.
- **SB 32.** This bill establishes for a statewide GHG emissions reduction target whereby CARB, in adopting rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions, shall ensure that statewide GHG emissions are reduced to at least 40% below 1990 levels by December 31, 2030.

This section evaluates whether the GHG emissions trajectory after proposed project completion would impede the attainment of the 2030 and 2050 GHG reduction goals identified in EOs B-30-15 and S-3-05.

To begin, CARB has expressed optimism with regard to both the 2030 and 2050 goals. It states in the First Update to the Climate Change Scoping Plan that "California is on track to meet the near-term 2020 GHG emissions limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32" (CARB 2014, p. ES2). With regard to the 2050 target for reducing GHG emissions to 80% below 1990 levels, the First Update to the Climate Change Scoping Plan states the following (CARB 2014, p. 34):

> This level of reduction is achievable in California. In fact, if California realizes the expected benefits of existing policy goals (such as 12,000 megawatts of renewable distributed generation by 2020, net zero energy homes after 2020, existing building retrofits under AB 758, and others) it could reduce emissions by 2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80% below 1990 levels by 2050. Additional measures, including locally driven measures and those necessary to meet federal air quality standards in 2032, could lead to even greater emission reductions.

In other words, CARB believes that the state is on a trajectory to meet the 2030 and 2050 GHG reduction targets set forth in AB 32, EO B-30-15, and EO S-3-05. This is confirmed in the 2017 Scoping Plan, which states (CARB 2017a):

> The Scoping Plan builds upon the successful framework established by the Initial Scoping Plan and First Update, while identifying new, technologically feasible and cost-effective strategies to ensure that California meets its GHG reduction targets in a way that promotes and rewards innovation, continues to foster economic growth, and delivers improvements to the environment and public health, including in disadvantaged communities.

Neither SCAQMD or Rancho Mirage adopted GHG thresholds of significance, and as discussed previously, the quantitative analysis provided herein is provided for informational purposes only. Nevertheless, the project would not exceed the SCAQMD's draft interim threshold of 3,000 MT $CO_2e$ per year (SCAQMD 2008), providing evidence that the project would not interfere with implementation of any of the above-described GHG reduction goals for 2030 or 2050 because . This unadopted threshold was established based on the goal of AB 32 to reduce statewide GHG emissions to 1990 levels by 2020. Because the proposed project would not exceed the threshold, this analysis provides support for the conclusion that the project would not impede the state's trajectory toward the above-described statewide GHG reduction goals for 2030 or 2050. In addition, the project would comply with laws and regulations that would reduce GHG emissions.

Furthermore, the proposed project would not conflict with the state's trajectory toward future GHG reductions. In addition, since the specific path to compliance for the state in regards to the long-term goals will likely require development of technology or other changes that are not currently known or available, specific additional mitigation measures for the project would be speculative and cannot be identified at this time. The proposed project's consistency would assist in meeting the City's contribution to GHG emission reduction targets in California. With respect to future GHG targets under SB 32 and EO S-3-05, CARB has also made clear its legal interpretation that it has the requisite authority to adopt whatever regulations are necessary, beyond the AB 32 horizon year of 2020, to meet SB 32's 40% reduction target by 2030 and EO S-3-05's 80% reduction target by 2050; this legal interpretation by an expert agency provides evidence that future regulations will be adopted to continue the state on its trajectory toward meeting these future GHG targets.

Based on the above considerations, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and no mitigation is required. This impact would be less than significant.

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# Appendix A

## CalEEMod Output Files

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# Ritz Carlton Rancho Mirage

**Riverside-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Enclosed Parking with Elevator | 381.00 | Space | 3.43 | 152,400.00 | 0 |
| Other Asphalt Surfaces | 77.85 | 1000sqft | 1.79 | 77,850.00 | 0 |
| Parking Lot | 129.00 | Space | 1.16 | 51,600.00 | 0 |
| Arena | 23.84 | 1000sqft | 7.66 | 23,840.00 | 0 |
| Quality Restaurant | 6.97 | 1000sqft | 0.16 | 6,966.00 | 0 |
| Recreational Swimming Pool | 23.75 | 1000sqft | 0.55 | 23,746.00 | 0 |
| Apartments Low Rise | 106.00 | Dwelling Unit | 6.63 | 106,000.00 | 303 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Rural | **Wind Speed (m/s)** | 2.4 | **Precipitation Freq (Days)** | 28 |
| **Climate Zone** | 10 | | | **Operational Year** | 2025 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 390.98 | **CH4 Intensity (lb/MWhr)** | 0.033 | **N2O Intensity (lb/MWhr)** | 0.004 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics.

Land Use - Venue modeled as Arena to represent event space. An approximately 5,513 square foot, 33-feet, 6-inches tall, community clubroom/lounge with access to a central pool terrace.

Construction Phase - Demolition and Site Preparation previously preformed. Schedule provided by applicant.

Off-road Equipment - Default values

Off-road Equipment - Default Values

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

Off-road Equipment - Default values

Off-road Equipment - Default values

Off-road Equipment - Default values

Trips and VMT - Based on applicant provided information.

On-road Fugitive Dust - Default values

Demolition - No demolition

Grading - Material export based on applicant provided 692 hauls trucks and extimated 10 cubic yard truck capacity. Total acres graded equal default values.

Architectural Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Vehicle Trips - Per TIA. Recreational Swimming Pool set equal to zero, as they are for residence use.

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Road Dust - Default values

Woodstoves - No woodstoves or fireplaces.

Area Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Landscape Equipment - Default values

Energy Use - Default values

Water And Wastewater - Coachella Valley Water District WRP-7 Assume 100% aerobic.

Solid Waste - Default values

Land Use Change -

Sequestration - Based on landscape plan: 845 trees will be planted.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps - Applicant provided information.

Stationary Sources - Emergency Generators and Fire Pumps EF - Default values

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblArchitecturalCoating | EF_Nonresidential_Exterior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Nonresidential_Interior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Exterior | 50.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Interior | 50.00 | 5.00 |
| tblAreaCoating | Area_EF_Nonresidential_Exterior | 100 | 5 |
| tblAreaCoating | Area_EF_Nonresidential_Interior | 100 | 5 |
| tblAreaCoating | Area_EF_Residential_Exterior | 50 | 5 |
| tblAreaCoating | Area_EF_Residential_Interior | 50 | 5 |
| tblConstructionPhase | NumDays | 20.00 | 67.00 |
| tblConstructionPhase | NumDays | 35.00 | 108.00 |
| tblConstructionPhase | NumDays | 20.00 | 22.00 |
| tblFireplaces | FireplaceDayYear | 25.00 | 0.00 |
| tblFireplaces | FireplaceHourDay | 3.00 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberGas | 90.10 | 0.00 |
| tblFireplaces | NumberNoFireplace | 10.60 | 0.00 |
| tblFireplaces | NumberWood | 5.30 | 0.00 |
| tblGrading | AcresOfGrading | 105.00 | 330.00 |
| tblGrading | MaterialExported | 0.00 | 6,920.00 |
| tblLandUse | LandUseSquareFeet | 6,970.00 | 6,966.00 |
| tblLandUse | LandUseSquareFeet | 23,750.00 | 23,746.00 |
| tblProjectCharacteristics | UrbanizationLevel | Urban | Rural |
| tblSequestration | NumberOfNewTrees | 0.00 | 845.00 |
| tblTripsAndVMT | HaulingTripNumber | 865.00 | 692.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 197.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 380.00 |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblTripsAndVMT | VendorTripNumber | 0.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 66.00 | 46.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 20.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | WorkerTripNumber | 20.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 218.00 | 50.00 |
| tblTripsAndVMT | WorkerTripNumber | 15.00 | 20.00 |
| tblTripsAndVMT | WorkerTripNumber | 44.00 | 70.00 |
| tblVehicleTrips | ST_TR | 8.14 | 7.14 |
| tblVehicleTrips | ST_TR | 10.71 | 25.58 |
| tblVehicleTrips | ST_TR | 90.04 | 43.98 |
| tblVehicleTrips | ST_TR | 9.10 | 0.00 |
| tblVehicleTrips | SU_TR | 6.28 | 6.10 |
| tblVehicleTrips | SU_TR | 10.71 | 25.58 |
| tblVehicleTrips | SU_TR | 71.97 | 33.63 |
| tblVehicleTrips | SU_TR | 13.60 | 0.00 |
| tblVehicleTrips | WD_TR | 10.71 | 0.00 |
| tblVehicleTrips | WD_TR | 83.84 | 41.92 |
| tblVehicleTrips | WD_TR | 28.82 | 0.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWoodstoves | NumberCatalytic | 5.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 5.30 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2023 | 0.3011 | 2.9760 | 2.7819 | 6.4400e-003 | 0.3678 | 0.1242 | 0.4920 | 0.1006 | 0.1153 | 0.2159 | 0.0000 | 571.6894 | 571.6894 | 0.1329 | 0.0137 | 579.0860 |
| 2024 | 0.3189 | 2.1046 | 2.6014 | 6.2700e-003 | 0.1881 | 0.0842 | 0.2723 | 0.0513 | 0.0793 | 0.1306 | 0.0000 | 562.9629 | 562.9629 | 0.0770 | 0.0262 | 572.6891 |
| **Maximum** | **0.3189** | **2.9760** | **2.7819** | **6.4400e-003** | **0.3678** | **0.1242** | **0.4920** | **0.1006** | **0.1153** | **0.2159** | **0.0000** | **571.6894** | **571.6894** | **0.1329** | **0.0262** | **579.0860** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2023 | 0.3011 | 2.9760 | 2.7819 | 6.4400e-003 | 0.2134 | 0.1242 | 0.3376 | 0.0583 | 0.1153 | 0.1736 | 0.0000 | 571.6889 | 571.6889 | 0.1329 | 0.0137 | 579.0855 |
| 2024 | 0.3189 | 2.1046 | 2.6014 | 6.2700e-003 | 0.1881 | 0.0842 | 0.2723 | 0.0513 | 0.0793 | 0.1306 | 0.0000 | 562.9626 | 562.9626 | 0.0770 | 0.0262 | 572.6887 |
| **Maximum** | **0.3189** | **2.9760** | **2.7819** | **6.4400e-003** | **0.2134** | **0.1242** | **0.3376** | **0.0583** | **0.1153** | **0.1736** | **0.0000** | **571.6889** | **571.6889** | **0.1329** | **0.0262** | **579.0855** |

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## EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **27.78** | **0.00** | **20.21** | **27.84** | **0.00** | **12.21** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **1** | **2-1-2023** | **4-30-2023** | 1.2362 | 1.2362 |
| **2** | **5-1-2023** | **7-31-2023** | 1.0536 | 1.0536 |
| **3** | **8-1-2023** | **10-31-2023** | 0.5934 | 0.5934 |
| **4** | **11-1-2023** | **1-31-2024** | 0.5835 | 0.5835 |
| **5** | **2-1-2024** | **4-30-2024** | 0.5470 | 0.5470 |
| **6** | **5-1-2024** | **7-31-2024** | 0.6327 | 0.6327 |
| **7** | **8-1-2024** | **9-30-2024** | 0.5322 | 0.5322 |
| | | **Highest** | 1.2362 | 1.2362 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| Energy | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 555.6353 | 555.6353 | 0.0320 | 7.5300e-003 | 558.6804 |
| Mobile | 0.6238 | 1.0413 | 6.6994 | 0.0163 | 1.7375 | 0.0131 | 1.7506 | 0.4642 | 0.0123 | 0.4764 | 0.0000 | 1,507.9183 | 1,507.9183 | 0.0755 | 0.0738 | 1,531.8121 |
| Stationary | 0.0492 | 0.2202 | 0.1255 | 2.4000e-004 | | 7.2400e-003 | 7.2400e-003 | | 7.2400e-003 | 7.2400e-003 | 0.0000 | 22.8478 | 22.8478 | 3.2000e-003 | 0.0000 | 22.9279 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 38.8038 | 0.0000 | 38.8038 | 2.2932 | 0.0000 | 96.1347 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 7.3223 | 59.6245 | 66.9469 | 0.0302 | 0.0165 | 72.6298 |
| **Total** | **1.2702** | **1.4789** | **8.0665** | **0.0179** | **1.7375** | **0.0424** | **1.7798** | **0.4642** | **0.0415** | **0.5057** | **46.1261** | **2,147.8275** | **2,193.9536** | **2.4360** | **0.0979** | **2,284.0302** |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| Energy | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 555.6353 | 555.6353 | 0.0320 | 7.5300e-003 | 558.6804 |
| Mobile | 0.6238 | 1.0413 | 6.6994 | 0.0163 | 1.7375 | 0.0131 | 1.7506 | 0.4642 | 0.0123 | 0.4764 | 0.0000 | 1,507.9183 | 1,507.9183 | 0.0755 | 0.0738 | 1,531.8121 |
| Stationary | 0.0492 | 0.2202 | 0.1255 | 2.4000e-004 | | 7.2400e-003 | 7.2400e-003 | | 7.2400e-003 | 7.2400e-003 | 0.0000 | 22.8478 | 22.8478 | 3.2000e-003 | 0.0000 | 22.9279 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 38.8038 | 0.0000 | 38.8038 | 2.2932 | 0.0000 | 96.1347 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 7.3223 | 59.6245 | 66.9469 | 0.0302 | 0.0165 | 72.6298 |
| **Total** | **1.2702** | **1.4789** | **8.0665** | **0.0179** | **1.7375** | **0.0424** | **1.7798** | **0.4642** | **0.0415** | **0.5057** | **46.1261** | **2,147.8275** | **2,193.9536** | **2.4360** | **0.0979** | **2,284.0302** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.3 Vegetation

**Vegetation**

| | CO2e |
|---|---|
| Category | MT |
| New Trees | 598.2600 |
| **Total** | **598.2600** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Grading | Grading | 2/1/2023 | 7/1/2023 | 5 | 108 | |
| 2 | Building Construction | Building Construction | 7/2/2023 | 11/29/2024 | 5 | 370 | |
| 3 | Architectural Coating/Finish Phase | Architectural Coating | 7/2/2024 | 10/2/2024 | 5 | 67 | |
| 4 | Paving | Paving | 9/29/2024 | 10/29/2024 | 5 | 22 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 330**

**Acres of Paving: 6.38**

**Residential Indoor: 214,650; Residential Outdoor: 71,550; Non-Residential Indoor: 54,479; Non-Residential Outdoor: 18,160; Striped Parking Area: 16,911 (Architectural Coating – sqft)**

**OffRoad Equipment**

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Architectural Coating/Finish Phase | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Grading | 8 | 10.00 | 8.00 | 692.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 50.00 | 46.00 | 60.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating/Finish Phase | 1 | 70.00 | 60.00 | 380.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 20.00 | 20.00 | 197.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.2808 | 0.0000 | 0.2808 | 0.0769 | 0.0000 | 0.0769 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1794 | 1.8638 | 1.5148 | 3.3500e-003 | | 0.0769 | 0.0769 | | 0.0708 | 0.0708 | 0.0000 | 294.4901 | 294.4901 | 0.0952 | 0.0000 | 296.8712 |
| **Total** | **0.1794** | **1.8638** | **1.5148** | **3.3500e-003** | **0.2808** | **0.0769** | **0.3577** | **0.0769** | **0.0708** | **0.1477** | **0.0000** | **294.4901** | **294.4901** | **0.0952** | **0.0000** | **296.8712** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 7.3000e-004 | 0.0365 | 9.5900e-003 | 1.9000e-004 | 5.9700e-003 | 4.2000e-004 | 6.3900e-003 | 1.6400e-003 | 4.0000e-004 | 2.0400e-003 | 0.0000 | 18.4308 | 18.4308 | 2.6000e-004 | 2.9000e-003 | 19.3028 |
| Vendor | 4.9000e-004 | 0.0162 | 6.0800e-003 | 9.0000e-005 | 3.1200e-003 | 1.4000e-004 | 3.2600e-003 | 9.0000e-004 | 1.3000e-004 | 1.0400e-003 | 0.0000 | 8.2171 | 8.2171 | 8.0000e-005 | 1.2100e-003 | 8.5809 |
| Worker | 2.1200e-003 | 1.6600e-003 | 0.0218 | 7.0000e-005 | 7.9900e-003 | 4.0000e-005 | 8.0300e-003 | 2.1200e-003 | 3.0000e-005 | 2.1600e-003 | 0.0000 | 6.0474 | 6.0474 | 1.3000e-004 | 1.5000e-004 | 6.0957 |
| **Total** | **3.3400e-003** | **0.0543** | **0.0375** | **3.5000e-004** | **0.0171** | **6.0000e-004** | **0.0177** | **4.6600e-003** | **5.6000e-004** | **5.2400e-003** | **0.0000** | **32.6953** | **32.6953** | **4.7000e-004** | **4.2600e-003** | **33.9794** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1264 | 0.0000 | 0.1264 | 0.0346 | 0.0000 | 0.0346 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1794 | 1.8638 | 1.5148 | 3.3500e-003 | | 0.0769 | 0.0769 | | 0.0708 | 0.0708 | 0.0000 | 294.4898 | 294.4898 | 0.0952 | 0.0000 | 296.8709 |
| **Total** | **0.1794** | **1.8638** | **1.5148** | **3.3500e-003** | **0.1264** | **0.0769** | **0.2033** | **0.0346** | **0.0708** | **0.1054** | **0.0000** | **294.4898** | **294.4898** | **0.0952** | **0.0000** | **296.8709** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 7.3000e-004 | 0.0365 | 9.5900e-003 | 1.9000e-004 | 5.9700e-003 | 4.2000e-004 | 6.3900e-003 | 1.6400e-003 | 4.0000e-004 | 2.0400e-003 | 0.0000 | 18.4308 | 18.4308 | 2.6000e-004 | 2.9000e-003 | 19.3028 |
| Vendor | 4.9000e-004 | 0.0162 | 6.0800e-003 | 9.0000e-005 | 3.1200e-003 | 1.4000e-004 | 3.2600e-003 | 9.0000e-004 | 1.3000e-004 | 1.0400e-003 | 0.0000 | 8.2171 | 8.2171 | 8.0000e-005 | 1.2100e-003 | 8.5809 |
| Worker | 2.1200e-003 | 1.6600e-003 | 0.0218 | 7.0000e-005 | 7.9900e-003 | 4.0000e-005 | 8.0300e-003 | 2.1200e-003 | 3.0000e-005 | 2.1600e-003 | 0.0000 | 6.0474 | 6.0474 | 1.3000e-004 | 1.5000e-004 | 6.0957 |
| **Total** | **3.3400e-003** | **0.0543** | **0.0375** | **3.5000e-004** | **0.0171** | **6.0000e-004** | **0.0177** | **4.6600e-003** | **5.6000e-004** | **5.2400e-003** | **0.0000** | **32.6953** | **32.6953** | **4.7000e-004** | **4.2600e-003** | **33.9794** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1022 | 0.9350 | 1.0559 | 1.7500e-003 | | 0.0455 | 0.0455 | | 0.0428 | 0.0428 | 0.0000 | 150.6731 | 150.6731 | 0.0358 | 0.0000 | 151.5692 |
| **Total** | **0.1022** | **0.9350** | **1.0559** | **1.7500e-003** | | **0.0455** | **0.0455** | | **0.0428** | **0.0428** | **0.0000** | **150.6731** | **150.6731** | **0.0358** | **0.0000** | **151.5692** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.0000e-005 | 1.1100e-003 | 2.9000e-004 | 1.0000e-005 | 1.8000e-004 | 1.0000e-005 | 1.9000e-004 | 5.0000e-005 | 1.0000e-005 | 6.0000e-005 | 0.0000 | 0.5615 | 0.5615 | 1.0000e-005 | 9.0000e-005 | 0.5880 |
| Vendor | 3.4000e-003 | 0.1118 | 0.0421 | 5.9000e-004 | 0.0216 | 9.7000e-004 | 0.0226 | 6.2400e-003 | 9.3000e-004 | 7.1700e-003 | 0.0000 | 56.8733 | 56.8733 | 5.6000e-004 | 8.4000e-003 | 59.3912 |
| Worker | 0.0128 | 9.9800e-003 | 0.1314 | 4.0000e-004 | 0.0481 | 2.2000e-004 | 0.0483 | 0.0128 | 2.1000e-004 | 0.0130 | 0.0000 | 36.3962 | 36.3962 | 7.9000e-004 | 9.1000e-004 | 36.6871 |
| **Total** | **0.0162** | **0.1229** | **0.1738** | **1.0000e-003** | **0.0699** | **1.2000e-003** | **0.0711** | **0.0191** | **1.1500e-003** | **0.0202** | **0.0000** | **93.8309** | **93.8309** | **1.3600e-003** | **9.4000e-003** | **96.6663** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1022 | 0.9350 | 1.0559 | 1.7500e-003 | | 0.0455 | 0.0455 | | 0.0428 | 0.0428 | 0.0000 | 150.6729 | 150.6729 | 0.0358 | 0.0000 | 151.5690 |
| **Total** | **0.1022** | **0.9350** | **1.0559** | **1.7500e-003** | | **0.0455** | **0.0455** | | **0.0428** | **0.0428** | **0.0000** | **150.6729** | **150.6729** | **0.0358** | **0.0000** | **151.5690** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.0000e-005 | 1.1100e-003 | 2.9000e-004 | 1.0000e-005 | 1.8000e-004 | 1.0000e-005 | 1.9000e-004 | 5.0000e-005 | 1.0000e-005 | 6.0000e-005 | 0.0000 | 0.5615 | 0.5615 | 1.0000e-005 | 9.0000e-005 | 0.5880 |
| Vendor | 3.4000e-003 | 0.1118 | 0.0421 | 5.9000e-004 | 0.0216 | 9.7000e-004 | 0.0226 | 6.2400e-003 | 9.3000e-004 | 7.1700e-003 | 0.0000 | 56.8733 | 56.8733 | 5.6000e-004 | 8.4000e-003 | 59.3912 |
| Worker | 0.0128 | 9.9800e-003 | 0.1314 | 4.0000e-004 | 0.0481 | 2.2000e-004 | 0.0483 | 0.0128 | 2.1000e-004 | 0.0130 | 0.0000 | 36.3962 | 36.3962 | 7.9000e-004 | 9.1000e-004 | 36.6871 |
| **Total** | **0.0162** | **0.1229** | **0.1738** | **1.0000e-003** | **0.0699** | **1.2000e-003** | **0.0711** | **0.0191** | **1.1500e-003** | **0.0202** | **0.0000** | **93.8309** | **93.8309** | **1.3600e-003** | **9.4000e-003** | **96.6663** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1766 | 1.6133 | 1.9400 | 3.2300e-003 | | 0.0736 | 0.0736 | | 0.0692 | 0.0692 | 0.0000 | 278.2189 | 278.2189 | 0.0658 | 0.0000 | 279.8637 |
| **Total** | **0.1766** | **1.6133** | **1.9400** | **3.2300e-003** | | **0.0736** | **0.0736** | | **0.0692** | **0.0692** | **0.0000** | **278.2189** | **278.2189** | **0.0658** | **0.0000** | **279.8637** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 4.0000e-005 | 2.0600e-003 | 5.4000e-004 | 1.0000e-005 | 3.4000e-004 | 2.0000e-005 | 3.6000e-004 | 9.0000e-005 | 2.0000e-005 | 1.1000e-004 | 0.0000 | 1.0196 | 1.0196 | 2.0000e-005 | 1.6000e-004 | 1.0679 |
| Vendor | 6.1700e-003 | 0.2065 | 0.0768 | 1.0700e-003 | 0.0399 | 1.7800e-003 | 0.0417 | 0.0115 | 1.7100e-003 | 0.0132 | 0.0000 | 103.3797 | 103.3797 | 1.0800e-003 | 0.0153 | 107.9508 |
| Worker | 0.0220 | 0.0164 | 0.2266 | 7.1000e-004 | 0.0888 | 3.9000e-004 | 0.0892 | 0.0236 | 3.6000e-004 | 0.0239 | 0.0000 | 65.0657 | 65.0657 | 1.3200e-003 | 1.5600e-003 | 65.5628 |
| **Total** | **0.0283** | **0.2249** | **0.3039** | **1.7900e-003** | **0.1291** | **2.1900e-003** | **0.1313** | **0.0352** | **2.0900e-003** | **0.0373** | **0.0000** | **169.4651** | **169.4651** | **2.4200e-003** | **0.0170** | **174.5814** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1766 | 1.6133 | 1.9400 | 3.2300e-003 | | 0.0736 | 0.0736 | | 0.0692 | 0.0692 | 0.0000 | 278.2186 | 278.2186 | 0.0658 | 0.0000 | 279.8634 |
| **Total** | **0.1766** | **1.6133** | **1.9400** | **3.2300e-003** | | **0.0736** | **0.0736** | | **0.0692** | **0.0692** | **0.0000** | **278.2186** | **278.2186** | **0.0658** | **0.0000** | **279.8634** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 4.0000e-005 | 2.0600e-003 | 5.4000e-004 | 1.0000e-005 | 3.4000e-004 | 2.0000e-005 | 3.6000e-004 | 9.0000e-005 | 2.0000e-005 | 1.1000e-004 | 0.0000 | 1.0196 | 1.0196 | 2.0000e-005 | 1.6000e-004 | 1.0679 |
| Vendor | 6.1700e-003 | 0.2065 | 0.0768 | 1.0700e-003 | 0.0399 | 1.7800e-003 | 0.0417 | 0.0115 | 1.7100e-003 | 0.0132 | 0.0000 | 103.3797 | 103.3797 | 1.0800e-003 | 0.0153 | 107.9508 |
| Worker | 0.0220 | 0.0164 | 0.2266 | 7.1000e-004 | 0.0888 | 3.9000e-004 | 0.0892 | 0.0236 | 3.6000e-004 | 0.0239 | 0.0000 | 65.0657 | 65.0657 | 1.3200e-003 | 1.5600e-003 | 65.5628 |
| **Total** | **0.0283** | **0.2249** | **0.3039** | **1.7900e-003** | **0.1291** | **2.1900e-003** | **0.1313** | **0.0352** | **2.0900e-003** | **0.0373** | **0.0000** | **169.4651** | **169.4651** | **2.4200e-003** | **0.0170** | **174.5814** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Architectural Coating/Finish Phase - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0808 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 6.0600e-003 | 0.0408 | 0.0606 | 1.0000e-004 | | 2.0400e-003 | 2.0400e-003 | | 2.0400e-003 | 2.0400e-003 | 0.0000 | 8.5534 | 8.5534 | 4.8000e-004 | 0.0000 | 8.5654 |
| **Total** | **0.0868** | **0.0408** | **0.0606** | **1.0000e-004** | | **2.0400e-003** | **2.0400e-003** | | **2.0400e-003** | **2.0400e-003** | **0.0000** | **8.5534** | **8.5534** | **4.8000e-004** | **0.0000** | **8.5654** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 4.0000e-004 | 0.0201 | 5.3200e-003 | 1.0000e-004 | 3.2800e-003 | 2.3000e-004 | 3.5000e-003 | 9.0000e-004 | 2.2000e-004 | 1.1200e-003 | 0.0000 | 9.9556 | 9.9556 | 1.5000e-004 | 1.5700e-003 | 10.4270 |
| Vendor | 2.2500e-003 | 0.0752 | 0.0280 | 3.9000e-004 | 0.0145 | 6.5000e-004 | 0.0152 | 4.1900e-003 | 6.2000e-004 | 4.8100e-003 | 0.0000 | 37.6437 | 37.6437 | 3.9000e-004 | 5.5500e-003 | 39.3082 |
| Worker | 8.6100e-003 | 6.4000e-003 | 0.0886 | 2.8000e-004 | 0.0347 | 1.5000e-004 | 0.0349 | 9.2200e-003 | 1.4000e-004 | 9.3600e-003 | 0.0000 | 25.4298 | 25.4298 | 5.1000e-004 | 6.1000e-004 | 25.6241 |
| **Total** | **0.0113** | **0.1017** | **0.1218** | **7.7000e-004** | **0.0525** | **1.0300e-003** | **0.0535** | **0.0143** | **9.8000e-004** | **0.0153** | **0.0000** | **73.0292** | **73.0292** | **1.0500e-003** | **7.7300e-003** | **75.3593** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Architectural Coating/Finish Phase - 2024

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0808 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 6.0600e-003 | 0.0408 | 0.0606 | 1.0000e-004 | | 2.0400e-003 | 2.0400e-003 | | 2.0400e-003 | 2.0400e-003 | 0.0000 | 8.5534 | 8.5534 | 4.8000e-004 | 0.0000 | 8.5654 |
| **Total** | **0.0868** | **0.0408** | **0.0606** | **1.0000e-004** | | **2.0400e-003** | **2.0400e-003** | | **2.0400e-003** | **2.0400e-003** | **0.0000** | **8.5534** | **8.5534** | **4.8000e-004** | **0.0000** | **8.5654** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 4.0000e-004 | 0.0201 | 5.3200e-003 | 1.0000e-004 | 3.2800e-003 | 2.3000e-004 | 3.5000e-003 | 9.0000e-004 | 2.2000e-004 | 1.1200e-003 | 0.0000 | 9.9556 | 9.9556 | 1.5000e-004 | 1.5700e-003 | 10.4270 |
| Vendor | 2.2500e-003 | 0.0752 | 0.0280 | 3.9000e-004 | 0.0145 | 6.5000e-004 | 0.0152 | 4.1900e-003 | 6.2000e-004 | 4.8100e-003 | 0.0000 | 37.6437 | 37.6437 | 3.9000e-004 | 5.5500e-003 | 39.3082 |
| Worker | 8.6100e-003 | 6.4000e-003 | 0.0886 | 2.8000e-004 | 0.0347 | 1.5000e-004 | 0.0349 | 9.2200e-003 | 1.4000e-004 | 9.3600e-003 | 0.0000 | 25.4298 | 25.4298 | 5.1000e-004 | 6.1000e-004 | 25.6241 |
| **Total** | **0.0113** | **0.1017** | **0.1218** | **7.7000e-004** | **0.0525** | **1.0300e-003** | **0.0535** | **0.0143** | **9.8000e-004** | **0.0153** | **0.0000** | **73.0292** | **73.0292** | **1.0500e-003** | **7.7300e-003** | **75.3593** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Paving - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 3.8600e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0147** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.1000e-004 | 0.0104 | 2.7600e-003 | 5.0000e-005 | 1.7000e-003 | 1.2000e-004 | 1.8200e-003 | 4.7000e-004 | 1.1000e-004 | 5.8000e-004 | 0.0000 | 5.1612 | 5.1612 | 8.0000e-005 | 8.1000e-004 | 5.4056 |
| Vendor | 2.5000e-004 | 8.2300e-003 | 3.0600e-003 | 4.0000e-005 | 1.5900e-003 | 7.0000e-005 | 1.6600e-003 | 4.6000e-004 | 7.0000e-005 | 5.3000e-004 | 0.0000 | 4.1202 | 4.1202 | 4.0000e-005 | 6.1000e-004 | 4.3024 |
| Worker | 8.1000e-004 | 6.0000e-004 | 8.3100e-003 | 3.0000e-005 | 3.2600e-003 | 1.0000e-005 | 3.2700e-003 | 8.6000e-004 | 1.0000e-005 | 8.8000e-004 | 0.0000 | 2.3857 | 2.3857 | 5.0000e-005 | 6.0000e-005 | 2.4040 |
| **Total** | **1.2700e-003** | **0.0192** | **0.0141** | **1.2000e-004** | **6.5500e-003** | **2.0000e-004** | **6.7500e-003** | **1.7900e-003** | **1.9000e-004** | **1.9900e-003** | **0.0000** | **11.6672** | **11.6672** | **1.7000e-004** | **1.4800e-003** | **12.1119** |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Paving - 2024

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 3.8600e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0147** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.1000e-004 | 0.0104 | 2.7600e-003 | 5.0000e-005 | 1.7000e-003 | 1.2000e-004 | 1.8200e-003 | 4.7000e-004 | 1.1000e-004 | 5.8000e-004 | 0.0000 | 5.1612 | 5.1612 | 8.0000e-005 | 8.1000e-004 | 5.4056 |
| Vendor | 2.5000e-004 | 8.2300e-003 | 3.0600e-003 | 4.0000e-005 | 1.5900e-003 | 7.0000e-005 | 1.6600e-003 | 4.6000e-004 | 7.0000e-005 | 5.3000e-004 | 0.0000 | 4.1202 | 4.1202 | 4.0000e-005 | 6.1000e-004 | 4.3024 |
| Worker | 8.1000e-004 | 6.0000e-004 | 8.3100e-003 | 3.0000e-005 | 3.2600e-003 | 1.0000e-005 | 3.2700e-003 | 8.6000e-004 | 1.0000e-005 | 8.8000e-004 | 0.0000 | 2.3857 | 2.3857 | 5.0000e-005 | 6.0000e-005 | 2.4040 |
| **Total** | **1.2700e-003** | **0.0192** | **0.0141** | **1.2000e-004** | **6.5500e-003** | **2.0000e-004** | **6.7500e-003** | **1.7900e-003** | **1.9000e-004** | **1.9900e-003** | **0.0000** | **11.6672** | **11.6672** | **1.7000e-004** | **1.4800e-003** | **12.1119** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.6238 | 1.0413 | 6.6994 | 0.0163 | 1.7375 | 0.0131 | 1.7506 | 0.4642 | 0.0123 | 0.4764 | 0.0000 | 1,507.9183 | 1,507.9183 | 0.0755 | 0.0738 | 1,531.8121 |
| Unmitigated | 0.6238 | 1.0413 | 6.6994 | 0.0163 | 1.7375 | 0.0131 | 1.7506 | 0.4642 | 0.0123 | 0.4764 | 0.0000 | 1,507.9183 | 1,507.9183 | 0.0755 | 0.0738 | 1,531.8121 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 775.92 | 756.84 | 646.60 | 3,667,810 | 3,667,810 |
| Arena | 0.00 | 609.83 | 609.83 | 448,639 | 448,639 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | | |
| Other Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Parking Lot | 0.00 | 0.00 | 0.00 | | |
| Quality Restaurant | 292.18 | 306.54 | 234.40 | 477,516 | 477,516 |
| Recreational Swimming Pool | 0.00 | 0.00 | 0.00 | | |
| Total | 1,068.10 | 1,673.21 | 1,490.83 | 4,593,965 | 4,593,965 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 19.80 | 9.60 | 12.90 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Arena | 18.50 | 10.10 | 7.90 | 0.00 | 81.00 | 19.00 | 66 | 28 | 6 |
| Enclosed Parking with Elevator | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Other Asphalt Surfaces | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Parking Lot | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Quality Restaurant | 18.50 | 10.10 | 7.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Recreational Swimming Pool | 18.50 | 10.10 | 7.90 | 33.00 | 48.00 | 19.00 | 52 | 39 | 9 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Arena | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Enclosed Parking with Elevator | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Other Asphalt Surfaces | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Parking Lot | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Quality Restaurant | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Recreational Swimming Pool | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 327.5881 | 327.5881 | 0.0277 | 3.3500e-003 | 329.2781 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 327.5881 | 327.5881 | 0.0277 | 3.3500e-003 | 329.2781 |
| NaturalGas Mitigated | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 228.0472 | 228.0472 | 4.3700e-003 | 4.1800e-003 | 229.4024 |
| NaturalGas Unmitigated | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 228.0472 | 228.0472 | 4.3700e-003 | 4.1800e-003 | 229.4024 |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 1.60335e+006 | 8.6500e-003 | 0.0739 | 0.0314 | 4.7000e-004 | | 5.9700e-003 | 5.9700e-003 | | 5.9700e-003 | 5.9700e-003 | 0.0000 | 85.5607 | 85.5607 | 1.6400e-003 | 1.5700e-003 | 86.0691 |
| Arena | 770747 | 4.1600e-003 | 0.0378 | 0.0317 | 2.3000e-004 | | 2.8700e-003 | 2.8700e-003 | | 2.8700e-003 | 2.8700e-003 | 0.0000 | 41.1300 | 41.1300 | 7.9000e-004 | 7.5000e-004 | 41.3744 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 1.89935e+006 | 0.0102 | 0.0931 | 0.0782 | 5.6000e-004 | | 7.0800e-003 | 7.0800e-003 | | 7.0800e-003 | 7.0800e-003 | 0.0000 | 101.3565 | 101.3565 | 1.9400e-003 | 1.8600e-003 | 101.9588 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0231** | **0.2048** | **0.1414** | **1.2600e-003** | | **0.0159** | **0.0159** | | **0.0159** | **0.0159** | **0.0000** | **228.0472** | **228.0472** | **4.3700e-003** | **4.1800e-003** | **229.4024** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 1.60335e+006 | 8.6500e-003 | 0.0739 | 0.0314 | 4.7000e-004 | | 5.9700e-003 | 5.9700e-003 | | 5.9700e-003 | 5.9700e-003 | 0.0000 | 85.5607 | 85.5607 | 1.6400e-003 | 1.5700e-003 | 86.0691 |
| Arena | 770747 | 4.1600e-003 | 0.0378 | 0.0317 | 2.3000e-004 | | 2.8700e-003 | 2.8700e-003 | | 2.8700e-003 | 2.8700e-003 | 0.0000 | 41.1300 | 41.1300 | 7.9000e-004 | 7.5000e-004 | 41.3744 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 1.89935e+006 | 0.0102 | 0.0931 | 0.0782 | 5.6000e-004 | | 7.0800e-003 | 7.0800e-003 | | 7.0800e-003 | 7.0800e-003 | 0.0000 | 101.3565 | 101.3565 | 1.9400e-003 | 1.8600e-003 | 101.9588 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0231** | **0.2048** | **0.1414** | **1.2600e-003** | | **0.0159** | **0.0159** | | **0.0159** | **0.0159** | **0.0000** | **228.0472** | **228.0472** | **4.3700e-003** | **4.1800e-003** | **229.4024** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 442015 | 78.3893 | 6.6200e-003 | 8.0000e-004 | 78.7937 |
| Arena | 236493 | 41.9409 | 3.5400e-003 | 4.3000e-004 | 42.1573 |
| Enclosed Parking with Elevator | 829056 | 147.0294 | 0.0124 | 1.5000e-003 | 147.7879 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 18060 | 3.2029 | 2.7000e-004 | 3.0000e-005 | 3.2194 |
| Quality Restaurant | 321551 | 57.0256 | 4.8100e-003 | 5.8000e-004 | 57.3197 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **327.5881** | **0.0277** | **3.3400e-003** | **329.2781** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 442015 | 78.3893 | 6.6200e-003 | 8.0000e-004 | 78.7937 |
| Arena | 236493 | 41.9409 | 3.5400e-003 | 4.3000e-004 | 42.1573 |
| Enclosed Parking with Elevator | 829056 | 147.0294 | 0.0124 | 1.5000e-003 | 147.7879 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 18060 | 3.2029 | 2.7000e-004 | 3.0000e-005 | 3.2194 |
| Quality Restaurant | 321551 | 57.0256 | 4.8100e-003 | 5.8000e-004 | 57.3197 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **327.5881** | **0.0277** | **3.3400e-003** | **329.2781** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| Unmitigated | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 8.0800e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.5325 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0335 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| **Total** | **0.5741** | **0.0127** | **1.1003** | **6.0000e-005** | | **6.0900e-003** | **6.0900e-003** | | **6.0900e-003** | **6.0900e-003** | **0.0000** | **1.8016** | **1.8016** | **1.7500e-003** | **0.0000** | **1.8454** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 8.0800e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.5325 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0335 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| **Total** | **0.5741** | **0.0127** | **1.1003** | **6.0000e-005** | | **6.0900e-003** | **6.0900e-003** | | **6.0900e-003** | **6.0900e-003** | **0.0000** | **1.8016** | **1.8016** | **1.7500e-003** | **0.0000** | **1.8454** |

# 7.0 Water Detail

## 7.1 Mitigation Measures Water

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 66.9469 | 0.0302 | 0.0165 | 72.6298 |
| Unmitigated | 66.9469 | 0.0302 | 0.0165 | 72.6298 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 6.90633 / 4.35399 | 26.9704 | 0.0105 | 5.5600e-003 | 28.8907 |
| Arena | 10.2696 / 0.655504 | 28.6396 | 0.0146 | 8.1600e-003 | 31.4358 |
| Enclosed Parking with Elevator | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 2.11563 / 0.13504 | 5.9000 | 3.0100e-003 | 1.6800e-003 | 6.4761 |
| Recreational Swimming Pool | 1.40465 / 0.860914 | 5.4369 | 2.1300e-003 | 1.1300e-003 | 5.8272 |
| **Total** | | **66.9468** | **0.0302** | **0.0165** | **72.6298** |

## 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 6.90633 / 4.35399 | 26.9704 | 0.0105 | 5.5600e-003 | 28.8907 |
| Arena | 10.2696 / 0.655504 | 28.6396 | 0.0146 | 8.1600e-003 | 31.4358 |
| Enclosed Parking with Elevator | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 2.11563 / 0.13504 | 5.9000 | 3.0100e-003 | 1.6800e-003 | 6.4761 |
| Recreational Swimming Pool | 1.40465 / 0.860914 | 5.4369 | 2.1300e-003 | 1.1300e-003 | 5.8272 |
| **Total** | | **66.9468** | **0.0302** | **0.0165** | **72.6298** |

# 8.0 Waste Detail

## 8.1 Mitigation Measures Waste

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 38.8038 | 2.2932 | 0.0000 | 96.1347 |
| Unmitigated | 38.8038 | 2.2932 | 0.0000 | 96.1347 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 48.76 | 9.8978 | 0.5850 | 0.0000 | 24.5215 |
| Arena | 0.66 | 0.1340 | 7.9200e-003 | 0.0000 | 0.3319 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 6.36 | 1.2910 | 0.0763 | 0.0000 | 3.1985 |
| Recreational Swimming Pool | 135.38 | 27.4809 | 1.6241 | 0.0000 | 68.0828 |
| **Total** | | **38.8038** | **2.2933** | **0.0000** | **96.1347** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 48.76 | 9.8978 | 0.5850 | 0.0000 | 24.5215 |
| Arena | 0.66 | 0.1340 | 7.9200e-003 | 0.0000 | 0.3319 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 6.36 | 1.2910 | 0.0763 | 0.0000 | 3.1985 |
| Recreational Swimming Pool | 135.38 | 27.4809 | 1.6241 | 0.0000 | 68.0828 |
| **Total** | | **38.8038** | **2.2933** | **0.0000** | **96.1347** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|
| Emergency Generator | 1 | 1 | 50 | 1200 | 0.73 | Diesel |

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 10.1 Stationary Sources

**Unmitigated/Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equipment Type | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Emergency Generator - Diesel (750 - 9999 HP) | 0.0492 | 0.2202 | 0.1255 | 2.4000e-004 | | 7.2400e-003 | 7.2400e-003 | | 7.2400e-003 | 7.2400e-003 | 0.0000 | 22.8478 | 22.8478 | 3.2000e-003 | 0.0000 | 22.9279 |
| **Total** | **0.0492** | **0.2202** | **0.1255** | **2.4000e-004** | | **7.2400e-003** | **7.2400e-003** | | **7.2400e-003** | **7.2400e-003** | **0.0000** | **22.8478** | **22.8478** | **3.2000e-003** | **0.0000** | **22.9279** |

## 11.0 Vegetation

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT | | | |
| Unmitigated | 598.2600 | 0.0000 | 0.0000 | 598.2600 |

## 11.2 Net New Trees

**Species Class**

| | Number of Trees | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| | | MT | | | |
| Miscellaneous | 845 | 598.2600 | 0.0000 | 0.0000 | 598.2600 |
| **Total** | | **598.2600** | **0.0000** | **0.0000** | **598.2600** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# Ritz Carlton Rancho Mirage

**Riverside-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Enclosed Parking with Elevator | 381.00 | Space | 3.43 | 152,400.00 | 0 |
| Other Asphalt Surfaces | 77.85 | 1000sqft | 1.79 | 77,850.00 | 0 |
| Parking Lot | 129.00 | Space | 1.16 | 51,600.00 | 0 |
| Arena | 23.84 | 1000sqft | 7.66 | 23,840.00 | 0 |
| Quality Restaurant | 6.97 | 1000sqft | 0.16 | 6,966.00 | 0 |
| Recreational Swimming Pool | 23.75 | 1000sqft | 0.55 | 23,746.00 | 0 |
| Apartments Low Rise | 106.00 | Dwelling Unit | 6.63 | 106,000.00 | 303 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Rural | **Wind Speed (m/s)** | 2.4 | **Precipitation Freq (Days)** | 28 |
| **Climate Zone** | 10 | | | **Operational Year** | 2025 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 390.98 | **CH4 Intensity (lb/MWhr)** | 0.033 | **N2O Intensity (lb/MWhr)** | 0.004 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics.

Land Use - Venue modeled as Arena to represent event space. An approximately 5,513 square foot, 33-feet, 6-inches tall, community clubroom/lounge with access to a central pool terrace.

Construction Phase - Demolition and Site Preparation previously preformed. Schedule provided by applicant.

Off-road Equipment - Default values

Off-road Equipment - Default Values

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

Off-road Equipment - Default values

Off-road Equipment - Default values

Off-road Equipment - Default values

Trips and VMT - Based on applicant provided information.

On-road Fugitive Dust - Default values

Demolition - No demolition

Grading - Material export based on applicant provided 692 hauls trucks and extimated 10 cubic yard truck capacity. Total acres graded equal default values.

Architectural Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Vehicle Trips - Per TIA. Recreational Swimming Pool set equal to zero, as they are for residence use.

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Road Dust - Default values

Woodstoves - No woodstoves or fireplaces.

Area Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Landscape Equipment - Default values

Energy Use - Default values

Water And Wastewater - Coachella Valley Water District WRP-7 Assume 100% aerobic.

Solid Waste - Default values

Land Use Change -

Sequestration - Based on landscape plan: 845 trees will be planted.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps - Applicant provided information.

Stationary Sources - Emergency Generators and Fire Pumps EF - Default values

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblArchitecturalCoating | EF_Nonresidential_Exterior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Nonresidential_Interior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Exterior | 50.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Interior | 50.00 | 5.00 |
| tblAreaCoating | Area_EF_Nonresidential_Exterior | 100 | 5 |
| tblAreaCoating | Area_EF_Nonresidential_Interior | 100 | 5 |
| tblAreaCoating | Area_EF_Residential_Exterior | 50 | 5 |
| tblAreaCoating | Area_EF_Residential_Interior | 50 | 5 |
| tblConstructionPhase | NumDays | 20.00 | 67.00 |
| tblConstructionPhase | NumDays | 35.00 | 108.00 |
| tblConstructionPhase | NumDays | 20.00 | 22.00 |
| tblFireplaces | FireplaceDayYear | 25.00 | 0.00 |
| tblFireplaces | FireplaceHourDay | 3.00 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberGas | 90.10 | 0.00 |
| tblFireplaces | NumberNoFireplace | 10.60 | 0.00 |
| tblFireplaces | NumberWood | 5.30 | 0.00 |
| tblGrading | AcresOfGrading | 105.00 | 330.00 |
| tblGrading | MaterialExported | 0.00 | 6,920.00 |
| tblLandUse | LandUseSquareFeet | 6,970.00 | 6,966.00 |
| tblLandUse | LandUseSquareFeet | 23,750.00 | 23,746.00 |
| tblProjectCharacteristics | UrbanizationLevel | Urban | Rural |
| tblSequestration | NumberOfNewTrees | 0.00 | 845.00 |
| tblTripsAndVMT | HaulingTripNumber | 865.00 | 692.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 197.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 380.00 |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblTripsAndVMT | VendorTripNumber | 0.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 66.00 | 46.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 20.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | WorkerTripNumber | 20.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 218.00 | 50.00 |
| tblTripsAndVMT | WorkerTripNumber | 15.00 | 20.00 |
| tblTripsAndVMT | WorkerTripNumber | 44.00 | 70.00 |
| tblVehicleTrips | ST_TR | 8.14 | 7.14 |
| tblVehicleTrips | ST_TR | 10.71 | 25.58 |
| tblVehicleTrips | ST_TR | 90.04 | 43.98 |
| tblVehicleTrips | ST_TR | 9.10 | 0.00 |
| tblVehicleTrips | SU_TR | 6.28 | 6.10 |
| tblVehicleTrips | SU_TR | 10.71 | 25.58 |
| tblVehicleTrips | SU_TR | 71.97 | 33.63 |
| tblVehicleTrips | SU_TR | 13.60 | 0.00 |
| tblVehicleTrips | WD_TR | 10.71 | 0.00 |
| tblVehicleTrips | WD_TR | 83.84 | 41.92 |
| tblVehicleTrips | WD_TR | 28.82 | 0.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWoodstoves | NumberCatalytic | 5.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 5.30 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2023 | 3.3888 | 35.4691 | 28.8153 | 0.0685 | 5.5214 | 1.4355 | 6.9569 | 1.5114 | 1.3210 | 2.8325 | 0.0000 | 6,688.2255 | 6,688.2255 | 1.9540 | 0.1585 | 6,762.9834 |
| 2024 | 6.1507 | 30.5135 | 40.9793 | 0.1031 | 3.2896 | 1.2103 | 4.4999 | 0.8956 | 1.1332 | 2.0288 | 0.0000 | 10,302.2409 | 10,302.2409 | 1.4089 | 0.5560 | 10,503.1520 |
| **Maximum** | **6.1507** | **35.4691** | **40.9793** | **0.1031** | **5.5214** | **1.4355** | **6.9569** | **1.5114** | **1.3210** | **2.8325** | **0.0000** | **10,302.2409** | **10,302.2409** | **1.9540** | **0.5560** | **10,503.1520** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2023 | 3.3888 | 35.4691 | 28.8153 | 0.0685 | 2.6614 | 1.4355 | 4.0969 | 0.7283 | 1.3210 | 2.0493 | 0.0000 | 6,688.2255 | 6,688.2255 | 1.9540 | 0.1585 | 6,762.9834 |
| 2024 | 6.1507 | 30.5135 | 40.9793 | 0.1031 | 3.2896 | 1.2103 | 4.4999 | 0.8956 | 1.1332 | 2.0288 | 0.0000 | 10,302.2409 | 10,302.2409 | 1.4089 | 0.5560 | 10,503.1520 |
| **Maximum** | **6.1507** | **35.4691** | **40.9793** | **0.1031** | **3.2896** | **1.4355** | **4.4999** | **0.8956** | **1.3210** | **2.0493** | **0.0000** | **10,302.2409** | **10,302.2409** | **1.9540** | **0.5560** | **10,503.1520** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **32.46** | **0.00** | **24.96** | **32.54** | **0.00** | **16.11** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |
| Energy | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |
| Mobile | 5.2946 | 6.9510 | 52.2262 | 0.1213 | 12.3664 | 0.0924 | 12.4588 | 3.2992 | 0.0866 | 3.3858 | | 12,360.4534 | 12,360.4534 | 0.5881 | 0.5641 | 12,543.2482 |
| Stationary | 1.9693 | 8.8065 | 5.0213 | 9.4600e-003 | | 0.2897 | 0.2897 | | 0.2897 | 0.2897 | | 1,007.4170 | 1,007.4170 | 0.1412 | | 1,010.9480 |
| **Total** | **10.6205** | **16.9807** | **66.8244** | **0.1382** | **12.3664** | **0.5180** | **12.8844** | **3.2992** | **0.5122** | **3.8114** | **0.0000** | **14,761.1767** | **14,761.1767** | **0.7711** | **0.5893** | **14,956.0740** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |
| Energy | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |
| Mobile | 5.2946 | 6.9510 | 52.2262 | 0.1213 | 12.3664 | 0.0924 | 12.4588 | 3.2992 | 0.0866 | 3.3858 | | 12,360.4534 | 12,360.4534 | 0.5881 | 0.5641 | 12,543.2482 |
| Stationary | 1.9693 | 8.8065 | 5.0213 | 9.4600e-003 | | 0.2897 | 0.2897 | | 0.2897 | 0.2897 | | 1,007.4170 | 1,007.4170 | 0.1412 | | 1,010.9480 |
| **Total** | **10.6205** | **16.9807** | **66.8244** | **0.1382** | **12.3664** | **0.5180** | **12.8844** | **3.2992** | **0.5122** | **3.8114** | **0.0000** | **14,761.1767** | **14,761.1767** | **0.7711** | **0.5893** | **14,956.0740** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Grading | Grading | 2/1/2023 | 7/1/2023 | 5 | 108 | |
| 2 | Building Construction | Building Construction | 7/2/2023 | 11/29/2024 | 5 | 370 | |
| 3 | Architectural Coating/Finish Phase | Architectural Coating | 7/2/2024 | 10/2/2024 | 5 | 67 | |
| 4 | Paving | Paving | 9/29/2024 | 10/29/2024 | 5 | 22 | |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 330**

**Acres of Paving: 6.38**

**Residential Indoor: 214,650; Residential Outdoor: 71,550; Non-Residential Indoor: 54,479; Non-Residential Outdoor: 18,160; Striped Parking Area: 16,911 (Architectural Coating – sqft)**

## OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Architectural Coating/Finish Phase | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |

## Trips and VMT

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Grading | 8 | 10.00 | 8.00 | 692.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 50.00 | 46.00 | 60.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Architectural Coating/Finish Phase | 1 | 70.00 | 60.00 | 380.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 20.00 | 20.00 | 197.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Grading - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 5.2001 | 0.0000 | 5.2001 | 1.4239 | 0.0000 | 1.4239 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.3217 | 34.5156 | 28.0512 | 0.0621 | | 1.4245 | 1.4245 | | 1.3105 | 1.3105 | | 6,011.4777 | 6,011.4777 | 1.9442 | | 6,060.0836 |
| **Total** | **3.3217** | **34.5156** | **28.0512** | **0.0621** | **5.2001** | **1.4245** | **6.6246** | **1.4239** | **1.3105** | **2.7344** | | **6,011.4777** | **6,011.4777** | **1.9442** | | **6,060.0836** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0140 | 0.6399 | 0.1760 | 3.5200e-003 | 0.1121 | 7.7200e-003 | 0.1199 | 0.0307 | 7.3900e-003 | 0.0381 | | 375.9839 | 375.9839 | 5.3300e-003 | 0.0593 | 393.7723 |
| Vendor | 9.4400e-003 | 0.2848 | 0.1110 | 1.5800e-003 | 0.0586 | 2.6000e-003 | 0.0612 | 0.0169 | 2.4900e-003 | 0.0194 | | 167.5832 | 167.5832 | 1.6800e-003 | 0.0247 | 174.9980 |
| Worker | 0.0436 | 0.0288 | 0.4772 | 1.3200e-003 | 0.1505 | 6.9000e-004 | 0.1512 | 0.0399 | 6.3000e-004 | 0.0406 | | 133.1806 | 133.1806 | 2.7200e-003 | 2.9600e-003 | 134.1294 |
| **Total** | **0.0670** | **0.9535** | **0.7641** | **6.4200e-003** | **0.3213** | **0.0110** | **0.3323** | **0.0875** | **0.0105** | **0.0980** | | **676.7478** | **676.7478** | **9.7300e-003** | **0.0870** | **702.8998** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.3401 | 0.0000 | 2.3401 | 0.6407 | 0.0000 | 0.6407 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.3217 | 34.5156 | 28.0512 | 0.0621 | | 1.4245 | 1.4245 | | 1.3105 | 1.3105 | 0.0000 | 6,011.4777 | 6,011.4777 | 1.9442 | | 6,060.0836 |
| **Total** | **3.3217** | **34.5156** | **28.0512** | **0.0621** | **2.3401** | **1.4245** | **3.7646** | **0.6407** | **1.3105** | **1.9513** | **0.0000** | **6,011.4777** | **6,011.4777** | **1.9442** | | **6,060.0836** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0140 | 0.6399 | 0.1760 | 3.5200e-003 | 0.1121 | 7.7200e-003 | 0.1199 | 0.0307 | 7.3900e-003 | 0.0381 | | 375.9839 | 375.9839 | 5.3300e-003 | 0.0593 | 393.7723 |
| Vendor | 9.4400e-003 | 0.2848 | 0.1110 | 1.5800e-003 | 0.0586 | 2.6000e-003 | 0.0612 | 0.0169 | 2.4900e-003 | 0.0194 | | 167.5832 | 167.5832 | 1.6800e-003 | 0.0247 | 174.9980 |
| Worker | 0.0436 | 0.0288 | 0.4772 | 1.3200e-003 | 0.1505 | 6.9000e-004 | 0.1512 | 0.0399 | 6.3000e-004 | 0.0406 | | 133.1806 | 133.1806 | 2.7200e-003 | 2.9600e-003 | 134.1294 |
| **Total** | **0.0670** | **0.9535** | **0.7641** | **6.4200e-003** | **0.3213** | **0.0110** | **0.3323** | **0.0875** | **0.0105** | **0.0980** | | **676.7478** | **676.7478** | **9.7300e-003** | **0.0870** | **702.8998** |

## 3.3 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 3.5000e-004 | 0.0162 | 4.4500e-003 | 9.0000e-005 | 2.8400e-003 | 2.0000e-004 | 3.0300e-003 | 7.8000e-004 | 1.9000e-004 | 9.7000e-004 | | 9.5156 | 9.5156 | 1.3000e-004 | 1.5000e-003 | 9.9658 |
| Vendor | 0.0543 | 1.6377 | 0.6383 | 9.0900e-003 | 0.3372 | 0.0149 | 0.3521 | 0.0971 | 0.0143 | 0.1114 | | 963.6036 | 963.6036 | 9.6400e-003 | 0.1423 | 1,006.2386 |
| Worker | 0.2179 | 0.1440 | 2.3859 | 6.5900e-003 | 0.7526 | 3.4400e-003 | 0.7561 | 0.1996 | 3.1700e-003 | 0.2027 | | 665.9032 | 665.9032 | 0.0136 | 0.0148 | 670.6472 |
| **Total** | **0.2725** | **1.7979** | **3.0286** | **0.0158** | **1.0926** | **0.0186** | **1.1112** | **0.2974** | **0.0177** | **0.3151** | | **1,639.0223** | **1,639.0223** | **0.0234** | **0.1585** | **1,686.8516** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 3.5000e-004 | 0.0162 | 4.4500e-003 | 9.0000e-005 | 2.8400e-003 | 2.0000e-004 | 3.0300e-003 | 7.8000e-004 | 1.9000e-004 | 9.7000e-004 | | 9.5156 | 9.5156 | 1.3000e-004 | 1.5000e-003 | 9.9658 |
| Vendor | 0.0543 | 1.6377 | 0.6383 | 9.0900e-003 | 0.3372 | 0.0149 | 0.3521 | 0.0971 | 0.0143 | 0.1114 | | 963.6036 | 963.6036 | 9.6400e-003 | 0.1423 | 1,006.2386 |
| Worker | 0.2179 | 0.1440 | 2.3859 | 6.5900e-003 | 0.7526 | 3.4400e-003 | 0.7561 | 0.1996 | 3.1700e-003 | 0.2027 | | 665.9032 | 665.9032 | 0.0136 | 0.0148 | 670.6472 |
| **Total** | **0.2725** | **1.7979** | **3.0286** | **0.0158** | **1.0926** | **0.0186** | **1.1112** | **0.2974** | **0.0177** | **0.3151** | | **1,639.0223** | **1,639.0223** | **0.0234** | **0.1585** | **1,686.8516** |

## 3.3 Building Construction - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4716 | 13.4438 | 16.1668 | 0.0270 | | 0.6133 | 0.6133 | | 0.5769 | 0.5769 | | 2,555.6989 | 2,555.6989 | 0.6044 | | 2,570.8077 |
| **Total** | **1.4716** | **13.4438** | **16.1668** | **0.0270** | | **0.6133** | **0.6133** | | **0.5769** | **0.5769** | | **2,555.6989** | **2,555.6989** | **0.6044** | | **2,570.8077** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 3.5000e-004 | 0.0162 | 4.5000e-003 | 9.0000e-005 | 2.8400e-003 | 1.9000e-004 | 3.0300e-003 | 7.8000e-004 | 1.9000e-004 | 9.6000e-004 | | 9.3602 | 9.3602 | 1.4000e-004 | 1.4800e-003 | 9.8033 |
| Vendor | 0.0534 | 1.6382 | 0.6306 | 8.9400e-003 | 0.3372 | 0.0148 | 0.3520 | 0.0971 | 0.0142 | 0.1113 | | 948.7567 | 948.7567 | 9.9900e-003 | 0.1399 | 990.6836 |
| Worker | 0.2033 | 0.1280 | 2.2281 | 6.3800e-003 | 0.7526 | 3.2800e-003 | 0.7559 | 0.1996 | 3.0200e-003 | 0.2026 | | 644.7075 | 644.7075 | 0.0123 | 0.0137 | 649.0996 |
| **Total** | **0.2571** | **1.7824** | **2.8632** | **0.0154** | **1.0926** | **0.0183** | **1.1109** | **0.2974** | **0.0174** | **0.3148** | | **1,602.8244** | **1,602.8244** | **0.0224** | **0.1551** | **1,649.5865** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4716 | 13.4438 | 16.1668 | 0.0270 | | 0.6133 | 0.6133 | | 0.5769 | 0.5769 | 0.0000 | 2,555.6989 | 2,555.6989 | 0.6044 | | 2,570.8077 |
| **Total** | **1.4716** | **13.4438** | **16.1668** | **0.0270** | | **0.6133** | **0.6133** | | **0.5769** | **0.5769** | **0.0000** | **2,555.6989** | **2,555.6989** | **0.6044** | | **2,570.8077** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 3.5000e-004 | 0.0162 | 4.5000e-003 | 9.0000e-005 | 2.8400e-003 | 1.9000e-004 | 3.0300e-003 | 7.8000e-004 | 1.9000e-004 | 9.6000e-004 | | 9.3602 | 9.3602 | 1.4000e-004 | 1.4800e-003 | 9.8033 |
| Vendor | 0.0534 | 1.6382 | 0.6306 | 8.9400e-003 | 0.3372 | 0.0148 | 0.3520 | 0.0971 | 0.0142 | 0.1113 | | 948.7567 | 948.7567 | 9.9900e-003 | 0.1399 | 990.6836 |
| Worker | 0.2033 | 0.1280 | 2.2281 | 6.3800e-003 | 0.7526 | 3.2800e-003 | 0.7559 | 0.1996 | 3.0200e-003 | 0.2026 | | 644.7075 | 644.7075 | 0.0123 | 0.0137 | 649.0996 |
| **Total** | **0.2571** | **1.7824** | **2.8632** | **0.0154** | **1.0926** | **0.0183** | **1.1109** | **0.2974** | **0.0174** | **0.3148** | | **1,602.8244** | **1,602.8244** | **0.0224** | **0.1551** | **1,649.5865** |

## 3.4 Architectural Coating/Finish Phase - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 2.4111 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **2.5919** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Architectural Coating/Finish Phase - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0124 | 0.5680 | 0.1575 | 3.0600e-003 | 0.0993 | 6.8000e-003 | 0.1061 | 0.0272 | 6.5000e-003 | 0.0337 | | 327.3725 | 327.3725 | 4.9800e-003 | 0.0516 | 342.8729 |
| Vendor | 0.0696 | 2.1367 | 0.8226 | 0.0117 | 0.4398 | 0.0194 | 0.4591 | 0.1266 | 0.0185 | 0.1451 | | 1,237.5088 | 1,237.5088 | 0.0130 | 0.1824 | 1,292.1960 |
| Worker | 0.2846 | 0.1791 | 3.1193 | 8.9300e-003 | 1.0537 | 4.5900e-003 | 1.0583 | 0.2794 | 4.2300e-003 | 0.2836 | | 902.5905 | 902.5905 | 0.0172 | 0.0192 | 908.7394 |
| **Total** | **0.3667** | **2.8839** | **4.0993** | **0.0237** | **1.5927** | **0.0307** | **1.6234** | **0.4332** | **0.0292** | **0.4625** | | **2,467.4717** | **2,467.4717** | **0.0352** | **0.2532** | **2,543.8082** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 2.4111 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **2.5919** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Architectural Coating/Finish Phase - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0124 | 0.5680 | 0.1575 | 3.0600e-003 | 0.0993 | 6.8000e-003 | 0.1061 | 0.0272 | 6.5000e-003 | 0.0337 | | 327.3725 | 327.3725 | 4.9800e-003 | 0.0516 | 342.8729 |
| Vendor | 0.0696 | 2.1367 | 0.8226 | 0.0117 | 0.4398 | 0.0194 | 0.4591 | 0.1266 | 0.0185 | 0.1451 | | 1,237.5088 | 1,237.5088 | 0.0130 | 0.1824 | 1,292.1960 |
| Worker | 0.2846 | 0.1791 | 3.1193 | 8.9300e-003 | 1.0537 | 4.5900e-003 | 1.0583 | 0.2794 | 4.2300e-003 | 0.2836 | | 902.5905 | 902.5905 | 0.0172 | 0.0192 | 908.7394 |
| **Total** | **0.3667** | **2.8839** | **4.0993** | **0.0237** | **1.5927** | **0.0307** | **1.6234** | **0.4332** | **0.0292** | **0.4625** | | **2,467.4717** | **2,467.4717** | **0.0352** | **0.2532** | **2,543.8082** |

## 3.5 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.3513 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3395** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0196 | 0.8968 | 0.2486 | 4.8400e-003 | 0.1567 | 0.0107 | 0.1674 | 0.0430 | 0.0103 | 0.0532 | | 516.8648 | 516.8648 | 7.8700e-003 | 0.0815 | 541.3373 |
| Vendor | 0.0232 | 0.7123 | 0.2742 | 3.8900e-003 | 0.1466 | 6.4500e-003 | 0.1530 | 0.0422 | 6.1700e-003 | 0.0484 | | 412.5029 | 412.5029 | 4.3400e-003 | 0.0608 | 430.7320 |
| Worker | 0.0813 | 0.0512 | 0.8912 | 2.5500e-003 | 0.3010 | 1.3100e-003 | 0.3024 | 0.0798 | 1.2100e-003 | 0.0810 | | 257.8830 | 257.8830 | 4.9100e-003 | 5.4800e-003 | 259.6398 |
| **Total** | **0.1241** | **1.6602** | **1.4140** | **0.0113** | **0.6043** | **0.0185** | **0.6228** | **0.1650** | **0.0177** | **0.1826** | | **1,187.2507** | **1,187.2507** | **0.0171** | **0.1478** | **1,231.7091** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.3513 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3395** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

### 3.5 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0196 | 0.8968 | 0.2486 | 4.8400e-003 | 0.1567 | 0.0107 | 0.1674 | 0.0430 | 0.0103 | 0.0532 | | 516.8648 | 516.8648 | 7.8700e-003 | 0.0815 | 541.3373 |
| Vendor | 0.0232 | 0.7123 | 0.2742 | 3.8900e-003 | 0.1466 | 6.4500e-003 | 0.1530 | 0.0422 | 6.1700e-003 | 0.0484 | | 412.5029 | 412.5029 | 4.3400e-003 | 0.0608 | 430.7320 |
| Worker | 0.0813 | 0.0512 | 0.8912 | 2.5500e-003 | 0.3010 | 1.3100e-003 | 0.3024 | 0.0798 | 1.2100e-003 | 0.0810 | | 257.8830 | 257.8830 | 4.9100e-003 | 5.4800e-003 | 259.6398 |
| **Total** | **0.1241** | **1.6602** | **1.4140** | **0.0113** | **0.6043** | **0.0185** | **0.6228** | **0.1650** | **0.0177** | **0.1826** | | **1,187.2507** | **1,187.2507** | **0.0171** | **0.1478** | **1,231.7091** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 5.2946 | 6.9510 | 52.2262 | 0.1213 | 12.3664 | 0.0924 | 12.4588 | 3.2992 | 0.0866 | 3.3858 | | 12,360.4534 | 12,360.4534 | 0.5881 | 0.5641 | 12,543.2482 |
| Unmitigated | 5.2946 | 6.9510 | 52.2262 | 0.1213 | 12.3664 | 0.0924 | 12.4588 | 3.2992 | 0.0866 | 3.3858 | | 12,360.4534 | 12,360.4534 | 0.5881 | 0.5641 | 12,543.2482 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 775.92 | 756.84 | 646.60 | 3,667,810 | 3,667,810 |
| Arena | 0.00 | 609.83 | 609.83 | 448,639 | 448,639 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | | |
| Other Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Parking Lot | 0.00 | 0.00 | 0.00 | | |
| Quality Restaurant | 292.18 | 306.54 | 234.40 | 477,516 | 477,516 |
| Recreational Swimming Pool | 0.00 | 0.00 | 0.00 | | |
| Total | 1,068.10 | 1,673.21 | 1,490.83 | 4,593,965 | 4,593,965 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 19.80 | 9.60 | 12.90 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Arena | 18.50 | 10.10 | 7.90 | 0.00 | 81.00 | 19.00 | 66 | 28 | 6 |
| Enclosed Parking with Elevator | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Other Asphalt Surfaces | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Parking Lot | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Quality Restaurant | 18.50 | 10.10 | 7.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Recreational Swimming Pool | 18.50 | 10.10 | 7.90 | 33.00 | 48.00 | 19.00 | 52 | 39 | 9 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Arena | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Enclosed Parking with Elevator | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Other Asphalt Surfaces | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Parking Lot | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Quality Restaurant | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Recreational Swimming Pool | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |
| NaturalGas Unmitigated | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 4392.73 | 0.0474 | 0.4048 | 0.1723 | 2.5800e-003 | | 0.0327 | 0.0327 | | 0.0327 | 0.0327 | | 516.7918 | 516.7918 | 9.9100e-003 | 9.4700e-003 | 519.8628 |
| Arena | 2111.64 | 0.0228 | 0.2070 | 0.1739 | 1.2400e-003 | | 0.0157 | 0.0157 | | 0.0157 | 0.0157 | | 248.4278 | 248.4278 | 4.7600e-003 | 4.5500e-003 | 249.9041 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 5203.7 | 0.0561 | 0.5102 | 0.4285 | 3.0600e-003 | | 0.0388 | 0.0388 | | 0.0388 | 0.0388 | | 612.1997 | 612.1997 | 0.0117 | 0.0112 | 615.8377 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.1263** | **1.1220** | **0.7747** | **6.8800e-003** | | **0.0872** | **0.0872** | | **0.0872** | **0.0872** | | **1,377.4193** | **1,377.4193** | **0.0264** | **0.0252** | **1,385.6046** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 4.39273 | 0.0474 | 0.4048 | 0.1723 | 2.5800e-003 | | 0.0327 | 0.0327 | | 0.0327 | 0.0327 | | 516.7918 | 516.7918 | 9.9100e-003 | 9.4700e-003 | 519.8628 |
| Arena | 2.11164 | 0.0228 | 0.2070 | 0.1739 | 1.2400e-003 | | 0.0157 | 0.0157 | | 0.0157 | 0.0157 | | 248.4278 | 248.4278 | 4.7600e-003 | 4.5500e-003 | 249.9041 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 5.2037 | 0.0561 | 0.5102 | 0.4285 | 3.0600e-003 | | 0.0388 | 0.0388 | | 0.0388 | 0.0388 | | 612.1997 | 612.1997 | 0.0117 | 0.0112 | 615.8377 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.1263** | **1.1220** | **0.7747** | **6.8800e-003** | | **0.0872** | **0.0872** | | **0.0872** | **0.0872** | | **1,377.4193** | **1,377.4193** | **0.0264** | **0.0252** | **1,385.6046** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |
| Unmitigated | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0443 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 2.9178 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.2683 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | | 15.8871 | 15.8871 | 0.0154 | | 16.2733 |
| **Total** | **3.2304** | **0.1012** | **8.8023** | **4.7000e-004** | | **0.0487** | **0.0487** | | **0.0487** | **0.0487** | **0.0000** | **15.8871** | **15.8871** | **0.0154** | **0.0000** | **16.2733** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0443 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 2.9178 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.2683 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | | 15.8871 | 15.8871 | 0.0154 | | 16.2733 |
| **Total** | **3.2304** | **0.1012** | **8.8023** | **4.7000e-004** | | **0.0487** | **0.0487** | | **0.0487** | **0.0487** | **0.0000** | **15.8871** | **15.8871** | **0.0154** | **0.0000** | **16.2733** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|
| Emergency Generator | 1 | 1 | 50 | 1200 | 0.73 | Diesel |

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 10.1 Stationary Sources

**Unmitigated/Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equipment Type | lb/day | | | | | | | | | | lb/day | | | | | |
| Emergency Generator - Diesel (750 - 9999 HP) | 1.9693 | 8.8065 | 5.0213 | 9.4600e-003 | | 0.2897 | 0.2897 | | 0.2897 | 0.2897 | | 1,007.4170 | 1,007.4170 | 0.1412 | | 1,010.9480 |
| **Total** | **1.9693** | **8.8065** | **5.0213** | **9.4600e-003** | | **0.2897** | **0.2897** | | **0.2897** | **0.2897** | | **1,007.4170** | **1,007.4170** | **0.1412** | | **1,010.9480** |

## 11.0 Vegetation

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# Ritz Carlton Rancho Mirage

**Riverside-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Enclosed Parking with Elevator | 381.00 | Space | 3.43 | 152,400.00 | 0 |
| Other Asphalt Surfaces | 77.85 | 1000sqft | 1.79 | 77,850.00 | 0 |
| Parking Lot | 129.00 | Space | 1.16 | 51,600.00 | 0 |
| Arena | 23.84 | 1000sqft | 7.66 | 23,840.00 | 0 |
| Quality Restaurant | 6.97 | 1000sqft | 0.16 | 6,966.00 | 0 |
| Recreational Swimming Pool | 23.75 | 1000sqft | 0.55 | 23,746.00 | 0 |
| Apartments Low Rise | 106.00 | Dwelling Unit | 6.63 | 106,000.00 | 303 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Rural | **Wind Speed (m/s)** | 2.4 | **Precipitation Freq (Days)** | 28 |
| **Climate Zone** | 10 | | | **Operational Year** | 2025 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 390.98 | **CH4 Intensity (lb/MWhr)** | 0.033 | **N2O Intensity (lb/MWhr)** | 0.004 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics.

Land Use - Venue modeled as Arena to represent event space. An approximately 5,513 square foot, 33-feet, 6-inches tall, community clubroom/lounge with access to a central pool terrace.

Construction Phase - Demolition and Site Preparation previously preformed. Schedule provided by applicant.

Off-road Equipment - Default values

Off-road Equipment - Default Values

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

Off-road Equipment - Default values

Off-road Equipment - Default values

Off-road Equipment - Default values

Trips and VMT - Based on applicant provided information.

On-road Fugitive Dust - Default values

Demolition - No demolition

Grading - Material export based on applicant provided 692 hauls trucks and extimated 10 cubic yard truck capacity. Total acres graded equal default values.

Architectural Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Vehicle Trips - Per TIA. Recreational Swimming Pool set equal to zero, as they are for residence use.

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Road Dust - Default values

Woodstoves - No woodstoves or fireplaces.

Area Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Landscape Equipment - Default values

Energy Use - Default values

Water And Wastewater - Coachella Valley Water District WRP-7 Assume 100% aerobic.

Solid Waste - Default values

Land Use Change -

Sequestration - Based on landscape plan: 845 trees will be planted.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps - Applicant provided information.

Stationary Sources - Emergency Generators and Fire Pumps EF - Default values

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblArchitecturalCoating | EF_Nonresidential_Exterior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Nonresidential_Interior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Exterior | 50.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Interior | 50.00 | 5.00 |
| tblAreaCoating | Area_EF_Nonresidential_Exterior | 100 | 5 |
| tblAreaCoating | Area_EF_Nonresidential_Interior | 100 | 5 |
| tblAreaCoating | Area_EF_Residential_Exterior | 50 | 5 |
| tblAreaCoating | Area_EF_Residential_Interior | 50 | 5 |
| tblConstructionPhase | NumDays | 20.00 | 67.00 |
| tblConstructionPhase | NumDays | 35.00 | 108.00 |
| tblConstructionPhase | NumDays | 20.00 | 22.00 |
| tblFireplaces | FireplaceDayYear | 25.00 | 0.00 |
| tblFireplaces | FireplaceHourDay | 3.00 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberGas | 90.10 | 0.00 |
| tblFireplaces | NumberNoFireplace | 10.60 | 0.00 |
| tblFireplaces | NumberWood | 5.30 | 0.00 |
| tblGrading | AcresOfGrading | 105.00 | 330.00 |
| tblGrading | MaterialExported | 0.00 | 6,920.00 |
| tblLandUse | LandUseSquareFeet | 6,970.00 | 6,966.00 |
| tblLandUse | LandUseSquareFeet | 23,750.00 | 23,746.00 |
| tblProjectCharacteristics | UrbanizationLevel | Urban | Rural |
| tblSequestration | NumberOfNewTrees | 0.00 | 845.00 |
| tblTripsAndVMT | HaulingTripNumber | 865.00 | 692.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 197.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 380.00 |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblTripsAndVMT | VendorTripNumber | 0.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 66.00 | 46.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 20.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | WorkerTripNumber | 20.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 218.00 | 50.00 |
| tblTripsAndVMT | WorkerTripNumber | 15.00 | 20.00 |
| tblTripsAndVMT | WorkerTripNumber | 44.00 | 70.00 |
| tblVehicleTrips | ST_TR | 8.14 | 7.14 |
| tblVehicleTrips | ST_TR | 10.71 | 25.58 |
| tblVehicleTrips | ST_TR | 90.04 | 43.98 |
| tblVehicleTrips | ST_TR | 9.10 | 0.00 |
| tblVehicleTrips | SU_TR | 6.28 | 6.10 |
| tblVehicleTrips | SU_TR | 10.71 | 25.58 |
| tblVehicleTrips | SU_TR | 71.97 | 33.63 |
| tblVehicleTrips | SU_TR | 13.60 | 0.00 |
| tblVehicleTrips | WD_TR | 10.71 | 0.00 |
| tblVehicleTrips | WD_TR | 83.84 | 41.92 |
| tblVehicleTrips | WD_TR | 28.82 | 0.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWoodstoves | NumberCatalytic | 5.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 5.30 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2023 | 3.3852 | 35.5254 | 28.7278 | 0.0684 | 5.5214 | 1.4355 | 6.9569 | 1.5114 | 1.3211 | 2.8325 | 0.0000 | 6,676.6293 | 6,676.6293 | 1.9538 | 0.1593 | 6,751.4535 |
| 2024 | 6.1165 | 30.8841 | 39.8055 | 0.1015 | 3.2896 | 1.2104 | 4.5001 | 0.8956 | 1.1333 | 2.0289 | 0.0000 | 10,139.5042 | 10,139.5042 | 1.4075 | 0.5583 | 10,341.0444 |
| **Maximum** | **6.1165** | **35.5254** | **39.8055** | **0.1015** | **5.5214** | **1.4355** | **6.9569** | **1.5114** | **1.3211** | **2.8325** | **0.0000** | **10,139.5042** | **10,139.5042** | **1.9538** | **0.5583** | **10,341.0444** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2023 | 3.3852 | 35.5254 | 28.7278 | 0.0684 | 2.6614 | 1.4355 | 4.0969 | 0.7283 | 1.3211 | 2.0493 | 0.0000 | 6,676.6293 | 6,676.6293 | 1.9538 | 0.1593 | 6,751.4535 |
| 2024 | 6.1165 | 30.8841 | 39.8055 | 0.1015 | 3.2896 | 1.2104 | 4.5001 | 0.8956 | 1.1333 | 2.0289 | 0.0000 | 10,139.5042 | 10,139.5042 | 1.4075 | 0.5583 | 10,341.0444 |
| **Maximum** | **6.1165** | **35.5254** | **39.8055** | **0.1015** | **3.2896** | **1.4355** | **4.5001** | **0.8956** | **1.3211** | **2.0493** | **0.0000** | **10,139.5042** | **10,139.5042** | **1.9538** | **0.5583** | **10,341.0444** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **32.46** | **0.00** | **24.96** | **32.54** | **0.00** | **16.11** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |
| Energy | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |
| Mobile | 4.5177 | 7.3724 | 46.1106 | 0.1126 | 12.3664 | 0.0924 | 12.4589 | 3.2992 | 0.0866 | 3.3858 | | 11,479.9934 | 11,479.9934 | 0.6007 | 0.5759 | 11,666.6164 |
| Stationary | 1.9693 | 8.8065 | 5.0213 | 9.4600e-003 | | 0.2897 | 0.2897 | | 0.2897 | 0.2897 | | 1,007.4170 | 1,007.4170 | 0.1412 | | 1,010.9480 |
| **Total** | **9.8436** | **17.4021** | **60.7088** | **0.1295** | **12.3664** | **0.5181** | **12.8845** | **3.2992** | **0.5123** | **3.8115** | **0.0000** | **13,880.7167** | **13,880.7167** | **0.7838** | **0.6011** | **14,079.4421** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |
| Energy | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |
| Mobile | 4.5177 | 7.3724 | 46.1106 | 0.1126 | 12.3664 | 0.0924 | 12.4589 | 3.2992 | 0.0866 | 3.3858 | | 11,479.9934 | 11,479.9934 | 0.6007 | 0.5759 | 11,666.6164 |
| Stationary | 1.9693 | 8.8065 | 5.0213 | 9.4600e-003 | | 0.2897 | 0.2897 | | 0.2897 | 0.2897 | | 1,007.4170 | 1,007.4170 | 0.1412 | | 1,010.9480 |
| **Total** | **9.8436** | **17.4021** | **60.7088** | **0.1295** | **12.3664** | **0.5181** | **12.8845** | **3.2992** | **0.5123** | **3.8115** | **0.0000** | **13,880.7167** | **13,880.7167** | **0.7838** | **0.6011** | **14,079.4421** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Grading | Grading | 2/1/2023 | 7/1/2023 | 5 | 108 | |
| 2 | Building Construction | Building Construction | 7/2/2023 | 11/29/2024 | 5 | 370 | |
| 3 | Architectural Coating/Finish Phase | Architectural Coating | 7/2/2024 | 10/2/2024 | 5 | 67 | |
| 4 | Paving | Paving | 9/29/2024 | 10/29/2024 | 5 | 22 | |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 330**

**Acres of Paving: 6.38**

**Residential Indoor: 214,650; Residential Outdoor: 71,550; Non-Residential Indoor: 54,479; Non-Residential Outdoor: 18,160; Striped Parking Area: 16,911 (Architectural Coating – sqft)**

## OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Architectural Coating/Finish Phase | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |

## Trips and VMT

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Grading | 8 | 10.00 | 8.00 | 692.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 50.00 | 46.00 | 60.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Architectural Coating/Finish Phase | 1 | 70.00 | 60.00 | 380.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 20.00 | 20.00 | 197.00 | 19.80 | 7.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Grading - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 5.2001 | 0.0000 | 5.2001 | 1.4239 | 0.0000 | 1.4239 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.3217 | 34.5156 | 28.0512 | 0.0621 | | 1.4245 | 1.4245 | | 1.3105 | 1.3105 | | 6,011.4777 | 6,011.4777 | 1.9442 | | 6,060.0836 |
| **Total** | **3.3217** | **34.5156** | **28.0512** | **0.0621** | **5.2001** | **1.4245** | **6.6246** | **1.4239** | **1.3105** | **2.7344** | | **6,011.4777** | **6,011.4777** | **1.9442** | | **6,060.0836** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0129 | 0.6780 | 0.1797 | 3.5300e-003 | 0.1121 | 7.7300e-003 | 0.1199 | 0.0307 | 7.4000e-003 | 0.0381 | | 376.5719 | 376.5719 | 5.2800e-003 | 0.0593 | 394.3867 |
| Vendor | 8.7800e-003 | 0.3019 | 0.1146 | 1.5800e-003 | 0.0586 | 2.6100e-003 | 0.0612 | 0.0169 | 2.4900e-003 | 0.0194 | | 167.9510 | 167.9510 | 1.6500e-003 | 0.0248 | 175.3874 |
| Worker | 0.0418 | 0.0299 | 0.3824 | 1.1900e-003 | 0.1505 | 6.9000e-004 | 0.1512 | 0.0399 | 6.3000e-004 | 0.0406 | | 120.6287 | 120.6287 | 2.6500e-003 | 3.0200e-003 | 121.5959 |
| **Total** | **0.0635** | **1.0098** | **0.6767** | **6.3000e-003** | **0.3213** | **0.0110** | **0.3323** | **0.0875** | **0.0105** | **0.0981** | | **665.1516** | **665.1516** | **9.5800e-003** | **0.0872** | **691.3700** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.3401 | 0.0000 | 2.3401 | 0.6407 | 0.0000 | 0.6407 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.3217 | 34.5156 | 28.0512 | 0.0621 | | 1.4245 | 1.4245 | | 1.3105 | 1.3105 | 0.0000 | 6,011.4777 | 6,011.4777 | 1.9442 | | 6,060.0836 |
| **Total** | **3.3217** | **34.5156** | **28.0512** | **0.0621** | **2.3401** | **1.4245** | **3.7646** | **0.6407** | **1.3105** | **1.9513** | **0.0000** | **6,011.4777** | **6,011.4777** | **1.9442** | | **6,060.0836** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0129 | 0.6780 | 0.1797 | 3.5300e-003 | 0.1121 | 7.7300e-003 | 0.1199 | 0.0307 | 7.4000e-003 | 0.0381 | | 376.5719 | 376.5719 | 5.2800e-003 | 0.0593 | 394.3867 |
| Vendor | 8.7800e-003 | 0.3019 | 0.1146 | 1.5800e-003 | 0.0586 | 2.6100e-003 | 0.0612 | 0.0169 | 2.4900e-003 | 0.0194 | | 167.9510 | 167.9510 | 1.6500e-003 | 0.0248 | 175.3874 |
| Worker | 0.0418 | 0.0299 | 0.3824 | 1.1900e-003 | 0.1505 | 6.9000e-004 | 0.1512 | 0.0399 | 6.3000e-004 | 0.0406 | | 120.6287 | 120.6287 | 2.6500e-003 | 3.0200e-003 | 121.5959 |
| **Total** | **0.0635** | **1.0098** | **0.6767** | **6.3000e-003** | **0.3213** | **0.0110** | **0.3323** | **0.0875** | **0.0105** | **0.0981** | | **665.1516** | **665.1516** | **9.5800e-003** | **0.0872** | **691.3700** |

## 3.3 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 3.3000e-004 | 0.0172 | 4.5500e-003 | 9.0000e-005 | 2.8400e-003 | 2.0000e-004 | 3.0300e-003 | 7.8000e-004 | 1.9000e-004 | 9.7000e-004 | | 9.5305 | 9.5305 | 1.3000e-004 | 1.5000e-003 | 9.9814 |
| Vendor | 0.0505 | 1.7358 | 0.6589 | 9.1100e-003 | 0.3372 | 0.0150 | 0.3521 | 0.0971 | 0.0143 | 0.1114 | | 965.7183 | 965.7183 | 9.4600e-003 | 0.1427 | 1,008.4773 |
| Worker | 0.2091 | 0.1493 | 1.9120 | 5.9700e-003 | 0.7526 | 3.4400e-003 | 0.7561 | 0.1996 | 3.1700e-003 | 0.2027 | | 603.1433 | 603.1433 | 0.0132 | 0.0151 | 607.9796 |
| **Total** | **0.2599** | **1.9023** | **2.5754** | **0.0152** | **1.0926** | **0.0186** | **1.1112** | **0.2974** | **0.0177** | **0.3151** | | **1,578.3920** | **1,578.3920** | **0.0228** | **0.1593** | **1,626.4383** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 3.3000e-004 | 0.0172 | 4.5500e-003 | 9.0000e-005 | 2.8400e-003 | 2.0000e-004 | 3.0300e-003 | 7.8000e-004 | 1.9000e-004 | 9.7000e-004 | | 9.5305 | 9.5305 | 1.3000e-004 | 1.5000e-003 | 9.9814 |
| Vendor | 0.0505 | 1.7358 | 0.6589 | 9.1100e-003 | 0.3372 | 0.0150 | 0.3521 | 0.0971 | 0.0143 | 0.1114 | | 965.7183 | 965.7183 | 9.4600e-003 | 0.1427 | 1,008.4773 |
| Worker | 0.2091 | 0.1493 | 1.9120 | 5.9700e-003 | 0.7526 | 3.4400e-003 | 0.7561 | 0.1996 | 3.1700e-003 | 0.2027 | | 603.1433 | 603.1433 | 0.0132 | 0.0151 | 607.9796 |
| **Total** | **0.2599** | **1.9023** | **2.5754** | **0.0152** | **1.0926** | **0.0186** | **1.1112** | **0.2974** | **0.0177** | **0.3151** | | **1,578.3920** | **1,578.3920** | **0.0228** | **0.1593** | **1,626.4383** |

## 3.3 Building Construction - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4716 | 13.4438 | 16.1668 | 0.0270 | | 0.6133 | 0.6133 | | 0.5769 | 0.5769 | | 2,555.6989 | 2,555.6989 | 0.6044 | | 2,570.8077 |
| **Total** | **1.4716** | **13.4438** | **16.1668** | **0.0270** | | **0.6133** | **0.6133** | | **0.5769** | **0.5769** | | **2,555.6989** | **2,555.6989** | **0.6044** | | **2,570.8077** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 3.3000e-004 | 0.0172 | 4.6000e-003 | 9.0000e-005 | 2.8400e-003 | 1.9000e-004 | 3.0300e-003 | 7.8000e-004 | 1.9000e-004 | 9.6000e-004 | | 9.3748 | 9.3748 | 1.4000e-004 | 1.4800e-003 | 9.8187 |
| Vendor | 0.0496 | 1.7364 | 0.6512 | 8.9600e-003 | 0.3372 | 0.0149 | 0.3520 | 0.0971 | 0.0142 | 0.1113 | | 950.8535 | 950.8535 | 9.8200e-003 | 0.1403 | 992.9010 |
| Worker | 0.1957 | 0.1327 | 1.7857 | 5.7800e-003 | 0.7526 | 3.2800e-003 | 0.7559 | 0.1996 | 3.0200e-003 | 0.2026 | | 584.0576 | 584.0576 | 0.0120 | 0.0140 | 588.5348 |
| **Total** | **0.2457** | **1.8863** | **2.4415** | **0.0148** | **1.0926** | **0.0184** | **1.1110** | **0.2974** | **0.0175** | **0.3148** | | **1,544.2859** | **1,544.2859** | **0.0219** | **0.1558** | **1,591.2545** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4716 | 13.4438 | 16.1668 | 0.0270 | | 0.6133 | 0.6133 | | 0.5769 | 0.5769 | 0.0000 | 2,555.6989 | 2,555.6989 | 0.6044 | | 2,570.8077 |
| **Total** | **1.4716** | **13.4438** | **16.1668** | **0.0270** | | **0.6133** | **0.6133** | | **0.5769** | **0.5769** | **0.0000** | **2,555.6989** | **2,555.6989** | **0.6044** | | **2,570.8077** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 3.3000e-004 | 0.0172 | 4.6000e-003 | 9.0000e-005 | 2.8400e-003 | 1.9000e-004 | 3.0300e-003 | 7.8000e-004 | 1.9000e-004 | 9.6000e-004 | | 9.3748 | 9.3748 | 1.4000e-004 | 1.4800e-003 | 9.8187 |
| Vendor | 0.0496 | 1.7364 | 0.6512 | 8.9600e-003 | 0.3372 | 0.0149 | 0.3520 | 0.0971 | 0.0142 | 0.1113 | | 950.8535 | 950.8535 | 9.8200e-003 | 0.1403 | 992.9010 |
| Worker | 0.1957 | 0.1327 | 1.7857 | 5.7800e-003 | 0.7526 | 3.2800e-003 | 0.7559 | 0.1996 | 3.0200e-003 | 0.2026 | | 584.0576 | 584.0576 | 0.0120 | 0.0140 | 588.5348 |
| **Total** | **0.2457** | **1.8863** | **2.4415** | **0.0148** | **1.0926** | **0.0184** | **1.1110** | **0.2974** | **0.0175** | **0.3148** | | **1,544.2859** | **1,544.2859** | **0.0219** | **0.1558** | **1,591.2545** |

## 3.4 Architectural Coating/Finish Phase - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 2.4111 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **2.5919** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Architectural Coating/Finish Phase - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0114 | 0.6019 | 0.1607 | 3.0700e-003 | 0.0993 | 6.8100e-003 | 0.1061 | 0.0272 | 6.5100e-003 | 0.0337 | | 327.8863 | 327.8863 | 4.9300e-003 | 0.0517 | 343.4098 |
| Vendor | 0.0647 | 2.2648 | 0.8494 | 0.0117 | 0.4398 | 0.0194 | 0.4592 | 0.1266 | 0.0186 | 0.1452 | | 1,240.2437 | 1,240.2437 | 0.0128 | 0.1830 | 1,295.0883 |
| Worker | 0.2740 | 0.1858 | 2.4999 | 8.0900e-003 | 1.0537 | 4.5900e-003 | 1.0583 | 0.2794 | 4.2300e-003 | 0.2836 | | 817.6806 | 817.6806 | 0.0168 | 0.0196 | 823.9487 |
| **Total** | **0.3501** | **3.0525** | **3.5101** | **0.0229** | **1.5927** | **0.0308** | **1.6235** | **0.4332** | **0.0293** | **0.4625** | | **2,385.8106** | **2,385.8106** | **0.0345** | **0.2543** | **2,462.4468** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 2.4111 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **2.5919** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Architectural Coating/Finish Phase - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0114 | 0.6019 | 0.1607 | 3.0700e-003 | 0.0993 | 6.8100e-003 | 0.1061 | 0.0272 | 6.5100e-003 | 0.0337 | | 327.8863 | 327.8863 | 4.9300e-003 | 0.0517 | 343.4098 |
| Vendor | 0.0647 | 2.2648 | 0.8494 | 0.0117 | 0.4398 | 0.0194 | 0.4592 | 0.1266 | 0.0186 | 0.1452 | | 1,240.2437 | 1,240.2437 | 0.0128 | 0.1830 | 1,295.0883 |
| Worker | 0.2740 | 0.1858 | 2.4999 | 8.0900e-003 | 1.0537 | 4.5900e-003 | 1.0583 | 0.2794 | 4.2300e-003 | 0.2836 | | 817.6806 | 817.6806 | 0.0168 | 0.0196 | 823.9487 |
| **Total** | **0.3501** | **3.0525** | **3.5101** | **0.0229** | **1.5927** | **0.0308** | **1.6235** | **0.4332** | **0.0293** | **0.4625** | | **2,385.8106** | **2,385.8106** | **0.0345** | **0.2543** | **2,462.4468** |

## 3.5 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.3513 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3395** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0180 | 0.9503 | 0.2538 | 4.8400e-003 | 0.1567 | 0.0107 | 0.1675 | 0.0430 | 0.0103 | 0.0532 | | 517.6760 | 517.6760 | 7.7900e-003 | 0.0816 | 542.1849 |
| Vendor | 0.0216 | 0.7549 | 0.2831 | 3.9000e-003 | 0.1466 | 6.4700e-003 | 0.1531 | 0.0422 | 6.1900e-003 | 0.0484 | | 413.4146 | 413.4146 | 4.2700e-003 | 0.0610 | 431.6961 |
| Worker | 0.0783 | 0.0531 | 0.7143 | 2.3100e-003 | 0.3010 | 1.3100e-003 | 0.3024 | 0.0798 | 1.2100e-003 | 0.0810 | | 233.6230 | 233.6230 | 4.7900e-003 | 5.6100e-003 | 235.4139 |
| **Total** | **0.1178** | **1.7583** | **1.2512** | **0.0111** | **0.6043** | **0.0185** | **0.6229** | **0.1650** | **0.0177** | **0.1827** | | **1,164.7136** | **1,164.7136** | **0.0169** | **0.1482** | **1,209.2949** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.3513 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3395** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

### 3.5 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0180 | 0.9503 | 0.2538 | 4.8400e-003 | 0.1567 | 0.0107 | 0.1675 | 0.0430 | 0.0103 | 0.0532 | | 517.6760 | 517.6760 | 7.7900e-003 | 0.0816 | 542.1849 |
| Vendor | 0.0216 | 0.7549 | 0.2831 | 3.9000e-003 | 0.1466 | 6.4700e-003 | 0.1531 | 0.0422 | 6.1900e-003 | 0.0484 | | 413.4146 | 413.4146 | 4.2700e-003 | 0.0610 | 431.6961 |
| Worker | 0.0783 | 0.0531 | 0.7143 | 2.3100e-003 | 0.3010 | 1.3100e-003 | 0.3024 | 0.0798 | 1.2100e-003 | 0.0810 | | 233.6230 | 233.6230 | 4.7900e-003 | 5.6100e-003 | 235.4139 |
| **Total** | **0.1178** | **1.7583** | **1.2512** | **0.0111** | **0.6043** | **0.0185** | **0.6229** | **0.1650** | **0.0177** | **0.1827** | | **1,164.7136** | **1,164.7136** | **0.0169** | **0.1482** | **1,209.2949** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 4.5177 | 7.3724 | 46.1106 | 0.1126 | 12.3664 | 0.0924 | 12.4589 | 3.2992 | 0.0866 | 3.3858 | | 11,479.9934 | 11,479.9934 | 0.6007 | 0.5759 | 11,666.6164 |
| Unmitigated | 4.5177 | 7.3724 | 46.1106 | 0.1126 | 12.3664 | 0.0924 | 12.4589 | 3.2992 | 0.0866 | 3.3858 | | 11,479.9934 | 11,479.9934 | 0.6007 | 0.5759 | 11,666.6164 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 775.92 | 756.84 | 646.60 | 3,667,810 | 3,667,810 |
| Arena | 0.00 | 609.83 | 609.83 | 448,639 | 448,639 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | | |
| Other Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Parking Lot | 0.00 | 0.00 | 0.00 | | |
| Quality Restaurant | 292.18 | 306.54 | 234.40 | 477,516 | 477,516 |
| Recreational Swimming Pool | 0.00 | 0.00 | 0.00 | | |
| Total | 1,068.10 | 1,673.21 | 1,490.83 | 4,593,965 | 4,593,965 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 19.80 | 9.60 | 12.90 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Arena | 18.50 | 10.10 | 7.90 | 0.00 | 81.00 | 19.00 | 66 | 28 | 6 |
| Enclosed Parking with Elevator | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Other Asphalt Surfaces | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Parking Lot | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Quality Restaurant | 18.50 | 10.10 | 7.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Recreational Swimming Pool | 18.50 | 10.10 | 7.90 | 33.00 | 48.00 | 19.00 | 52 | 39 | 9 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Arena | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Enclosed Parking with Elevator | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Other Asphalt Surfaces | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Parking Lot | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Quality Restaurant | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Recreational Swimming Pool | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |
| NaturalGas Unmitigated | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 4392.73 | 0.0474 | 0.4048 | 0.1723 | 2.5800e-003 | | 0.0327 | 0.0327 | | 0.0327 | 0.0327 | | 516.7918 | 516.7918 | 9.9100e-003 | 9.4700e-003 | 519.8628 |
| Arena | 2111.64 | 0.0228 | 0.2070 | 0.1739 | 1.2400e-003 | | 0.0157 | 0.0157 | | 0.0157 | 0.0157 | | 248.4278 | 248.4278 | 4.7600e-003 | 4.5500e-003 | 249.9041 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 5203.7 | 0.0561 | 0.5102 | 0.4285 | 3.0600e-003 | | 0.0388 | 0.0388 | | 0.0388 | 0.0388 | | 612.1997 | 612.1997 | 0.0117 | 0.0112 | 615.8377 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.1263** | **1.1220** | **0.7747** | **6.8800e-003** | | **0.0872** | **0.0872** | | **0.0872** | **0.0872** | | **1,377.4193** | **1,377.4193** | **0.0264** | **0.0252** | **1,385.6046** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 4.39273 | 0.0474 | 0.4048 | 0.1723 | 2.5800e-003 | | 0.0327 | 0.0327 | | 0.0327 | 0.0327 | | 516.7918 | 516.7918 | 9.9100e-003 | 9.4700e-003 | 519.8628 |
| Arena | 2.11164 | 0.0228 | 0.2070 | 0.1739 | 1.2400e-003 | | 0.0157 | 0.0157 | | 0.0157 | 0.0157 | | 248.4278 | 248.4278 | 4.7600e-003 | 4.5500e-003 | 249.9041 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 5.2037 | 0.0561 | 0.5102 | 0.4285 | 3.0600e-003 | | 0.0388 | 0.0388 | | 0.0388 | 0.0388 | | 612.1997 | 612.1997 | 0.0117 | 0.0112 | 615.8377 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.1263** | **1.1220** | **0.7747** | **6.8800e-003** | | **0.0872** | **0.0872** | | **0.0872** | **0.0872** | | **1,377.4193** | **1,377.4193** | **0.0264** | **0.0252** | **1,385.6046** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |
| Unmitigated | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0443 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 2.9178 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.2683 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | | 15.8871 | 15.8871 | 0.0154 | | 16.2733 |
| **Total** | **3.2304** | **0.1012** | **8.8023** | **4.7000e-004** | | **0.0487** | **0.0487** | | **0.0487** | **0.0487** | **0.0000** | **15.8871** | **15.8871** | **0.0154** | **0.0000** | **16.2733** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0443 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 2.9178 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.2683 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | | 15.8871 | 15.8871 | 0.0154 | | 16.2733 |
| **Total** | **3.2304** | **0.1012** | **8.8023** | **4.7000e-004** | | **0.0487** | **0.0487** | | **0.0487** | **0.0487** | **0.0000** | **15.8871** | **15.8871** | **0.0154** | **0.0000** | **16.2733** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

Ritz Carlton Rancho Mirage - Riverside-South Coast County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|
| Emergency Generator | 1 | 1 | 50 | 1200 | 0.73 | Diesel |

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 10.1 Stationary Sources

**Unmitigated/Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equipment Type | lb/day | | | | | | | | | | lb/day | | | | | |
| Emergency Generator - Diesel (750 - 9999 HP) | 1.9693 | 8.8065 | 5.0213 | 9.4600e-003 | | 0.2897 | 0.2897 | | 0.2897 | 0.2897 | | 1,007.4170 | 1,007.4170 | 0.1412 | | 1,010.9480 |
| **Total** | **1.9693** | **8.8065** | **5.0213** | **9.4600e-003** | | **0.2897** | **0.2897** | | **0.2897** | **0.2897** | | **1,007.4170** | **1,007.4170** | **0.1412** | | **1,010.9480** |

## 11.0 Vegetation

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# Ritz Carlton Rancho Mirage for LST

**Riverside-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Enclosed Parking with Elevator | 381.00 | Space | 3.43 | 152,400.00 | 0 |
| Other Asphalt Surfaces | 77.85 | 1000sqft | 1.79 | 77,850.00 | 0 |
| Parking Lot | 129.00 | Space | 1.16 | 51,600.00 | 0 |
| Arena | 23.84 | 1000sqft | 7.66 | 23,840.00 | 0 |
| Quality Restaurant | 6.97 | 1000sqft | 0.16 | 6,966.00 | 0 |
| Recreational Swimming Pool | 23.75 | 1000sqft | 0.55 | 23,746.00 | 0 |
| Apartments Low Rise | 106.00 | Dwelling Unit | 6.63 | 106,000.00 | 303 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Rural | **Wind Speed (m/s)** | 2.4 | **Precipitation Freq (Days)** | 28 |
| **Climate Zone** | 10 | | | **Operational Year** | 2025 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 390.98 | **CH4 Intensity (lb/MWhr)** | 0.033 | **N2O Intensity (lb/MWhr)** | 0.004 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics.

Land Use - Venue modeled as Arena to represent event space. An approximately 5,513 square foot, 33-feet, 6-inches tall, community clubroom/lounge with access to a central pool terrace.

Construction Phase - Demolition and Site Preparation previously preformed. Schedule provided by applicant.

Off-road Equipment - Default values

Off-road Equipment - Default Values

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

Off-road Equipment - Default values

Off-road Equipment - Default values

Off-road Equipment - Default values

Trips and VMT - Based on applicant provided information. For LST anlaysis trip lengths set equal to 1,000 ft for onsite operation only.

On-road Fugitive Dust - Default values

Demolition - No demolition

Grading - Material export based on applicant provided 692 hauls trucks and extimated 10 cubic yard truck capacity. Total acres graded equal default values.

Architectural Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Vehicle Trips - Per TIA. Recreational Swimming Pool set equal to zero, as they are for residence use.

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Road Dust - Default values

Woodstoves - No woodstoves or fireplaces.

Area Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Landscape Equipment - Default values

Energy Use - Default values

Water And Wastewater - Coachella Valley Water District WRP-7 Assume 100% aerobic.

Solid Waste - Default values

Land Use Change -

Sequestration - Based on landscape plan: 845 trees will be planted.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps - Applicant provided information.

Stationary Sources - Emergency Generators and Fire Pumps EF - Default values

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblArchitecturalCoating | EF_Nonresidential_Exterior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Nonresidential_Interior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Exterior | 50.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Interior | 50.00 | 5.00 |
| tblAreaCoating | Area_EF_Nonresidential_Exterior | 100 | 5 |
| tblAreaCoating | Area_EF_Nonresidential_Interior | 100 | 5 |
| tblAreaCoating | Area_EF_Residential_Exterior | 50 | 5 |
| tblAreaCoating | Area_EF_Residential_Interior | 50 | 5 |
| tblConstructionPhase | NumDays | 20.00 | 67.00 |
| tblConstructionPhase | NumDays | 35.00 | 108.00 |
| tblConstructionPhase | NumDays | 20.00 | 22.00 |
| tblFireplaces | FireplaceDayYear | 25.00 | 0.00 |
| tblFireplaces | FireplaceHourDay | 3.00 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberGas | 90.10 | 0.00 |
| tblFireplaces | NumberNoFireplace | 10.60 | 0.00 |
| tblFireplaces | NumberWood | 5.30 | 0.00 |
| tblGrading | AcresOfGrading | 105.00 | 330.00 |
| tblGrading | MaterialExported | 0.00 | 6,920.00 |
| tblLandUse | LandUseSquareFeet | 6,970.00 | 6,966.00 |
| tblLandUse | LandUseSquareFeet | 23,750.00 | 23,746.00 |
| tblProjectCharacteristics | UrbanizationLevel | Urban | Rural |
| tblSequestration | NumberOfNewTrees | 0.00 | 845.00 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblTripsAndVMT | HaulingTripNumber | 865.00 | 692.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 197.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 380.00 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 66.00 | 46.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 20.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.19 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.19 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.19 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.19 |
| tblTripsAndVMT | WorkerTripNumber | 20.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 218.00 | 50.00 |
| tblTripsAndVMT | WorkerTripNumber | 15.00 | 20.00 |
| tblTripsAndVMT | WorkerTripNumber | 44.00 | 70.00 |
| tblVehicleTrips | ST_TR | 8.14 | 7.14 |
| tblVehicleTrips | ST_TR | 10.71 | 25.58 |
| tblVehicleTrips | ST_TR | 90.04 | 43.98 |
| tblVehicleTrips | ST_TR | 9.10 | 0.00 |
| tblVehicleTrips | SU_TR | 6.28 | 6.10 |
| tblVehicleTrips | SU_TR | 10.71 | 25.58 |
| tblVehicleTrips | SU_TR | 71.97 | 33.63 |
| tblVehicleTrips | SU_TR | 13.60 | 0.00 |
| tblVehicleTrips | WD_TR | 10.71 | 0.00 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblVehicleTrips | WD_TR | 83.84 | 41.92 |
| tblVehicleTrips | WD_TR | 28.82 | 0.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWoodstoves | NumberCatalytic | 5.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 5.30 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2023 | 3.3529 | 34.7573 | 28.3032 | 0.0625 | 5.2045 | 1.4248 | 6.6293 | 1.4251 | 1.3108 | 2.7360 | 0.0000 | 6,057.2549 | 6,057.2549 | 1.9462 | 0.0195 | 6,108.0826 |
| 2024 | 5.7313 | 26.1877 | 34.8636 | 0.0563 | 0.0498 | 1.1456 | 1.1954 | 0.0144 | 1.0716 | 1.0859 | 0.0000 | 5,426.3912 | 5,426.3912 | 1.3559 | 0.0610 | 5,478.4687 |
| **Maximum** | **5.7313** | **34.7573** | **34.8636** | **0.0625** | **5.2045** | **1.4248** | **6.6293** | **1.4251** | **1.3108** | **2.7360** | **0.0000** | **6,057.2549** | **6,057.2549** | **1.9462** | **0.0610** | **6,108.0826** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2023 | 3.3529 | 34.7573 | 28.3032 | 0.0625 | 2.3444 | 1.4248 | 3.7692 | 0.6420 | 1.3108 | 1.9528 | 0.0000 | 6,057.2549 | 6,057.2549 | 1.9462 | 0.0195 | 6,108.0826 |
| 2024 | 5.7313 | 26.1877 | 34.8636 | 0.0563 | 0.0498 | 1.1456 | 1.1954 | 0.0144 | 1.0716 | 1.0859 | 0.0000 | 5,426.3912 | 5,426.3912 | 1.3559 | 0.0610 | 5,478.4687 |
| **Maximum** | **5.7313** | **34.7573** | **34.8636** | **0.0625** | **2.3444** | **1.4248** | **3.7692** | **0.6420** | **1.3108** | **1.9528** | **0.0000** | **6,057.2549** | **6,057.2549** | **1.9462** | **0.0610** | **6,108.0826** |

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **54.43** | **0.00** | **36.55** | **54.40** | **0.00** | **20.49** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |
| Energy | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |
| Mobile | 5.2946 | 6.9510 | 52.2262 | 0.1213 | 12.3664 | 0.0924 | 12.4588 | 3.2992 | 0.0866 | 3.3858 | | 12,360.4534 | 12,360.4534 | 0.5881 | 0.5641 | 12,543.2482 |
| Stationary | 1.9693 | 8.8065 | 5.0213 | 9.4600e-003 | | 0.2897 | 0.2897 | | 0.2897 | 0.2897 | | 1,007.4170 | 1,007.4170 | 0.1412 | | 1,010.9480 |
| **Total** | **10.6205** | **16.9807** | **66.8244** | **0.1382** | **12.3664** | **0.5180** | **12.8844** | **3.2992** | **0.5122** | **3.8114** | **0.0000** | **14,761.1767** | **14,761.1767** | **0.7711** | **0.5893** | **14,956.0740** |

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |
| Energy | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |
| Mobile | 5.2946 | 6.9510 | 52.2262 | 0.1213 | 12.3664 | 0.0924 | 12.4588 | 3.2992 | 0.0866 | 3.3858 | | 12,360.4534 | 12,360.4534 | 0.5881 | 0.5641 | 12,543.2482 |
| Stationary | 1.9693 | 8.8065 | 5.0213 | 9.4600e-003 | | 0.2897 | 0.2897 | | 0.2897 | 0.2897 | | 1,007.4170 | 1,007.4170 | 0.1412 | | 1,010.9480 |
| **Total** | **10.6205** | **16.9807** | **66.8244** | **0.1382** | **12.3664** | **0.5180** | **12.8844** | **3.2992** | **0.5122** | **3.8114** | **0.0000** | **14,761.1767** | **14,761.1767** | **0.7711** | **0.5893** | **14,956.0740** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Grading | Grading | 2/1/2023 | 7/1/2023 | 5 | 108 | |
| 2 | Building Construction | Building Construction | 7/2/2023 | 11/29/2024 | 5 | 370 | |
| 3 | Paving | Paving | 9/29/2024 | 10/29/2024 | 5 | 22 | |
| 4 | Architectural Coating/Finish Phase | Architectural Coating | 7/2/2024 | 10/2/2024 | 5 | 67 | |

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 330**

**Acres of Paving: 6.38**

**Residential Indoor: 214,650; Residential Outdoor: 71,550; Non-Residential Indoor: 54,479; Non-Residential Outdoor: 18,160; Striped Parking Area: 16,911 (Architectural Coating – sqft)**

## OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating/Finish Phase | Air Compressors | 1 | 6.00 | 78 | 0.48 |

## Trips and VMT

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Grading | 8 | 10.00 | 8.00 | 692.00 | 0.19 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 50.00 | 46.00 | 60.00 | 0.19 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Paving | 6 | 20.00 | 20.00 | 197.00 | 0.19 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating/Finish Phase | 1 | 70.00 | 60.00 | 380.00 | 0.19 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Grading - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 5.2001 | 0.0000 | 5.2001 | 1.4239 | 0.0000 | 1.4239 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.3217 | 34.5156 | 28.0512 | 0.0621 | | 1.4245 | 1.4245 | | 1.3105 | 1.3105 | | 6,011.4777 | 6,011.4777 | 1.9442 | | 6,060.0836 |
| **Total** | **3.3217** | **34.5156** | **28.0512** | **0.0621** | **5.2001** | **1.4245** | **6.6246** | **1.4239** | **1.3105** | **2.7344** | | **6,011.4777** | **6,011.4777** | **1.9442** | | **6,060.0836** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 8.5800e-003 | 0.1329 | 0.1179 | 2.3000e-004 | 1.2000e-003 | 1.5000e-004 | 1.3500e-003 | 3.4000e-004 | 1.4000e-004 | 4.8000e-004 | | 24.3182 | 24.3182 | 4.9000e-004 | 3.8300e-003 | 25.4708 |
| Vendor | 6.1800e-003 | 0.1040 | 0.0849 | 1.7000e-004 | 1.6200e-003 | 1.2000e-004 | 1.7300e-003 | 4.9000e-004 | 1.1000e-004 | 6.0000e-004 | | 18.2681 | 18.2681 | 4.1000e-004 | 2.8500e-003 | 19.1277 |
| Worker | 0.0164 | 4.8300e-003 | 0.0492 | 3.0000e-005 | 1.5400e-003 | 5.0000e-005 | 1.5900e-003 | 4.2000e-004 | 5.0000e-005 | 4.7000e-004 | | 3.1910 | 3.1910 | 1.1000e-003 | 6.1000e-004 | 3.4005 |
| **Total** | **0.0312** | **0.2417** | **0.2520** | **4.3000e-004** | **4.3600e-003** | **3.2000e-004** | **4.6700e-003** | **1.2500e-003** | **3.0000e-004** | **1.5500e-003** | | **45.7772** | **45.7772** | **2.0000e-003** | **7.2900e-003** | **47.9990** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.3401 | 0.0000 | 2.3401 | 0.6407 | 0.0000 | 0.6407 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.3217 | 34.5156 | 28.0512 | 0.0621 | | 1.4245 | 1.4245 | | 1.3105 | 1.3105 | 0.0000 | 6,011.4777 | 6,011.4777 | 1.9442 | | 6,060.0836 |
| **Total** | **3.3217** | **34.5156** | **28.0512** | **0.0621** | **2.3401** | **1.4245** | **3.7646** | **0.6407** | **1.3105** | **1.9513** | **0.0000** | **6,011.4777** | **6,011.4777** | **1.9442** | | **6,060.0836** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 8.5800e-003 | 0.1329 | 0.1179 | 2.3000e-004 | 1.2000e-003 | 1.5000e-004 | 1.3500e-003 | 3.4000e-004 | 1.4000e-004 | 4.8000e-004 | | 24.3182 | 24.3182 | 4.9000e-004 | 3.8300e-003 | 25.4708 |
| Vendor | 6.1800e-003 | 0.1040 | 0.0849 | 1.7000e-004 | 1.6200e-003 | 1.2000e-004 | 1.7300e-003 | 4.9000e-004 | 1.1000e-004 | 6.0000e-004 | | 18.2681 | 18.2681 | 4.1000e-004 | 2.8500e-003 | 19.1277 |
| Worker | 0.0164 | 4.8300e-003 | 0.0492 | 3.0000e-005 | 1.5400e-003 | 5.0000e-005 | 1.5900e-003 | 4.2000e-004 | 5.0000e-005 | 4.7000e-004 | | 3.1910 | 3.1910 | 1.1000e-003 | 6.1000e-004 | 3.4005 |
| **Total** | **0.0312** | **0.2417** | **0.2520** | **4.3000e-004** | **4.3600e-003** | **3.2000e-004** | **4.6700e-003** | **1.2500e-003** | **3.0000e-004** | **1.5500e-003** | | **45.7772** | **45.7772** | **2.0000e-003** | **7.2900e-003** | **47.9990** |

## 3.3 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 2.2000e-004 | 3.3600e-003 | 2.9800e-003 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | | 0.6155 | 0.6155 | 1.0000e-005 | 1.0000e-004 | 0.6446 |
| Vendor | 0.0355 | 0.5978 | 0.4883 | 9.9000e-004 | 9.2900e-003 | 6.8000e-004 | 9.9700e-003 | 2.8000e-003 | 6.5000e-004 | 3.4500e-003 | | 105.0415 | 105.0415 | 2.3400e-003 | 0.0164 | 109.9845 |
| Worker | 0.0820 | 0.0242 | 0.2459 | 1.6000e-004 | 7.7100e-003 | 2.6000e-004 | 7.9700e-003 | 2.1100e-003 | 2.4000e-004 | 2.3500e-003 | | 15.9548 | 15.9548 | 5.5000e-003 | 3.0500e-003 | 17.0024 |
| **Total** | **0.1177** | **0.6253** | **0.7372** | **1.1600e-003** | **0.0170** | **9.4000e-004** | **0.0180** | **4.9200e-003** | **8.9000e-004** | **5.8100e-003** | | **121.6117** | **121.6117** | **7.8500e-003** | **0.0195** | **127.6315** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 2.2000e-004 | 3.3600e-003 | 2.9800e-003 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | | 0.6155 | 0.6155 | 1.0000e-005 | 1.0000e-004 | 0.6446 |
| Vendor | 0.0355 | 0.5978 | 0.4883 | 9.9000e-004 | 9.2900e-003 | 6.8000e-004 | 9.9700e-003 | 2.8000e-003 | 6.5000e-004 | 3.4500e-003 | | 105.0415 | 105.0415 | 2.3400e-003 | 0.0164 | 109.9845 |
| Worker | 0.0820 | 0.0242 | 0.2459 | 1.6000e-004 | 7.7100e-003 | 2.6000e-004 | 7.9700e-003 | 2.1100e-003 | 2.4000e-004 | 2.3500e-003 | | 15.9548 | 15.9548 | 5.5000e-003 | 3.0500e-003 | 17.0024 |
| **Total** | **0.1177** | **0.6253** | **0.7372** | **1.1600e-003** | **0.0170** | **9.4000e-004** | **0.0180** | **4.9200e-003** | **8.9000e-004** | **5.8100e-003** | | **121.6117** | **121.6117** | **7.8500e-003** | **0.0195** | **127.6315** |

## 3.3 Building Construction - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4716 | 13.4438 | 16.1668 | 0.0270 | | 0.6133 | 0.6133 | | 0.5769 | 0.5769 | | 2,555.6989 | 2,555.6989 | 0.6044 | | 2,570.8077 |
| **Total** | **1.4716** | **13.4438** | **16.1668** | **0.0270** | | **0.6133** | **0.6133** | | **0.5769** | **0.5769** | | **2,555.6989** | **2,555.6989** | **0.6044** | | **2,570.8077** |

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 2.2000e-004 | 3.3600e-003 | 2.9800e-003 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | | 0.6059 | 0.6059 | 1.0000e-005 | 1.0000e-004 | 0.6346 |
| Vendor | 0.0352 | 0.5958 | 0.4848 | 9.7000e-004 | 9.2900e-003 | 6.7000e-004 | 9.9700e-003 | 2.8000e-003 | 6.4000e-004 | 3.4400e-003 | | 103.3932 | 103.3932 | 2.3400e-003 | 0.0161 | 108.2588 |
| Worker | 0.0758 | 0.0223 | 0.2362 | 1.5000e-004 | 7.7100e-003 | 2.5000e-004 | 7.9600e-003 | 2.1100e-003 | 2.3000e-004 | 2.3400e-003 | | 15.4415 | 15.4415 | 5.0600e-003 | 2.9000e-003 | 16.4329 |
| **Total** | **0.1112** | **0.6215** | **0.7240** | **1.1300e-003** | **0.0170** | **9.2000e-004** | **0.0180** | **4.9200e-003** | **8.7000e-004** | **5.7900e-003** | | **119.4406** | **119.4406** | **7.4100e-003** | **0.0191** | **125.3263** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4716 | 13.4438 | 16.1668 | 0.0270 | | 0.6133 | 0.6133 | | 0.5769 | 0.5769 | 0.0000 | 2,555.6989 | 2,555.6989 | 0.6044 | | 2,570.8077 |
| **Total** | **1.4716** | **13.4438** | **16.1668** | **0.0270** | | **0.6133** | **0.6133** | | **0.5769** | **0.5769** | **0.0000** | **2,555.6989** | **2,555.6989** | **0.6044** | | **2,570.8077** |

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 2.2000e-004 | 3.3600e-003 | 2.9800e-003 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | | 0.6059 | 0.6059 | 1.0000e-005 | 1.0000e-004 | 0.6346 |
| Vendor | 0.0352 | 0.5958 | 0.4848 | 9.7000e-004 | 9.2900e-003 | 6.7000e-004 | 9.9700e-003 | 2.8000e-003 | 6.4000e-004 | 3.4400e-003 | | 103.3932 | 103.3932 | 2.3400e-003 | 0.0161 | 108.2588 |
| Worker | 0.0758 | 0.0223 | 0.2362 | 1.5000e-004 | 7.7100e-003 | 2.5000e-004 | 7.9600e-003 | 2.1100e-003 | 2.3000e-004 | 2.3400e-003 | | 15.4415 | 15.4415 | 5.0600e-003 | 2.9000e-003 | 16.4329 |
| **Total** | **0.1112** | **0.6215** | **0.7240** | **1.1300e-003** | **0.0170** | **9.2000e-004** | **0.0180** | **4.9200e-003** | **8.7000e-004** | **5.7900e-003** | | **119.4406** | **119.4406** | **7.4100e-003** | **0.0191** | **125.3263** |

## 3.4 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.3513 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3395** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0120 | 0.1854 | 0.1645 | 3.1000e-004 | 1.6800e-003 | 2.0000e-004 | 1.8800e-003 | 4.8000e-004 | 1.9000e-004 | 6.7000e-004 | | 33.4567 | 33.4567 | 6.9000e-004 | 5.2700e-003 | 35.0431 |
| Vendor | 0.0153 | 0.2591 | 0.2108 | 4.2000e-004 | 4.0400e-003 | 2.9000e-004 | 4.3300e-003 | 1.2200e-003 | 2.8000e-004 | 1.5000e-003 | | 44.9536 | 44.9536 | 1.0200e-003 | 7.0100e-003 | 47.0691 |
| Worker | 0.0303 | 8.9200e-003 | 0.0945 | 6.0000e-005 | 3.0800e-003 | 1.0000e-004 | 3.1800e-003 | 8.4000e-004 | 9.0000e-005 | 9.4000e-004 | | 6.1766 | 6.1766 | 2.0200e-003 | 1.1600e-003 | 6.5732 |
| **Total** | **0.0576** | **0.4533** | **0.4697** | **7.9000e-004** | **8.8000e-003** | **5.9000e-004** | **9.3900e-003** | **2.5400e-003** | **5.6000e-004** | **3.1100e-003** | | **84.5869** | **84.5869** | **3.7300e-003** | **0.0134** | **88.6853** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.3513 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3395** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0120 | 0.1854 | 0.1645 | 3.1000e-004 | 1.6800e-003 | 2.0000e-004 | 1.8800e-003 | 4.8000e-004 | 1.9000e-004 | 6.7000e-004 | | 33.4567 | 33.4567 | 6.9000e-004 | 5.2700e-003 | 35.0431 |
| Vendor | 0.0153 | 0.2591 | 0.2108 | 4.2000e-004 | 4.0400e-003 | 2.9000e-004 | 4.3300e-003 | 1.2200e-003 | 2.8000e-004 | 1.5000e-003 | | 44.9536 | 44.9536 | 1.0200e-003 | 7.0100e-003 | 47.0691 |
| Worker | 0.0303 | 8.9200e-003 | 0.0945 | 6.0000e-005 | 3.0800e-003 | 1.0000e-004 | 3.1800e-003 | 8.4000e-004 | 9.0000e-005 | 9.4000e-004 | | 6.1766 | 6.1766 | 2.0200e-003 | 1.1600e-003 | 6.5732 |
| **Total** | **0.0576** | **0.4533** | **0.4697** | **7.9000e-004** | **8.8000e-003** | **5.9000e-004** | **9.3900e-003** | **2.5400e-003** | **5.6000e-004** | **3.1100e-003** | | **84.5869** | **84.5869** | **3.7300e-003** | **0.0134** | **88.6853** |

## 3.5 Architectural Coating/Finish Phase - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 2.4111 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **2.5919** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Architectural Coating/Finish Phase - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 7.5800e-003 | 0.1174 | 0.1042 | 2.0000e-004 | 1.0600e-003 | 1.3000e-004 | 1.1900e-003 | 3.0000e-004 | 1.2000e-004 | 4.2000e-004 | | 21.1909 | 21.1909 | 4.3000e-004 | 3.3400e-003 | 22.1956 |
| Vendor | 0.0460 | 0.7772 | 0.6324 | 1.2700e-003 | 0.0121 | 8.8000e-004 | 0.0130 | 3.6500e-003 | 8.4000e-004 | 4.4900e-003 | | 134.8607 | 134.8607 | 3.0500e-003 | 0.0210 | 141.2071 |
| Worker | 0.1061 | 0.0312 | 0.3307 | 2.1000e-004 | 0.0108 | 3.5000e-004 | 0.0111 | 2.9500e-003 | 3.2000e-004 | 3.2700e-003 | | 21.6181 | 21.6181 | 7.0800e-003 | 4.0600e-003 | 23.0061 |
| **Total** | **0.1596** | **0.9258** | **1.0672** | **1.6800e-003** | **0.0240** | **1.3600e-003** | **0.0253** | **6.9000e-003** | **1.2800e-003** | **8.1800e-003** | | **177.6696** | **177.6696** | **0.0106** | **0.0284** | **186.4088** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 2.4111 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **2.5919** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

### 3.5 Architectural Coating/Finish Phase - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 7.5800e-003 | 0.1174 | 0.1042 | 2.0000e-004 | 1.0600e-003 | 1.3000e-004 | 1.1900e-003 | 3.0000e-004 | 1.2000e-004 | 4.2000e-004 | | 21.1909 | 21.1909 | 4.3000e-004 | 3.3400e-003 | 22.1956 |
| Vendor | 0.0460 | 0.7772 | 0.6324 | 1.2700e-003 | 0.0121 | 8.8000e-004 | 0.0130 | 3.6500e-003 | 8.4000e-004 | 4.4900e-003 | | 134.8607 | 134.8607 | 3.0500e-003 | 0.0210 | 141.2071 |
| Worker | 0.1061 | 0.0312 | 0.3307 | 2.1000e-004 | 0.0108 | 3.5000e-004 | 0.0111 | 2.9500e-003 | 3.2000e-004 | 3.2700e-003 | | 21.6181 | 21.6181 | 7.0800e-003 | 4.0600e-003 | 23.0061 |
| **Total** | **0.1596** | **0.9258** | **1.0672** | **1.6800e-003** | **0.0240** | **1.3600e-003** | **0.0253** | **6.9000e-003** | **1.2800e-003** | **8.1800e-003** | | **177.6696** | **177.6696** | **0.0106** | **0.0284** | **186.4088** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 5.2946 | 6.9510 | 52.2262 | 0.1213 | 12.3664 | 0.0924 | 12.4588 | 3.2992 | 0.0866 | 3.3858 | | 12,360.4534 | 12,360.4534 | 0.5881 | 0.5641 | 12,543.2482 |
| Unmitigated | 5.2946 | 6.9510 | 52.2262 | 0.1213 | 12.3664 | 0.0924 | 12.4588 | 3.2992 | 0.0866 | 3.3858 | | 12,360.4534 | 12,360.4534 | 0.5881 | 0.5641 | 12,543.2482 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 775.92 | 756.84 | 646.60 | 3,667,810 | 3,667,810 |
| Arena | 0.00 | 609.83 | 609.83 | 448,639 | 448,639 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | | |
| Other Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Parking Lot | 0.00 | 0.00 | 0.00 | | |
| Quality Restaurant | 292.18 | 306.54 | 234.40 | 477,516 | 477,516 |
| Recreational Swimming Pool | 0.00 | 0.00 | 0.00 | | |
| Total | 1,068.10 | 1,673.21 | 1,490.83 | 4,593,965 | 4,593,965 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 19.80 | 9.60 | 12.90 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Arena | 18.50 | 10.10 | 7.90 | 0.00 | 81.00 | 19.00 | 66 | 28 | 6 |
| Enclosed Parking with Elevator | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Other Asphalt Surfaces | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Parking Lot | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Quality Restaurant | 18.50 | 10.10 | 7.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Recreational Swimming Pool | 18.50 | 10.10 | 7.90 | 33.00 | 48.00 | 19.00 | 52 | 39 | 9 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Arena | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Enclosed Parking with Elevator | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Other Asphalt Surfaces | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Parking Lot | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Quality Restaurant | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |
| Recreational Swimming Pool | 0.537845 | 0.056225 | 0.173186 | 0.138405 | 0.025906 | 0.007191 | 0.011447 | 0.018769 | 0.000611 | 0.000309 | 0.023821 | 0.001097 | 0.005189 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |
| NaturalGas Unmitigated | 0.1263 | 1.1220 | 0.7747 | 6.8900e-003 | | 0.0872 | 0.0872 | | 0.0872 | 0.0872 | | 1,377.4193 | 1,377.4193 | 0.0264 | 0.0253 | 1,385.6046 |

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 4392.73 | 0.0474 | 0.4048 | 0.1723 | 2.5800e-003 | | 0.0327 | 0.0327 | | 0.0327 | 0.0327 | | 516.7918 | 516.7918 | 9.9100e-003 | 9.4700e-003 | 519.8628 |
| Arena | 2111.64 | 0.0228 | 0.2070 | 0.1739 | 1.2400e-003 | | 0.0157 | 0.0157 | | 0.0157 | 0.0157 | | 248.4278 | 248.4278 | 4.7600e-003 | 4.5500e-003 | 249.9041 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 5203.7 | 0.0561 | 0.5102 | 0.4285 | 3.0600e-003 | | 0.0388 | 0.0388 | | 0.0388 | 0.0388 | | 612.1997 | 612.1997 | 0.0117 | 0.0112 | 615.8377 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.1263** | **1.1220** | **0.7747** | **6.8800e-003** | | **0.0872** | **0.0872** | | **0.0872** | **0.0872** | | **1,377.4193** | **1,377.4193** | **0.0264** | **0.0252** | **1,385.6046** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 4.39273 | 0.0474 | 0.4048 | 0.1723 | 2.5800e-003 | | 0.0327 | 0.0327 | | 0.0327 | 0.0327 | | 516.7918 | 516.7918 | 9.9100e-003 | 9.4700e-003 | 519.8628 |
| Arena | 2.11164 | 0.0228 | 0.2070 | 0.1739 | 1.2400e-003 | | 0.0157 | 0.0157 | | 0.0157 | 0.0157 | | 248.4278 | 248.4278 | 4.7600e-003 | 4.5500e-003 | 249.9041 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 5.2037 | 0.0561 | 0.5102 | 0.4285 | 3.0600e-003 | | 0.0388 | 0.0388 | | 0.0388 | 0.0388 | | 612.1997 | 612.1997 | 0.0117 | 0.0112 | 615.8377 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.1263** | **1.1220** | **0.7747** | **6.8800e-003** | | **0.0872** | **0.0872** | | **0.0872** | **0.0872** | | **1,377.4193** | **1,377.4193** | **0.0264** | **0.0252** | **1,385.6046** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |
| Unmitigated | 3.2304 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 15.8871 | 15.8871 | 0.0154 | 0.0000 | 16.2733 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0443 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 2.9178 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.2683 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | | 15.8871 | 15.8871 | 0.0154 | | 16.2733 |
| **Total** | **3.2304** | **0.1012** | **8.8023** | **4.7000e-004** | | **0.0487** | **0.0487** | | **0.0487** | **0.0487** | **0.0000** | **15.8871** | **15.8871** | **0.0154** | **0.0000** | **16.2733** |

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0443 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 2.9178 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.2683 | 0.1012 | 8.8023 | 4.7000e-004 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | | 15.8871 | 15.8871 | 0.0154 | | 16.2733 |
| **Total** | **3.2304** | **0.1012** | **8.8023** | **4.7000e-004** | | **0.0487** | **0.0487** | | **0.0487** | **0.0487** | **0.0000** | **15.8871** | **15.8871** | **0.0154** | **0.0000** | **16.2733** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

Ritz Carlton Rancho Mirage for LST - Riverside-South Coast County, Summer

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|
| Emergency Generator | 1 | 1 | 50 | 1200 | 0.73 | Diesel |

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 10.1 Stationary Sources

**Unmitigated/Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equipment Type | lb/day | | | | | | | | | | lb/day | | | | | |
| Emergency Generator - Diesel (750 - 9999 HP) | 1.9693 | 8.8065 | 5.0213 | 9.4600e-003 | | 0.2897 | 0.2897 | | 0.2897 | 0.2897 | | 1,007.4170 | 1,007.4170 | 0.1412 | | 1,010.9480 |
| **Total** | **1.9693** | **8.8065** | **5.0213** | **9.4600e-003** | | **0.2897** | **0.2897** | | **0.2897** | **0.2897** | | **1,007.4170** | **1,007.4170** | **0.1412** | | **1,010.9480** |

## 11.0 Vegetation

# Appendix B

## SCAQMD Risk Tool Files

# TIER 1/TIER 2 SCREENING RISK ASSESSMENT DATA INPUT

***(Procedure Version 8.1 & Package N, September 1, 2017 ) - Risk Tool V1.1***

| | |
|---|---|
| Application Deemed Complete Date | 03/18/20 |
| A/N | |
| Facility Name | |

| **1. Stack Data** | **Input** | **Units** |
|---|---|---|
| Hours/Day | 1 | hrs/day |
| Days/Week | 1 | days/wk |
| Weeks/Year | 50 | wks/yr |
| Control Efficiency | 0.000 | |
| Does source have T-BACT? | NO | |
| Source type (Point or Volume) | P | P or V |
| Stack Height or Building Height | 20 | feet |
| Building Area | 5000 | $ft^2$ |
| Distance-Residential | 170 | meters |
| Distance-Commercial | 170 | meters |
| Meteorological Station | Mission Viejo | |
| Project Duration<br>(Short term options: 2, 5, or 9 years; Else 30 years) | 30 | years |

| | |
|---|---|
| Source Type | Diesel ICE |
| Screening Mode (**NO** = Tier 1 or Tier 2; **YES** = Tier 3) | NO |

**TIER 2 SCREENING RISK ASSESSMENT REPORT**

***(Procedure Version 8.1 & Package N, September 1, 2017 ) - Risk Tool V1.1***

**A/N:** _____ **Fac:** _____ **Application deemed complete date:** 3/18/2020

**1. Stack Data**

| | | |
|---|---|---|
| Equipment Type | Diesel ICE | Engine Horse Power: 1200 BHP |
| | | Engine Year Built: 2020 |
| | | Generator Engine? YES |
| Combustion Eff | 0.0 | Engine Emission Factor: 0.07 g/bhp-hr |
| | No T-BACT | |
| Operation Schedule | 1 hrs/day | |
| | 1 days/week | |
| | 50 weeks/year | |
| Stack Height | 20 ft | |
| Distance to Residential | 170 m | |
| Distance to Commercial | 170 m | |
| Meteorological Station | Mission Viejo | |

**2. Tier 2 Data**

| Dispersion Factors tables | Point Source |
|---|---|
| For Chronic X/Q | Table 10 |
| For Acute X/Q max | Table 10.6 |

Dilution Factors

| Receptor | X/Q (µg/m³)/(tons/yr) | X/Qmax (µg/m³)/(lbs/hr) |
|---|---|---|
| Residential | 0.18 | 12.09 |
| Commercial - Worker | 0.18 | 8.67 |

Intake and Adjustment Factors

| | Residential | Worker |
|---|---|---|
| Year of Exposure | 30 | |
| Combined Exposure Factor (CEF) - Table 4 | 677.40 | 55.86 |
| Worker Adjustment Factor (WAF) - Table 5 | 1 | 4.20 |

A/N: _____ Application deemed complete date: 03/18/20

**3. Rule 1401 Compound Data**

| Compound | R1 - Uncontrolled (lbs/hr) | R2 - Controlled (lbs/hr) | CP $(mg/kg\text{-}day)^{-1}$ | MP MICR Resident | MP MICR Worker | MP Chronic Resident | MP Chronic Worker | REL Chronic ($\mu g/m^3$) | REL 8-hr Chronic ($\mu g/m^3$) | REL Acute ($\mu g/m^3$) | MWAF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Particulate Emissions from Diesel-Fueled E | 1.85E-01 | 1.67E-01 | 1.10E+00 | 1.00 | 1.00 | 1.00 | 1.00 | 5.00E+00 | | | 1 |
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A/N: _____ Application deemed complete date: 03/18/20

**4. Emission Calculations**

| Compound | R1 (lbs/hr) | R2 (lbs/hr) | R1 (lbs/day) | R2 (lbs/day) | R2 (lbs/yr) | R2 (tons/yr) |
|---|---|---|---|---|---|---|
| Particulate Emissions from Diesel-Fueled Er | 1.85E-01 | 1.67E-01 | 1.85E-01 | 1.67E-01 | 8.33E+00 | 4.16E-03 |
| | | | | | | |
| | | | | | | |
| | | | | | |

**TIER 2 RESULTS** **A/N:** _____ **Application deemed complete date:** 03/18/20

**5a. MICR**

MICR Resident = CP (mg/(kg-day))^-1 * Q (ton/yr) * (X/Q) Resident * CEF Resident * MP Resident * 1e-6 * MWAF

MICR Worker = CP (mg/(kg-day))^-1 * Q (ton/yr) * (X/Q) Worker * CEF Worker* MP Worker* WAF Worker* 1e-6 * MWAF

| Compound | Residential | Commercial |
|---|---|---|
| Particulate Emissions from Diesel-Fueled Er | 5.61E-07 | 1.94E-07 |
| **Total** | **5.61E-07** | **1.94E-07** |
| | **PASS** | **PASS** |

**5b. Is Cancer Burden Calculation Needed (MICR >1E-6)?** **NO**

New X/Q at which $MICR_{70yr}$ is one-in-a-million [(µg/m³)/(tons/yr)]:
New Distance, interpolated from X/Q table using New X/Q (meter):
Zone Impact Area (km²):
Zone of Impact Population (7000 person/km²):
**Cancer Burden:**

**6. Hazard Index Summary** **A/N:** _____ **Application deemed complete date:** 03/18/20

HIA = [Q(lb/hr) * (X/Q)max * MWAF ]/ Acute REL
HIC = [Q(ton/yr) * (X/Q) * MP * MWAF] / Chronic REL
HIC 8-hr= [Q(ton/yr) * (X/Q) * WAF * MWAF] / 8-hr Chronic REL

| Target Organs | Acute | Chronic | 8-hr Chronic | Acute Pass/Fail | Chronic Pass/Fail | 8-hr Chronic Pass/Fail |
|---|---|---|---|---|---|---|
| Alimentary system (liver) - AL | | | N/A | Pass | Pass | Pass |
| Bones and teeth - BN | | | N/A | Pass | Pass | Pass |
| Cardiovascular system - CV | | | N/A | Pass | Pass | Pass |
| Developmental - DEV | | | N/A | Pass | Pass | Pass |
| Endocrine system - END | | | N/A | Pass | Pass | Pass |
| Eye | | | N/A | Pass | Pass | Pass |
| Hematopoietic system - HEM | | | N/A | Pass | Pass | Pass |
| Immune system - IMM | | | N/A | Pass | Pass | Pass |
| Kidney - KID | | | N/A | Pass | Pass | Pass |
| Nervous system - NS | | | N/A | Pass | Pass | Pass |
| Reproductive system - REP | | | N/A | Pass | Pass | Pass |
| Respiratory system - RES | | 1.51E-04 | N/A | Pass | Pass | Pass |
| Skin | | | N/A | Pass | Pass | Pass |

**6a. Hazard Index Acute - Resident**

HIA = [Q(lb/hr) * (X/Q)max resident * MWAF] / Acute REL

| | HIA - Residential | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Compound | AL | CV | DEV | EYE | HEM | IMM | NS | REP | RESP | SKIN |
| Particulate Emissions from Diesel-Fueled Er | | | | | | | | | | |
| **Total** | | | | | | | | | | |

**6a. Hazard Index Acute - Worker** **A/N:** _____ **Application deemed complete date:** 03/18/20

HIA = [Q(lb/hr) * (X/Q)max Worker * MWAF] / Acute REL

| | HIA - Commercial | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Compound | AL | CV | DEV | EYE | HEM | IMM | NS | REP | RESP | SKIN |
| Particulate Emissions from Diesel-Fueled Er | | | | | | | | | | |
| **Total** | | | | | | | | | | |

# **Appendix A-2**
## Health Risk Assessment Memorandum

# MEMORANDUM

| | |
|---|---|
| **To:** | Kam Sang Company, Inc. |
| **From:** | Dudek |
| **Subject:** | Ritz-Carlton Rancho Mirage Project – Supplemental Construction Health Risk Assessment Technical Memorandum |
| **Date:** | July 2, 2024 |
| **Attachments:** | Attachment A – CalEEMod Files<br>Attachment B – AERMOD and HARP2 Outputs |

# 1 Introduction and Purpose

The purpose of this memorandum is to provide supplemental construction health risk assessment analysis in consideration of comments received by the City of Rancho Mirage (City) during the public review period for the Draft Initial Study/Mitigated Negative Declaration (IS/MND) for the Ritz-Carlton Rancho Mirage Project (project).

Comments raised concerns regarding health risks from diesel particulate matter (DPM) exhaust, which is a toxic air contaminant (TAC). A construction health risk assessment HRA was performed and detailed in this memorandum. While the construction HRA demonstrated an increase in the severity of construction health risk impacts than what was disclosed in the IS/MND, a new mitigation measure (MM-AQ-1), which the applicant has agreed to implement, would mitigate that impact to a level of insignificance as presented herein.

# 2 Supplemental Air Quality Analysis

## 2.1 Health Effects of Toxic Air Contaminants - Construction

### 2.1.1 Health Risk Assessment Methodology

Health risk impacts associated with exposure to TACs were qualitatively analyzed in the IS/MND Section 3.2, concluding that such impacts would be less than significant (IS/MND, p. 81). In response to comments received during public review of the IS/MND, this memorandum provides an additional quantitative construction HRA for the potential exposure to DPM from construction equipment/trucks.

The SCAQMD's Modeling Guidance for American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) (SCAQMD 2023) provides guidance[1] for performing dispersion modeling for use in HRAs within the South Coast Air Basin. As described in the IS/MND, the SCAQMD has adopted a cancer risk threshold of 10 in a million (SCAQMD 2019), which indicates that a person has an additional risk of 10 chances in

[1] See http://www.aqmd.gov/home/air-quality/meteorological-data/modeling-guidance.

a million (0.001%) of developing cancer during their lifetime as a result of the air pollution scenario being evaluated. The SCAQMD has also adopted a hazard index of less than 1.0, below which indicates that people are not likely to experience any non-cancer health effects (SCAQMD 2019).

Cancer risk is defined as the increase in lifetime probability (chance) of an individual developing cancer due to exposure to a carcinogenic compound, typically expressed as the increased probability in 1 million. The cancer risk from inhalation of a TAC is estimated by calculating the inhalation (and if applicable, ingestion and dermal) dose in units of milligrams per kilogram body weight per day based on an ambient concentration in units of micrograms per cubic meter (µg/m$^3$), breathing rate, and exposure period, and multiplying the dose by the inhalation cancer potency factor, expressed as (milligrams/kilogram body weight per day). Cancer risks are typically calculated for all carcinogenic TACs and summed to calculate the overall increase in cancer risk to an individual. The calculation procedure assumes that cancer risk is proportional to concentrations at any level of exposure and that risks due to different carcinogens are additive. This approach is generally considered to constitute a conservative assumption for low doses and is consistent with the current Office of Environmental Health Hazard Assessment (OEHHA) regulatory approach (OEHHA 2015). Exposure to carcinogenic TACs does not imply that the exposed individual would contract cancer; rather, the cancer risk is a probability of developing cancer if other factors (e.g., heredity, exposure to environmental or workplace risks that compromise the immune system, overall health) would result in an increased susceptibility to developing cancer.

The non-cancer health impact of an inhaled TAC is measured by the hazard quotient, which is the ratio of the ambient concentration of a TAC in units of µg/m$^3$ divided by the reference exposure level (REL), also in units of µg/m$^3$. The REL is the concentration at or below which no adverse health effects are anticipated. The REL is typically based on health effects on a particular target organ system, such as the respiratory system, liver, or central nervous system. Hazard quotients of individual TACs are then summed for each target organ system to obtain a hazard index. An acute hazard index estimates the likelihood of a person experiencing non-cancer health effects when they are exposed to a TAC concentration for a 1-hour period. A chronic hazard index estimates the likelihood of non-cancer health effects when a person is exposed to a TAC concentration for a 1-year period or longer. No acute REL values are established for DPM (CARB 2023); therefore, an acute hazard index cannot be estimated for DPM. As such, the HRA herein evaluates cancer and chronic health risk only.

OEHHA's most recent guidance is the *Air Toxics Hot Spots Program Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments 2015* (2015 Risk Assessment Guidelines Manual) (OEHHA 2015), which supersedes the 2003 OEHHA Risk Assessment Guidelines Manual. The 2015 Risk Assessment Guidelines Manual was used to calculate the health risk impacts from project construction. The Children's Environmental Health Protection Act of 1999 (Senate Bill 25), which requires explicit consideration of infants and children in assessing risks from air toxics, required revision of the methods for non-cancer and cancer risk assessment and of the exposure assumptions in the 2003 OEHHA Risk Assessment Guidelines Manual. In response to Senate Bill 25, OEHHA released three technical support documents addressing RELs (OEHHA 2008), cancer potency (OEHHA 2009), and exposure assessment and stochastic analysis (OEHHA 2012) and subsequently adopted the 2015 Risk Assessment Guidelines Manual, which is OEHHA's most recent guidance for performing HRAs. The technical support documents for RELs and continuing work to re-evaluate TACs to ensure adequate protection for infants and children led to revisions of RELs for approximately 10 chemicals and chemical families. The basic methodology for evaluating acute and chronic health effects using the RELs otherwise remained the same as in the 2003 Risk Assessment Guidelines Manual. RELs are designed to protect the most sensitive individuals in the population, including infants and children, by selecting appropriate toxicological data and including margins of safety. Accordingly, the evaluation

methods defined in the 2015 Risk Assessment Guidelines Manual are assumed to protect children and other sensitive subpopulations (groups of more highly susceptible individuals) from adverse health effects in the event of exposure.

The cancer risk methodology described in the exposure assessment and stochastic analysis technical support document and the 2015 Risk Assessment Guidelines Manual accounts for the higher sensitivity of infants and children by applying age-specific daily breathing rates (DBRs) and age-sensitivity factors (ASFs). According to the technical support document, "accounting for effects of early in life exposure requires accounting for both the increased potency of early in life exposure to carcinogens and the greater exposure on a per [kilogram] body weight that occurs early in life due to behavioral and physiological differences between infants and children, and adults" (OEHHA 2012). In the absence of chemical-specific data, OEHHA recommends a default ASF of 10 for the third trimester of pregnancy to age 2 years and an ASF of 3 for ages 2 through 15 years to account for potential increased sensitivity to carcinogens during childhood (OEHHA 2015). The ASF for adults is 1. In addition to the ASFs, children have higher DBRs per unit of body weight than adults. The OEHHA 2015 Risk Assessment Guidelines Manual considers the age-specific breathing rates in the cancer risk calculations.

In addition, OEHHA and CARB evaluated information from activity patterns databases to estimate the fraction of time at home (FAH) during the day. From the third trimester of pregnancy to age <2 years, 85% of time is spent at home. From age 2 through <16 years, 72% of time is spent at home. From age 16 years and greater, 73% of time is spent at home. However, for projects with any school within the 1 in 1 million or greater isopleth, the OEHHA recommends using an FAH of 100% for children under 16 years old (OEHHA 2015).

The cancer risk parameters for exposure to TACs, such as ASFs, DBRs, exposure period, FAH, and cancer potency factors used in the analysis herein are based on the values and data recommended by OEHHA as implemented in the Hotspots Analysis and Reporting Program Version 2 (HARP2). Accordingly, this HRA evaluates and reflects conservative, health-protective methodologies to assess health impacts to adults, as well as infants, children, and other sensitive subpopulations.

For risk assessment purposes, $PM_{10}$ in diesel exhaust is considered DPM, originating mainly from off-road equipment operating at a defined location for a given length of time at a given distance from sensitive receptors. Less-intensive, more-dispersed emissions result from on road vehicle exhaust (e.g., heavy-duty diesel trucks).

Air dispersion modeling was performed using the U.S. Environmental Protection Agency's (EPA's) American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) Version 23132 modeling system (computer software) with the Lakes Environmental Software implementation/user interface, known as AERMOD View Version 12.0. The dispersion modeling included the use of standard regulatory default options. AERMOD parameters were selected as representative of the project site and project activities. Principal parameters of this modeling are presented in Table 1.

**Table 1. American Meteorological Society/Environmental Protection Agency Regulatory Model Principal Parameters**

| Parameter | Details |
|---|---|
| Meteorological Data | The latest 5-year (2012-2016) meteorological data for the Palm Springs (KPSP, Station ID 93138) from SCAQMD were downloaded and then inputted to AERMOD. |
| Urban versus Rural Option | Urban areas typically have more surface roughness as well as structures and low-albedo surfaces that absorb more sunlight—and thus more heat—relative to rural areas. According to SCAQMD guidelines for AERMOD, the urban dispersion option was selected (SCAQMD 2023). |
| Terrain Characteristics | Digital elevation data were imported into AERMOD and elevations were assigned to receptors and emission sources, as necessary. Digital elevation data were obtained through the AERMOD View in the U.S. Geological Survey's National Elevation Dataset format with a resolution of 1 arc-second resolution. |
| Source Release Characterizations | The following modeling parameters for emissions sources were incorporated into AERMOD. These parameters were obtained from information published by regulatory agencies, including SCAQMD, EPA, and SBCAPCD, and represent the best available information at the time of this writing.<br><u>Construction:</u><br>▪ Off-road equipment was modeled as a line of adjacent volume sources across the project site with a release height of 5 meters, a plume height of 10 meters, and plume width of 9 meters (SCAQMD 2008a). |
| Receptors | Discrete receptors placed at each sensitive receptor in the vicinity of the project site were used to capture the maximum point of impacts. |

Notes: AERMOD = American Meteorological Society/Environmental Protection Agency Regulatory Model; SCAQMD = South Coast Air Quality Management District; SBCAPCD = Santa Barbara County Air Pollution Control District.
See Attachment B.

The health risk calculations presented herein were performed using the HARP2 Air Dispersion and Risk Tool (ADMRT, Version 22118). AERMOD was run for each receptor with all emission sources emitting unit emissions (1 gram per second) to obtain the necessary input values for HARP2, in accordance with OEHHA modeling methodology recommendations (OEHHA 2015). The concentration plot files were then used to estimate the long-term cancer and non-cancer health risk at the residential receptors. For residential receptors during project construction, TAC exposure was assumed to begin in the 3rd trimester of pregnancy (assumed to be the worst-case scenario for cancer risk) for a duration of 1.75 years (21-month project construction).[2]

### 2.2.2 Health Risk Assessment Results

#### Construction Health Risk Assessment

Results of the HRA for unmitigated construction are presented in Table 2 for the MEIR. Model outputs are presented in Attachment B.

[2] OEHHA describes cancer risk evaluations for 9-, 30-, and 70-year exposure durations in the 2015 Risk Assessment Guidelines Manual, and identifies that the 9- and 30-year durations correspond to the average and high-end of residency time recommended by the EPA, with the 30-year exposure duration recommended for use as the basis for estimating cancer risk at the maximally exposed individual resident in all HRAs (OEHHA 2015).

**Table 2. Construction Health Risk Assessment Results - Unmitigated**

| Impact Parameter | Units | Project Impact | CEQA Threshold | Level of Significance |
|---|---|---|---|---|
| Cancer Risk – MEIR | Per Million | 32.23 | 10 | **Potentially Significant** |
| Chronic Hazard Index – MEIR | Index Value | 0.021 | 1.0 | Less than Significant |

**Source**: Attachment B.
**Note**: CEQA = California Environmental Quality Act; MEIR = Maximally Exposed Individual Resident.

The results of the construction HRA for the project demonstrate that the construction DPM emissions would result in a potential maximum cancer risk at the MEIR above the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold in the absence of mitigation. Because the potential maximum cancer risk at the MEIR exceeds the applicable CEQA threshold, project construction would result in a potentially significant impact if mitigation were not imposed.

MM-AQ-1 has been set forth to reduce DPM and any associated cancer risk. MM-AQ-1 states that, prior to the commencement of construction activities, the applicant shall require its construction contractor to demonstrate that all 75-horsepower or greater diesel-powered equipment is powered with CARB-certified Tier 4 engines. Table 3 presents the construction health risk results after implementation of MM-AQ-1.

**Table 3. Construction Health Risk Assessment Results - Mitigated**

| Impact Parameter | Units | Project Impact | CEQA Threshold | Level of Significance |
|---|---|---|---|---|
| Cancer Risk – MEIR | Per Million | 6.65 | 10 | Less than Significant |
| Chronic Hazard Index – MEIR | Index Value | 0.004 | 1.0 | Less than Significant |

**Source**: Attachment B.
**Note**: CEQA = California Environmental Quality Act; MEIR = Maximally Exposed Individual Resident.

With implementation of MM-AQ-1, the project estimated construction emissions result in a potential maximum cancer risk at the MEIR below the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold. As such, the project would result in a construction health risk impact that would be less than significant with mitigation. This determination differs from the IS/MND, which concluded that construction heath risk impacts would be less than significant with no mitigation required. (IS/MND, p. 81.) While the information contained herein demonstrates an increase in the severity of this impact relative to what was previously disclosed in the IS/MND, MM-AQ-1 would reduce this impact to a level of insignificance, and the applicant has agreed to implement MM-AQ-1 if the project is approved.

## Mitigation Measure

The following mitigation measure would reduce potentially significant construction impacts to a less-than-significant level.

### MM-AQ-1 Construction Equipment – Use of Tier 4 Engines

Prior to the commencement of construction activities for the project, the applicant shall require its construction contractor to use California Air Resources Board (CARB)-certified Tier 4 engines for all diesel-powered equipment pieces that are 75 horsepower or greater throughout all phases of construction.

In the event of changed circumstances (e.g., changes in the availability of specific types of construction equipment), the applicant may submit a request to the City to apply an equivalent method of achieving project-generated construction emissions that fall below the numeric cancer risk standards established by the South Coast Air Quality Management District (SCAQMD). Documentation using industry-standard emission estimation methodologies shall be furnished to the City demonstrating that estimated project-generated construction emissions would not exceed the applicable SCAQMD cancer risk threshold with the alternate construction method(s). If the documentation demonstrates that project-generated construction emissions will remain below the applicable SCAQMD cancer risk threshold, then the City may approve the alternate construction method(s), at the City's discretion.

Required construction equipment fleet and methodologies approved by the City shall be included in the contract specifications for the applicant's construction contractor.

# 3 References

CARB (California Air Resources Board). 2023. *Consolidated Table of OEHHA / CARB Approved Risk Assessment Health Values*. October 6, 2023. Accessed November 2023. https://ww2.arb.ca.gov/sites/default/files/classic/toxics/healthval/contable10062023.pdf.

EPA (United States Environmental Protection Agency). 2016. *Nonroad Compression-Ignition Engines: Exhaust Emission Standards*. EPA-420-B-16-022. March 2016. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1000A05.pdf.

OEHHA (Office of Environmental Health Hazard Assessment). 2008. *Air Toxics Hot Spots Risk Assessment Guidelines Technical Support Document for the Derivation of Noncancer Reference Exposure Levels*. As approved by the Scientific Review Panel, June 18, 2008. Accessed October 2017. http://www.oehha.ca.gov/air/hot_spots/2008/NoncancerTSD_final.pdf.

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OEHHA. 2012. *Air Toxics Hot Spots Program Risk Assessment Guidelines – Technical Support Document Exposure Assessment and Stochastic Analysis*. Accessed October 2017. http://www.oehha.ca.gov/air/hot_spots/pdf/2012tsd/TSDportfolio2012.pdf.

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SCAQMD (South Coast Air Quality Management District). 2008a. *Final Localized Significance Threshold Methodology.* Revised July 2008. http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf.

SCAQMD. 2019. "SCAQMD Air Quality Significance Thresholds." Originally published in CEQA Air Quality Handbook, Table A9-11-A. Revised April 2019.http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2.

SCAQMD. 2023. "South Coast AQMD Modeling Guidance for AERMOD." Accessed June 2023. http://www.aqmd.gov/home/air-quality/meteorological-data/modeling-guidance.

# Attachment A

CalEEMod Emissions Outputs

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# Ritz Carlton Rancho Mirage for HRA

**Riverside-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Enclosed Parking with Elevator | 381.00 | Space | 3.43 | 152,400.00 | 0 |
| Other Asphalt Surfaces | 77.85 | 1000sqft | 1.79 | 77,850.00 | 0 |
| Parking Lot | 129.00 | Space | 1.16 | 51,600.00 | 0 |
| Arena | 23.84 | 1000sqft | 7.66 | 23,840.00 | 0 |
| Quality Restaurant | 6.97 | 1000sqft | 0.16 | 6,966.00 | 0 |
| Recreational Swimming Pool | 23.75 | 1000sqft | 0.55 | 23,746.00 | 0 |
| Apartments Low Rise | 106.00 | Dwelling Unit | 6.63 | 106,000.00 | 303 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Rural | **Wind Speed (m/s)** | 2.4 | **Precipitation Freq (Days)** | 28 |
| **Climate Zone** | 10 | | | **Operational Year** | 2025 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 390.98 | **CH4 Intensity (lb/MWhr)** | 0.033 | **N2O Intensity (lb/MWhr)** | 0.004 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics.

Land Use - Venue modeled as Arena to represent event space. An approximately 5,513 square foot, 33-feet, 6-inches tall, community clubroom/lounge with access to a central pool terrace.

Construction Phase - Demolition and Site Preparation previously preformed. Schedule provided by applicant.

Off-road Equipment - Default values

Off-road Equipment - Default Values

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

Off-road Equipment - Default values

Off-road Equipment - Default values

Off-road Equipment - Default values

Trips and VMT - Based on applicant provided information. For HRA anlaysis trip lengths set equal to 1,000 ft for onsite operation only for trucks and DPM emissions

On-road Fugitive Dust - Default values

Demolition - No demolition

Grading - Material export based on applicant provided 692 hauls trucks and extimated 10 cubic yard truck capacity. Total acres graded equal default values.

Architectural Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Vehicle Trips - Per TIA. Recreational Swimming Pool set equal to zero, as they are for residence use.

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Road Dust - Default values

Woodstoves - No woodstoves or fireplaces.

Area Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Landscape Equipment - Default values

Energy Use - Default values

Water And Wastewater - Coachella Valley Water District WRP-7 Assume 100% aerobic.

Solid Waste - Default values

Land Use Change -

Sequestration - Based on landscape plan: 845 trees will be planted.

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps - Applicant provided information.

Stationary Sources - Emergency Generators and Fire Pumps EF - Default values

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblArchitecturalCoating | EF_Nonresidential_Exterior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Nonresidential_Interior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Exterior | 50.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Interior | 50.00 | 5.00 |
| tblAreaCoating | Area_EF_Nonresidential_Exterior | 100 | 5 |
| tblAreaCoating | Area_EF_Nonresidential_Interior | 100 | 5 |
| tblAreaCoating | Area_EF_Residential_Exterior | 50 | 5 |
| tblAreaCoating | Area_EF_Residential_Interior | 50 | 5 |
| tblConstructionPhase | NumDays | 20.00 | 67.00 |
| tblConstructionPhase | NumDays | 35.00 | 108.00 |
| tblConstructionPhase | NumDays | 20.00 | 22.00 |
| tblFireplaces | FireplaceDayYear | 25.00 | 0.00 |
| tblFireplaces | FireplaceHourDay | 3.00 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberGas | 90.10 | 0.00 |
| tblFireplaces | NumberNoFireplace | 10.60 | 0.00 |
| tblFireplaces | NumberWood | 5.30 | 0.00 |
| tblGrading | AcresOfGrading | 324.00 | 330.00 |
| tblGrading | MaterialExported | 0.00 | 6,920.00 |
| tblLandUse | LandUseSquareFeet | 6,970.00 | 6,966.00 |
| tblLandUse | LandUseSquareFeet | 23,750.00 | 23,746.00 |
| tblProjectCharacteristics | UrbanizationLevel | Urban | Rural |
| tblSequestration | NumberOfNewTrees | 0.00 | 845.00 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblTripsAndVMT | HaulingTripNumber | 865.00 | 692.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 380.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 197.00 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 66.00 | 46.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 20.00 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 20.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 218.00 | 50.00 |
| tblTripsAndVMT | WorkerTripNumber | 44.00 | 70.00 |
| tblTripsAndVMT | WorkerTripNumber | 15.00 | 20.00 |
| tblVehicleTrips | ST_TR | 8.14 | 7.14 |
| tblVehicleTrips | ST_TR | 10.71 | 25.58 |
| tblVehicleTrips | ST_TR | 90.04 | 43.98 |
| tblVehicleTrips | ST_TR | 9.10 | 0.00 |
| tblVehicleTrips | SU_TR | 6.28 | 6.10 |
| tblVehicleTrips | SU_TR | 10.71 | 25.58 |
| tblVehicleTrips | SU_TR | 71.97 | 33.63 |
| tblVehicleTrips | SU_TR | 13.60 | 0.00 |
| tblVehicleTrips | WD_TR | 10.71 | 0.00 |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblVehicleTrips | WD_TR | 83.84 | 41.92 |
| tblVehicleTrips | WD_TR | 28.82 | 0.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWoodstoves | NumberCatalytic | 5.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 5.30 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2023 | 0.2894 | 2.8543 | 2.6334 | 5.2000e-003 | 0.5014 | 0.1225 | 0.6239 | 0.1980 | 0.1136 | 0.3116 | 0.0000 | 454.2034 | 454.2034 | 0.1317 | 1.5200e-003 | 457.9480 |
| 2024 | 0.2942 | 1.8730 | 2.2921 | 3.7800e-003 | 1.6900e-003 | 0.0810 | 0.0826 | 5.2000e-004 | 0.0762 | 0.0767 | 0.0000 | 327.2174 | 327.2174 | 0.0746 | 3.1000e-003 | 330.0069 |
| **Maximum** | **0.2942** | **2.8543** | **2.6334** | **5.2000e-003** | **0.5014** | **0.1225** | **0.6239** | **0.1980** | **0.1136** | **0.3116** | **0.0000** | **454.2034** | **454.2034** | **0.1317** | **3.1000e-003** | **457.9480** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2023 | 0.2894 | 2.8543 | 2.6334 | 5.2000e-003 | 0.2261 | 0.1225 | 0.3486 | 0.0892 | 0.1136 | 0.2029 | 0.0000 | 454.2029 | 454.2029 | 0.1317 | 1.5200e-003 | 457.9475 |
| 2024 | 0.2942 | 1.8730 | 2.2921 | 3.7800e-003 | 1.6900e-003 | 0.0810 | 0.0826 | 5.2000e-004 | 0.0762 | 0.0767 | 0.0000 | 327.2170 | 327.2170 | 0.0746 | 3.1000e-003 | 330.0065 |
| **Maximum** | **0.2942** | **2.8543** | **2.6334** | **5.2000e-003** | **0.2261** | **0.1225** | **0.3486** | **0.0892** | **0.1136** | **0.2029** | **0.0000** | **454.2029** | **454.2029** | **0.1317** | **3.1000e-003** | **457.9475** |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

## EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **54.73** | **0.00** | **38.97** | **54.79** | **0.00** | **28.01** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **1** | **2-1-2023** | **4-30-2023** | 1.2116 | 1.2116 |
| **2** | **5-1-2023** | **7-31-2023** | 1.0228 | 1.0228 |
| **3** | **8-1-2023** | **10-31-2023** | 0.5489 | 0.5489 |
| **4** | **11-1-2023** | **1-31-2024** | 0.5377 | 0.5377 |
| **5** | **2-1-2024** | **4-30-2024** | 0.5034 | 0.5034 |
| **6** | **5-1-2024** | **7-31-2024** | 0.5665 | 0.5665 |
| **7** | **8-1-2024** | **9-30-2024** | 0.4556 | 0.4556 |
| | | **Highest** | 1.2116 | 1.2116 |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| Energy | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 555.6353 | 555.6353 | 0.0320 | 7.5300e-003 | 558.6804 |
| Mobile | 0.5972 | 0.9773 | 6.3908 | 0.0158 | 1.7372 | 0.0126 | 1.7498 | 0.4640 | 0.0118 | 0.4759 | 0.0000 | 1,457.8007 | 1,457.8007 | 0.0723 | 0.0709 | 1,480.7414 |
| Stationary | 0.0492 | 0.2202 | 0.1255 | 2.4000e-004 | | 7.2400e-003 | 7.2400e-003 | | 7.2400e-003 | 7.2400e-003 | 0.0000 | 22.8478 | 22.8478 | 3.2000e-003 | 0.0000 | 22.9279 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 38.8038 | 0.0000 | 38.8038 | 2.2932 | 0.0000 | 96.1347 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 7.3223 | 59.6245 | 66.9469 | 0.0302 | 0.0165 | 72.6298 |
| **Total** | **1.2436** | **1.4149** | **7.7580** | **0.0173** | **1.7372** | **0.0419** | **1.7790** | **0.4640** | **0.0411** | **0.5051** | **46.1261** | **2,097.7099** | **2,143.8360** | **2.4327** | **0.0950** | **2,232.9596** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| Energy | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 555.6353 | 555.6353 | 0.0320 | 7.5300e-003 | 558.6804 |
| Mobile | 0.5972 | 0.9773 | 6.3908 | 0.0158 | 1.7372 | 0.0126 | 1.7498 | 0.4640 | 0.0118 | 0.4759 | 0.0000 | 1,457.8007 | 1,457.8007 | 0.0723 | 0.0709 | 1,480.7414 |
| Stationary | 0.0492 | 0.2202 | 0.1255 | 2.4000e-004 | | 7.2400e-003 | 7.2400e-003 | | 7.2400e-003 | 7.2400e-003 | 0.0000 | 22.8478 | 22.8478 | 3.2000e-003 | 0.0000 | 22.9279 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 38.8038 | 0.0000 | 38.8038 | 2.2932 | 0.0000 | 96.1347 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 7.3223 | 59.6245 | 66.9469 | 0.0302 | 0.0165 | 72.6298 |
| **Total** | **1.2436** | **1.4149** | **7.7580** | **0.0173** | **1.7372** | **0.0419** | **1.7790** | **0.4640** | **0.0411** | **0.5051** | **46.1261** | **2,097.7099** | **2,143.8360** | **2.4327** | **0.0950** | **2,232.9596** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.3 Vegetation

**Vegetation**

| | CO2e |
|---|---|
| Category | MT |
| New Trees | 598.2600 |
| **Total** | **598.2600** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Grading | Grading | 2/1/2023 | 7/1/2023 | 5 | 108 | |
| 2 | Building Construction | Building Construction | 7/2/2023 | 11/29/2024 | 5 | 370 | |
| 3 | Architectural Coating/Finish Phase | Architectural Coating | 7/2/2024 | 10/2/2024 | 5 | 67 | |
| 4 | Paving | Paving | 9/29/2024 | 10/29/2024 | 5 | 22 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 330**

**Acres of Paving: 6.38**

**Residential Indoor: 214,650; Residential Outdoor: 71,550; Non-Residential Indoor: 54,479; Non-Residential Outdoor: 18,160; Striped Parking Area: 16,911 (Architectural Coating – sqft)**

**OffRoad Equipment**

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Architectural Coating/Finish Phase | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Grading | 8 | 10.00 | 8.00 | 692.00 | 0.00 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 50.00 | 46.00 | 60.00 | 0.00 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating/Finish Phase | 1 | 70.00 | 60.00 | 380.00 | 0.00 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 20.00 | 20.00 | 197.00 | 0.00 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.5006 | 0.0000 | 0.5006 | 0.1977 | 0.0000 | 0.1977 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1794 | 1.8638 | 1.5148 | 3.3500e-003 | | 0.0769 | 0.0769 | | 0.0708 | 0.0708 | 0.0000 | 294.4901 | 294.4901 | 0.0952 | 0.0000 | 296.8712 |
| **Total** | **0.1794** | **1.8638** | **1.5148** | **3.3500e-003** | **0.5006** | **0.0769** | **0.5775** | **0.1977** | **0.0708** | **0.2685** | **0.0000** | **294.4901** | **294.4901** | **0.0952** | **0.0000** | **296.8712** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 4.4000e-004 | 7.4500e-003 | 6.4500e-003 | 1.0000e-005 | 6.0000e-005 | 1.0000e-005 | 7.0000e-005 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 1.2034 | 1.2034 | 2.0000e-005 | 1.9000e-004 | 1.2604 |
| Vendor | 3.2000e-004 | 5.8000e-003 | 4.6800e-003 | 1.0000e-005 | 9.0000e-005 | 1.0000e-005 | 9.0000e-005 | 3.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.9025 | 0.9025 | 2.0000e-005 | 1.4000e-004 | 0.9450 |
| Worker | 6.8000e-004 | 2.6000e-004 | 2.7100e-003 | 0.0000 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0928 | 0.0928 | 6.0000e-005 | 3.0000e-005 | 0.1031 |
| **Total** | **1.4400e-003** | **0.0135** | **0.0138** | **2.0000e-005** | **1.6000e-004** | **2.0000e-005** | **1.7000e-004** | **5.0000e-005** | **2.0000e-005** | **6.0000e-005** | **0.0000** | **2.1987** | **2.1987** | **1.0000e-004** | **3.6000e-004** | **2.3084** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.2253 | 0.0000 | 0.2253 | 0.0890 | 0.0000 | 0.0890 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1794 | 1.8638 | 1.5148 | 3.3500e-003 | | 0.0769 | 0.0769 | | 0.0708 | 0.0708 | 0.0000 | 294.4898 | 294.4898 | 0.0952 | 0.0000 | 296.8709 |
| **Total** | **0.1794** | **1.8638** | **1.5148** | **3.3500e-003** | **0.2253** | **0.0769** | **0.3022** | **0.0890** | **0.0708** | **0.1597** | **0.0000** | **294.4898** | **294.4898** | **0.0952** | **0.0000** | **296.8709** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 4.4000e-004 | 7.4500e-003 | 6.4500e-003 | 1.0000e-005 | 6.0000e-005 | 1.0000e-005 | 7.0000e-005 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 1.2034 | 1.2034 | 2.0000e-005 | 1.9000e-004 | 1.2604 |
| Vendor | 3.2000e-004 | 5.8000e-003 | 4.6800e-003 | 1.0000e-005 | 9.0000e-005 | 1.0000e-005 | 9.0000e-005 | 3.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.9025 | 0.9025 | 2.0000e-005 | 1.4000e-004 | 0.9450 |
| Worker | 6.8000e-004 | 2.6000e-004 | 2.7100e-003 | 0.0000 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0928 | 0.0928 | 6.0000e-005 | 3.0000e-005 | 0.1031 |
| **Total** | **1.4400e-003** | **0.0135** | **0.0138** | **2.0000e-005** | **1.6000e-004** | **2.0000e-005** | **1.7000e-004** | **5.0000e-005** | **2.0000e-005** | **6.0000e-005** | **0.0000** | **2.1987** | **2.1987** | **1.0000e-004** | **3.6000e-004** | **2.3084** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1022 | 0.9350 | 1.0559 | 1.7500e-003 | | 0.0455 | 0.0455 | | 0.0428 | 0.0428 | 0.0000 | 150.6731 | 150.6731 | 0.0358 | 0.0000 | 151.5692 |
| **Total** | **0.1022** | **0.9350** | **1.0559** | **1.7500e-003** | | **0.0455** | **0.0455** | | **0.0428** | **0.0428** | **0.0000** | **150.6731** | **150.6731** | **0.0358** | **0.0000** | **151.5692** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.0000e-005 | 2.3000e-004 | 2.0000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0367 | 0.0367 | 0.0000 | 1.0000e-005 | 0.0384 |
| Vendor | 2.1900e-003 | 0.0401 | 0.0324 | 6.0000e-005 | 6.0000e-004 | 5.0000e-005 | 6.4000e-004 | 1.8000e-004 | 4.0000e-005 | 2.2000e-004 | 0.0000 | 6.2465 | 6.2465 | 1.3000e-004 | 9.8000e-004 | 6.5405 |
| Worker | 4.1100e-003 | 1.5500e-003 | 0.0163 | 1.0000e-005 | 3.0000e-005 | 2.0000e-005 | 5.0000e-005 | 1.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.5584 | 0.5584 | 3.6000e-004 | 1.8000e-004 | 0.6203 |
| **Total** | **6.3100e-003** | **0.0419** | **0.0489** | **7.0000e-005** | **6.3000e-004** | **7.0000e-005** | **6.9000e-004** | **1.9000e-004** | **5.0000e-005** | **2.5000e-004** | **0.0000** | **6.8415** | **6.8415** | **4.9000e-004** | **1.1700e-003** | **7.1992** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1022 | 0.9350 | 1.0559 | 1.7500e-003 | | 0.0455 | 0.0455 | | 0.0428 | 0.0428 | 0.0000 | 150.6729 | 150.6729 | 0.0358 | 0.0000 | 151.5690 |
| **Total** | **0.1022** | **0.9350** | **1.0559** | **1.7500e-003** | | **0.0455** | **0.0455** | | **0.0428** | **0.0428** | **0.0000** | **150.6729** | **150.6729** | **0.0358** | **0.0000** | **151.5690** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.0000e-005 | 2.3000e-004 | 2.0000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0367 | 0.0367 | 0.0000 | 1.0000e-005 | 0.0384 |
| Vendor | 2.1900e-003 | 0.0401 | 0.0324 | 6.0000e-005 | 6.0000e-004 | 5.0000e-005 | 6.4000e-004 | 1.8000e-004 | 4.0000e-005 | 2.2000e-004 | 0.0000 | 6.2465 | 6.2465 | 1.3000e-004 | 9.8000e-004 | 6.5405 |
| Worker | 4.1100e-003 | 1.5500e-003 | 0.0163 | 1.0000e-005 | 3.0000e-005 | 2.0000e-005 | 5.0000e-005 | 1.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.5584 | 0.5584 | 3.6000e-004 | 1.8000e-004 | 0.6203 |
| **Total** | **6.3100e-003** | **0.0419** | **0.0489** | **7.0000e-005** | **6.3000e-004** | **7.0000e-005** | **6.9000e-004** | **1.9000e-004** | **5.0000e-005** | **2.5000e-004** | **0.0000** | **6.8415** | **6.8415** | **4.9000e-004** | **1.1700e-003** | **7.1992** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1766 | 1.6133 | 1.9400 | 3.2300e-003 | | 0.0736 | 0.0736 | | 0.0692 | 0.0692 | 0.0000 | 278.2189 | 278.2189 | 0.0658 | 0.0000 | 279.8637 |
| **Total** | **0.1766** | **1.6133** | **1.9400** | **3.2300e-003** | | **0.0736** | **0.0736** | | **0.0692** | **0.0692** | **0.0000** | **278.2189** | **278.2189** | **0.0658** | **0.0000** | **279.8637** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.0000e-005 | 4.2000e-004 | 3.6000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0666 | 0.0666 | 0.0000 | 1.0000e-005 | 0.0698 |
| Vendor | 4.0100e-003 | 0.0739 | 0.0594 | 1.2000e-004 | 1.1000e-003 | 8.0000e-005 | 1.1800e-003 | 3.3000e-004 | 8.0000e-005 | 4.1000e-004 | 0.0000 | 11.3518 | 11.3518 | 2.5000e-004 | 1.7700e-003 | 11.8860 |
| Worker | 7.0000e-003 | 2.6500e-003 | 0.0290 | 1.0000e-005 | 6.0000e-005 | 3.0000e-005 | 9.0000e-005 | 2.0000e-005 | 2.0000e-005 | 5.0000e-005 | 0.0000 | 0.9973 | 0.9973 | 6.2000e-004 | 3.1000e-004 | 1.1056 |
| **Total** | **0.0110** | **0.0769** | **0.0888** | **1.3000e-004** | **1.1600e-003** | **1.1000e-004** | **1.2700e-003** | **3.5000e-004** | **1.0000e-004** | **4.6000e-004** | **0.0000** | **12.4157** | **12.4157** | **8.7000e-004** | **2.0900e-003** | **13.0614** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1766 | 1.6133 | 1.9400 | 3.2300e-003 | | 0.0736 | 0.0736 | | 0.0692 | 0.0692 | 0.0000 | 278.2186 | 278.2186 | 0.0658 | 0.0000 | 279.8634 |
| **Total** | **0.1766** | **1.6133** | **1.9400** | **3.2300e-003** | | **0.0736** | **0.0736** | | **0.0692** | **0.0692** | **0.0000** | **278.2186** | **278.2186** | **0.0658** | **0.0000** | **279.8634** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.0000e-005 | 4.2000e-004 | 3.6000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0666 | 0.0666 | 0.0000 | 1.0000e-005 | 0.0698 |
| Vendor | 4.0100e-003 | 0.0739 | 0.0594 | 1.2000e-004 | 1.1000e-003 | 8.0000e-005 | 1.1800e-003 | 3.3000e-004 | 8.0000e-005 | 4.1000e-004 | 0.0000 | 11.3518 | 11.3518 | 2.5000e-004 | 1.7700e-003 | 11.8860 |
| Worker | 7.0000e-003 | 2.6500e-003 | 0.0290 | 1.0000e-005 | 6.0000e-005 | 3.0000e-005 | 9.0000e-005 | 2.0000e-005 | 2.0000e-005 | 5.0000e-005 | 0.0000 | 0.9973 | 0.9973 | 6.2000e-004 | 3.1000e-004 | 1.1056 |
| **Total** | **0.0110** | **0.0769** | **0.0888** | **1.3000e-004** | **1.1600e-003** | **1.1000e-004** | **1.2700e-003** | **3.5000e-004** | **1.0000e-004** | **4.6000e-004** | **0.0000** | **12.4157** | **12.4157** | **8.7000e-004** | **2.0900e-003** | **13.0614** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Architectural Coating/Finish Phase - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0808 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 6.0600e-003 | 0.0408 | 0.0606 | 1.0000e-004 | | 2.0400e-003 | 2.0400e-003 | | 2.0400e-003 | 2.0400e-003 | 0.0000 | 8.5534 | 8.5534 | 4.8000e-004 | 0.0000 | 8.5654 |
| **Total** | **0.0868** | **0.0408** | **0.0606** | **1.0000e-004** | | **2.0400e-003** | **2.0400e-003** | | **2.0400e-003** | **2.0400e-003** | **0.0000** | **8.5534** | **8.5534** | **4.8000e-004** | **0.0000** | **8.5654** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.4000e-004 | 4.0800e-003 | 3.5400e-003 | 1.0000e-005 | 4.0000e-005 | 0.0000 | 4.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.6506 | 0.6506 | 1.0000e-005 | 1.0000e-004 | 0.6814 |
| Vendor | 1.4600e-003 | 0.0269 | 0.0216 | 4.0000e-005 | 4.0000e-004 | 3.0000e-005 | 4.3000e-004 | 1.2000e-004 | 3.0000e-005 | 1.5000e-004 | 0.0000 | 4.1335 | 4.1335 | 9.0000e-005 | 6.5000e-004 | 4.3281 |
| Worker | 2.7400e-003 | 1.0400e-003 | 0.0114 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 1.0000e-005 | 1.0000e-005 | 2.0000e-005 | 0.0000 | 0.3898 | 0.3898 | 2.4000e-004 | 1.2000e-004 | 0.4321 |
| **Total** | **4.4400e-003** | **0.0320** | **0.0365** | **5.0000e-005** | **4.6000e-004** | **4.0000e-005** | **5.0000e-004** | **1.4000e-004** | **4.0000e-005** | **1.8000e-004** | **0.0000** | **5.1739** | **5.1739** | **3.4000e-004** | **8.7000e-004** | **5.4416** |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Architectural Coating/Finish Phase - 2024

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0808 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 6.0600e-003 | 0.0408 | 0.0606 | 1.0000e-004 | | 2.0400e-003 | 2.0400e-003 | | 2.0400e-003 | 2.0400e-003 | 0.0000 | 8.5534 | 8.5534 | 4.8000e-004 | 0.0000 | 8.5654 |
| **Total** | **0.0868** | **0.0408** | **0.0606** | **1.0000e-004** | | **2.0400e-003** | **2.0400e-003** | | **2.0400e-003** | **2.0400e-003** | **0.0000** | **8.5534** | **8.5534** | **4.8000e-004** | **0.0000** | **8.5654** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.4000e-004 | 4.0800e-003 | 3.5400e-003 | 1.0000e-005 | 4.0000e-005 | 0.0000 | 4.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.6506 | 0.6506 | 1.0000e-005 | 1.0000e-004 | 0.6814 |
| Vendor | 1.4600e-003 | 0.0269 | 0.0216 | 4.0000e-005 | 4.0000e-004 | 3.0000e-005 | 4.3000e-004 | 1.2000e-004 | 3.0000e-005 | 1.5000e-004 | 0.0000 | 4.1335 | 4.1335 | 9.0000e-005 | 6.5000e-004 | 4.3281 |
| Worker | 2.7400e-003 | 1.0400e-003 | 0.0114 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 1.0000e-005 | 1.0000e-005 | 2.0000e-005 | 0.0000 | 0.3898 | 0.3898 | 2.4000e-004 | 1.2000e-004 | 0.4321 |
| **Total** | **4.4400e-003** | **0.0320** | **0.0365** | **5.0000e-005** | **4.6000e-004** | **4.0000e-005** | **5.0000e-004** | **1.4000e-004** | **4.0000e-005** | **1.8000e-004** | **0.0000** | **5.1739** | **5.1739** | **3.4000e-004** | **8.7000e-004** | **5.4416** |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Paving - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 3.8600e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0147** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.2000e-004 | 2.1200e-003 | 1.8300e-003 | 0.0000 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.3373 | 0.3373 | 1.0000e-005 | 5.0000e-005 | 0.3533 |
| Vendor | 1.6000e-004 | 2.9400e-003 | 2.3700e-003 | 0.0000 | 4.0000e-005 | 0.0000 | 5.0000e-005 | 1.0000e-005 | 0.0000 | 2.0000e-005 | 0.0000 | 0.4524 | 0.4524 | 1.0000e-005 | 7.0000e-005 | 0.4737 |
| Worker | 2.6000e-004 | 1.0000e-004 | 1.0600e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0366 | 0.0366 | 2.0000e-005 | 1.0000e-005 | 0.0405 |
| **Total** | **5.4000e-004** | **5.1600e-003** | **5.2600e-003** | **0.0000** | **6.0000e-005** | **0.0000** | **7.0000e-005** | **2.0000e-005** | **0.0000** | **3.0000e-005** | **0.0000** | **0.8263** | **0.8263** | **4.0000e-005** | **1.3000e-004** | **0.8675** |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Paving - 2024

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 3.8600e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0147** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.2000e-004 | 2.1200e-003 | 1.8300e-003 | 0.0000 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.3373 | 0.3373 | 1.0000e-005 | 5.0000e-005 | 0.3533 |
| Vendor | 1.6000e-004 | 2.9400e-003 | 2.3700e-003 | 0.0000 | 4.0000e-005 | 0.0000 | 5.0000e-005 | 1.0000e-005 | 0.0000 | 2.0000e-005 | 0.0000 | 0.4524 | 0.4524 | 1.0000e-005 | 7.0000e-005 | 0.4737 |
| Worker | 2.6000e-004 | 1.0000e-004 | 1.0600e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0366 | 0.0366 | 2.0000e-005 | 1.0000e-005 | 0.0405 |
| **Total** | **5.4000e-004** | **5.1600e-003** | **5.2600e-003** | **0.0000** | **6.0000e-005** | **0.0000** | **7.0000e-005** | **2.0000e-005** | **0.0000** | **3.0000e-005** | **0.0000** | **0.8263** | **0.8263** | **4.0000e-005** | **1.3000e-004** | **0.8675** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.5972 | 0.9773 | 6.3908 | 0.0158 | 1.7372 | 0.0126 | 1.7498 | 0.4640 | 0.0118 | 0.4759 | 0.0000 | 1,457.8007 | 1,457.8007 | 0.0723 | 0.0709 | 1,480.7414 |
| Unmitigated | 0.5972 | 0.9773 | 6.3908 | 0.0158 | 1.7372 | 0.0126 | 1.7498 | 0.4640 | 0.0118 | 0.4759 | 0.0000 | 1,457.8007 | 1,457.8007 | 0.0723 | 0.0709 | 1,480.7414 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 775.92 | 756.84 | 646.60 | 3,667,810 | 3,667,810 |
| Arena | 0.00 | 609.83 | 609.83 | 448,639 | 448,639 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | | |
| Other Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Parking Lot | 0.00 | 0.00 | 0.00 | | |
| Quality Restaurant | 292.18 | 306.54 | 234.40 | 477,516 | 477,516 |
| Recreational Swimming Pool | 0.00 | 0.00 | 0.00 | | |
| Total | 1,068.10 | 1,673.21 | 1,490.83 | 4,593,965 | 4,593,965 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 19.80 | 9.60 | 12.90 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Arena | 18.50 | 10.10 | 7.90 | 0.00 | 81.00 | 19.00 | 66 | 28 | 6 |
| Enclosed Parking with Elevator | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Other Asphalt Surfaces | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Parking Lot | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Quality Restaurant | 18.50 | 10.10 | 7.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Recreational Swimming Pool | 18.50 | 10.10 | 7.90 | 33.00 | 48.00 | 19.00 | 52 | 39 | 9 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Arena | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Enclosed Parking with Elevator | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Other Asphalt Surfaces | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Parking Lot | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Quality Restaurant | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Recreational Swimming Pool | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 327.5881 | 327.5881 | 0.0277 | 3.3500e-003 | 329.2781 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 327.5881 | 327.5881 | 0.0277 | 3.3500e-003 | 329.2781 |
| NaturalGas Mitigated | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 228.0472 | 228.0472 | 4.3700e-003 | 4.1800e-003 | 229.4024 |
| NaturalGas Unmitigated | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 228.0472 | 228.0472 | 4.3700e-003 | 4.1800e-003 | 229.4024 |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 1.60335e+006 | 8.6500e-003 | 0.0739 | 0.0314 | 4.7000e-004 | | 5.9700e-003 | 5.9700e-003 | | 5.9700e-003 | 5.9700e-003 | 0.0000 | 85.5607 | 85.5607 | 1.6400e-003 | 1.5700e-003 | 86.0691 |
| Arena | 770747 | 4.1600e-003 | 0.0378 | 0.0317 | 2.3000e-004 | | 2.8700e-003 | 2.8700e-003 | | 2.8700e-003 | 2.8700e-003 | 0.0000 | 41.1300 | 41.1300 | 7.9000e-004 | 7.5000e-004 | 41.3744 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 1.89935e+006 | 0.0102 | 0.0931 | 0.0782 | 5.6000e-004 | | 7.0800e-003 | 7.0800e-003 | | 7.0800e-003 | 7.0800e-003 | 0.0000 | 101.3565 | 101.3565 | 1.9400e-003 | 1.8600e-003 | 101.9588 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0231** | **0.2048** | **0.1414** | **1.2600e-003** | | **0.0159** | **0.0159** | | **0.0159** | **0.0159** | **0.0000** | **228.0472** | **228.0472** | **4.3700e-003** | **4.1800e-003** | **229.4024** |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 1.60335e+006 | 8.6500e-003 | 0.0739 | 0.0314 | 4.7000e-004 | | 5.9700e-003 | 5.9700e-003 | | 5.9700e-003 | 5.9700e-003 | 0.0000 | 85.5607 | 85.5607 | 1.6400e-003 | 1.5700e-003 | 86.0691 |
| Arena | 770747 | 4.1600e-003 | 0.0378 | 0.0317 | 2.3000e-004 | | 2.8700e-003 | 2.8700e-003 | | 2.8700e-003 | 2.8700e-003 | 0.0000 | 41.1300 | 41.1300 | 7.9000e-004 | 7.5000e-004 | 41.3744 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 1.89935e+006 | 0.0102 | 0.0931 | 0.0782 | 5.6000e-004 | | 7.0800e-003 | 7.0800e-003 | | 7.0800e-003 | 7.0800e-003 | 0.0000 | 101.3565 | 101.3565 | 1.9400e-003 | 1.8600e-003 | 101.9588 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0231** | **0.2048** | **0.1414** | **1.2600e-003** | | **0.0159** | **0.0159** | | **0.0159** | **0.0159** | **0.0000** | **228.0472** | **228.0472** | **4.3700e-003** | **4.1800e-003** | **229.4024** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 442015 | 78.3893 | 6.6200e-003 | 8.0000e-004 | 78.7937 |
| Arena | 236493 | 41.9409 | 3.5400e-003 | 4.3000e-004 | 42.1573 |
| Enclosed Parking with Elevator | 829056 | 147.0294 | 0.0124 | 1.5000e-003 | 147.7879 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 18060 | 3.2029 | 2.7000e-004 | 3.0000e-005 | 3.2194 |
| Quality Restaurant | 321551 | 57.0256 | 4.8100e-003 | 5.8000e-004 | 57.3197 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **327.5881** | **0.0277** | **3.3400e-003** | **329.2781** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 442015 | 78.3893 | 6.6200e-003 | 8.0000e-004 | 78.7937 |
| Arena | 236493 | 41.9409 | 3.5400e-003 | 4.3000e-004 | 42.1573 |
| Enclosed Parking with Elevator | 829056 | 147.0294 | 0.0124 | 1.5000e-003 | 147.7879 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 18060 | 3.2029 | 2.7000e-004 | 3.0000e-005 | 3.2194 |
| Quality Restaurant | 321551 | 57.0256 | 4.8100e-003 | 5.8000e-004 | 57.3197 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **327.5881** | **0.0277** | **3.3400e-003** | **329.2781** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| Unmitigated | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 8.0800e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.5325 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0335 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| **Total** | **0.5741** | **0.0127** | **1.1003** | **6.0000e-005** | | **6.0900e-003** | **6.0900e-003** | | **6.0900e-003** | **6.0900e-003** | **0.0000** | **1.8016** | **1.8016** | **1.7500e-003** | **0.0000** | **1.8454** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 8.0800e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.5325 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0335 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| **Total** | **0.5741** | **0.0127** | **1.1003** | **6.0000e-005** | | **6.0900e-003** | **6.0900e-003** | | **6.0900e-003** | **6.0900e-003** | **0.0000** | **1.8016** | **1.8016** | **1.7500e-003** | **0.0000** | **1.8454** |

# 7.0 Water Detail

## 7.1 Mitigation Measures Water

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 66.9469 | 0.0302 | 0.0165 | 72.6298 |
| Unmitigated | 66.9469 | 0.0302 | 0.0165 | 72.6298 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 6.90633 / 4.35399 | 26.9704 | 0.0105 | 5.5600e-003 | 28.8907 |
| Arena | 10.2696 / 0.655504 | 28.6396 | 0.0146 | 8.1600e-003 | 31.4358 |
| Enclosed Parking with Elevator | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 2.11563 / 0.13504 | 5.9000 | 3.0100e-003 | 1.6800e-003 | 6.4761 |
| Recreational Swimming Pool | 1.40465 / 0.860914 | 5.4369 | 2.1300e-003 | 1.1300e-003 | 5.8272 |
| **Total** | | **66.9468** | **0.0302** | **0.0165** | **72.6298** |

## 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 6.90633 / 4.35399 | 26.9704 | 0.0105 | 5.5600e-003 | 28.8907 |
| Arena | 10.2696 / 0.655504 | 28.6396 | 0.0146 | 8.1600e-003 | 31.4358 |
| Enclosed Parking with Elevator | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 2.11563 / 0.13504 | 5.9000 | 3.0100e-003 | 1.6800e-003 | 6.4761 |
| Recreational Swimming Pool | 1.40465 / 0.860914 | 5.4369 | 2.1300e-003 | 1.1300e-003 | 5.8272 |
| **Total** | | **66.9468** | **0.0302** | **0.0165** | **72.6298** |

# 8.0 Waste Detail

## 8.1 Mitigation Measures Waste

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 38.8038 | 2.2932 | 0.0000 | 96.1347 |
| Unmitigated | 38.8038 | 2.2932 | 0.0000 | 96.1347 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 48.76 | 9.8978 | 0.5850 | 0.0000 | 24.5215 |
| Arena | 0.66 | 0.1340 | 7.9200e-003 | 0.0000 | 0.3319 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 6.36 | 1.2910 | 0.0763 | 0.0000 | 3.1985 |
| Recreational Swimming Pool | 135.38 | 27.4809 | 1.6241 | 0.0000 | 68.0828 |
| **Total** | | **38.8038** | **2.2933** | **0.0000** | **96.1347** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 48.76 | 9.8978 | 0.5850 | 0.0000 | 24.5215 |
| Arena | 0.66 | 0.1340 | 7.9200e-003 | 0.0000 | 0.3319 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 6.36 | 1.2910 | 0.0763 | 0.0000 | 3.1985 |
| Recreational Swimming Pool | 135.38 | 27.4809 | 1.6241 | 0.0000 | 68.0828 |
| **Total** | | **38.8038** | **2.2933** | **0.0000** | **96.1347** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|
| Emergency Generator | 1 | 1 | 50 | 1200 | 0.73 | Diesel |

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 10.1 Stationary Sources

**Unmitigated/Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equipment Type | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Emergency Generator - Diesel (750 - 9999 HP) | 0.0492 | 0.2202 | 0.1255 | 2.4000e-004 | | 7.2400e-003 | 7.2400e-003 | | 7.2400e-003 | 7.2400e-003 | 0.0000 | 22.8478 | 22.8478 | 3.2000e-003 | 0.0000 | 22.9279 |
| **Total** | **0.0492** | **0.2202** | **0.1255** | **2.4000e-004** | | **7.2400e-003** | **7.2400e-003** | | **7.2400e-003** | **7.2400e-003** | **0.0000** | **22.8478** | **22.8478** | **3.2000e-003** | **0.0000** | **22.9279** |

## 11.0 Vegetation

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT | | | |
| Unmitigated | 598.2600 | 0.0000 | 0.0000 | 598.2600 |

## 11.2 Net New Trees

**Species Class**

| | Number of Trees | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| | | MT | | | |
| Miscellaneous | 845 | 598.2600 | 0.0000 | 0.0000 | 598.2600 |
| **Total** | | **598.2600** | **0.0000** | **0.0000** | **598.2600** |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# Ritz Carlton Rancho Mirage for HRA

**Riverside-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Enclosed Parking with Elevator | 381.00 | Space | 3.43 | 152,400.00 | 0 |
| Other Asphalt Surfaces | 77.85 | 1000sqft | 1.79 | 77,850.00 | 0 |
| Parking Lot | 129.00 | Space | 1.16 | 51,600.00 | 0 |
| Arena | 23.84 | 1000sqft | 7.66 | 23,840.00 | 0 |
| Quality Restaurant | 6.97 | 1000sqft | 0.16 | 6,966.00 | 0 |
| Recreational Swimming Pool | 23.75 | 1000sqft | 0.55 | 23,746.00 | 0 |
| Apartments Low Rise | 106.00 | Dwelling Unit | 6.63 | 106,000.00 | 303 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Rural | **Wind Speed (m/s)** | 2.4 | **Precipitation Freq (Days)** | 28 |
| **Climate Zone** | 10 | | | **Operational Year** | 2025 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 390.98 | **CH4 Intensity (lb/MWhr)** | 0.033 | **N2O Intensity (lb/MWhr)** | 0.004 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics.

Land Use - Venue modeled as Arena to represent event space. An approximately 5,513 square foot, 33-feet, 6-inches tall, community clubroom/lounge with access to a central pool terrace.

Construction Phase - Demolition and Site Preparation previously preformed. Schedule provided by applicant.

Off-road Equipment - Default values

Off-road Equipment - Default Values

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

Off-road Equipment - Default values

Off-road Equipment - Default values

Off-road Equipment - Default values

Trips and VMT - Based on applicant provided information. For HRA anlaysis trip lengths set equal to 1,000 ft for onsite operation only for trucks and DPM emissions

On-road Fugitive Dust - Default values

Demolition - No demolition

Grading - Material export based on applicant provided 692 hauls trucks and extimated 10 cubic yard truck capacity. Total acres graded equal default values.

Architectural Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Vehicle Trips - Per TIA. Recreational Swimming Pool set equal to zero, as they are for residence use.

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Vehicle Emission Factors - Default values

Road Dust - Default values

Woodstoves - No woodstoves or fireplaces.

Area Coating - Per applicant No-VOC paint will be used, VOC content of 5 grams/liter assumed.

Landscape Equipment - Default values

Energy Use - Default values

Water And Wastewater - Coachella Valley Water District WRP-7 Assume 100% aerobic.

Solid Waste - Default values

Land Use Change -

Sequestration - Based on landscape plan: 845 trees will be planted.

Construction Off-road Equipment Mitigation - Tier 4i Equipment

Mobile Land Use Mitigation -

Energy Mitigation -

Water Mitigation -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps - Applicant provided information.

Stationary Sources - Emergency Generators and Fire Pumps EF - Default values

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblArchitecturalCoating | EF_Nonresidential_Exterior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Nonresidential_Interior | 100.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Exterior | 50.00 | 5.00 |
| tblArchitecturalCoating | EF_Residential_Interior | 50.00 | 5.00 |
| tblAreaCoating | Area_EF_Nonresidential_Exterior | 100 | 5 |
| tblAreaCoating | Area_EF_Nonresidential_Interior | 100 | 5 |
| tblAreaCoating | Area_EF_Residential_Exterior | 50 | 5 |
| tblAreaCoating | Area_EF_Residential_Interior | 50 | 5 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 5.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstructionPhase | NumDays | 20.00 | 67.00 |
| tblConstructionPhase | NumDays | 35.00 | 108.00 |
| tblConstructionPhase | NumDays | 20.00 | 22.00 |
| tblFireplaces | FireplaceDayYear | 25.00 | 0.00 |
| tblFireplaces | FireplaceHourDay | 3.00 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberGas | 90.10 | 0.00 |
| tblFireplaces | NumberNoFireplace | 10.60 | 0.00 |
| tblFireplaces | NumberWood | 5.30 | 0.00 |
| tblGrading | AcresOfGrading | 324.00 | 330.00 |
| tblGrading | MaterialExported | 0.00 | 6,920.00 |
| tblLandUse | LandUseSquareFeet | 6,970.00 | 6,966.00 |
| tblLandUse | LandUseSquareFeet | 23,750.00 | 23,746.00 |
| tblProjectCharacteristics | UrbanizationLevel | Urban | Rural |
| tblSequestration | NumberOfNewTrees | 0.00 | 845.00 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.19 |
| tblTripsAndVMT | HaulingTripNumber | 865.00 | 692.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 380.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 197.00 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripLength | 7.90 | 0.19 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 66.00 | 46.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 60.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 20.00 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 19.80 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 20.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 218.00 | 50.00 |
| tblTripsAndVMT | WorkerTripNumber | 44.00 | 70.00 |
| tblTripsAndVMT | WorkerTripNumber | 15.00 | 20.00 |
| tblVehicleTrips | ST_TR | 8.14 | 7.14 |
| tblVehicleTrips | ST_TR | 10.71 | 25.58 |
| tblVehicleTrips | ST_TR | 90.04 | 43.98 |
| tblVehicleTrips | ST_TR | 9.10 | 0.00 |
| tblVehicleTrips | SU_TR | 6.28 | 6.10 |
| tblVehicleTrips | SU_TR | 10.71 | 25.58 |
| tblVehicleTrips | SU_TR | 71.97 | 33.63 |
| tblVehicleTrips | SU_TR | 13.60 | 0.00 |
| tblVehicleTrips | WD_TR | 10.71 | 0.00 |
| tblVehicleTrips | WD_TR | 83.84 | 41.92 |
| tblVehicleTrips | WD_TR | 28.82 | 0.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AerobicPercent | 87.46 | 100.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | AnaerobicandFacultativeLagoonsPercent | 2.21 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWater | SepticTankPercent | 10.33 | 0.00 |
| tblWoodstoves | NumberCatalytic | 5.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 5.30 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2023 | 0.2894 | 2.8543 | 2.6334 | 5.2000e-003 | 0.5014 | 0.1225 | 0.6239 | 0.1980 | 0.1136 | 0.3116 | 0.0000 | 454.2034 | 454.2034 | 0.1317 | 1.5200e-003 | 457.9480 |
| 2024 | 0.2942 | 1.8730 | 2.2921 | 3.7800e-003 | 1.6900e-003 | 0.0810 | 0.0826 | 5.2000e-004 | 0.0762 | 0.0767 | 0.0000 | 327.2174 | 327.2174 | 0.0746 | 3.1000e-003 | 330.0069 |
| **Maximum** | **0.2942** | **2.8543** | **2.6334** | **5.2000e-003** | **0.5014** | **0.1225** | **0.6239** | **0.1980** | **0.1136** | **0.3116** | **0.0000** | **454.2034** | **454.2034** | **0.1317** | **3.1000e-003** | **457.9480** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2023 | 0.0995 | 0.5639 | 2.9663 | 5.2000e-003 | 0.2261 | 0.0194 | 0.2454 | 0.0892 | 0.0194 | 0.1086 | 0.0000 | 454.2029 | 454.2029 | 0.1317 | 1.5200e-003 | 457.9475 |
| 2024 | 0.1934 | 0.7163 | 2.4504 | 3.7800e-003 | 1.6900e-003 | 0.0232 | 0.0249 | 5.2000e-004 | 0.0232 | 0.0237 | 0.0000 | 327.2170 | 327.2170 | 0.0746 | 3.1000e-003 | 330.0065 |
| **Maximum** | **0.1934** | **0.7163** | **2.9663** | **5.2000e-003** | **0.2261** | **0.0232** | **0.2454** | **0.0892** | **0.0232** | **0.1086** | **0.0000** | **454.2029** | **454.2029** | **0.1317** | **3.1000e-003** | **457.9475** |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

## EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **49.80** | **72.92** | **-9.97** | **0.00** | **54.73** | **79.08** | **61.74** | **54.79** | **77.59** | **65.93** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **1** | **2-1-2023** | **4-30-2023** | 1.2116 | 0.1380 |
| **2** | **5-1-2023** | **7-31-2023** | 1.0228 | 0.1667 |
| **3** | **8-1-2023** | **10-31-2023** | 0.5489 | 0.2171 |
| **4** | **11-1-2023** | **1-31-2024** | 0.5377 | 0.2147 |
| **5** | **2-1-2024** | **4-30-2024** | 0.5034 | 0.2043 |
| **6** | **5-1-2024** | **7-31-2024** | 0.5665 | 0.2475 |
| **7** | **8-1-2024** | **9-30-2024** | 0.4556 | 0.2194 |
| | | **Highest** | 1.2116 | 0.2475 |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| Energy | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 555.6353 | 555.6353 | 0.0320 | 7.5300e-003 | 558.6804 |
| Mobile | 0.5972 | 0.9773 | 6.3908 | 0.0158 | 1.7372 | 0.0126 | 1.7498 | 0.4640 | 0.0118 | 0.4759 | 0.0000 | 1,457.8007 | 1,457.8007 | 0.0723 | 0.0709 | 1,480.7414 |
| Stationary | 0.0492 | 0.2202 | 0.1255 | 2.4000e-004 | | 7.2400e-003 | 7.2400e-003 | | 7.2400e-003 | 7.2400e-003 | 0.0000 | 22.8478 | 22.8478 | 3.2000e-003 | 0.0000 | 22.9279 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 38.8038 | 0.0000 | 38.8038 | 2.2932 | 0.0000 | 96.1347 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 7.3223 | 59.6245 | 66.9469 | 0.0302 | 0.0165 | 72.6298 |
| **Total** | **1.2436** | **1.4149** | **7.7580** | **0.0173** | **1.7372** | **0.0419** | **1.7790** | **0.4640** | **0.0411** | **0.5051** | **46.1261** | **2,097.7099** | **2,143.8360** | **2.4327** | **0.0950** | **2,232.9596** |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| Energy | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 555.6353 | 555.6353 | 0.0320 | 7.5300e-003 | 558.6804 |
| Mobile | 0.5972 | 0.9773 | 6.3908 | 0.0158 | 1.7372 | 0.0126 | 1.7498 | 0.4640 | 0.0118 | 0.4759 | 0.0000 | 1,457.8007 | 1,457.8007 | 0.0723 | 0.0709 | 1,480.7414 |
| Stationary | 0.0492 | 0.2202 | 0.1255 | 2.4000e-004 | | 7.2400e-003 | 7.2400e-003 | | 7.2400e-003 | 7.2400e-003 | 0.0000 | 22.8478 | 22.8478 | 3.2000e-003 | 0.0000 | 22.9279 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 38.8038 | 0.0000 | 38.8038 | 2.2932 | 0.0000 | 96.1347 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 7.3223 | 59.6245 | 66.9469 | 0.0302 | 0.0165 | 72.6298 |
| **Total** | **1.2436** | **1.4149** | **7.7580** | **0.0173** | **1.7372** | **0.0419** | **1.7790** | **0.4640** | **0.0411** | **0.5051** | **46.1261** | **2,097.7099** | **2,143.8360** | **2.4327** | **0.0950** | **2,232.9596** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.3 Vegetation

**Vegetation**

| | CO2e |
|---|---|
| Category | MT |
| New Trees | 598.2600 |
| **Total** | **598.2600** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Grading | Grading | 2/1/2023 | 7/1/2023 | 5 | 108 | |
| 2 | Building Construction | Building Construction | 7/2/2023 | 11/29/2024 | 5 | 370 | |
| 3 | Architectural Coating/Finish Phase | Architectural Coating | 7/2/2024 | 10/2/2024 | 5 | 67 | |
| 4 | Paving | Paving | 9/29/2024 | 10/29/2024 | 5 | 22 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 330**

**Acres of Paving: 6.38**

**Residential Indoor: 214,650; Residential Outdoor: 71,550; Non-Residential Indoor: 54,479; Non-Residential Outdoor: 18,160; Striped Parking Area: 16,911 (Architectural Coating – sqft)**

**OffRoad Equipment**

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Architectural Coating/Finish Phase | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Grading | 8 | 10.00 | 8.00 | 692.00 | 0.00 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 50.00 | 46.00 | 60.00 | 0.00 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating/Finish Phase | 1 | 70.00 | 60.00 | 380.00 | 0.00 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 20.00 | 20.00 | 197.00 | 0.00 | 0.19 | 0.19 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.5006 | 0.0000 | 0.5006 | 0.1977 | 0.0000 | 0.1977 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1794 | 1.8638 | 1.5148 | 3.3500e-003 | | 0.0769 | 0.0769 | | 0.0708 | 0.0708 | 0.0000 | 294.4901 | 294.4901 | 0.0952 | 0.0000 | 296.8712 |
| **Total** | **0.1794** | **1.8638** | **1.5148** | **3.3500e-003** | **0.5006** | **0.0769** | **0.5775** | **0.1977** | **0.0708** | **0.2685** | **0.0000** | **294.4901** | **294.4901** | **0.0952** | **0.0000** | **296.8712** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 4.4000e-004 | 7.4500e-003 | 6.4500e-003 | 1.0000e-005 | 6.0000e-005 | 1.0000e-005 | 7.0000e-005 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 1.2034 | 1.2034 | 2.0000e-005 | 1.9000e-004 | 1.2604 |
| Vendor | 3.2000e-004 | 5.8000e-003 | 4.6800e-003 | 1.0000e-005 | 9.0000e-005 | 1.0000e-005 | 9.0000e-005 | 3.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.9025 | 0.9025 | 2.0000e-005 | 1.4000e-004 | 0.9450 |
| Worker | 6.8000e-004 | 2.6000e-004 | 2.7100e-003 | 0.0000 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0928 | 0.0928 | 6.0000e-005 | 3.0000e-005 | 0.1031 |
| **Total** | **1.4400e-003** | **0.0135** | **0.0138** | **2.0000e-005** | **1.6000e-004** | **2.0000e-005** | **1.7000e-004** | **5.0000e-005** | **2.0000e-005** | **6.0000e-005** | **0.0000** | **2.1987** | **2.1987** | **1.0000e-004** | **3.6000e-004** | **2.3084** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Grading - 2023

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.2253 | 0.0000 | 0.2253 | 0.0890 | 0.0000 | 0.0890 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0411 | 0.1782 | 1.7820 | 3.3500e-003 | | 5.4800e-003 | 5.4800e-003 | | 5.4800e-003 | 5.4800e-003 | 0.0000 | 294.4898 | 294.4898 | 0.0952 | 0.0000 | 296.8709 |
| **Total** | **0.0411** | **0.1782** | **1.7820** | **3.3500e-003** | **0.2253** | **5.4800e-003** | **0.2308** | **0.0890** | **5.4800e-003** | **0.0945** | **0.0000** | **294.4898** | **294.4898** | **0.0952** | **0.0000** | **296.8709** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 4.4000e-004 | 7.4500e-003 | 6.4500e-003 | 1.0000e-005 | 6.0000e-005 | 1.0000e-005 | 7.0000e-005 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 1.2034 | 1.2034 | 2.0000e-005 | 1.9000e-004 | 1.2604 |
| Vendor | 3.2000e-004 | 5.8000e-003 | 4.6800e-003 | 1.0000e-005 | 9.0000e-005 | 1.0000e-005 | 9.0000e-005 | 3.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.9025 | 0.9025 | 2.0000e-005 | 1.4000e-004 | 0.9450 |
| Worker | 6.8000e-004 | 2.6000e-004 | 2.7100e-003 | 0.0000 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0928 | 0.0928 | 6.0000e-005 | 3.0000e-005 | 0.1031 |
| **Total** | **1.4400e-003** | **0.0135** | **0.0138** | **2.0000e-005** | **1.6000e-004** | **2.0000e-005** | **1.7000e-004** | **5.0000e-005** | **2.0000e-005** | **6.0000e-005** | **0.0000** | **2.1987** | **2.1987** | **1.0000e-004** | **3.6000e-004** | **2.3084** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1022 | 0.9350 | 1.0559 | 1.7500e-003 | | 0.0455 | 0.0455 | | 0.0428 | 0.0428 | 0.0000 | 150.6731 | 150.6731 | 0.0358 | 0.0000 | 151.5692 |
| **Total** | **0.1022** | **0.9350** | **1.0559** | **1.7500e-003** | | **0.0455** | **0.0455** | | **0.0428** | **0.0428** | **0.0000** | **150.6731** | **150.6731** | **0.0358** | **0.0000** | **151.5692** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.0000e-005 | 2.3000e-004 | 2.0000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0367 | 0.0367 | 0.0000 | 1.0000e-005 | 0.0384 |
| Vendor | 2.1900e-003 | 0.0401 | 0.0324 | 6.0000e-005 | 6.0000e-004 | 5.0000e-005 | 6.4000e-004 | 1.8000e-004 | 4.0000e-005 | 2.2000e-004 | 0.0000 | 6.2465 | 6.2465 | 1.3000e-004 | 9.8000e-004 | 6.5405 |
| Worker | 4.1100e-003 | 1.5500e-003 | 0.0163 | 1.0000e-005 | 3.0000e-005 | 2.0000e-005 | 5.0000e-005 | 1.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.5584 | 0.5584 | 3.6000e-004 | 1.8000e-004 | 0.6203 |
| **Total** | **6.3100e-003** | **0.0419** | **0.0489** | **7.0000e-005** | **6.3000e-004** | **7.0000e-005** | **6.9000e-004** | **1.9000e-004** | **5.0000e-005** | **2.5000e-004** | **0.0000** | **6.8415** | **6.8415** | **4.9000e-004** | **1.1700e-003** | **7.1992** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2023

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0506 | 0.3303 | 1.1215 | 1.7500e-003 | | 0.0138 | 0.0138 | | 0.0138 | 0.0138 | 0.0000 | 150.6729 | 150.6729 | 0.0358 | 0.0000 | 151.5690 |
| **Total** | **0.0506** | **0.3303** | **1.1215** | **1.7500e-003** | | **0.0138** | **0.0138** | | **0.0138** | **0.0138** | **0.0000** | **150.6729** | **150.6729** | **0.0358** | **0.0000** | **151.5690** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.0000e-005 | 2.3000e-004 | 2.0000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0367 | 0.0367 | 0.0000 | 1.0000e-005 | 0.0384 |
| Vendor | 2.1900e-003 | 0.0401 | 0.0324 | 6.0000e-005 | 6.0000e-004 | 5.0000e-005 | 6.4000e-004 | 1.8000e-004 | 4.0000e-005 | 2.2000e-004 | 0.0000 | 6.2465 | 6.2465 | 1.3000e-004 | 9.8000e-004 | 6.5405 |
| Worker | 4.1100e-003 | 1.5500e-003 | 0.0163 | 1.0000e-005 | 3.0000e-005 | 2.0000e-005 | 5.0000e-005 | 1.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.5584 | 0.5584 | 3.6000e-004 | 1.8000e-004 | 0.6203 |
| **Total** | **6.3100e-003** | **0.0419** | **0.0489** | **7.0000e-005** | **6.3000e-004** | **7.0000e-005** | **6.9000e-004** | **1.9000e-004** | **5.0000e-005** | **2.5000e-004** | **0.0000** | **6.8415** | **6.8415** | **4.9000e-004** | **1.1700e-003** | **7.1992** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1766 | 1.6133 | 1.9400 | 3.2300e-003 | | 0.0736 | 0.0736 | | 0.0692 | 0.0692 | 0.0000 | 278.2189 | 278.2189 | 0.0658 | 0.0000 | 279.8637 |
| **Total** | **0.1766** | **1.6133** | **1.9400** | **3.2300e-003** | | **0.0736** | **0.0736** | | **0.0692** | **0.0692** | **0.0000** | **278.2189** | **278.2189** | **0.0658** | **0.0000** | **279.8637** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.0000e-005 | 4.2000e-004 | 3.6000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0666 | 0.0666 | 0.0000 | 1.0000e-005 | 0.0698 |
| Vendor | 4.0100e-003 | 0.0739 | 0.0594 | 1.2000e-004 | 1.1000e-003 | 8.0000e-005 | 1.1800e-003 | 3.3000e-004 | 8.0000e-005 | 4.1000e-004 | 0.0000 | 11.3518 | 11.3518 | 2.5000e-004 | 1.7700e-003 | 11.8860 |
| Worker | 7.0000e-003 | 2.6500e-003 | 0.0290 | 1.0000e-005 | 6.0000e-005 | 3.0000e-005 | 9.0000e-005 | 2.0000e-005 | 2.0000e-005 | 5.0000e-005 | 0.0000 | 0.9973 | 0.9973 | 6.2000e-004 | 3.1000e-004 | 1.1056 |
| **Total** | **0.0110** | **0.0769** | **0.0888** | **1.3000e-004** | **1.1600e-003** | **1.1000e-004** | **1.2700e-003** | **3.5000e-004** | **1.0000e-004** | **4.6000e-004** | **0.0000** | **12.4157** | **12.4157** | **8.7000e-004** | **2.0900e-003** | **13.0614** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Building Construction - 2024

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0887 | 0.5845 | 2.0682 | 3.2300e-003 | | 0.0225 | 0.0225 | | 0.0225 | 0.0225 | 0.0000 | 278.2186 | 278.2186 | 0.0658 | 0.0000 | 279.8634 |
| **Total** | **0.0887** | **0.5845** | **2.0682** | **3.2300e-003** | | **0.0225** | **0.0225** | | **0.0225** | **0.0225** | **0.0000** | **278.2186** | **278.2186** | **0.0658** | **0.0000** | **279.8634** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.0000e-005 | 4.2000e-004 | 3.6000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0666 | 0.0666 | 0.0000 | 1.0000e-005 | 0.0698 |
| Vendor | 4.0100e-003 | 0.0739 | 0.0594 | 1.2000e-004 | 1.1000e-003 | 8.0000e-005 | 1.1800e-003 | 3.3000e-004 | 8.0000e-005 | 4.1000e-004 | 0.0000 | 11.3518 | 11.3518 | 2.5000e-004 | 1.7700e-003 | 11.8860 |
| Worker | 7.0000e-003 | 2.6500e-003 | 0.0290 | 1.0000e-005 | 6.0000e-005 | 3.0000e-005 | 9.0000e-005 | 2.0000e-005 | 2.0000e-005 | 5.0000e-005 | 0.0000 | 0.9973 | 0.9973 | 6.2000e-004 | 3.1000e-004 | 1.1056 |
| **Total** | **0.0110** | **0.0769** | **0.0888** | **1.3000e-004** | **1.1600e-003** | **1.1000e-004** | **1.2700e-003** | **3.5000e-004** | **1.0000e-004** | **4.6000e-004** | **0.0000** | **12.4157** | **12.4157** | **8.7000e-004** | **2.0900e-003** | **13.0614** |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Architectural Coating/Finish Phase - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0808 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 6.0600e-003 | 0.0408 | 0.0606 | 1.0000e-004 | | 2.0400e-003 | 2.0400e-003 | | 2.0400e-003 | 2.0400e-003 | 0.0000 | 8.5534 | 8.5534 | 4.8000e-004 | 0.0000 | 8.5654 |
| **Total** | **0.0868** | **0.0408** | **0.0606** | **1.0000e-004** | | **2.0400e-003** | **2.0400e-003** | | **2.0400e-003** | **2.0400e-003** | **0.0000** | **8.5534** | **8.5534** | **4.8000e-004** | **0.0000** | **8.5654** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.4000e-004 | 4.0800e-003 | 3.5400e-003 | 1.0000e-005 | 4.0000e-005 | 0.0000 | 4.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.6506 | 0.6506 | 1.0000e-005 | 1.0000e-004 | 0.6814 |
| Vendor | 1.4600e-003 | 0.0269 | 0.0216 | 4.0000e-005 | 4.0000e-004 | 3.0000e-005 | 4.3000e-004 | 1.2000e-004 | 3.0000e-005 | 1.5000e-004 | 0.0000 | 4.1335 | 4.1335 | 9.0000e-005 | 6.5000e-004 | 4.3281 |
| Worker | 2.7400e-003 | 1.0400e-003 | 0.0114 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 1.0000e-005 | 1.0000e-005 | 2.0000e-005 | 0.0000 | 0.3898 | 0.3898 | 2.4000e-004 | 1.2000e-004 | 0.4321 |
| **Total** | **4.4400e-003** | **0.0320** | **0.0365** | **5.0000e-005** | **4.6000e-004** | **4.0000e-005** | **5.0000e-004** | **1.4000e-004** | **4.0000e-005** | **1.8000e-004** | **0.0000** | **5.1739** | **5.1739** | **3.4000e-004** | **8.7000e-004** | **5.4416** |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Architectural Coating/Finish Phase - 2024

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0808 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.0000e-003 | 4.3100e-003 | 0.0614 | 1.0000e-004 | | 1.3000e-004 | 1.3000e-004 | | 1.3000e-004 | 1.3000e-004 | 0.0000 | 8.5534 | 8.5534 | 4.8000e-004 | 0.0000 | 8.5654 |
| **Total** | **0.0818** | **4.3100e-003** | **0.0614** | **1.0000e-004** | | **1.3000e-004** | **1.3000e-004** | | **1.3000e-004** | **1.3000e-004** | **0.0000** | **8.5534** | **8.5534** | **4.8000e-004** | **0.0000** | **8.5654** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.4000e-004 | 4.0800e-003 | 3.5400e-003 | 1.0000e-005 | 4.0000e-005 | 0.0000 | 4.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.6506 | 0.6506 | 1.0000e-005 | 1.0000e-004 | 0.6814 |
| Vendor | 1.4600e-003 | 0.0269 | 0.0216 | 4.0000e-005 | 4.0000e-004 | 3.0000e-005 | 4.3000e-004 | 1.2000e-004 | 3.0000e-005 | 1.5000e-004 | 0.0000 | 4.1335 | 4.1335 | 9.0000e-005 | 6.5000e-004 | 4.3281 |
| Worker | 2.7400e-003 | 1.0400e-003 | 0.0114 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 1.0000e-005 | 1.0000e-005 | 2.0000e-005 | 0.0000 | 0.3898 | 0.3898 | 2.4000e-004 | 1.2000e-004 | 0.4321 |
| **Total** | **4.4400e-003** | **0.0320** | **0.0365** | **5.0000e-005** | **4.6000e-004** | **4.0000e-005** | **5.0000e-004** | **1.4000e-004** | **4.0000e-005** | **1.8000e-004** | **0.0000** | **5.1739** | **5.1739** | **3.4000e-004** | **8.7000e-004** | **5.4416** |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Paving - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 3.8600e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0147** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.2000e-004 | 2.1200e-003 | 1.8300e-003 | 0.0000 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.3373 | 0.3373 | 1.0000e-005 | 5.0000e-005 | 0.3533 |
| Vendor | 1.6000e-004 | 2.9400e-003 | 2.3700e-003 | 0.0000 | 4.0000e-005 | 0.0000 | 5.0000e-005 | 1.0000e-005 | 0.0000 | 2.0000e-005 | 0.0000 | 0.4524 | 0.4524 | 1.0000e-005 | 7.0000e-005 | 0.4737 |
| Worker | 2.6000e-004 | 1.0000e-004 | 1.0600e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0366 | 0.0366 | 2.0000e-005 | 1.0000e-005 | 0.0405 |
| **Total** | **5.4000e-004** | **5.1600e-003** | **5.2600e-003** | **0.0000** | **6.0000e-005** | **0.0000** | **7.0000e-005** | **2.0000e-005** | **0.0000** | **3.0000e-005** | **0.0000** | **0.8263** | **0.8263** | **4.0000e-005** | **1.3000e-004** | **0.8675** |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Paving - 2024

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 3.0900e-003 | 0.0134 | 0.1903 | 2.5000e-004 | | 4.1000e-004 | 4.1000e-004 | | 4.1000e-004 | 4.1000e-004 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 3.8600e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.9500e-003** | **0.0134** | **0.1903** | **2.5000e-004** | | **4.1000e-004** | **4.1000e-004** | | **4.1000e-004** | **4.1000e-004** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.2000e-004 | 2.1200e-003 | 1.8300e-003 | 0.0000 | 2.0000e-005 | 0.0000 | 2.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.3373 | 0.3373 | 1.0000e-005 | 5.0000e-005 | 0.3533 |
| Vendor | 1.6000e-004 | 2.9400e-003 | 2.3700e-003 | 0.0000 | 4.0000e-005 | 0.0000 | 5.0000e-005 | 1.0000e-005 | 0.0000 | 2.0000e-005 | 0.0000 | 0.4524 | 0.4524 | 1.0000e-005 | 7.0000e-005 | 0.4737 |
| Worker | 2.6000e-004 | 1.0000e-004 | 1.0600e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0366 | 0.0366 | 2.0000e-005 | 1.0000e-005 | 0.0405 |
| **Total** | **5.4000e-004** | **5.1600e-003** | **5.2600e-003** | **0.0000** | **6.0000e-005** | **0.0000** | **7.0000e-005** | **2.0000e-005** | **0.0000** | **3.0000e-005** | **0.0000** | **0.8263** | **0.8263** | **4.0000e-005** | **1.3000e-004** | **0.8675** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.5972 | 0.9773 | 6.3908 | 0.0158 | 1.7372 | 0.0126 | 1.7498 | 0.4640 | 0.0118 | 0.4759 | 0.0000 | 1,457.8007 | 1,457.8007 | 0.0723 | 0.0709 | 1,480.7414 |
| Unmitigated | 0.5972 | 0.9773 | 6.3908 | 0.0158 | 1.7372 | 0.0126 | 1.7498 | 0.4640 | 0.0118 | 0.4759 | 0.0000 | 1,457.8007 | 1,457.8007 | 0.0723 | 0.0709 | 1,480.7414 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 775.92 | 756.84 | 646.60 | 3,667,810 | 3,667,810 |
| Arena | 0.00 | 609.83 | 609.83 | 448,639 | 448,639 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | | |
| Other Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Parking Lot | 0.00 | 0.00 | 0.00 | | |
| Quality Restaurant | 292.18 | 306.54 | 234.40 | 477,516 | 477,516 |
| Recreational Swimming Pool | 0.00 | 0.00 | 0.00 | | |
| Total | 1,068.10 | 1,673.21 | 1,490.83 | 4,593,965 | 4,593,965 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 19.80 | 9.60 | 12.90 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Arena | 18.50 | 10.10 | 7.90 | 0.00 | 81.00 | 19.00 | 66 | 28 | 6 |
| Enclosed Parking with Elevator | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Other Asphalt Surfaces | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Parking Lot | 18.50 | 10.10 | 7.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Quality Restaurant | 18.50 | 10.10 | 7.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Recreational Swimming Pool | 18.50 | 10.10 | 7.90 | 33.00 | 48.00 | 19.00 | 52 | 39 | 9 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Arena | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Enclosed Parking with Elevator | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Other Asphalt Surfaces | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Parking Lot | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Quality Restaurant | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |
| Recreational Swimming Pool | 0.540541 | 0.056458 | 0.173793 | 0.136090 | 0.025268 | 0.007074 | 0.011525 | 0.018705 | 0.000610 | 0.000304 | 0.023606 | 0.001094 | 0.004932 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 327.5881 | 327.5881 | 0.0277 | 3.3500e-003 | 329.2781 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 327.5881 | 327.5881 | 0.0277 | 3.3500e-003 | 329.2781 |
| NaturalGas Mitigated | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 228.0472 | 228.0472 | 4.3700e-003 | 4.1800e-003 | 229.4024 |
| NaturalGas Unmitigated | 0.0230 | 0.2048 | 0.1414 | 1.2600e-003 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 228.0472 | 228.0472 | 4.3700e-003 | 4.1800e-003 | 229.4024 |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 1.60335e+006 | 8.6500e-003 | 0.0739 | 0.0314 | 4.7000e-004 | | 5.9700e-003 | 5.9700e-003 | | 5.9700e-003 | 5.9700e-003 | 0.0000 | 85.5607 | 85.5607 | 1.6400e-003 | 1.5700e-003 | 86.0691 |
| Arena | 770747 | 4.1600e-003 | 0.0378 | 0.0317 | 2.3000e-004 | | 2.8700e-003 | 2.8700e-003 | | 2.8700e-003 | 2.8700e-003 | 0.0000 | 41.1300 | 41.1300 | 7.9000e-004 | 7.5000e-004 | 41.3744 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 1.89935e+006 | 0.0102 | 0.0931 | 0.0782 | 5.6000e-004 | | 7.0800e-003 | 7.0800e-003 | | 7.0800e-003 | 7.0800e-003 | 0.0000 | 101.3565 | 101.3565 | 1.9400e-003 | 1.8600e-003 | 101.9588 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0231** | **0.2048** | **0.1414** | **1.2600e-003** | | **0.0159** | **0.0159** | | **0.0159** | **0.0159** | **0.0000** | **228.0472** | **228.0472** | **4.3700e-003** | **4.1800e-003** | **229.4024** |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 1.60335e+006 | 8.6500e-003 | 0.0739 | 0.0314 | 4.7000e-004 | | 5.9700e-003 | 5.9700e-003 | | 5.9700e-003 | 5.9700e-003 | 0.0000 | 85.5607 | 85.5607 | 1.6400e-003 | 1.5700e-003 | 86.0691 |
| Arena | 770747 | 4.1600e-003 | 0.0378 | 0.0317 | 2.3000e-004 | | 2.8700e-003 | 2.8700e-003 | | 2.8700e-003 | 2.8700e-003 | 0.0000 | 41.1300 | 41.1300 | 7.9000e-004 | 7.5000e-004 | 41.3744 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 1.89935e+006 | 0.0102 | 0.0931 | 0.0782 | 5.6000e-004 | | 7.0800e-003 | 7.0800e-003 | | 7.0800e-003 | 7.0800e-003 | 0.0000 | 101.3565 | 101.3565 | 1.9400e-003 | 1.8600e-003 | 101.9588 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0231** | **0.2048** | **0.1414** | **1.2600e-003** | | **0.0159** | **0.0159** | | **0.0159** | **0.0159** | **0.0000** | **228.0472** | **228.0472** | **4.3700e-003** | **4.1800e-003** | **229.4024** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 442015 | 78.3893 | 6.6200e-003 | 8.0000e-004 | 78.7937 |
| Arena | 236493 | 41.9409 | 3.5400e-003 | 4.3000e-004 | 42.1573 |
| Enclosed Parking with Elevator | 829056 | 147.0294 | 0.0124 | 1.5000e-003 | 147.7879 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 18060 | 3.2029 | 2.7000e-004 | 3.0000e-005 | 3.2194 |
| Quality Restaurant | 321551 | 57.0256 | 4.8100e-003 | 5.8000e-004 | 57.3197 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **327.5881** | **0.0277** | **3.3400e-003** | **329.2781** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 442015 | 78.3893 | 6.6200e-003 | 8.0000e-004 | 78.7937 |
| Arena | 236493 | 41.9409 | 3.5400e-003 | 4.3000e-004 | 42.1573 |
| Enclosed Parking with Elevator | 829056 | 147.0294 | 0.0124 | 1.5000e-003 | 147.7879 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 18060 | 3.2029 | 2.7000e-004 | 3.0000e-005 | 3.2194 |
| Quality Restaurant | 321551 | 57.0256 | 4.8100e-003 | 5.8000e-004 | 57.3197 |
| Recreational Swimming Pool | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **327.5881** | **0.0277** | **3.3400e-003** | **329.2781** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| Unmitigated | 0.5741 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 8.0800e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.5325 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0335 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| **Total** | **0.5741** | **0.0127** | **1.1003** | **6.0000e-005** | | **6.0900e-003** | **6.0900e-003** | | **6.0900e-003** | **6.0900e-003** | **0.0000** | **1.8016** | **1.8016** | **1.7500e-003** | **0.0000** | **1.8454** |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 8.0800e-003 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.5325 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0335 | 0.0127 | 1.1003 | 6.0000e-005 | | 6.0900e-003 | 6.0900e-003 | | 6.0900e-003 | 6.0900e-003 | 0.0000 | 1.8016 | 1.8016 | 1.7500e-003 | 0.0000 | 1.8454 |
| **Total** | **0.5741** | **0.0127** | **1.1003** | **6.0000e-005** | | **6.0900e-003** | **6.0900e-003** | | **6.0900e-003** | **6.0900e-003** | **0.0000** | **1.8016** | **1.8016** | **1.7500e-003** | **0.0000** | **1.8454** |

# 7.0 Water Detail

## 7.1 Mitigation Measures Water

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 66.9469 | 0.0302 | 0.0165 | 72.6298 |
| Unmitigated | 66.9469 | 0.0302 | 0.0165 | 72.6298 |

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 6.90633 / 4.35399 | 26.9704 | 0.0105 | 5.5600e-003 | 28.8907 |
| Arena | 10.2696 / 0.655504 | 28.6396 | 0.0146 | 8.1600e-003 | 31.4358 |
| Enclosed Parking with Elevator | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 2.11563 / 0.13504 | 5.9000 | 3.0100e-003 | 1.6800e-003 | 6.4761 |
| Recreational Swimming Pool | 1.40465 / 0.860914 | 5.4369 | 2.1300e-003 | 1.1300e-003 | 5.8272 |
| **Total** | | **66.9468** | **0.0302** | **0.0165** | **72.6298** |

## 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 6.90633 / 4.35399 | 26.9704 | 0.0105 | 5.5600e-003 | 28.8907 |
| Arena | 10.2696 / 0.655504 | 28.6396 | 0.0146 | 8.1600e-003 | 31.4358 |
| Enclosed Parking with Elevator | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 2.11563 / 0.13504 | 5.9000 | 3.0100e-003 | 1.6800e-003 | 6.4761 |
| Recreational Swimming Pool | 1.40465 / 0.860914 | 5.4369 | 2.1300e-003 | 1.1300e-003 | 5.8272 |
| **Total** | | **66.9468** | **0.0302** | **0.0165** | **72.6298** |

# 8.0 Waste Detail

## 8.1 Mitigation Measures Waste

Ritz Carlton Rancho Mirage for HRA - Riverside-South Coast County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 38.8038 | 2.2932 | 0.0000 | 96.1347 |
| Unmitigated | 38.8038 | 2.2932 | 0.0000 | 96.1347 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 48.76 | 9.8978 | 0.5850 | 0.0000 | 24.5215 |
| Arena | 0.66 | 0.1340 | 7.9200e-003 | 0.0000 | 0.3319 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 6.36 | 1.2910 | 0.0763 | 0.0000 | 3.1985 |
| Recreational Swimming Pool | 135.38 | 27.4809 | 1.6241 | 0.0000 | 68.0828 |
| **Total** | | **38.8038** | **2.2933** | **0.0000** | **96.1347** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 48.76 | 9.8978 | 0.5850 | 0.0000 | 24.5215 |
| Arena | 0.66 | 0.1340 | 7.9200e-003 | 0.0000 | 0.3319 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Other Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Parking Lot | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Quality Restaurant | 6.36 | 1.2910 | 0.0763 | 0.0000 | 3.1985 |
| Recreational Swimming Pool | 135.38 | 27.4809 | 1.6241 | 0.0000 | 68.0828 |
| **Total** | | **38.8038** | **2.2933** | **0.0000** | **96.1347** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|
| Emergency Generator | 1 | 1 | 50 | 1200 | 0.73 | Diesel |

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 10.1 Stationary Sources

**Unmitigated/Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equipment Type | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Emergency Generator - Diesel (750 - 9999 HP) | 0.0492 | 0.2202 | 0.1255 | 2.4000e-004 | | 7.2400e-003 | 7.2400e-003 | | 7.2400e-003 | 7.2400e-003 | 0.0000 | 22.8478 | 22.8478 | 3.2000e-003 | 0.0000 | 22.9279 |
| **Total** | **0.0492** | **0.2202** | **0.1255** | **2.4000e-004** | | **7.2400e-003** | **7.2400e-003** | | **7.2400e-003** | **7.2400e-003** | **0.0000** | **22.8478** | **22.8478** | **3.2000e-003** | **0.0000** | **22.9279** |

## 11.0 Vegetation

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT | | | |
| Unmitigated | 598.2600 | 0.0000 | 0.0000 | 598.2600 |

## 11.2 Net New Trees

**Species Class**

| | Number of Trees | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| | | MT | | | |
| Miscellaneous | 845 | 598.2600 | 0.0000 | 0.0000 | 598.2600 |
| **Total** | | **598.2600** | **0.0000** | **0.0000** | **598.2600** |

# Attachment B

AERMOD and HARP2 Outputs

```
**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 12.0.0
** Lakes Environmental Software Inc.
** Date: 6/27/2024
** File: C:\Users\dlarocca\Desktop\Lakes Files\RitzPalmSping\RitzPalmSping.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE C:\Users\dlarocca\Desktop\Lakes Files\RitzPalmSping\RitzPalmSping.is
   MODELOPT DFAULT CONC
   AVERTIME 1 PERIOD
   URBANOPT 2189641
   POLLUTID PM_10
   RUNORNOT RUN
   ERRORFIL RitzPalmSping.err
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
** ----------------------------------------------------------------------
** Line Source Represented by Adjacent Volume Sources
** LINE VOLUME Source ID = CONST
** DESCRSRC Project Construction
** PREFIX
** Length of Side = 9.00
** Configuration = Adjacent
** Emission Rate = 1.0
** Vertical Dimension = 10.00
** SZINIT = 4.65
** Nodes = 48
** 550173.313, 3736415.141, 194.76, 5.00, 4.19
** 550086.701, 3736314.464, 196.42, 5.00, 4.19
** 550098.546, 3736305.581, 195.89, 5.00, 4.19
** 550185.897, 3736407.738, 197.02, 5.00, 4.19
```

```
** 550205.144, 3736406.998, 196.82, 5.00, 4.19
** 550109.650, 3736295.217, 195.48, 5.00, 4.19
** 550120.013, 3736285.594, 196.13, 5.00, 4.19
** 550233.275, 3736415.881, 194.24, 5.00, 4.19
** 550257.703, 3736424.024, 194.16, 5.00, 4.19
** 550131.117, 3736276.710, 196.90, 5.00, 4.19
** 550142.962, 3736267.827, 197.88, 5.00, 4.19
** 550279.911, 3736426.245, 194.32, 5.00, 4.19
** 550298.418, 3736444.011, 194.13, 5.00, 4.19
** 550320.626, 3736443.271, 193.69, 5.00, 4.19
** 550157.027, 3736258.204, 198.36, 5.00, 4.19
** 550190.339, 3736267.087, 199.63, 5.00, 4.19
** 550336.172, 3736435.868, 194.00, 5.00, 4.19
** 550355.419, 3736428.465, 194.26, 5.00, 4.19
** 550219.209, 3736273.749, 200.60, 5.00, 4.19
** 550245.859, 3736273.749, 202.13, 5.00, 4.19
** 550368.744, 3736418.102, 193.94, 5.00, 4.19
** 550385.770, 3736409.218, 193.43, 5.00, 4.19
** 550265.846, 3736270.048, 204.79, 5.00, 4.19
** 550299.899, 3736272.269, 202.25, 5.00, 4.19
** 550399.835, 3736398.114, 193.26, 5.00, 4.19
** 550413.160, 3736383.309, 193.30, 5.00, 4.19
** 550322.107, 3736270.048, 195.49, 5.00, 4.19
** 550353.938, 3736270.048, 188.51, 5.00, 4.19
** 550373.926, 3736315.945, 185.70, 5.00, 4.19
** 550425.744, 3736373.686, 192.89, 5.00, 4.19
** 550435.368, 3736364.802, 191.42, 5.00, 4.19
** 550403.536, 3736323.347, 184.30, 5.00, 4.19
** 550426.485, 3736324.828, 184.73, 5.00, 4.19
** 550475.342, 3736386.270, 196.62, 5.00, 4.19
** 550513.096, 3736398.855, 196.15, 5.00, 4.19
** 550574.538, 3736447.712, 194.44, 5.00, 4.19
** 550561.954, 3736468.440, 197.65, 5.00, 4.19
** 550506.434, 3736416.621, 199.55, 5.00, 4.19
** 550480.524, 3736405.517, 196.69, 5.00, 4.19
** 550477.563, 3736424.764, 197.27, 5.00, 4.19
** 550502.732, 3736435.868, 200.83, 5.00, 4.19
** 550553.811, 3736483.986, 197.24, 5.00, 4.19
** 550532.343, 3736495.090, 193.71, 5.00, 4.19
** 550521.979, 3736509.895, 190.18, 5.00, 4.19
** 550498.291, 3736493.609, 194.79, 5.00, 4.19
** 550495.330, 3736468.440, 200.40, 5.00, 4.19
** 550484.226, 3736446.972, 201.45, 5.00, 4.19
** 550522.720, 3736481.765, 194.66, 5.00, 4.19
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   SRCPARAM L0000389     0.0025706941      5.00      4.19      4.65
** ------------------------------------------------------------------------
   URBANSRC ALL
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED RitzPalmSping.rou
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE ..\Metdata\PalmSpringsAirportADJU\KPSP_V9_ADJU\KPSP_v9.SFC
   PROFFILE ..\Metdata\PalmSpringsAirportADJU\KPSP_V9_ADJU\KPSP_v9.PFL
   SURFDATA 93138 2012
   UAIRDATA 3190 2012
```

```
   PROFBASE 125.0 METERS
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST
   RECTABLE 1 1ST
** Auto-Generated Plotfiles
   PLOTFILE 1 ALL 1ST RitzPalmSping.AD\01H1GALL.PLT 31
   PLOTFILE PERIOD ALL RitzPalmSping.AD\PE00GALL.PLT 32
   SUMMFILE RitzPalmSping.sum
OU FINISHED


  *** Message Summary For AERMOD Model Setup ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            2 Warning Message(s)
 A Total of            0 Informational Message(s)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186     902       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
     0.50
 ME W187     902       MEOPEN: ADJ_U* Option for Stable Low Winds used in AERMET


 ***********************************
 *** SETUP Finishes Successfully ***
 ***********************************

 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                       ***        13:13:39

                                  PAGE   1
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                             ***     MODEL SETUP OPTIONS SUMMARY
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 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 ** Model Options Selected:
      * Model Uses Regulatory DEFAULT Options
      * Model Is Setup For Calculation of Average CONCentration Values.
      * NO GAS DEPOSITION Data Provided.
      * NO PARTICLE DEPOSITION Data Provided.
      * Model Uses NO DRY DEPLETION. DDPLETE  =  F
      * Model Uses NO WET DEPLETION. WETDPLT  =  F
      * Stack-tip Downwash.
      * Model Accounts for ELEVated Terrain Effects.
      * Use Calms Processing Routine.
      * Use Missing Data Processing Routine.
      * No Exponential Decay.
      * Model Uses URBAN Dispersion Algorithm for the SBL for   389 Source(s),
        for Total of    1 Urban Area(s):
   Urban Population =   2189641.0 ;  Urban Roughness Length =  1.000 m
      * Urban Roughness Length of 1.0 Meter Used.
      * ADJ_U*   - Use ADJ_U* option for SBL in AERMET
      * CCVR_Sub - Meteorological data includes CCVR substitutions
      * TEMP_Sub - Meteorological data includes TEMP substitutions
      * Model Assumes No FLAGPOLE Receptor Heights.
      * The User Specified a Pollutant Type of: PM_10

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates PERIOD Averages

 **This Run Includes:    389 Source(s);       1 Source Group(s); and     166
Receptor(s)

                with:      0 POINT(s), including
                           0 POINTCAP(s) and      0 POINTHOR(s)
                 and:    389 VOLUME source(s)
                 and:      0 AREA type source(s)
                 and:      0 LINE source(s)
                 and:      0 RLINE/RLINEXT source(s)
                 and:      0 OPENPIT source(s)
                 and:      0 BUOYANT LINE source(s) with a total of     0 line(s)
                 and:      0 SWPOINT source(s)


 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  16216

 **Output Options Selected:
          Model Outputs Tables of PERIOD Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE
```

Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE
Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE
Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   125.00 ;  Decay
Coef. =    0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;
Emission Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of RAM.

 **Input Runstream File:          aermod.inp

 **Output Print File:             aermod.out


 **Detailed Error/Message File:   RitzPalmSping.err

 **File for Summary of Results:   RitzPalmSping.sum

 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                       ***        13:13:39

                                  PAGE   2
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                                  *** VOLUME SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE    RELEASE    INIT.
INIT.   URBAN  EMISSION RATE   AIRCRAFT
   SOURCE       PART.  (GRAMS/SEC)     X        Y      ELEV.   HEIGHT      SY
SZ     SOURCE  SCALAR VARY
     ID         CATS.               (METERS) (METERS) (METERS) (METERS) (METERS)
(METERS)             BY
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 L0000001         0   0.25707E-02  550170.4 3736411.7   194.4     5.00     4.19
4.65     YES                    NO

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L0000002 | 0 | 0.25707E-02 | 550164.5 | 3736404.9 | 195.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000003 | 0 | 0.25707E-02 | 550158.6 | 3736398.1 | 195.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000004 | 0 | 0.25707E-02 | 550152.8 | 3736391.3 | 195.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000005 | 0 | 0.25707E-02 | 550146.9 | 3736384.4 | 195.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000006 | 0 | 0.25707E-02 | 550141.0 | 3736377.6 | 195.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000007 | 0 | 0.25707E-02 | 550135.2 | 3736370.8 | 194.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000008 | 0 | 0.25707E-02 | 550129.3 | 3736364.0 | 194.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000009 | 0 | 0.25707E-02 | 550123.4 | 3736357.1 | 196.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000010 | 0 | 0.25707E-02 | 550117.6 | 3736350.3 | 197.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000011 | 0 | 0.25707E-02 | 550111.7 | 3736343.5 | 198.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000012 | 0 | 0.25707E-02 | 550105.8 | 3736336.7 | 197.6 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000013 | 0 | 0.25707E-02 | 550099.9 | 3736329.9 | 197.6 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000014 | 0 | 0.25707E-02 | 550094.1 | 3736323.0 | 197.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000015 | 0 | 0.25707E-02 | 550088.2 | 3736316.2 | 196.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000016 | 0 | 0.25707E-02 | 550092.1 | 3736310.4 | 196.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000017 | 0 | 0.25707E-02 | 550099.1 | 3736306.3 | 195.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000018 | 0 | 0.25707E-02 | 550105.0 | 3736313.1 | 197.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000019 | 0 | 0.25707E-02 | 550110.8 | 3736319.9 | 198.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000020 | 0 | 0.25707E-02 | 550116.7 | 3736326.8 | 198.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000021 | 0 | 0.25707E-02 | 550122.5 | 3736333.6 | 197.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000022 | 0 | 0.25707E-02 | 550128.4 | 3736340.5 | 197.6 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000023 | 0 | 0.25707E-02 | 550134.2 | 3736347.3 | 196.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000024 | 0 | 0.25707E-02 | 550140.1 | 3736354.1 | 195.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000025 | 0 | 0.25707E-02 | 550145.9 | 3736361.0 | 195.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000026 | 0 | 0.25707E-02 | 550151.8 | 3736367.8 | 195.6 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |

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 L0000027         0   0.25707E-02  550157.6 3736374.7   196.0     5.00     4.19
4.65     YES                    NO
 L0000028         0   0.25707E-02  550163.5 3736381.5   196.5     5.00     4.19
4.65     YES                    NO
 L0000029         0   0.25707E-02  550169.3 3736388.3   196.8     5.00     4.19
4.65     YES                    NO
 L0000030         0   0.25707E-02  550175.2 3736395.2   197.1     5.00     4.19
4.65     YES                    NO
 L0000031         0   0.25707E-02  550181.0 3736402.0   196.9     5.00     4.19
4.65     YES                    NO
 L0000032         0   0.25707E-02  550187.4 3736407.7   195.3     5.00     4.19
4.65     YES                    NO
 L0000033         0   0.25707E-02  550196.4 3736407.3   194.9     5.00     4.19
4.65     YES                    NO
 L0000034         0   0.25707E-02  550205.0 3736406.8   195.4     5.00     4.19
4.65     YES                    NO
 L0000035         0   0.25707E-02  550199.2 3736400.0   197.0     5.00     4.19
4.65     YES                    NO
 L0000036         0   0.25707E-02  550193.3 3736393.1   197.2     5.00     4.19
4.65     YES                    NO
 L0000037         0   0.25707E-02  550187.5 3736386.3   197.2     5.00     4.19
4.65     YES                    NO
 L0000038         0   0.25707E-02  550181.6 3736379.5   197.1     5.00     4.19
4.65     YES                    NO
 L0000039         0   0.25707E-02  550175.8 3736372.6   197.0     5.00     4.19
4.65     YES                    NO
 L0000040         0   0.25707E-02  550169.9 3736365.8   196.9     5.00     4.19
4.65     YES                    NO
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                       ***        13:13:39

                                  PAGE   3
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                                    *** VOLUME SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE    RELEASE    INIT.
INIT.   URBAN  EMISSION RATE   AIRCRAFT
   SOURCE       PART.  (GRAMS/SEC)     X        Y      ELEV.   HEIGHT      SY
SZ     SOURCE  SCALAR VARY
     ID         CATS.               (METERS) (METERS) (METERS) (METERS) (METERS)
(METERS)             BY
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 L0000041         0   0.25707E-02  550164.1 3736358.9   196.6     5.00     4.19
4.65     YES                    NO
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L0000042 | 0 | 0.25707E-02 | 550158.2 | 3736352.1 | 196.5 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000043 | 0 | 0.25707E-02 | 550152.4 | 3736345.2 | 197.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000044 | 0 | 0.25707E-02 | 550146.5 | 3736338.4 | 197.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000045 | 0 | 0.25707E-02 | 550140.7 | 3736331.6 | 198.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000046 | 0 | 0.25707E-02 | 550134.9 | 3736324.7 | 198.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000047 | 0 | 0.25707E-02 | 550129.0 | 3736317.9 | 198.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000048 | 0 | 0.25707E-02 | 550123.2 | 3736311.0 | 197.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000049 | 0 | 0.25707E-02 | 550117.3 | 3736304.2 | 196.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000050 | 0 | 0.25707E-02 | 550111.5 | 3736297.3 | 195.6 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000051 | 0 | 0.25707E-02 | 550114.2 | 3736291.0 | 195.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000052 | 0 | 0.25707E-02 | 550120.7 | 3736286.4 | 196.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000053 | 0 | 0.25707E-02 | 550126.6 | 3736293.2 | 196.5 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000054 | 0 | 0.25707E-02 | 550132.5 | 3736300.0 | 197.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000055 | 0 | 0.25707E-02 | 550138.4 | 3736306.8 | 198.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000056 | 0 | 0.25707E-02 | 550144.3 | 3736313.6 | 198.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000057 | 0 | 0.25707E-02 | 550150.2 | 3736320.4 | 199.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000058 | 0 | 0.25707E-02 | 550156.1 | 3736327.1 | 198.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000059 | 0 | 0.25707E-02 | 550162.0 | 3736333.9 | 198.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000060 | 0 | 0.25707E-02 | 550167.9 | 3736340.7 | 198.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000061 | 0 | 0.25707E-02 | 550173.8 | 3736347.5 | 198.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000062 | 0 | 0.25707E-02 | 550179.8 | 3736354.3 | 198.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000063 | 0 | 0.25707E-02 | 550185.7 | 3736361.1 | 197.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000064 | 0 | 0.25707E-02 | 550191.6 | 3736367.9 | 197.6 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000065 | 0 | 0.25707E-02 | 550197.5 | 3736374.7 | 197.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000066 | 0 | 0.25707E-02 | 550203.4 | 3736381.5 | 197.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |

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 L0000067         0   0.25707E-02  550209.3 3736388.3   197.0     5.00     4.19
4.65     YES                    NO
 L0000068         0   0.25707E-02  550215.2 3736395.1   196.7     5.00     4.19
4.65     YES                    NO
 L0000069         0   0.25707E-02  550221.1 3736401.9   195.9     5.00     4.19
4.65     YES                    NO
 L0000070         0   0.25707E-02  550227.0 3736408.7   194.7     5.00     4.19
4.65     YES                    NO
 L0000071         0   0.25707E-02  550232.9 3736415.4   193.8     5.00     4.19
4.65     YES                    NO
 L0000072         0   0.25707E-02  550241.3 3736418.5   194.0     5.00     4.19
4.65     YES                    NO
 L0000073         0   0.25707E-02  550249.8 3736421.4   194.1     5.00     4.19
4.65     YES                    NO
 L0000074         0   0.25707E-02  550257.3 3736423.5   194.0     5.00     4.19
4.65     YES                    NO
 L0000075         0   0.25707E-02  550251.4 3736416.7   194.3     5.00     4.19
4.65     YES                    NO
 L0000076         0   0.25707E-02  550245.5 3736409.9   194.2     5.00     4.19
4.65     YES                    NO
 L0000077         0   0.25707E-02  550239.7 3736403.0   194.0     5.00     4.19
4.65     YES                    NO
 L0000078         0   0.25707E-02  550233.8 3736396.2   195.6     5.00     4.19
4.65     YES                    NO
 L0000079         0   0.25707E-02  550227.9 3736389.4   197.1     5.00     4.19
4.65     YES                    NO
 L0000080         0   0.25707E-02  550222.1 3736382.6   197.6     5.00     4.19
4.65     YES                    NO
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                      ***        13:13:39

                                  PAGE   4
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                                    *** VOLUME SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE    RELEASE    INIT.
INIT.   URBAN  EMISSION RATE   AIRCRAFT
   SOURCE       PART.  (GRAMS/SEC)     X         Y      ELEV.   HEIGHT      SY
SZ     SOURCE  SCALAR VARY
     ID         CATS.               (METERS) (METERS) (METERS) (METERS) (METERS)
(METERS)             BY
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 L0000081         0   0.25707E-02  550216.2 3736375.7   197.8     5.00     4.19
4.65     YES                    NO
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L0000082 | 0 | 0.25707E-02 | 550210.3 | 3736368.9 | 197.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000083 | 0 | 0.25707E-02 | 550204.5 | 3736362.1 | 198.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000084 | 0 | 0.25707E-02 | 550198.6 | 3736355.3 | 198.5 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000085 | 0 | 0.25707E-02 | 550192.7 | 3736348.4 | 198.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000086 | 0 | 0.25707E-02 | 550186.9 | 3736341.6 | 198.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000087 | 0 | 0.25707E-02 | 550181.0 | 3736334.8 | 199.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000088 | 0 | 0.25707E-02 | 550175.1 | 3736327.9 | 199.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000089 | 0 | 0.25707E-02 | 550169.3 | 3736321.1 | 199.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000090 | 0 | 0.25707E-02 | 550163.4 | 3736314.3 | 199.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000091 | 0 | 0.25707E-02 | 550157.6 | 3736307.5 | 199.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000092 | 0 | 0.25707E-02 | 550151.7 | 3736300.6 | 198.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000093 | 0 | 0.25707E-02 | 550145.8 | 3736293.8 | 197.5 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000094 | 0 | 0.25707E-02 | 550140.0 | 3736287.0 | 196.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000095 | 0 | 0.25707E-02 | 550134.1 | 3736280.2 | 196.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000096 | 0 | 0.25707E-02 | 550134.7 | 3736274.0 | 197.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000097 | 0 | 0.25707E-02 | 550141.9 | 3736268.6 | 197.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000098 | 0 | 0.25707E-02 | 550148.0 | 3736273.6 | 197.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000099 | 0 | 0.25707E-02 | 550153.8 | 3736280.4 | 197.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000100 | 0 | 0.25707E-02 | 550159.7 | 3736287.2 | 197.6 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000101 | 0 | 0.25707E-02 | 550165.6 | 3736294.0 | 198.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000102 | 0 | 0.25707E-02 | 550171.5 | 3736300.8 | 199.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000103 | 0 | 0.25707E-02 | 550177.4 | 3736307.6 | 199.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000104 | 0 | 0.25707E-02 | 550183.3 | 3736314.5 | 199.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000105 | 0 | 0.25707E-02 | 550189.2 | 3736321.3 | 199.6 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000106 | 0 | 0.25707E-02 | 550195.0 | 3736328.1 | 199.5 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |

*** VOLUME SOURCE DATA ***

| SOURCE ID | NUMBER PART. CATS. | EMISSION RATE (GRAMS/SEC) | X (METERS) | Y (METERS) | BASE ELEV. (METERS) | RELEASE HEIGHT (METERS) | INIT. SY (METERS) | INIT. SZ | URBAN SOURCE | EMISSION RATE SCALAR VARY BY | AIRCRAFT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L0000121 | 0 | 0.25707E-02 | 550283.7 | 3736429.9 | 194.1 | 5.00 | 4.19 | 4.65 | YES | NO | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L0000122 | 0 | 0.25707E-02 | 550290.2 | 3736436.1 | 194.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000123 | 0 | 0.25707E-02 | 550296.7 | 3736442.3 | 194.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000124 | 0 | 0.25707E-02 | 550305.0 | 3736443.8 | 194.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000125 | 0 | 0.25707E-02 | 550314.0 | 3736443.5 | 194.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000126 | 0 | 0.25707E-02 | 550319.1 | 3736441.5 | 193.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000127 | 0 | 0.25707E-02 | 550313.1 | 3736434.8 | 194.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000128 | 0 | 0.25707E-02 | 550307.1 | 3736428.0 | 194.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000129 | 0 | 0.25707E-02 | 550301.2 | 3736421.3 | 194.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000130 | 0 | 0.25707E-02 | 550295.2 | 3736414.5 | 194.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000131 | 0 | 0.25707E-02 | 550289.3 | 3736407.8 | 194.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000132 | 0 | 0.25707E-02 | 550283.3 | 3736401.0 | 194.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000133 | 0 | 0.25707E-02 | 550277.3 | 3736394.3 | 194.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000134 | 0 | 0.25707E-02 | 550271.4 | 3736387.6 | 194.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000135 | 0 | 0.25707E-02 | 550265.4 | 3736380.8 | 193.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000136 | 0 | 0.25707E-02 | 550259.5 | 3736374.1 | 194.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000137 | 0 | 0.25707E-02 | 550253.5 | 3736367.3 | 196.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000138 | 0 | 0.25707E-02 | 550247.5 | 3736360.6 | 198.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000139 | 0 | 0.25707E-02 | 550241.6 | 3736353.8 | 198.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000140 | 0 | 0.25707E-02 | 550235.6 | 3736347.1 | 199.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000141 | 0 | 0.25707E-02 | 550229.7 | 3736340.4 | 199.7 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000142 | 0 | 0.25707E-02 | 550223.7 | 3736333.6 | 200.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000143 | 0 | 0.25707E-02 | 550217.7 | 3736326.9 | 201.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000144 | 0 | 0.25707E-02 | 550211.8 | 3736320.1 | 201.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000145 | 0 | 0.25707E-02 | 550205.8 | 3736313.4 | 200.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000146 | 0 | 0.25707E-02 | 550199.9 | 3736306.6 | 200.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |

```
 L0000147         0   0.25707E-02  550193.9 3736299.9   200.0     5.00     4.19
4.65     YES                    NO
 L0000148         0   0.25707E-02  550187.9 3736293.2   199.8     5.00     4.19
4.65     YES                    NO
 L0000149         0   0.25707E-02  550182.0 3736286.4   199.2     5.00     4.19
4.65     YES                    NO
 L0000150         0   0.25707E-02  550176.0 3736279.7   198.4     5.00     4.19
4.65     YES                    NO
 L0000151         0   0.25707E-02  550170.0 3736272.9   198.1     5.00     4.19
4.65     YES                    NO
 L0000152         0   0.25707E-02  550164.1 3736266.2   198.4     5.00     4.19
4.65     YES                    NO
 L0000153         0   0.25707E-02  550158.1 3736259.4   198.4     5.00     4.19
4.65     YES                    NO
 L0000154         0   0.25707E-02  550164.1 3736260.1   198.6     5.00     4.19
4.65     YES                    NO
 L0000155         0   0.25707E-02  550172.8 3736262.4   198.8     5.00     4.19
4.65     YES                    NO
 L0000156         0   0.25707E-02  550181.5 3736264.7   199.1     5.00     4.19
4.65     YES                    NO
 L0000157         0   0.25707E-02  550190.2 3736267.1   199.6     5.00     4.19
4.65     YES                    NO
 L0000158         0   0.25707E-02  550196.1 3736273.8   199.9     5.00     4.19
4.65     YES                    NO
 L0000159         0   0.25707E-02  550202.0 3736280.6   200.1     5.00     4.19
4.65     YES                    NO
 L0000160         0   0.25707E-02  550207.9 3736287.4   200.2     5.00     4.19
4.65     YES                    NO
```



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                                                    *** VOLUME SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE    RELEASE    INIT.
INIT.   URBAN  EMISSION RATE   AIRCRAFT
   SOURCE       PART.  (GRAMS/SEC)     X        Y      ELEV.   HEIGHT      SY
SZ     SOURCE  SCALAR VARY
     ID         CATS.               (METERS) (METERS) (METERS) (METERS) (METERS)
(METERS)             BY
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 L0000161         0   0.25707E-02  550213.8 3736294.2   200.5     5.00     4.19
4.65     YES                    NO
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L0000162 | 0 | 0.25707E-02 | 550219.7 | 3736301.0 | 201.3 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000163 | 0 | 0.25707E-02 | 550225.6 | 3736307.8 | 202.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000164 | 0 | 0.25707E-02 | 550231.4 | 3736314.7 | 203.3 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000165 | 0 | 0.25707E-02 | 550237.3 | 3736321.5 | 202.2 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000166 | 0 | 0.25707E-02 | 550243.2 | 3736328.3 | 200.2 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000167 | 0 | 0.25707E-02 | 550249.1 | 3736335.1 | 199.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000168 | 0 | 0.25707E-02 | 550255.0 | 3736341.9 | 198.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000169 | 0 | 0.25707E-02 | 550260.9 | 3736348.7 | 198.5 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000170 | 0 | 0.25707E-02 | 550266.7 | 3736355.5 | 197.7 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000171 | 0 | 0.25707E-02 | 550272.6 | 3736362.3 | 195.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000172 | 0 | 0.25707E-02 | 550278.5 | 3736369.1 | 194.0 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000173 | 0 | 0.25707E-02 | 550284.4 | 3736375.9 | 193.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000174 | 0 | 0.25707E-02 | 550290.3 | 3736382.8 | 194.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000175 | 0 | 0.25707E-02 | 550296.2 | 3736389.6 | 194.2 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000176 | 0 | 0.25707E-02 | 550302.1 | 3736396.4 | 194.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000177 | 0 | 0.25707E-02 | 550307.9 | 3736403.2 | 194.2 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000178 | 0 | 0.25707E-02 | 550313.8 | 3736410.0 | 194.3 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000179 | 0 | 0.25707E-02 | 550319.7 | 3736416.8 | 194.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000180 | 0 | 0.25707E-02 | 550325.6 | 3736423.6 | 194.2 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000181 | 0 | 0.25707E-02 | 550331.5 | 3736430.4 | 194.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000182 | 0 | 0.25707E-02 | 550337.9 | 3736435.2 | 193.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000183 | 0 | 0.25707E-02 | 550346.3 | 3736432.0 | 194.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000184 | 0 | 0.25707E-02 | 550354.7 | 3736428.8 | 194.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000185 | 0 | 0.25707E-02 | 550350.0 | 3736422.3 | 194.3 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000186 | 0 | 0.25707E-02 | 550344.1 | 3736415.6 | 193.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |

```
 L0000187         0   0.25707E-02  550338.1 3736408.8   193.8     5.00     4.19
4.65     YES                    NO
 L0000188         0   0.25707E-02  550332.2 3736402.1   194.0     5.00     4.19
4.65     YES                    NO
 L0000189         0   0.25707E-02  550326.2 3736395.3   194.5     5.00     4.19
4.65     YES                    NO
 L0000190         0   0.25707E-02  550320.3 3736388.5   194.4     5.00     4.19
4.65     YES                    NO
 L0000191         0   0.25707E-02  550314.3 3736381.8   194.1     5.00     4.19
4.65     YES                    NO
 L0000192         0   0.25707E-02  550308.4 3736375.0   194.2     5.00     4.19
4.65     YES                    NO
 L0000193         0   0.25707E-02  550302.4 3736368.3   194.6     5.00     4.19
4.65     YES                    NO
 L0000194         0   0.25707E-02  550296.5 3736361.5   195.7     5.00     4.19
4.65     YES                    NO
 L0000195         0   0.25707E-02  550290.5 3736354.8   197.1     5.00     4.19
4.65     YES                    NO
 L0000196         0   0.25707E-02  550284.6 3736348.0   198.0     5.00     4.19
4.65     YES                    NO
 L0000197         0   0.25707E-02  550278.6 3736341.3   198.6     5.00     4.19
4.65     YES                    NO
 L0000198         0   0.25707E-02  550272.7 3736334.5   198.8     5.00     4.19
4.65     YES                    NO
 L0000199         0   0.25707E-02  550266.7 3736327.7   199.1     5.00     4.19
4.65     YES                    NO
 L0000200         0   0.25707E-02  550260.8 3736321.0   199.6     5.00     4.19
4.65     YES                    NO
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
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 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                                    *** VOLUME SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE    RELEASE    INIT.
INIT.   URBAN  EMISSION RATE   AIRCRAFT
   SOURCE       PART.  (GRAMS/SEC)     X        Y      ELEV.   HEIGHT      SY
SZ     SOURCE  SCALAR VARY
     ID         CATS.               (METERS) (METERS) (METERS) (METERS) (METERS)
(METERS)             BY
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 L0000201         0   0.25707E-02  550254.9 3736314.2   201.1     5.00     4.19
4.65     YES                    NO
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L0000202 | 0 | 0.25707E-02 | 550248.9 | 3736307.5 | 202.7 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000203 | 0 | 0.25707E-02 | 550243.0 | 3736300.7 | 202.9 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000204 | 0 | 0.25707E-02 | 550237.0 | 3736294.0 | 202.2 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000205 | 0 | 0.25707E-02 | 550231.1 | 3736287.2 | 201.3 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000206 | 0 | 0.25707E-02 | 550225.1 | 3736280.5 | 201.0 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000207 | 0 | 0.25707E-02 | 550219.3 | 3736273.7 | 200.7 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000208 | 0 | 0.25707E-02 | 550228.3 | 3736273.7 | 201.2 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000209 | 0 | 0.25707E-02 | 550237.3 | 3736273.7 | 201.7 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000210 | 0 | 0.25707E-02 | 550246.1 | 3736274.1 | 202.2 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000211 | 0 | 0.25707E-02 | 550252.0 | 3736280.9 | 202.4 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000212 | 0 | 0.25707E-02 | 550257.8 | 3736287.8 | 202.5 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000213 | 0 | 0.25707E-02 | 550263.6 | 3736294.6 | 202.5 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000214 | 0 | 0.25707E-02 | 550269.5 | 3736301.5 | 202.0 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000215 | 0 | 0.25707E-02 | 550275.3 | 3736308.3 | 201.4 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000216 | 0 | 0.25707E-02 | 550281.1 | 3736315.2 | 200.4 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000217 | 0 | 0.25707E-02 | 550287.0 | 3736322.0 | 199.5 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000218 | 0 | 0.25707E-02 | 550292.8 | 3736328.9 | 198.8 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000219 | 0 | 0.25707E-02 | 550298.6 | 3736335.7 | 198.6 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000220 | 0 | 0.25707E-02 | 550304.5 | 3736342.6 | 198.1 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000221 | 0 | 0.25707E-02 | 550310.3 | 3736349.4 | 197.5 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000222 | 0 | 0.25707E-02 | 550316.1 | 3736356.3 | 196.5 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000223 | 0 | 0.25707E-02 | 550322.0 | 3736363.1 | 195.5 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000224 | 0 | 0.25707E-02 | 550327.8 | 3736370.0 | 194.8 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000225 | 0 | 0.25707E-02 | 550333.6 | 3736376.9 | 194.8 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |
| L0000226 | 0 | 0.25707E-02 | 550339.5 | 3736383.7 | 194.5 | 5.00 | 4.19 | 4.65 |
| YES | | NO | | | | | | |

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 L0000227         0   0.25707E-02  550345.3 3736390.6   194.0     5.00     4.19
4.65     YES                    NO
 L0000228         0   0.25707E-02  550351.1 3736397.4   193.7     5.00     4.19
4.65     YES                    NO
 L0000229         0   0.25707E-02  550357.0 3736404.3   193.5     5.00     4.19
4.65     YES                    NO
 L0000230         0   0.25707E-02  550362.8 3736411.1   193.9     5.00     4.19
4.65     YES                    NO
 L0000231         0   0.25707E-02  550368.6 3736418.0   193.9     5.00     4.19
4.65     YES                    NO
 L0000232         0   0.25707E-02  550376.6 3736414.0   193.7     5.00     4.19
4.65     YES                    NO
 L0000233         0   0.25707E-02  550384.6 3736409.9   193.4     5.00     4.19
4.65     YES                    NO
 L0000234         0   0.25707E-02  550380.8 3736403.4   193.5     5.00     4.19
4.65     YES                    NO
 L0000235         0   0.25707E-02  550374.9 3736396.6   193.4     5.00     4.19
4.65     YES                    NO
 L0000236         0   0.25707E-02  550369.0 3736389.8   193.4     5.00     4.19
4.65     YES                    NO
 L0000237         0   0.25707E-02  550363.2 3736383.0   193.7     5.00     4.19
4.65     YES                    NO
 L0000238         0   0.25707E-02  550357.3 3736376.2   194.1     5.00     4.19
4.65     YES                    NO
 L0000239         0   0.25707E-02  550351.4 3736369.3   194.6     5.00     4.19
4.65     YES                    NO
 L0000240         0   0.25707E-02  550345.5 3736362.5   195.2     5.00     4.19
4.65     YES                    NO
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
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 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                                    *** VOLUME SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE    RELEASE    INIT.
INIT.   URBAN  EMISSION RATE   AIRCRAFT
   SOURCE       PART.  (GRAMS/SEC)     X         Y      ELEV.   HEIGHT      SY
SZ     SOURCE  SCALAR VARY
     ID         CATS.               (METERS) (METERS) (METERS) (METERS) (METERS)
(METERS)             BY
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 L0000241         0   0.25707E-02  550339.7 3736355.7   195.8     5.00     4.19
4.65     YES                    NO
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L0000242 | 0 | 0.25707E-02 | 550333.8 | 3736348.9 | 196.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000243 | 0 | 0.25707E-02 | 550327.9 | 3736342.1 | 196.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000244 | 0 | 0.25707E-02 | 550322.0 | 3736335.3 | 197.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000245 | 0 | 0.25707E-02 | 550316.2 | 3736328.4 | 198.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000246 | 0 | 0.25707E-02 | 550310.3 | 3736321.6 | 199.6 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000247 | 0 | 0.25707E-02 | 550304.4 | 3736314.8 | 200.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000248 | 0 | 0.25707E-02 | 550298.5 | 3736308.0 | 201.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000249 | 0 | 0.25707E-02 | 550292.7 | 3736301.2 | 202.6 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000250 | 0 | 0.25707E-02 | 550286.8 | 3736294.4 | 203.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000251 | 0 | 0.25707E-02 | 550280.9 | 3736287.5 | 204.3 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000252 | 0 | 0.25707E-02 | 550275.0 | 3736280.7 | 204.7 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000253 | 0 | 0.25707E-02 | 550269.2 | 3736273.9 | 204.6 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000254 | 0 | 0.25707E-02 | 550269.8 | 3736270.3 | 205.0 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000255 | 0 | 0.25707E-02 | 550278.7 | 3736270.9 | 205.7 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000256 | 0 | 0.25707E-02 | 550287.7 | 3736271.5 | 205.0 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000257 | 0 | 0.25707E-02 | 550296.7 | 3736272.1 | 202.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000258 | 0 | 0.25707E-02 | 550303.5 | 3736276.8 | 199.7 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000259 | 0 | 0.25707E-02 | 550309.1 | 3736283.9 | 199.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000260 | 0 | 0.25707E-02 | 550314.7 | 3736290.9 | 198.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000261 | 0 | 0.25707E-02 | 550320.3 | 3736297.9 | 197.5 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000262 | 0 | 0.25707E-02 | 550325.9 | 3736305.0 | 196.5 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000263 | 0 | 0.25707E-02 | 550331.5 | 3736312.0 | 195.6 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000264 | 0 | 0.25707E-02 | 550337.1 | 3736319.1 | 194.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000265 | 0 | 0.25707E-02 | 550342.7 | 3736326.1 | 194.5 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000266 | 0 | 0.25707E-02 | 550348.3 | 3736333.2 | 194.2 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |

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 L0000267         0   0.25707E-02  550353.9 3736340.2   193.4     5.00     4.19
4.65     YES                    NO
 L0000268         0   0.25707E-02  550359.5 3736347.3   192.8     5.00     4.19
4.65     YES                    NO
 L0000269         0   0.25707E-02  550365.1 3736354.3   192.3     5.00     4.19
4.65     YES                    NO
 L0000270         0   0.25707E-02  550370.7 3736361.4   192.3     5.00     4.19
4.65     YES                    NO
 L0000271         0   0.25707E-02  550376.3 3736368.4   192.1     5.00     4.19
4.65     YES                    NO
 L0000272         0   0.25707E-02  550381.9 3736375.5   192.6     5.00     4.19
4.65     YES                    NO
 L0000273         0   0.25707E-02  550387.5 3736382.5   193.3     5.00     4.19
4.65     YES                    NO
 L0000274         0   0.25707E-02  550393.1 3736389.6   193.3     5.00     4.19
4.65     YES                    NO
 L0000275         0   0.25707E-02  550398.6 3736396.6   193.2     5.00     4.19
4.65     YES                    NO
 L0000276         0   0.25707E-02  550404.6 3736392.8   193.2     5.00     4.19
4.65     YES                    NO
 L0000277         0   0.25707E-02  550410.6 3736386.2   193.3     5.00     4.19
4.65     YES                    NO
 L0000278         0   0.25707E-02  550409.9 3736379.3   193.1     5.00     4.19
4.65     YES                    NO
 L0000279         0   0.25707E-02  550404.3 3736372.3   192.1     5.00     4.19
4.65     YES                    NO
 L0000280         0   0.25707E-02  550398.6 3736365.2   189.8     5.00     4.19
4.65     YES                    NO
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
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 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                                    *** VOLUME SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE    RELEASE    INIT.
INIT.   URBAN  EMISSION RATE   AIRCRAFT
   SOURCE       PART.  (GRAMS/SEC)     X         Y      ELEV.   HEIGHT      SY
SZ     SOURCE  SCALAR VARY
     ID         CATS.               (METERS) (METERS) (METERS) (METERS) (METERS)
(METERS)             BY
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 L0000281         0   0.25707E-02  550393.0 3736358.2   188.8     5.00     4.19
4.65     YES                    NO
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L0000282 | 0 | 0.25707E-02 | 550387.4 | 3736351.2 | 188.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000283 | 0 | 0.25707E-02 | 550381.7 | 3736344.2 | 188.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000284 | 0 | 0.25707E-02 | 550376.1 | 3736337.2 | 188.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000285 | 0 | 0.25707E-02 | 550370.4 | 3736330.2 | 189.6 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000286 | 0 | 0.25707E-02 | 550364.8 | 3736323.2 | 190.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000287 | 0 | 0.25707E-02 | 550359.2 | 3736316.1 | 189.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000288 | 0 | 0.25707E-02 | 550353.5 | 3736309.1 | 188.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000289 | 0 | 0.25707E-02 | 550347.9 | 3736302.1 | 189.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000290 | 0 | 0.25707E-02 | 550342.2 | 3736295.1 | 191.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000291 | 0 | 0.25707E-02 | 550336.6 | 3736288.1 | 192.2 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000292 | 0 | 0.25707E-02 | 550331.0 | 3736281.1 | 192.8 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000293 | 0 | 0.25707E-02 | 550325.3 | 3736274.1 | 195.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000294 | 0 | 0.25707E-02 | 550326.0 | 3736270.0 | 195.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000295 | 0 | 0.25707E-02 | 550335.0 | 3736270.0 | 193.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000296 | 0 | 0.25707E-02 | 550344.0 | 3736270.0 | 190.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000297 | 0 | 0.25707E-02 | 550353.0 | 3736270.0 | 188.3 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000298 | 0 | 0.25707E-02 | 550357.1 | 3736277.4 | 184.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000299 | 0 | 0.25707E-02 | 550360.7 | 3736285.7 | 181.5 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000300 | 0 | 0.25707E-02 | 550364.3 | 3736293.9 | 180.9 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000301 | 0 | 0.25707E-02 | 550367.9 | 3736302.2 | 182.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000302 | 0 | 0.25707E-02 | 550371.5 | 3736310.4 | 185.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000303 | 0 | 0.25707E-02 | 550375.9 | 3736318.1 | 187.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000304 | 0 | 0.25707E-02 | 550381.9 | 3736324.8 | 187.0 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000305 | 0 | 0.25707E-02 | 550387.9 | 3736331.5 | 188.1 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |
| L0000306 | 0 | 0.25707E-02 | 550393.9 | 3736338.2 | 188.4 | 5.00 | 4.19 | |
| 4.65 | YES | NO | | | | | | |

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 L0000307         0   0.25707E-02  550399.9 3736344.9   188.6     5.00     4.19
4.65     YES                    NO
 L0000308         0   0.25707E-02  550406.0 3736351.6   188.9     5.00     4.19
4.65     YES                    NO
 L0000309         0   0.25707E-02  550412.0 3736358.3   188.9     5.00     4.19
4.65     YES                    NO
 L0000310         0   0.25707E-02  550418.0 3736365.0   190.5     5.00     4.19
4.65     YES                    NO
 L0000311         0   0.25707E-02  550424.0 3736371.7   192.9     5.00     4.19
4.65     YES                    NO
 L0000312         0   0.25707E-02  550430.4 3736369.4   192.6     5.00     4.19
4.65     YES                    NO
 L0000313         0   0.25707E-02  550434.0 3736363.0   191.7     5.00     4.19
4.65     YES                    NO
 L0000314         0   0.25707E-02  550428.5 3736355.9   190.7     5.00     4.19
4.65     YES                    NO
 L0000315         0   0.25707E-02  550423.0 3736348.7   189.7     5.00     4.19
4.65     YES                    NO
 L0000316         0   0.25707E-02  550417.5 3736341.6   189.3     5.00     4.19
4.65     YES                    NO
 L0000317         0   0.25707E-02  550412.1 3736334.4   188.4     5.00     4.19
4.65     YES                    NO
 L0000318         0   0.25707E-02  550406.6 3736327.3   186.8     5.00     4.19
4.65     YES                    NO
 L0000319         0   0.25707E-02  550407.5 3736323.6   185.6     5.00     4.19
4.65     YES                    NO
 L0000320         0   0.25707E-02  550416.5 3736324.2   185.9     5.00     4.19
4.65     YES                    NO
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
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                                  PAGE  10
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                                    *** VOLUME SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE    RELEASE    INIT.
INIT.   URBAN  EMISSION RATE   AIRCRAFT
   SOURCE       PART.  (GRAMS/SEC)     X        Y      ELEV.   HEIGHT      SY
SZ     SOURCE  SCALAR VARY
     ID         CATS.               (METERS) (METERS) (METERS) (METERS) (METERS)
(METERS)             BY
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - -

 L0000321         0   0.25707E-02  550425.5 3736324.8   186.1     5.00     4.19
4.65     YES                    NO
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L0000322 | 0 | 0.25707E-02 | 550431.5 | 3736331.1 | 187.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000323 | 0 | 0.25707E-02 | 550437.1 | 3736338.1 | 187.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000324 | 0 | 0.25707E-02 | 550442.7 | 3736345.2 | 189.2 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000325 | 0 | 0.25707E-02 | 550448.3 | 3736352.2 | 191.2 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000326 | 0 | 0.25707E-02 | 550453.9 | 3736359.3 | 193.0 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000327 | 0 | 0.25707E-02 | 550459.5 | 3736366.3 | 194.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000328 | 0 | 0.25707E-02 | 550465.1 | 3736373.4 | 195.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000329 | 0 | 0.25707E-02 | 550470.7 | 3736380.4 | 196.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000330 | 0 | 0.25707E-02 | 550476.8 | 3736386.8 | 197.2 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000331 | 0 | 0.25707E-02 | 550485.3 | 3736389.6 | 198.3 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000332 | 0 | 0.25707E-02 | 550493.9 | 3736392.4 | 198.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000333 | 0 | 0.25707E-02 | 550502.4 | 3736395.3 | 198.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000334 | 0 | 0.25707E-02 | 550510.9 | 3736398.1 | 197.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000335 | 0 | 0.25707E-02 | 550518.4 | 3736403.0 | 197.6 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000336 | 0 | 0.25707E-02 | 550525.4 | 3736408.6 | 198.6 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000337 | 0 | 0.25707E-02 | 550532.4 | 3736414.2 | 198.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000338 | 0 | 0.25707E-02 | 550539.5 | 3736419.8 | 197.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000339 | 0 | 0.25707E-02 | 550546.5 | 3736425.4 | 196.7 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000340 | 0 | 0.25707E-02 | 550553.6 | 3736431.0 | 196.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000341 | 0 | 0.25707E-02 | 550560.6 | 3736436.6 | 196.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000342 | 0 | 0.25707E-02 | 550567.7 | 3736442.2 | 195.7 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000343 | 0 | 0.25707E-02 | 550574.4 | 3736447.9 | 194.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000344 | 0 | 0.25707E-02 | 550569.8 | 3736455.6 | 196.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000345 | 0 | 0.25707E-02 | 550565.1 | 3736463.3 | 197.6 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000346 | 0 | 0.25707E-02 | 550559.8 | 3736466.4 | 197.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |

```
 L0000347         0   0.25707E-02  550553.2 3736460.3   198.1     5.00     4.19
4.65     YES                    NO
 L0000348         0   0.25707E-02  550546.6 3736454.1   198.6     5.00     4.19
4.65     YES                    NO
 L0000349         0   0.25707E-02  550540.0 3736448.0   199.2     5.00     4.19
4.65     YES                    NO
 L0000350         0   0.25707E-02  550533.5 3736441.8   200.3     5.00     4.19
4.65     YES                    NO
 L0000351         0   0.25707E-02  550526.9 3736435.7   202.3     5.00     4.19
4.65     YES                    NO
 L0000352         0   0.25707E-02  550520.3 3736429.6   202.9     5.00     4.19
4.65     YES                    NO
 L0000353         0   0.25707E-02  550513.7 3736423.4   201.9     5.00     4.19
4.65     YES                    NO
 L0000354         0   0.25707E-02  550507.1 3736417.3   200.1     5.00     4.19
4.65     YES                    NO
 L0000355         0   0.25707E-02  550499.1 3736413.5   198.8     5.00     4.19
4.65     YES                    NO
 L0000356         0   0.25707E-02  550490.8 3736409.9   197.8     5.00     4.19
4.65     YES                    NO
 L0000357         0   0.25707E-02  550482.5 3736406.4   196.5     5.00     4.19
4.65     YES                    NO
 L0000358         0   0.25707E-02  550479.5 3736412.3   196.1     5.00     4.19
4.65     YES                    NO
 L0000359         0   0.25707E-02  550478.1 3736421.2   197.5     5.00     4.19
4.65     YES                    NO
 L0000360         0   0.25707E-02  550482.5 3736426.9   199.0     5.00     4.19
4.65     YES                    NO
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                      ***        13:13:39

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 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                                    *** VOLUME SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE    RELEASE    INIT.
INIT.   URBAN  EMISSION RATE   AIRCRAFT
   SOURCE       PART.  (GRAMS/SEC)     X        Y      ELEV.   HEIGHT      SY
SZ     SOURCE  SCALAR VARY
     ID         CATS.               (METERS) (METERS) (METERS) (METERS) (METERS)
(METERS)             BY
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - -

 L0000361         0   0.25707E-02  550490.7 3736430.6   199.9     5.00     4.19
4.65     YES                    NO
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L0000362 | 0 | 0.25707E-02 | 550498.9 | 3736434.2 | 200.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000363 | 0 | 0.25707E-02 | 550506.3 | 3736439.2 | 200.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000364 | 0 | 0.25707E-02 | 550512.8 | 3736445.4 | 201.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000365 | 0 | 0.25707E-02 | 550519.4 | 3736451.5 | 200.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000366 | 0 | 0.25707E-02 | 550525.9 | 3736457.7 | 199.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000367 | 0 | 0.25707E-02 | 550532.5 | 3736463.9 | 198.5 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000368 | 0 | 0.25707E-02 | 550539.0 | 3736470.1 | 198.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000369 | 0 | 0.25707E-02 | 550545.6 | 3736476.2 | 197.6 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000370 | 0 | 0.25707E-02 | 550552.1 | 3736482.4 | 197.3 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000371 | 0 | 0.25707E-02 | 550547.9 | 3736487.1 | 197.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000372 | 0 | 0.25707E-02 | 550539.9 | 3736491.2 | 195.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000373 | 0 | 0.25707E-02 | 550532.0 | 3736495.5 | 192.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000374 | 0 | 0.25707E-02 | 550526.9 | 3736502.9 | 191.3 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000375 | 0 | 0.25707E-02 | 550521.6 | 3736509.6 | 190.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000376 | 0 | 0.25707E-02 | 550514.2 | 3736504.5 | 189.8 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000377 | 0 | 0.25707E-02 | 550506.8 | 3736499.4 | 192.0 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000378 | 0 | 0.25707E-02 | 550499.4 | 3736494.3 | 194.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000379 | 0 | 0.25707E-02 | 550497.4 | 3736486.0 | 196.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000380 | 0 | 0.25707E-02 | 550496.3 | 3736477.0 | 198.4 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000381 | 0 | 0.25707E-02 | 550495.2 | 3736468.1 | 199.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000382 | 0 | 0.25707E-02 | 550491.0 | 3736460.1 | 201.5 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000383 | 0 | 0.25707E-02 | 550486.9 | 3736452.1 | 202.3 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000384 | 0 | 0.25707E-02 | 550486.6 | 3736449.1 | 202.1 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000385 | 0 | 0.25707E-02 | 550493.3 | 3736455.1 | 201.9 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |
| L0000386 | 0 | 0.25707E-02 | 550499.9 | 3736461.2 | 200.3 | 5.00 | 4.19 | |
| 4.65 | YES | | NO | | | | | |

*** SOURCE IDs DEFINING SOURCE GROUPS ***

| SRCGROUP ID | SOURCE IDs |
|---|---|
| ALL | L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 , L0000008 , |
| | L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 , L0000016 , |
| | L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 , L0000024 , |
| | L0000025 , L0000026 , L0000027 , L0000028 , L0000029 , L0000030 , L0000031 , L0000032 , |
| | L0000033 , L0000034 , L0000035 , L0000036 , L0000037 , L0000038 , L0000039 , L0000040 , |
| | L0000041 , L0000042 , L0000043 , L0000044 , L0000045 , L0000046 , L0000047 , L0000048 , |
| | L0000049 , L0000050 , L0000051 , L0000052 , L0000053 , L0000054 , L0000055 , L0000056 , |
| | L0000057 , L0000058 , L0000059 , L0000060 , L0000061 , L0000062 , L0000063 , L0000064 , |
| | L0000065 , L0000066 , L0000067 , L0000068 , L0000069 , L0000070 , L0000071 , L0000072 , |
| | L0000073 , L0000074 , L0000075 , L0000076 , L0000077 , L0000078 , L0000079 , L0000080 , |

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             L0000081    , L0000082    , L0000083    , L0000084    , L0000085    ,
L0000086    , L0000087    , L0000088    ,

             L0000089    , L0000090    , L0000091    , L0000092    , L0000093    ,
L0000094    , L0000095    , L0000096    ,

             L0000097    , L0000098    , L0000099    , L0000100    , L0000101    ,
L0000102    , L0000103    , L0000104    ,

             L0000105    , L0000106    , L0000107    , L0000108    , L0000109    ,
L0000110    , L0000111    , L0000112    ,

             L0000113    , L0000114    , L0000115    , L0000116    , L0000117    ,
L0000118    , L0000119    , L0000120    ,

             L0000121    , L0000122    , L0000123    , L0000124    , L0000125    ,
L0000126    , L0000127    , L0000128    ,

             L0000129    , L0000130    , L0000131    , L0000132    , L0000133    ,
L0000134    , L0000135    , L0000136    ,

             L0000137    , L0000138    , L0000139    , L0000140    , L0000141    ,
L0000142    , L0000143    , L0000144    ,

             L0000145    , L0000146    , L0000147    , L0000148    , L0000149    ,
L0000150    , L0000151    , L0000152    ,

             L0000153    , L0000154    , L0000155    , L0000156    , L0000157    ,
L0000158    , L0000159    , L0000160    ,
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
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                                  PAGE  13
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*


                                          *** SOURCE IDs DEFINING SOURCE GROUPS ***

 SRCGROUP ID                                          SOURCE IDs
 -----------                                          ----------


             L0000161    , L0000162    , L0000163    , L0000164    , L0000165    ,
L0000166    , L0000167    , L0000168    ,

             L0000169    , L0000170    , L0000171    , L0000172    , L0000173    ,
L0000174    , L0000175    , L0000176    ,
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            L0000177    , L0000178    , L0000179    , L0000180    , L0000181    ,
L0000182    , L0000183    , L0000184    ,

            L0000185    , L0000186    , L0000187    , L0000188    , L0000189    ,
L0000190    , L0000191    , L0000192    ,

            L0000193    , L0000194    , L0000195    , L0000196    , L0000197    ,
L0000198    , L0000199    , L0000200    ,

            L0000201    , L0000202    , L0000203    , L0000204    , L0000205    ,
L0000206    , L0000207    , L0000208    ,

            L0000209    , L0000210    , L0000211    , L0000212    , L0000213    ,
L0000214    , L0000215    , L0000216    ,

            L0000217    , L0000218    , L0000219    , L0000220    , L0000221    ,
L0000222    , L0000223    , L0000224    ,

            L0000225    , L0000226    , L0000227    , L0000228    , L0000229    ,
L0000230    , L0000231    , L0000232    ,

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L0000238    , L0000239    , L0000240    ,

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L0000262    , L0000263    , L0000264    ,

            L0000265    , L0000266    , L0000267    , L0000268    , L0000269    ,
L0000270    , L0000271    , L0000272    ,

            L0000273    , L0000274    , L0000275    , L0000276    , L0000277    ,
L0000278    , L0000279    , L0000280    ,

            L0000281    , L0000282    , L0000283    , L0000284    , L0000285    ,
L0000286    , L0000287    , L0000288    ,

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L0000294    , L0000295    , L0000296    ,

            L0000297    , L0000298    , L0000299    , L0000300    , L0000301    ,
L0000302    , L0000303    , L0000304    ,

            L0000305    , L0000306    , L0000307    , L0000308    , L0000309    ,
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L0000310    , L0000311    , L0000312    ,

             L0000313    , L0000314    , L0000315    , L0000316    , L0000317    ,
L0000318    , L0000319    , L0000320    ,

 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                          *** SOURCE IDs DEFINING SOURCE GROUPS ***

 SRCGROUP ID                                          SOURCE IDs
 -----------                                          ----------

             L0000321    , L0000322    , L0000323    , L0000324    , L0000325    ,
L0000326    , L0000327    , L0000328    ,

             L0000329    , L0000330    , L0000331    , L0000332    , L0000333    ,
L0000334    , L0000335    , L0000336    ,

             L0000337    , L0000338    , L0000339    , L0000340    , L0000341    ,
L0000342    , L0000343    , L0000344    ,

             L0000345    , L0000346    , L0000347    , L0000348    , L0000349    ,
L0000350    , L0000351    , L0000352    ,

             L0000353    , L0000354    , L0000355    , L0000356    , L0000357    ,
L0000358    , L0000359    , L0000360    ,

             L0000361    , L0000362    , L0000363    , L0000364    , L0000365    ,
L0000366    , L0000367    , L0000368    ,

             L0000369    , L0000370    , L0000371    , L0000372    , L0000373    ,
L0000374    , L0000375    , L0000376    ,

             L0000377    , L0000378    , L0000379    , L0000380    , L0000381    ,
L0000382    , L0000383    , L0000384    ,

             L0000385    , L0000386    , L0000387    , L0000388    , L0000389    ,

*** MODELOPTs:  RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

*** SOURCE IDs DEFINED AS URBAN SOURCES ***

| URBAN ID | URBAN POP | SOURCE IDs |
|---|---|---|
| | 2189641. | L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 , L0000008 , |
| | | L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 , L0000016 , |
| | | L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 , L0000024 , |
| | | L0000025 , L0000026 , L0000027 , L0000028 , L0000029 , L0000030 , L0000031 , L0000032 , |
| | | L0000033 , L0000034 , L0000035 , L0000036 , L0000037 , L0000038 , L0000039 , L0000040 , |
| | | L0000041 , L0000042 , L0000043 , L0000044 , L0000045 , L0000046 , L0000047 , L0000048 , |
| | | L0000049 , L0000050 , L0000051 , L0000052 , L0000053 , L0000054 , L0000055 , L0000056 , |
| | | L0000057 , L0000058 , L0000059 , L0000060 , L0000061 , L0000062 , L0000063 , L0000064 , |
| | | L0000065 , L0000066 , L0000067 , L0000068 , L0000069 , L0000070 , L0000071 , L0000072 , |
| | | L0000073 , L0000074 , L0000075 , L0000076 , L0000077 , L0000078 , L0000079 , L0000080 , |
| | | L0000081 , L0000082 , L0000083 , L0000084 , L0000085 , L0000086 , L0000087 , L0000088 , |
| | | L0000089 , L0000090 , L0000091 , L0000092 , L0000093 , L0000094 , L0000095 , L0000096 , |
| | | L0000097 , L0000098 , L0000099 , L0000100 , L0000101 , L0000102 , L0000103 , L0000104 , |

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L0000110    , L0000111    , L0000112    ,

             L0000113    , L0000114    , L0000115    , L0000116    , L0000117    ,
L0000118    , L0000119    , L0000120    ,

             L0000121    , L0000122    , L0000123    , L0000124    , L0000125    ,
L0000126    , L0000127    , L0000128    ,

             L0000129    , L0000130    , L0000131    , L0000132    , L0000133    ,
L0000134    , L0000135    , L0000136    ,

             L0000137    , L0000138    , L0000139    , L0000140    , L0000141    ,
L0000142    , L0000143    , L0000144    ,

             L0000145    , L0000146    , L0000147    , L0000148    , L0000149    ,
L0000150    , L0000151    , L0000152    ,

             L0000153    , L0000154    , L0000155    , L0000156    , L0000157    ,
L0000158    , L0000159    , L0000160    ,
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                                        *** SOURCE IDs DEFINED AS URBAN SOURCES
***

  URBAN ID   URBAN POP                                  SOURCE IDs
  --------   ---------                                  ----------


             L0000161    , L0000162    , L0000163    , L0000164    , L0000165    ,
L0000166    , L0000167    , L0000168    ,

             L0000169    , L0000170    , L0000171    , L0000172    , L0000173    ,
L0000174    , L0000175    , L0000176    ,

             L0000177    , L0000178    , L0000179    , L0000180    , L0000181    ,
L0000182    , L0000183    , L0000184    ,

             L0000185    , L0000186    , L0000187    , L0000188    , L0000189    ,
L0000190    , L0000191    , L0000192    ,

             L0000193    , L0000194    , L0000195    , L0000196    , L0000197    ,
L0000198    , L0000199    , L0000200    ,
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L0000206    , L0000207    , L0000208    ,

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L0000214    , L0000215    , L0000216    ,

             L0000217    , L0000218    , L0000219    , L0000220    , L0000221    ,
L0000222    , L0000223    , L0000224    ,

             L0000225    , L0000226    , L0000227    , L0000228    , L0000229    ,
L0000230    , L0000231    , L0000232    ,

             L0000233    , L0000234    , L0000235    , L0000236    , L0000237    ,
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             L0000241    , L0000242    , L0000243    , L0000244    , L0000245    ,
L0000246    , L0000247    , L0000248    ,

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             L0000257    , L0000258    , L0000259    , L0000260    , L0000261    ,
L0000262    , L0000263    , L0000264    ,

             L0000265    , L0000266    , L0000267    , L0000268    , L0000269    ,
L0000270    , L0000271    , L0000272    ,

             L0000273    , L0000274    , L0000275    , L0000276    , L0000277    ,
L0000278    , L0000279    , L0000280    ,

             L0000281    , L0000282    , L0000283    , L0000284    , L0000285    ,
L0000286    , L0000287    , L0000288    ,

             L0000289    , L0000290    , L0000291    , L0000292    , L0000293    ,
L0000294    , L0000295    , L0000296    ,

             L0000297    , L0000298    , L0000299    , L0000300    , L0000301    ,
L0000302    , L0000303    , L0000304    ,

             L0000305    , L0000306    , L0000307    , L0000308    , L0000309    ,
L0000310    , L0000311    , L0000312    ,

             L0000313    , L0000314    , L0000315    , L0000316    , L0000317    ,
L0000318    , L0000319    , L0000320    ,
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                      ***       13:13:39
```

*** SOURCE IDs DEFINED AS URBAN SOURCES ***

| URBAN ID | URBAN POP | SOURCE IDs |
|---|---|---|

L0000321 , L0000322 , L0000323 , L0000324 , L0000325 , L0000326 , L0000327 , L0000328 ,

L0000329 , L0000330 , L0000331 , L0000332 , L0000333 , L0000334 , L0000335 , L0000336 ,

L0000337 , L0000338 , L0000339 , L0000340 , L0000341 , L0000342 , L0000343 , L0000344 ,

L0000345 , L0000346 , L0000347 , L0000348 , L0000349 , L0000350 , L0000351 , L0000352 ,

L0000353 , L0000354 , L0000355 , L0000356 , L0000357 , L0000358 , L0000359 , L0000360 ,

L0000361 , L0000362 , L0000363 , L0000364 , L0000365 , L0000366 , L0000367 , L0000368 ,

L0000369 , L0000370 , L0000371 , L0000372 , L0000373 , L0000374 , L0000375 , L0000376 ,

L0000377 , L0000378 , L0000379 , L0000380 , L0000381 , L0000382 , L0000383 , L0000384 ,

L0000385 , L0000386 , L0000387 , L0000388 , L0000389 ,



*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

( 550340.4, 3736223.5, 205.5, 3291.5, 0.0); ( 550311.9, 3736237.2, 205.7, 3291.5, 0.0);

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     ( 550173.8, 3736211.9,     202.9,    3291.5,       0.0);         ( 550124.3,
3736208.7,     203.1,    3291.5,       0.0);
     ( 550084.2, 3736251.9,     199.6,    3291.5,       0.0);         ( 550071.6,
3736209.8,     201.9,    3291.5,       0.0);
     ( 550073.7, 3736154.9,     204.1,    3291.5,       0.0);         ( 550113.8,
3736149.7,     206.6,    3291.5,       0.0);
     ( 550178.0, 3736157.0,     209.3,    3291.5,       0.0);         ( 550224.4,
3736163.4,     208.1,    3291.5,       0.0);
     ( 550235.0, 3736202.4,     205.0,    3291.5,       0.0);         ( 550286.6,
3736164.4,     207.8,    3291.5,       0.0);
     ( 550311.9, 3736163.4,     207.9,    3291.5,       0.0);         ( 550063.2,
3736081.2,     208.3,    3291.5,       0.0);
     ( 550109.5, 3736094.9,     208.3,    3291.5,       0.0);         ( 550158.0,
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     ( 550143.3, 3736087.5,     212.2,    3291.5,       0.0);         ( 550125.3,
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     ( 550077.9, 3736049.5,     213.6,    3291.5,       0.0);         ( 550113.8,
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     ( 550116.9, 3735910.4,     226.1,    3291.5,       0.0);         ( 550153.8,
3735948.3,     224.2,    3291.5,       0.0);
     ( 550181.2, 3735996.8,     218.3,    3291.5,       0.0);         ( 550192.8,
3736051.6,     216.0,    3291.5,       0.0);
     ( 550210.7, 3736090.6,     214.5,    3291.5,       0.0);         ( 550271.9,
3736058.0,     214.6,    3291.5,       0.0);
     ( 550290.8, 3736100.1,     213.0,    3291.5,       0.0);         ( 550259.2,
3736121.2,     213.1,    3291.5,       0.0);
     ( 550023.1, 3736313.0,     194.1,    3291.5,       0.0);         ( 549995.7,
3736285.6,     196.4,    3291.5,       0.0);
     ( 550004.1, 3736246.6,     197.5,    3291.5,       0.0);         ( 550001.0,
3736210.8,     200.5,    3291.5,       0.0);
     ( 549905.1, 3736294.1,     196.7,    3291.5,       0.0);         ( 549884.0,
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     ( 549857.6, 3736244.5,     196.4,    3291.5,       0.0);         ( 549830.2,
3736221.3,     196.8,    3291.5,       0.0);
     ( 549898.7, 3736362.6,     192.2,    3291.5,       0.0);         ( 549856.6,
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     ( 549834.4, 3736352.0,     191.5,    3291.5,       0.0);         ( 549823.9,
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     ( 549808.1, 3736286.7,     191.2,    3291.5,       0.0);         ( 549759.6,
3736402.6,     185.1,    3291.5,       0.0);
     ( 549731.1, 3736332.0,     186.3,    3291.5,       0.0);         ( 549738.5,
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     ( 549716.4, 3736253.0,     195.1,    3291.5,       0.0);         ( 549683.7,
3736234.0,     196.8,    3291.5,       0.0);
     ( 549665.8, 3736210.8,     197.8,    3291.5,       0.0);         ( 549642.6,
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     ( 549634.2, 3736117.0,     208.2,    3291.5,       0.0);         ( 549710.1,
3736157.0,     204.1,    3291.5,       0.0);
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     ( 549717.4, 3736058.0,     213.1,    3291.5,       0.0);         ( 549758.5,
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     ( 549794.4, 3736119.1,     206.2,    3291.5,       0.0);         ( 549860.8,
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     ( 549886.1, 3736097.0,     207.6,    3291.5,       0.0);         ( 549910.3,
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     ( 549945.1, 3736133.9,     205.2,    3291.5,       0.0);         ( 550006.2,
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     ( 549999.9, 3736107.5,     206.9,    3291.5,       0.0);         ( 549998.9,
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     ( 549997.8, 3736030.6,     214.2,    3291.5,       0.0);         ( 549959.9,
3736036.9,     214.7,    3291.5,       0.0);
     ( 549913.5, 3736006.3,     215.5,    3291.5,       0.0);         ( 549884.0,
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     ( 549807.0, 3735942.0,     223.9,    3291.5,       0.0);         ( 549877.7,
3735917.8,     223.3,    3291.5,       0.0);
     ( 549913.5, 3735922.0,     223.7,    3291.5,       0.0);         ( 549953.5,
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     ( 549990.4, 3735912.5,     223.4,    3291.5,       0.0);         ( 550003.1,
3735974.7,     220.5,    3291.5,       0.0);
     ( 550046.3, 3735971.5,     219.4,    3291.5,       0.0);         ( 549766.2,
3735846.5,     234.0,    3291.5,       0.0);
     ( 549802.2, 3735841.5,     231.7,    3291.5,       0.0);         ( 549874.1,
3735826.6,     233.4,    3291.5,       0.0);
     ( 549934.9, 3735830.4,     233.8,    3291.5,       0.0);         ( 550006.8,
3735846.5,     234.5,    3291.5,       0.0);
     ( 550055.2, 3735862.6,     234.9,    3291.5,       0.0);         ( 549786.1,
3735728.7,     246.1,    3291.5,       0.0);
     ( 549884.1, 3735734.9,     240.9,    3291.5,       0.0);         ( 549921.2,
3735729.9,     241.1,    3291.5,       0.0);
     ( 549953.5, 3735729.9,     241.3,    3291.5,       0.0);         ( 549956.0,
3735772.1,     233.8,    3291.5,       0.0);
     ( 549871.7, 3735641.9,     247.7,    3291.5,       0.0);         ( 549910.1,
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     ( 549947.3, 3735635.7,     250.8,    3291.5,       0.0);         ( 549844.4,
3735572.4,     254.5,    3291.5,       0.0);
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                        ***        13:13:39

                                    PAGE  19
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                      *** DISCRETE CARTESIAN RECEPTORS ***
                                    (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                              (METERS)
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```
     ( 549767.5, 3735609.6,     252.5,    3291.5,       0.0);         ( 551029.9,
3735920.5,     120.3,    3291.5,       0.0);
     ( 551062.5, 3735984.9,     115.9,    3291.5,       0.0);         ( 551099.6,
3736003.4,     112.9,    3291.5,       0.0);
     ( 551109.3, 3736040.5,     109.6,    3291.5,       0.0);         ( 551158.7,
3736083.8,     104.8,    3291.5,       0.0);
     ( 551201.1, 3736121.7,     100.5,    3291.5,       0.0);         ( 551255.0,
3736175.6,      96.3,    3291.5,       0.0);
     ( 551277.0, 3736215.3,      92.8,    3291.5,       0.0);         ( 551299.1,
3736207.4,      92.7,    3291.5,       0.0);
     ( 551264.7, 3736149.1,      96.7,    3291.5,       0.0);         ( 551212.6,
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     ( 551178.2, 3736069.7,     104.8,    3291.5,       0.0);         ( 551134.9,
3736038.8,     109.0,    3291.5,       0.0);
     ( 551101.4, 3735977.0,     112.0,    3291.5,       0.0);         ( 551066.9,
3735952.2,     116.7,    3291.5,       0.0);
     ( 549996.6, 3736646.9,     170.4,    3291.5,       0.0);         ( 549995.9,
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     ( 549995.9, 3736699.9,     167.4,    3291.5,       0.0);         ( 549995.9,
3736724.6,     167.0,    3291.5,       0.0);
     ( 549995.9, 3736745.1,     166.8,    3291.5,       0.0);         ( 549997.3,
3736776.2,     166.5,    3291.5,       0.0);
     ( 549995.9, 3736801.0,     166.2,    3291.5,       0.0);         ( 549995.1,
3736827.2,     166.4,    3291.5,       0.0);
     ( 549995.1, 3736851.9,     167.9,    3291.5,       0.0);         ( 550063.0,
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     ( 550072.2, 3736742.3,     175.9,    3291.5,       0.0);         ( 550082.8,
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     ( 550077.9, 3736834.9,     175.7,    3291.5,       0.0);         ( 550077.2,
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     ( 550077.9, 3736880.9,     173.0,    3291.5,       0.0);         ( 550126.0,
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     ( 550131.6, 3736636.2,     183.1,    3291.5,       0.0);         ( 550138.7,
3736658.9,     182.6,    3291.5,       0.0);
     ( 550137.3, 3736682.2,     182.1,    3291.5,       0.0);         ( 550140.1,
3736708.4,     181.8,    3291.5,       0.0);
     ( 550146.5, 3736730.3,     181.2,    3291.5,       0.0);         ( 550188.2,
3736663.1,     182.2,    3291.5,       0.0);
     ( 550217.2, 3736733.8,     181.6,    3291.5,       0.0);         ( 550228.5,
3736764.2,     182.0,    3291.5,       0.0);
     ( 550234.8, 3736784.0,     182.2,    3291.5,       0.0);         ( 550232.7,
3736810.2,     182.8,    3291.5,       0.0);
     ( 550216.5, 3736837.1,     185.0,    3291.5,       0.0);         ( 550212.2,
3736854.0,     186.8,    3291.5,       0.0);
     ( 550208.0, 3736875.9,     187.7,    3291.5,       0.0);         ( 550199.5,
3736900.7,     187.9,    3291.5,       0.0);
```

*** MODELOPTs:  RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER; WITHIN OPENPIT; OR BEYOND 80KM FOR FASTAREA/FASTALL

| SOURCE ID | - - RECEPTOR LOCATION - - XR (METERS) | YR (METERS) | DISTANCE (METERS) |
|---|---|---|---|
| L0000328 | 550473.0 | 3736374.5 | -1.07 |
| L0000328 | 550463.2 | 3736381.8 | |

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

1 1 1 

*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\Metdata\PalmSpringsAirportADJU\KPSP_V9_ADJU\KPSP_v9.SFC
Met Version: 16216
Profile file: ..\Metdata\PalmSpringsAirportADJU\KPSP_V9_ADJU\KPSP_v9.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 93138 Upper air station no.: 3190
Name: UNKNOWN Name: UNKNOWN

Year: 2012 Year: 2012

First 24 hours of scalar data

| YR | MO | DY | JDY | HR | H0 | U* | W* | DT/DZ | ZICNV | ZIMCH | M-O LEN | Z0 | BOWEN | ALBEDO | REF WS | WD | HT | REF TA | HT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 01 | 01 | 1 | 01 | -28.7 | 0.293 | -9.000 | -9.000 | -999. | 381. | 94.4 | 0.13 | 4.07 | 1.00 | 3.32 | 328. | 10.1 | 286.4 | 2.0 |
| 12 | 01 | 01 | 1 | 02 | -5.5 | 0.102 | -9.000 | -9.000 | -999. | 122. | 17.6 | 0.13 | 4.07 | 1.00 | 1.23 | 320. | 10.1 | 284.2 | 2.0 |
| 12 | 01 | 01 | 1 | 03 | -19.4 | 0.196 | -9.000 | -9.000 | -999. | 209. | 42.5 | 0.13 | 4.07 | 1.00 | 2.27 | 306. | 10.1 | 283.1 | 2.0 |
| 12 | 01 | 01 | 1 | 04 | -16.5 | 0.181 | -9.000 | -9.000 | -999. | 184. | 35.9 | 0.13 | 4.07 | 1.00 | 2.10 | 328. | 10.1 | 282.5 | 2.0 |
| 12 | 01 | 01 | 1 | 05 | -20.0 | 0.202 | -9.000 | -9.000 | -999. | 218. | 44.9 | 0.13 | 4.07 | 1.00 | 2.33 | 328. | 10.1 | 283.8 | 2.0 |
| 12 | 01 | 01 | 1 | 06 | -18.7 | 0.193 | -9.000 | -9.000 | -999. | 203. | 40.9 | 0.13 | 4.07 | 1.00 | 2.23 | 325. | 10.1 | 283.1 | 2.0 |
| 12 | 01 | 01 | 1 | 07 | -18.7 | 0.193 | -9.000 | -9.000 | -999. | 203. | 40.9 | 0.13 | 4.07 | 1.00 | 2.23 | 327. | 10.1 | 284.2 | 2.0 |
| 12 | 01 | 01 | 1 | 08 | -9.3 | 0.150 | -9.000 | -9.000 | -999. | 140. | 32.5 | 0.13 | 4.07 | 0.52 | 1.74 | 297. | 10.1 | 284.9 | 2.0 |
| 12 | 01 | 01 | 1 | 09 | 50.6 | 0.130 | 0.399 | 0.011 | 45. | 112. | -3.9 | 0.13 | 4.07 | 0.32 | 0.92 | 282. | 10.1 | 291.4 | 2.0 |
| 12 | 01 | 01 | 1 | 10 | 126.5 | 0.172 | 0.815 | 0.008 | 154. | 171. | -3.6 | 0.13 | 4.07 | 0.25 | 1.20 | 233. | 10.1 | 294.2 | 2.0 |
| 12 | 01 | 01 | 1 | 11 | 179.5 | 0.134 | 1.299 | 0.005 | 439. | 118. | -1.2 | 0.13 | 4.07 | 0.23 | 0.75 | 344. | 10.1 | 297.5 | 2.0 |
| 12 | 01 | 01 | 1 | 12 | 203.7 | 0.185 | 1.649 | 0.005 | 791. | 192. | -2.8 | 0.13 | 4.07 | 0.22 | 1.23 | 100. | 10.1 | 298.8 | 2.0 |
| 12 | 01 | 01 | 1 | 13 | 199.8 | 0.234 | 1.913 | 0.005 | 1259. | 271. | -5.7 | 0.13 | 4.07 | | | | | | |

```
0.22    1.76  110.   10.1  299.9    2.0
 12 01 01   1 14  167.6  0.236  1.916  0.005 1507.  275.     -7.0  0.13   4.07
0.24    1.84  124.   10.1  300.4    2.0
 12 01 01   1 15  108.5  0.273  1.697  0.005 1617.  342.    -16.8  0.13   4.07
0.27    2.40   92.   10.1  300.4    2.0
 12 01 01   1 16   27.5  0.235  1.080  0.005 1640.  275.    -42.5  0.13   4.07
0.37    2.27  144.   10.1  299.2    2.0
 12 01 01   1 17   -5.6  0.106 -9.000 -9.000 -999.   95.     19.2  0.13   4.07
0.66    1.28  204.   10.1  294.9    2.0
 12 01 01   1 18  -17.6  0.188 -9.000 -9.000 -999.  196.     39.0  0.13   4.07
1.00    2.18  314.   10.1  292.0    2.0
 12 01 01   1 19  -25.3  0.260 -9.000 -9.000 -999.  318.     74.4  0.13   4.07
1.00    2.96  322.   10.1  289.9    2.0
 12 01 01   1 20  -21.1  0.217 -9.000 -9.000 -999.  243.     51.7  0.13   4.07
1.00    2.49  314.   10.1  289.2    2.0
 12 01 01   1 21  -26.7  0.275 -9.000 -9.000 -999.  346.     83.0  0.13   4.07
1.00    3.12  314.   10.1  290.4    2.0
 12 01 01   1 22  -22.1  0.226 -9.000 -9.000 -999.  259.     56.2  0.13   4.07
1.00    2.59  317.   10.1  288.8    2.0
 12 01 01   1 23  -28.1  0.285 -9.000 -9.000 -999.  365.     89.2  0.13   4.07
1.00    3.23  328.   10.1  285.4    2.0
 12 01 01   1 24  -33.3  0.338 -9.000 -9.000 -999.  472.    125.8  0.13   4.07
1.00    3.81  331.   10.1  286.4    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 12 01 01 01   10.1 1  328.    3.32   286.5   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                       ***        13:13:39

                                  PAGE  23
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                               *** THE PERIOD ( 43848 HRS) AVERAGE CONCENTRATION
VALUES FOR SOURCE GROUP: ALL       ***
                                  INCLUDING SOURCE(S):     L0000001    , L0000002
, L0000003    , L0000004    , L0000005    ,
                  L0000006    , L0000007    , L0000008    , L0000009    , L0000010
, L0000011    , L0000012    , L0000013    ,
                  L0000014    , L0000015    , L0000016    , L0000017    , L0000018
, L0000019    , L0000020    , L0000021    ,
                  L0000022    , L0000023    , L0000024    , L0000025    , L0000026
, L0000027    , L0000028    ,  . . .      ,

                                                *** DISCRETE CARTESIAN RECEPTOR POINTS
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** CONC OF PM_10 IN MICROGRAMS/M**3 **

| X-COORD (M) | Y-COORD (M) | CONC | X-COORD (M) | Y-COORD (M) | CONC |
|---|---|---|---|---|---|
| 550340.37 | 3736223.46 | 25.93566 | 550311.91 | 3736237.16 | 31.65731 |
| 550282.39 | 3736241.38 | 34.74093 | 550221.26 | 3736238.21 | 35.45246 |
| 550173.83 | 3736211.86 | 20.69587 | 550124.29 | 3736208.70 | 12.28967 |
| 550084.24 | 3736251.92 | 16.17397 | 550071.59 | 3736209.76 | 8.83558 |
| 550073.70 | 3736154.95 | 5.19739 | 550113.75 | 3736149.68 | 5.25368 |
| 550178.04 | 3736157.05 | 7.52455 | 550224.42 | 3736163.38 | 11.77592 |
| 550234.96 | 3736202.38 | 21.62664 | 550286.61 | 3736164.43 | 14.79819 |
| 550311.91 | 3736163.38 | 15.12265 | 550063.16 | 3736081.16 | 2.66275 |
| 550109.53 | 3736094.87 | 3.36759 | 550158.02 | 3736112.78 | 4.36681 |
| 550143.26 | 3736087.49 | 3.16254 | 550125.34 | 3736049.54 | 2.28653 |
| 550077.91 | 3736049.54 | 1.97504 | 550113.75 | 3735984.19 | 1.39002 |
| 550116.91 | 3735910.41 | 0.91199 | 550153.80 | 3735948.35 | 1.19137 |
| 550181.21 | 3735996.84 | 1.90972 | 550192.80 | 3736051.65 | 2.87948 |
| 550210.72 | 3736090.65 | 4.36208 | 550271.85 | 3736057.97 | 4.93581 |
| 550290.83 | 3736100.14 | 7.63480 | 550259.21 | 3736121.22 | 7.82807 |
| 550023.10 | 3736313.05 | 12.01833 | 549995.70 | 3736285.65 | 8.47987 |
| 550004.13 | 3736246.65 | 7.62024 | 550000.97 | 3736210.81 | 5.90934 |
| 549905.05 | 3736294.08 | 4.69165 | 549883.97 | 3736262.46 | 3.91943 |
| 549857.62 | 3736244.54 | 3.33857 | 549830.21 | 3736221.35 | 2.84063 |
| 549898.73 | 3736362.59 | 4.93204 | 549856.56 | 3736375.24 | 3.98636 |
| 549834.43 | 3736352.05 | 3.54377 | 549823.89 | | |

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3736315.16        3.24918
         549808.08    3736286.70        2.92164                          549759.59
3736402.64        2.60409
         549731.13    3736332.02        2.27544                          549738.51
3736262.46        2.20308
         549716.38    3736252.97        2.01790                          549683.70
3736234.00        1.77673
         549665.78    3736210.81        1.63138                          549642.60
3736181.30        1.44580
         549634.16    3736117.00        0.87607                          549710.05
3736157.05        1.33239
         549742.73    3736180.24        1.72500                          549769.08
3736191.84        2.06026
         549717.43    3736057.97        0.80569                          549758.54
3736053.76        0.88016
         549794.38    3736119.11        1.40038                          549860.78
3736062.19        1.28186
         549886.08    3736096.97        1.62312                          549910.32
3736123.32        2.08973
         549945.10    3736133.86        2.49055                          550006.24
3736140.19        3.55170
         549999.91    3736107.51        2.55784                          549998.86
3736076.95        1.97462
         549997.80    3736030.57        1.43533                          549959.86
3736036.89        1.29638
         549913.48    3736006.33        1.03706                          549883.97
3735993.68        0.91014
         549807.02    3735942.03        0.56259                          549877.65
3735917.79        0.62600
         549913.48    3735922.00        0.66774                          549953.54
3735914.63        0.70169
         549990.43    3735912.52        0.76599                          550003.08
3735974.71        1.00188
         550046.29    3735971.54        1.13585                          549766.25
3735846.49        0.35095
         549802.21    3735841.53        0.38870                          549874.13
3735826.65        0.40977
         549934.89    3735830.37        0.44929                          550006.81
3735846.49        0.51623
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                      ***        13:13:39

                                 PAGE  24
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                               *** THE PERIOD ( 43848 HRS) AVERAGE CONCENTRATION
VALUES FOR SOURCE GROUP: ALL       ***
                                   INCLUDING SOURCE(S):     L0000001    , L0000002
```

```
, L0000003    , L0000004    , L0000005    ,
                L0000006    , L0000007    , L0000008    , L0000009    , L0000010
, L0000011    , L0000012    , L0000013    ,
                L0000014    , L0000015    , L0000016    , L0000017    , L0000018
, L0000019    , L0000020    , L0000021    ,
                L0000022    , L0000023    , L0000024    , L0000025    , L0000026
, L0000027    , L0000028    ,  . . .      ,

                                          *** DISCRETE CARTESIAN RECEPTOR POINTS
***

                                        ** CONC OF PM_10    IN MICROGRAMS/M**3
                 **

       X-COORD (M)   Y-COORD (M)        CONC                        X-COORD (M)
Y-COORD (M)        CONC
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
         550055.17    3735862.61        0.57956                       549786.09
3735728.69        0.25033
         549884.05    3735734.89        0.31052                       549921.25
3735729.93        0.32218
         549953.49    3735729.93        0.33580                       549955.97
3735772.09        0.41756
         549871.65    3735641.89        0.24061                       549910.09
3735634.45        0.24312
         549947.29    3735635.69        0.25274                       549844.37
3735572.45        0.19720
         549767.49    3735609.65        0.19489                       551029.85
3735920.47        1.59673
         551062.52    3735984.91        1.49222                       551099.59
3736003.45        1.36639
         551109.31    3736040.53        1.32764                       551158.74
3736083.78        1.17214
         551201.12    3736121.74        1.05500                       551254.97
3736175.59        0.92626
         551277.04    3736215.32        0.87363                       551299.11
3736207.37        0.84048
         551264.68    3736149.11        0.91725                       551212.59
3736098.79        1.03729
         551178.16    3736069.66        1.12727                       551134.91
3736038.76        1.25196
         551101.36    3735976.97        1.36211                       551066.93
3735952.25        1.47498
         549996.56    3736646.86        3.22336                       549995.85
3736674.43        2.90380
         549995.85    3736699.89        2.65349                       549995.85
3736724.64        2.45031
         549995.85    3736745.14        2.29966                       549997.26
3736776.25        2.10043
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         549995.85    3736801.00        1.95239                     549995.14
3736827.16        1.81815
         549995.14    3736851.90        1.71820                     550063.02
3736670.19        3.47000
         550063.02    3736696.35        3.15831                     550068.67
3736719.69        2.93854
         550072.21    3736742.31        2.74275                     550082.82
3736764.94        2.58484
         550083.52    3736789.68        2.39090                     550079.99
3736812.31        2.21435
         550077.87    3736834.94        2.05645                     550077.16
3736856.15        1.92157
         550077.87    3736880.89        1.77425                     550125.95
3736612.21        5.43572
         550131.60    3736636.25        4.85130                     550138.67
3736658.88        4.39834
         550137.26    3736682.21        3.94555                     550140.09
3736708.37        3.54283
         550146.45    3736730.29        3.25408                     550188.17
3736663.12        4.57600
         550217.16    3736733.83        3.41269                     550228.47
3736764.23        3.05056
         550234.83    3736784.03        2.84262                     550232.71
3736810.19        2.59261
         550216.45    3736837.06        2.38236                     550212.21
3736854.03        2.27034
         550207.96    3736875.94        2.12233                     550199.48
3736900.69        1.96233
         550195.94    3736922.61        1.83789                     550189.58
3736945.94        1.67884
         550187.46    3736967.86        1.55376                     550184.63
3736990.49        1.47679
         550180.39    3736779.08        2.80852                     550172.61
3736802.41        2.58810
         550163.42    3736825.74        2.39091                     550155.64
3736846.96        2.22863
         550154.23    3736867.46        2.09102                     550149.99
3736889.38        1.92362
         550145.74    3736910.59        1.76162                     550125.95
3736932.51        1.62199
         550116.75    3736954.43        1.57747                     550482.14
3736496.15       24.19733
         550528.30    3736529.79       15.59072                     550542.35
3736503.56       25.51753
         550556.37    3736506.79       19.50184                     550587.22
3736447.17       23.73022
         550571.05    3736421.50       27.84541                     550549.00
3736403.48       29.80839
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
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                            *** THE PERIOD ( 43848 HRS) AVERAGE CONCENTRATION
VALUES FOR SOURCE GROUP: ALL      ***
                                 INCLUDING SOURCE(S):     L0000001    , L0000002
, L0000003    , L0000004    , L0000005    ,
                  L0000006    , L0000007    , L0000008    , L0000009    , L0000010
, L0000011    , L0000012    , L0000013    ,
                  L0000014    , L0000015    , L0000016    , L0000017    , L0000018
, L0000019    , L0000020    , L0000021    ,
                  L0000022    , L0000023    , L0000024    , L0000025    , L0000026
, L0000027    , L0000028    ,  . . .      ,

                                              *** DISCRETE CARTESIAN RECEPTOR POINTS
***

                                          ** CONC OF PM_10    IN MICROGRAMS/M**3
                  **

       X-COORD (M)   Y-COORD (M)        CONC                        X-COORD (M)
Y-COORD (M)        CONC
 - - -

, L0000027    , L0000028    ,  . . .      ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10    IN MICROGRAMS/M**3 **

| X-COORD (M) | Y-COORD (M) | CONC | (YYMMDDHH) | X-COORD (M) | Y-COORD (M) | CONC | (YYMMDDHH) |
|---|---|---|---|---|---|---|---|
| 550340.37 | 3736223.46 | 102.70807 | (16102919) | 550311.91 | 3736237.16 | 121.71914 | (12090505) |
| 550282.39 | 3736241.38 | 126.30981 | (13081904) | 550221.26 | 3736238.21 | 118.16557 | (12072505) |
| 550173.83 | 3736211.86 | 87.05278 | (12072505) | 550124.29 | 3736208.70 | 80.02281 | (13091420) |
| 550084.24 | 3736251.92 | 95.97608 | (13062621) | 550071.59 | 3736209.76 | 73.11244 | (14072523) |
| 550073.70 | 3736154.95 | 65.03615 | (15091820) | 550113.75 | 3736149.68 | 76.46703 | (12092323) |
| 550178.04 | 3736157.05 | 79.14159 | (14072520) | 550224.42 | 3736163.38 | 76.60224 | (15061901) |
| 550234.96 | 3736202.38 | 91.16564 | (13081904) | 550286.61 | 3736164.43 | 76.23336 | (13090722) |
| 550311.91 | 3736163.38 | 76.40409 | (14072520) | 550063.16 | 3736081.16 | 64.60564 | (14051420) |
| 550109.53 | 3736094.87 | 66.32097 | (16082121) | 550158.02 | 3736112.78 | 69.57002 | (12112717) |
| 550143.26 | 3736087.49 | 66.24132 | (13090722) | 550125.34 | 3736049.54 | 61.09579 | (14090105) |
| 550077.91 | 3736049.54 | 63.77661 | (15061901) | 550113.75 | 3735984.19 | 53.28967 | (16080806) |
| 550116.91 | 3735910.41 | 45.48866 | (16080806) | 550153.80 | 3735948.35 | 46.86503 | (16080806) |
| 550181.21 | 3735996.84 | 53.78422 | (14072520) | 550192.80 | 3736051.65 | 59.96645 | (14072520) |
| 550210.72 | 3736090.65 | 64.76676 | (14072520) | 550271.85 | 3736057.97 | 58.43965 | (13090803) |
| 550290.83 | 3736100.14 | 63.76961 | (13090803) | 550259.21 | 3736121.22 | 67.69921 | (14072520) |
| 550023.10 | 3736313.05 | 93.79414 | (16010316) | 549995.70 | 3736285.65 | 70.29539 | (12020617) |
| 550004.13 | 3736246.65 | 59.79355 | (12090319) | 550000.97 | 3736210.81 | 57.17880 | (13062621) |
| 549905.05 | 3736294.08 | 44.52963 | (16010316) | 549883.97 | 3736262.46 | 36.39889 | (13062720) |
| 549857.62 | 3736244.54 | 32.77741 | (13062720) | 549830.21 | 3736221.35 | 29.36719 | (13062720) |

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        549898.73   3736362.59       36.26563  (13062620)                549856.56
3736375.24       30.63191  (13062620)
        549834.43   3736352.05       28.91389  (15081623)                549823.89
3736315.16       30.63356  (16010316)
        549808.08   3736286.70       28.75783  (16010316)                549759.59
3736402.64       21.17428  (16123116)
        549731.13   3736332.02       20.82726  (15081623)                549738.51
3736262.46       22.08448  (13091319)
        549716.38   3736252.97       21.60320  (13091319)                549683.70
3736234.00       20.21292  (14080121)
        549665.78   3736210.81       19.44399  (14080121)                549642.60
3736181.30       19.19597  (13062720)
        549634.16   3736117.00       38.38011  (12103018)                549710.05
3736157.05       34.33357  (15093019)
        549742.73   3736180.24       29.49254  (13063020)                549769.08
3736191.84       27.46430  (13063020)
        549717.43   3736057.97       49.51556  (13090802)                549758.54
3736053.76       51.56680  (14011819)
        549794.38   3736119.11       46.07309  (15020518)                549860.78
3736062.19       55.86789  (13062622)
        549886.08   3736096.97       57.04011  (13062622)                549910.32
3736123.32       55.11983  (14080203)
        549945.10   3736133.86       58.31925  (15081624)                550006.24
3736140.19       58.31860  (12092121)
        549999.91   3736107.51       64.21371  (12071223)                549998.86
3736076.95       66.11102  (13070202)
        549997.80   3736030.57       62.67709  (13081904)                549959.86
3736036.89       62.40719  (13070202)
        549913.48   3736006.33       57.55378  (13070202)                549883.97
3735993.68       55.61167  (15092020)
        549807.02   3735942.03       48.66342  (12072505)                549877.65
3735917.79       47.79952  (13081904)
        549913.48   3735922.00       48.85625  (13081904)                549953.54
3735914.63       47.46932  (12090706)
        549990.43   3735912.52       48.10290  (12090505)                550003.08
3735974.71       53.68321  (16031901)
        550046.29   3735971.54       53.45785  (15061901)                549766.25
3735846.49       38.20171  (15122719)
        549802.21   3735841.53       39.37430  (14010619)                549874.13
3735826.65       39.48178  (12090706)
        549934.89   3735830.37       41.26956  (12080306)                550006.81
3735846.49       42.16701  (12080306)
 *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                       ***        13:13:39

                                  PAGE  27
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*
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*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

| X-COORD (M) | Y-COORD (M) | CONC | (YYMMDDHH) | X-COORD (M) | Y-COORD (M) | CONC | (YYMMDDHH) |
|---|---|---|---|---|---|---|---|
| 550055.17 | 3735862.61 | 40.53293 | (16080806) | 549786.09 | 3735728.69 | 30.57665 | (12090706) |
| 549884.05 | 3735734.89 | 35.83001 | (12080306) | 549921.25 | 3735729.93 | 36.27264 | (12080306) |
| 549953.49 | 3735729.93 | 35.33107 | (12080306) | 549955.97 | 3735772.09 | 39.24570 | (12080306) |
| 549871.65 | 3735641.89 | 31.90020 | (12080306) | 549910.09 | 3735634.45 | 30.02916 | (12080306) |
| 549947.29 | 3735635.69 | 28.22674 | (16080806) | 549844.37 | 3735572.45 | 28.52184 | (12080306) |
| 549767.49 | 3735609.65 | 27.53346 | (12090706) | 551029.85 | 3735920.47 | 8.05293 | (16072321) |
| 551062.52 | 3735984.91 | 8.23218 | (16072321) | 551099.59 | 3736003.45 | 7.90061 | (15081505) |
| 551109.31 | 3736040.53 | 8.13859 | (16072522) | 551158.74 | 3736083.78 | 7.83679 | (13082821) |
| 551201.12 | 3736121.74 | 7.58179 | (13082821) | 551254.97 | 3736175.59 | 7.15011 | (13051320) |
| 551277.04 | 3736215.32 | 6.99718 | (13051320) | 551299.11 | 3736207.37 | 6.78471 | (13051320) |
| 551264.68 | 3736149.11 | 6.97268 | (14073103) | 551212.59 | 3736098.79 | 7.40282 | (13082821) |
| 551178.16 | 3736069.66 | 7.54943 | (15082820) | 551134.91 | 3736038.76 | 7.86091 | (16072522) |
| 551101.36 | 3735976.97 | 7.73545 | (14091023) | 551066.93 | 3735952.25 | 8.02818 | (16072321) |
| 549996.56 | 3736646.86 | 25.82531 | (14120516) | 549995.85 | 3736674.43 | 24.18142 | (14120516) |
| 549995.85 | 3736699.89 | 22.97827 | (15062619) | 549995.85 |

3736724.64  22.56983  (15062619)
  549995.85  3736745.14  22.16145  (15062619)  549997.26
3736776.25  21.54871  (15062619)
  549995.85  3736801.00  20.76016  (15062619)  549995.14
3736827.16  20.00293  (15062619)
  549995.14  3736851.90  19.43089  (15062619)  550063.02
3736670.19  34.67692  (15062619)
  550063.02  3736696.35  32.92584  (15062619)  550068.67
3736719.69  31.75955  (15062619)
  550072.21  3736742.31  30.36836  (15062619)  550082.82
3736764.94  29.10569  (15062619)
  550083.52  3736789.68  27.19458  (15062619)  550079.99
3736812.31  25.40368  (15062619)
  550077.87  3736834.94  23.75314  (15062619)  550077.16
3736856.15  22.30336  (15062619)
  550077.87  3736880.89  20.68053  (15062619)  550125.95
3736612.21  53.13304  (15062619)
  550131.60  3736636.25  48.75770  (15062619)  550138.67
3736658.88  44.94481  (15062619)
  550137.26  3736682.21  41.02377  (15062619)  550140.09
3736708.37  37.14754  (15062619)
  550146.45  3736730.29  33.99597  (15062619)  550188.17
3736663.12  43.38994  (15062619)
  550217.16  3736733.83  29.62334  (15062619)  550228.47
3736764.23  25.21980  (15062619)
  550234.83  3736784.03  24.04165  (12122916)  550232.71
3736810.19  22.39407  (12122916)
  550216.45  3736837.06  20.13986  (12122916)  550212.21
3736854.03  19.14335  (12122916)
  550207.96  3736875.94  17.89982  (12122916)  550199.48
3736900.69  16.89174  (14120116)
  550195.94  3736922.61  15.95765  (14120116)  550189.58
3736945.94  14.98954  (14120116)
  550187.46  3736967.86  14.01109  (14120116)  550184.63
3736990.49  13.32709  (14120116)
  550180.39  3736779.08  26.95308  (15062619)  550172.61
3736802.41  25.10719  (15062619)
  550163.42  3736825.74  23.48483  (15062619)  550155.64
3736846.96  22.29577  (14120116)
  550154.23  3736867.46  21.00961  (14120116)  550149.99
3736889.38  19.64194  (14120116)
  550145.74  3736910.59  18.31797  (14120116)  550125.95
3736932.51  17.71022  (14120116)
  550116.75  3736954.43  17.35742  (14120116)  550482.14
3736496.15  108.47789  (15062619)
  550528.30  3736529.79  86.08271  (14020517)  550542.35
3736503.56  120.23000  (12071806)
  550556.37  3736506.79  106.67830  (13020317)  550587.22
3736447.17  122.90651  (15030117)
  550571.05  3736421.50  116.70967  (15030117)  550549.00

3736403.48      121.00209  (15030117)

 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP:  ALL      ***
                                 INCLUDING SOURCE(S):     L0000001    , L0000002 , L0000003    , L0000004    , L0000005    ,
                 L0000006    , L0000007    , L0000008    , L0000009    , L0000010 , L0000011    , L0000012    , L0000013    ,
                 L0000014    , L0000015    , L0000016    , L0000017    , L0000018 , L0000019    , L0000020    , L0000021    ,
                 L0000022    , L0000023    , L0000024    , L0000025    , L0000026 , L0000027    , L0000028    ,  . . .      ,

                                          *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                      ** CONC OF PM_10    IN MICROGRAMS/M**3
                  **

      X-COORD (M)  Y-COORD (M)        CONC     (YYMMDDHH)              X-COORD (M)  Y-COORD (M)        CONC     (YYMMDDHH)
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
        550501.93   3736379.62      144.42630  (15030117)               550472.95   3736374.47      151.09894  (15030117)
        550463.23   3736381.76      147.69779  (15030117)               550469.18   3736415.09      163.04577  (12071806)
        550461.93   3736438.54      126.71444  (12071806)               550484.25   3736464.71      161.01389  (12071806)

 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                      *** THE SUMMARY OF MAXIMUM PERIOD ( 43848 HRS) RESULTS ***


                                     ** CONC OF PM_10    IN MICROGRAMS/M**3
               **

```
                        NETWORK
GROUP ID                      AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS      36.22554 AT (  550501.93,  3736379.62,   198.28,
 3291.50,    0.00)  DC
          2ND HIGHEST VALUE IS      35.93287 AT (  550469.18,  3736415.09,   195.61,
 3291.50,    0.00)  DC
          3RD HIGHEST VALUE IS      35.45246 AT (  550221.26,  3736238.21,   202.75,
 3291.50,    0.00)  DC
          4TH HIGHEST VALUE IS      34.74093 AT (  550282.39,  3736241.38,   206.27,
 3291.50,    0.00)  DC
          5TH HIGHEST VALUE IS      34.56212 AT (  550484.25,  3736464.71,   200.33,
 3291.50,    0.00)  DC
          6TH HIGHEST VALUE IS      33.58224 AT (  550463.23,  3736381.76,   194.32,
 3291.50,    0.00)  DC
          7TH HIGHEST VALUE IS      32.75493 AT (  550472.95,  3736374.47,   197.76,
 3291.50,    0.00)  DC
          8TH HIGHEST VALUE IS      31.65731 AT (  550311.91,  3736237.16,   205.71,
 3291.50,    0.00)  DC
          9TH HIGHEST VALUE IS      29.80839 AT (  550549.00,  3736403.48,   191.25,
 3291.50,    0.00)  DC
         10TH HIGHEST VALUE IS      29.52443 AT (  550461.93,  3736438.54,   196.39,
 3291.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
↟ *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                      ***        13:13:39

                                   PAGE  30
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                              *** THE SUMMARY OF HIGHEST  1-HR
RESULTS ***


                                   ** CONC OF PM_10    IN MICROGRAMS/M**3
               **

                                                    DATE
```

```
                                        NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)             RECEPTOR
(XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS     163.04577  ON 12071806: AT (  550469.18,
3736415.09,   195.61,  3291.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
↟ *** AERMOD - VERSION 23132  ***   *** C:\Users\dlarocca\Desktop\Lakes
Files\RitzPalmSping\RitzPalmSping.is ***        06/27/24
 *** AERMET - VERSION  16216 ***   ***
                       ***        13:13:39

                                   PAGE  31
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            2 Warning Message(s)
 A Total of          709 Informational Message(s)

 A Total of        43848 Hours Were Processed

 A Total of          289 Calm Hours Identified

 A Total of          420 Missing Hours Identified (  0.96 Percent)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186     902       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
     0.50
 ME W187     902       MEOPEN: ADJ_U* Option for Stable Low Winds used in AERMET


    ***********************************
    *** AERMOD Finishes Successfully ***
    ***********************************
```

HARP2 - HRACalc (dated 22118) 6/27/2024 2:40:45 PM - Output Log

GLCs loaded successfully
Pollutants loaded successfully
Pathway receptors loaded successfully
**********
RISK SCENARIO SETTINGS

Receptor Type: Resident
Scenario: Cancer
Calculation Method: HighEnd

**********
EXPOSURE DURATION PARAMETERS FOR CANCER

Start Age: -0.25
Total Exposure Duration: 1.75

Exposure Duration Bin Distribution
3rd Trimester Bin: 0.25
0<2 Years Bin: 1.75
2<9 Years Bin: 0
2<16 Years Bin: 0
16<30 Years Bin: 0
16 to 70 Years Bin: 0

**********
PATHWAYS ENABLED

NOTE: Inhalation is always enabled and used for all assessments.  The remaining pathways are only used for cancer and noncancer chronic assessments.

Inhalation: True
Soil: True
Dermal: True
Mother's milk: True
Water: False
Fish: False
Homegrown crops: True
Beef: False
Dairy: False
Pig: False
Chicken: False
Egg: False

**********
INHALATION

Daily breathing rate: RMP

**Worker Adjustment Factors**
Worker adjustment factors enabled: NO

**Fraction at time at home**
3rd Trimester to 16 years: OFF
16 years to 70 years: ON

**********
SOIL & DERMAL PATHWAY SETTINGS

Deposition rate (m/s): 0.02
Soil mixing depth (m): 0.01
Dermal climate: Warm

**********
HOMEGROWN CROP PATHWAY SETTINGS

Household type: HouseholdsthatGarden
Fraction leafy: 0.137
Fraction exposed: 0.137
Fraction protected: 0.137
Fraction root: 0.137

**********
TIER 2 SETTINGS

Tier2 adjustments were used in this assessment.  Please see the input file for details.
Tier2 - What was changed: ED or start age changed|
Calculating cancer risk
Cancer risk breakdown by pollutant and receptor saved to:
C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRACancerCancerRisk.csv
Cancer risk total by receptor saved to: C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRACancerCancerRiskSumByRec.csv
HRA ran successfully

*HARP - HRACalc v22118 6/27/2024 2:40:45 PM - Cancer Risk - Input File: C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRACancerHRAInput.hra

| REC | GRP | NETID | X | Y | RISK_SUM | SCENARIO | INH_RISK | SOIL_RISK | DERMAL_F | MMILK_RIS | WATER_RI | FISH_RISK | CROP_RIS | BEEF_RISK | DAIRY_RIS | PIG_RISK | CHICKEN_ | EGG_RISK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ALL | | 550340.4 | 3736223 | 2.31E-05 | 1.75YrCan | 2.31E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 2 | ALL | | 550311.9 | 3736237 | 2.82E-05 | 1.75YrCan | 2.82E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 3 | ALL | | 550282.4 | 3736241 | 3.09E-05 | 1.75YrCan | 3.09E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 4 | ALL | | 550221.3 | 3736238 | 3.15E-05 | 1.75YrCan | 3.15E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 5 | ALL | | 550173.8 | 3736212 | 1.84E-05 | 1.75YrCan | 1.84E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 6 | ALL | | 550124.3 | 3736209 | 1.09E-05 | 1.75YrCan | 1.09E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 7 | ALL | | 550084.2 | 3736252 | 1.44E-05 | 1.75YrCan | 1.44E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 8 | ALL | | 550071.6 | 3736210 | 7.86E-06 | 1.75YrCan | 7.86E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 9 | ALL | | 550073.7 | 3736155 | 4.62E-06 | 1.75YrCan | 4.62E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 10 | ALL | | 550113.8 | 3736150 | 4.67E-06 | 1.75YrCan | 4.67E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 11 | ALL | | 550178 | 3736157 | 6.69E-06 | 1.75YrCan | 6.69E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 12 | ALL | | 550224.4 | 3736163 | 1.05E-05 | 1.75YrCan | 1.05E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 13 | ALL | | 550235 | 3736202 | 1.92E-05 | 1.75YrCan | 1.92E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 14 | ALL | | 550286.6 | 3736164 | 1.32E-05 | 1.75YrCan | 1.32E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 15 | ALL | | 550311.9 | 3736163 | 1.35E-05 | 1.75YrCan | 1.35E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 16 | ALL | | 550063.2 | 3736081 | 2.37E-06 | 1.75YrCan | 2.37E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 17 | ALL | | 550109.5 | 3736095 | 3.00E-06 | 1.75YrCan | 3.00E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 18 | ALL | | 550158 | 3736113 | 3.89E-06 | 1.75YrCan | 3.89E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 19 | ALL | | 550143.3 | 3736087 | 2.81E-06 | 1.75YrCan | 2.81E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 20 | ALL | | 550125.3 | 3736050 | 2.03E-06 | 1.75YrCan | 2.03E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 21 | ALL | | 550077.9 | 3736050 | 1.76E-06 | 1.75YrCan | 1.76E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 22 | ALL | | 550113.8 | 3735984 | 1.24E-06 | 1.75YrCan | 1.24E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 23 | ALL | | 550116.9 | 3735910 | 8.11E-07 | 1.75YrCan | 8.11E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 24 | ALL | | 550153.8 | 3735948 | 1.06E-06 | 1.75YrCan | 1.06E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 25 | ALL | | 550181.2 | 3735997 | 1.70E-06 | 1.75YrCan | 1.70E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 26 | ALL | | 550192.8 | 3736052 | 2.56E-06 | 1.75YrCan | 2.56E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 27 | ALL | | 550210.7 | 3736091 | 3.88E-06 | 1.75YrCan | 3.88E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 28 | ALL | | 550271.9 | 3736058 | 4.39E-06 | 1.75YrCan | 4.39E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 29 | ALL | | 550290.8 | 3736100 | 6.79E-06 | 1.75YrCan | 6.79E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 30 | ALL | | 550259.2 | 3736121 | 6.96E-06 | 1.75YrCan | 6.96E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 31 | ALL | | 550023.1 | 3736313 | 1.07E-05 | 1.75YrCan | 1.07E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 32 | ALL | | 549995.7 | 3736286 | 7.54E-06 | 1.75YrCan | 7.54E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 33 | ALL | | 550004.1 | 3736247 | 6.78E-06 | 1.75YrCan | 6.78E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 34 | ALL | | 550001 | 3736211 | 5.26E-06 | 1.75YrCan | 5.26E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 35 | ALL | | 549905.1 | 3736294 | 4.17E-06 | 1.75YrCan | 4.17E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 36 | ALL | | 549884 | 3736262 | 3.49E-06 | 1.75YrCan | 3.49E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 37 | ALL | | 549857.6 | 3736245 | 2.97E-06 | 1.75YrCan | 2.97E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 38 | ALL | | 549830.2 | 3736221 | 2.53E-06 | 1.75YrCan | 2.53E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 39 | ALL | | 549898.7 | 3736363 | 4.39E-06 | 1.75YrCan | 4.39E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 40 | ALL | | 549856.6 | 3736375 | 3.55E-06 | 1.75YrCan | 3.55E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 41 | ALL | | 549834.4 | 3736352 | 3.15E-06 | 1.75YrCan | 3.15E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 42 | ALL | | 549823.9 | 3736315 | 2.89E-06 | 1.75YrCan | 2.89E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 43 | ALL | | 549808.1 | 3736287 | 2.60E-06 | 1.75YrCan | 2.60E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | ALL | 549759.6 | 3736403 | 2.32E-06 | 1.75YrCan | 2.32E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 45 | ALL | 549731.1 | 3736332 | 2.02E-06 | 1.75YrCan | 2.02E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 46 | ALL | 549738.5 | 3736262 | 1.96E-06 | 1.75YrCan | 1.96E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 47 | ALL | 549716.4 | 3736253 | 1.80E-06 | 1.75YrCan | 1.80E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 48 | ALL | 549683.7 | 3736234 | 1.58E-06 | 1.75YrCan | 1.58E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 49 | ALL | 549665.8 | 3736211 | 1.45E-06 | 1.75YrCan | 1.45E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 50 | ALL | 549642.6 | 3736181 | 1.29E-06 | 1.75YrCan | 1.29E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 51 | ALL | 549634.2 | 3736117 | 7.79E-07 | 1.75YrCan | 7.79E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 52 | ALL | 549710.1 | 3736157 | 1.19E-06 | 1.75YrCan | 1.19E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 53 | ALL | 549742.7 | 3736180 | 1.53E-06 | 1.75YrCan | 1.53E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 54 | ALL | 549769.1 | 3736192 | 1.83E-06 | 1.75YrCan | 1.83E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 55 | ALL | 549717.4 | 3736058 | 7.17E-07 | 1.75YrCan | 7.17E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 56 | ALL | 549758.5 | 3736054 | 7.83E-07 | 1.75YrCan | 7.83E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 57 | ALL | 549794.4 | 3736119 | 1.25E-06 | 1.75YrCan | 1.25E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 58 | ALL | 549860.8 | 3736062 | 1.14E-06 | 1.75YrCan | 1.14E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 59 | ALL | 549886.1 | 3736097 | 1.44E-06 | 1.75YrCan | 1.44E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 60 | ALL | 549910.3 | 3736123 | 1.86E-06 | 1.75YrCan | 1.86E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 61 | ALL | 549945.1 | 3736134 | 2.22E-06 | 1.75YrCan | 2.22E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 62 | ALL | 550006.2 | 3736140 | 3.16E-06 | 1.75YrCan | 3.16E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 63 | ALL | 549999.9 | 3736108 | 2.28E-06 | 1.75YrCan | 2.28E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 64 | ALL | 549998.9 | 3736077 | 1.76E-06 | 1.75YrCan | 1.76E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 65 | ALL | 549997.8 | 3736031 | 1.28E-06 | 1.75YrCan | 1.28E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 66 | ALL | 549959.9 | 3736037 | 1.15E-06 | 1.75YrCan | 1.15E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 67 | ALL | 549913.5 | 3736006 | 9.23E-07 | 1.75YrCan | 9.23E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 68 | ALL | 549884 | 3735994 | 8.10E-07 | 1.75YrCan | 8.10E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 69 | ALL | 549807 | 3735942 | 5.01E-07 | 1.75YrCan | 5.01E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 70 | ALL | 549877.7 | 3735918 | 5.57E-07 | 1.75YrCan | 5.57E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 71 | ALL | 549913.5 | 3735922 | 5.94E-07 | 1.75YrCan | 5.94E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 72 | ALL | 549953.5 | 3735915 | 6.24E-07 | 1.75YrCan | 6.24E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 73 | ALL | 549990.4 | 3735913 | 6.81E-07 | 1.75YrCan | 6.81E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 74 | ALL | 550003.1 | 3735975 | 8.91E-07 | 1.75YrCan | 8.91E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 75 | ALL | 550046.3 | 3735972 | 1.01E-06 | 1.75YrCan | 1.01E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 76 | ALL | 549766.3 | 3735846 | 3.12E-07 | 1.75YrCan | 3.12E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 77 | ALL | 549802.2 | 3735842 | 3.46E-07 | 1.75YrCan | 3.46E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 78 | ALL | 549874.1 | 3735827 | 3.65E-07 | 1.75YrCan | 3.65E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 79 | ALL | 549934.9 | 3735830 | 4.00E-07 | 1.75YrCan | 4.00E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 80 | ALL | 550006.8 | 3735846 | 4.59E-07 | 1.75YrCan | 4.59E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 81 | ALL | 550055.2 | 3735863 | 5.16E-07 | 1.75YrCan | 5.16E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 82 | ALL | 549786.1 | 3735729 | 2.23E-07 | 1.75YrCan | 2.23E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 83 | ALL | 549884.1 | 3735735 | 2.76E-07 | 1.75YrCan | 2.76E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 84 | ALL | 549921.3 | 3735730 | 2.87E-07 | 1.75YrCan | 2.87E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 85 | ALL | 549953.5 | 3735730 | 2.99E-07 | 1.75YrCan | 2.99E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 86 | ALL | 549956 | 3735772 | 3.71E-07 | 1.75YrCan | 3.71E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 87 | ALL | 549871.7 | 3735642 | 2.14E-07 | 1.75YrCan | 2.14E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 88 | ALL | 549910.1 | 3735634 | 2.16E-07 | 1.75YrCan | 2.16E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 89 | ALL | 549947.3 | 3735636 | 2.25E-07 | 1.75YrCan | 2.25E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 90 | ALL | 549844.4 | 3735572 | 1.75E-07 | 1.75YrCan | 1.75E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 91 | ALL | 549767.5 | 3735610 | 1.73E-07 | 1.75YrCan | 1.73E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 92 | ALL | 551029.9 | 3735920 | 1.42E-06 | 1.75YrCan | 1.42E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 93 | ALL | 551062.5 | 3735985 | 1.33E-06 | 1.75YrCan | 1.33E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 94 | ALL | 551099.6 | 3736003 | 1.22E-06 | 1.75YrCan | 1.22E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 95 | ALL | 551109.3 | 3736041 | 1.18E-06 | 1.75YrCan | 1.18E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 96 | ALL | 551158.7 | 3736084 | 1.04E-06 | 1.75YrCan | 1.04E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 97 | ALL | 551201.1 | 3736122 | 9.39E-07 | 1.75YrCan | 9.39E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 98 | ALL | 551255 | 3736176 | 8.24E-07 | 1.75YrCan | 8.24E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 99 | ALL | 551277 | 3736215 | 7.77E-07 | 1.75YrCan | 7.77E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 100 | ALL | 551299.1 | 3736207 | 7.48E-07 | 1.75YrCan | 7.48E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 101 | ALL | 551264.7 | 3736149 | 8.16E-07 | 1.75YrCan | 8.16E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 102 | ALL | 551212.6 | 3736099 | 9.23E-07 | 1.75YrCan | 9.23E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 103 | ALL | 551178.2 | 3736070 | 1.00E-06 | 1.75YrCan | 1.00E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 104 | ALL | 551134.9 | 3736039 | 1.11E-06 | 1.75YrCan | 1.11E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 105 | ALL | 551101.4 | 3735977 | 1.21E-06 | 1.75YrCan | 1.21E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 106 | ALL | 551066.9 | 3735952 | 1.31E-06 | 1.75YrCan | 1.31E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 107 | ALL | 549996.6 | 3736647 | 2.87E-06 | 1.75YrCan | 2.87E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 108 | ALL | 549995.9 | 3736674 | 2.58E-06 | 1.75YrCan | 2.58E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 109 | ALL | 549995.9 | 3736700 | 2.36E-06 | 1.75YrCan | 2.36E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 110 | ALL | 549995.9 | 3736725 | 2.18E-06 | 1.75YrCan | 2.18E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 111 | ALL | 549995.9 | 3736745 | 2.05E-06 | 1.75YrCan | 2.05E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 112 | ALL | 549997.3 | 3736776 | 1.87E-06 | 1.75YrCan | 1.87E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 113 | ALL | 549995.9 | 3736801 | 1.74E-06 | 1.75YrCan | 1.74E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 114 | ALL | 549995.1 | 3736827 | 1.62E-06 | 1.75YrCan | 1.62E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 115 | ALL | 549995.1 | 3736852 | 1.53E-06 | 1.75YrCan | 1.53E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 116 | ALL | 550063 | 3736670 | 3.09E-06 | 1.75YrCan | 3.09E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 117 | ALL | 550063 | 3736696 | 2.81E-06 | 1.75YrCan | 2.81E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 118 | ALL | 550068.7 | 3736720 | 2.61E-06 | 1.75YrCan | 2.61E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 119 | ALL | 550072.2 | 3736742 | 2.44E-06 | 1.75YrCan | 2.44E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 120 | ALL | 550082.8 | 3736765 | 2.30E-06 | 1.75YrCan | 2.30E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 121 | ALL | 550083.5 | 3736790 | 2.13E-06 | 1.75YrCan | 2.13E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 122 | ALL | 550080 | 3736812 | 1.97E-06 | 1.75YrCan | 1.97E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 123 | ALL | 550077.9 | 3736835 | 1.83E-06 | 1.75YrCan | 1.83E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 124 | ALL | 550077.2 | 3736856 | 1.71E-06 | 1.75YrCan | 1.71E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 125 | ALL | 550077.9 | 3736881 | 1.58E-06 | 1.75YrCan | 1.58E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 126 | ALL | 550126 | 3736612 | 4.84E-06 | 1.75YrCan | 4.84E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 127 | ALL | 550131.6 | 3736636 | 4.32E-06 | 1.75YrCan | 4.32E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 128 | ALL | 550138.7 | 3736659 | 3.91E-06 | 1.75YrCan | 3.91E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 129 | ALL | 550137.3 | 3736682 | 3.51E-06 | 1.75YrCan | 3.51E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 130 | ALL | 550140.1 | 3736708 | 3.15E-06 | 1.75YrCan | 3.15E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 131 | ALL | 550146.5 | 3736730 | 2.90E-06 | 1.75YrCan | 2.90E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 132 | ALL | 550188.2 | 3736663 | 4.07E-06 | 1.75YrCan | 4.07E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 133 | ALL | 550217.2 | 3736734 | 3.04E-06 | 1.75YrCan | 3.04E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 134 | ALL | 550228.5 | 3736764 | 2.71E-06 | 1.75YrCan | 2.71E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 135 | ALL | 550234.8 | 3736784 | 2.53E-06 | 1.75YrCan | 2.53E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 136 | ALL | 550232.7 | 3736810 | 2.31E-06 | 1.75YrCan | 2.31E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 137 | ALL | 550216.5 | 3736837 | 2.12E-06 | 1.75YrCan | 2.12E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 138 | ALL | 550212.2 | 3736854 | 2.02E-06 | 1.75YrCan | 2.02E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 139 | ALL | 550208 | 3736876 | 1.89E-06 | 1.75YrCan | 1.89E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 140 | ALL | 550199.5 | 3736901 | 1.75E-06 | 1.75YrCan | 1.75E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 141 | ALL | 550195.9 | 3736923 | 1.64E-06 | 1.75YrCan | 1.64E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 142 | ALL | 550189.6 | 3736946 | 1.49E-06 | 1.75YrCan | 1.49E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 143 | ALL | 550187.5 | 3736968 | 1.38E-06 | 1.75YrCan | 1.38E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 144 | ALL | 550184.6 | 3736990 | 1.31E-06 | 1.75YrCan | 1.31E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 145 | ALL | 550180.4 | 3736779 | 2.50E-06 | 1.75YrCan | 2.50E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 146 | ALL | 550172.6 | 3736802 | 2.30E-06 | 1.75YrCan | 2.30E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 147 | ALL | 550163.4 | 3736826 | 2.13E-06 | 1.75YrCan | 2.13E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 148 | ALL | 550155.6 | 3736847 | 1.98E-06 | 1.75YrCan | 1.98E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 149 | ALL | 550154.2 | 3736867 | 1.86E-06 | 1.75YrCan | 1.86E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 150 | ALL | 550150 | 3736889 | 1.71E-06 | 1.75YrCan | 1.71E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 151 | ALL | 550145.7 | 3736911 | 1.57E-06 | 1.75YrCan | 1.57E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 152 | ALL | 550126 | 3736933 | 1.44E-06 | 1.75YrCan | 1.44E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 153 | ALL | 550116.8 | 3736954 | 1.40E-06 | 1.75YrCan | 1.40E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 154 | ALL | 550482.1 | 3736496 | 2.15E-05 | 1.75YrCan | 2.15E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 155 | ALL | 550528.3 | 3736530 | 1.39E-05 | 1.75YrCan | 1.39E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 156 | ALL | 550542.4 | 3736504 | 2.27E-05 | 1.75YrCan | 2.27E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 157 | ALL | 550556.4 | 3736507 | 1.74E-05 | 1.75YrCan | 1.74E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 158 | ALL | 550587.2 | 3736447 | 2.11E-05 | 1.75YrCan | 2.11E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 159 | ALL | 550571.1 | 3736422 | 2.48E-05 | 1.75YrCan | 2.48E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 160 | ALL | 550549 | 3736403 | 2.65E-05 | 1.75YrCan | 2.65E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 161 | ALL | 550501.9 | 3736380 | 3.22E-05 | 1.75YrCan | 3.22E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 162 | ALL | 550473 | 3736374 | 2.91E-05 | 1.75YrCan | 2.91E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 163 | ALL | 550463.2 | 3736382 | 2.99E-05 | 1.75YrCan | 2.99E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 164 | ALL | 550469.2 | 3736415 | 3.20E-05 | 1.75YrCan | 3.20E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 165 | ALL | 550461.9 | 3736439 | 2.63E-05 | 1.75YrCan | 2.63E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 166 | ALL | 550484.3 | 3736465 | 3.07E-05 | 1.75YrCan | 3.07E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

3.22E-05

3.22E+01

HARP2 - HRACalc (dated 22118) 6/27/2024 3:05:02 PM - Output Log

GLCs loaded successfully
Pollutants loaded successfully
Pathway receptors loaded successfully
**********
RISK SCENARIO SETTINGS

Receptor Type: Resident
Scenario: NCChronic
Calculation Method: Derived

**********
EXPOSURE DURATION PARAMETERS FOR CANCER
**Exposure duration are only adjusted for cancer assessments**

**********
PATHWAYS ENABLED

NOTE: Inhalation is always enabled and used for all assessments.  The remaining pathways are only used for cancer and noncancer chronic assessments.

Inhalation: True
Soil: True
Dermal: True
Mother's milk: True
Water: False
Fish: False
Homegrown crops: True
Beef: False
Dairy: False
Pig: False
Chicken: False
Egg: False

**********
INHALATION

Daily breathing rate: LongTerm24HR

**Worker Adjustment Factors**
Worker adjustment factors enabled: NO

**Fraction at time at home**
NOTE: Exposure duration (i.e., start age, end age, ED, & FAH) are only adjusted for cancer assessments.

**********
SOIL & DERMAL PATHWAY SETTINGS

Deposition rate (m/s): 0.02
Soil mixing depth (m): 0.01
Dermal climate: Warm

**********
HOMEGROWN CROP PATHWAY SETTINGS

Household type: HouseholdsthatGarden
Fraction leafy: 0.137
Fraction exposed: 0.137
Fraction protected: 0.137
Fraction root: 0.137

**********
TIER 2 SETTINGS

Tier2 adjustments were used in this assessment.  Please see the input file for details.
Tier2 - What was changed: ED or start age changed
Calculating chronic risk
Chronic risk breakdown by pollutant and receptor saved to:
C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRAChronicNCChronicRisk.csv
Chronic risk total by receptor saved to: C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRAChronicNCChronicRiskSumByRec.csv
HRA ran successfully

*HARP - HRACalc v22118 6/27/2024 3:05:02 PM - Chronic Risk - Input File: C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRAChronicHRAInput.hra

| REC | GRP | NETID | X | Y | SCENARIO | CV | CNS | IMMUN | KIDNEY | GILV | REPRO/DE | RESP | SKIN | EYE | BONE/TEE | ENDO | BLOOD | ODOR | GENERAL | MAXHI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ALL | | 550340.4 | 3736223 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E-02 |
| 2 | ALL | | 550311.9 | 3736237 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.87E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.87E-02 |
| 3 | ALL | | 550282.4 | 3736241 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.05E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.05E-02 |
| 4 | ALL | | 550221.3 | 3736238 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.10E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.10E-02 |
| 5 | ALL | | 550173.8 | 3736212 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.22E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.22E-02 |
| 6 | ALL | | 550124.3 | 3736209 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.26E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.26E-03 |
| 7 | ALL | | 550084.2 | 3736252 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.56E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.56E-03 |
| 8 | ALL | | 550071.6 | 3736210 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.22E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.22E-03 |
| 9 | ALL | | 550073.7 | 3736155 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.07E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.07E-03 |
| 10 | ALL | | 550113.8 | 3736150 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.11E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.11E-03 |
| 11 | ALL | | 550178 | 3736157 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.45E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.45E-03 |
| 12 | ALL | | 550224.4 | 3736163 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.96E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.96E-03 |
| 13 | ALL | | 550235 | 3736202 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.28E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.28E-02 |
| 14 | ALL | | 550286.6 | 3736164 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.75E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.75E-03 |
| 15 | ALL | | 550311.9 | 3736163 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.94E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.94E-03 |
| 16 | ALL | | 550063.2 | 3736081 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.57E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.57E-03 |
| 17 | ALL | | 550109.5 | 3736095 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.99E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.99E-03 |
| 18 | ALL | | 550158 | 3736113 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.58E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.58E-03 |
| 19 | ALL | | 550143.3 | 3736087 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.87E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.87E-03 |
| 20 | ALL | | 550125.3 | 3736050 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.35E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.35E-03 |
| 21 | ALL | | 550077.9 | 3736050 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.17E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.17E-03 |
| 22 | ALL | | 550113.8 | 3735984 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.22E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.22E-04 |
| 23 | ALL | | 550116.9 | 3735910 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.39E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.39E-04 |
| 24 | ALL | | 550153.8 | 3735948 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.04E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.04E-04 |
| 25 | ALL | | 550181.2 | 3735997 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.13E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.13E-03 |
| 26 | ALL | | 550192.8 | 3736052 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.70E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.70E-03 |
| 27 | ALL | | 550210.7 | 3736091 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.58E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.58E-03 |
| 28 | ALL | | 550271.9 | 3736058 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.92E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.92E-03 |
| 29 | ALL | | 550290.8 | 3736100 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.51E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.51E-03 |
| 30 | ALL | | 550259.2 | 3736121 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.63E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.63E-03 |
| 31 | ALL | | 550023.1 | 3736313 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.10E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.10E-03 |
| 32 | ALL | | 549995.7 | 3736286 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.01E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.01E-03 |
| 33 | ALL | | 550004.1 | 3736247 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.50E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.50E-03 |
| 34 | ALL | | 550001 | 3736211 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.49E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.49E-03 |
| 35 | ALL | | 549905.1 | 3736294 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.77E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.77E-03 |
| 36 | ALL | | 549884 | 3736262 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.32E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.32E-03 |
| 37 | ALL | | 549857.6 | 3736245 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.97E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.97E-03 |
| 38 | ALL | | 549830.2 | 3736221 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.68E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.68E-03 |
| 39 | ALL | | 549898.7 | 3736363 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.92E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.92E-03 |
| 40 | ALL | | 549856.6 | 3736375 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.36E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.36E-03 |
| 41 | ALL | | 549834.4 | 3736352 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.09E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.09E-03 |
| 42 | ALL | | 549823.9 | 3736315 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.92E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.92E-03 |
| 43 | ALL | | 549808.1 | 3736287 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.73E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.73E-03 |
| 44 | ALL | | 549759.6 | 3736403 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.54E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.54E-03 |
| 45 | ALL | | 549731.1 | 3736332 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.35E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.35E-03 |
| 46 | ALL | | 549738.5 | 3736262 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.30E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.30E-03 |
| 47 | ALL | | 549716.4 | 3736253 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.19E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.19E-03 |
| 48 | ALL | | 549683.7 | 3736234 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.05E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.05E-03 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 49 | ALL | 549665.8 | 3736211 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.64E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.64E-04 |
| 50 | ALL | 549642.6 | 3736181 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.55E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.55E-04 |
| 51 | ALL | 549634.2 | 3736117 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.18E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.18E-04 |
| 52 | ALL | 549710.1 | 3736157 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.88E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.88E-04 |
| 53 | ALL | 549742.7 | 3736180 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.02E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.02E-03 |
| 54 | ALL | 549769.1 | 3736192 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.22E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.22E-03 |
| 55 | ALL | 549717.4 | 3736058 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.76E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.76E-04 |
| 56 | ALL | 549758.5 | 3736054 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.20E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.20E-04 |
| 57 | ALL | 549794.4 | 3736119 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.28E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.28E-04 |
| 58 | ALL | 549860.8 | 3736062 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.58E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.58E-04 |
| 59 | ALL | 549886.1 | 3736097 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.59E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.59E-04 |
| 60 | ALL | 549910.3 | 3736123 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.24E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.24E-03 |
| 61 | ALL | 549945.1 | 3736134 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.47E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.47E-03 |
| 62 | ALL | 550006.2 | 3736140 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.10E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.10E-03 |
| 63 | ALL | 549999.9 | 3736108 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.51E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.51E-03 |
| 64 | ALL | 549998.9 | 3736077 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.17E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.17E-03 |
| 65 | ALL | 549997.8 | 3736031 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.48E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.48E-04 |
| 66 | ALL | 549959.9 | 3736037 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.66E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.66E-04 |
| 67 | ALL | 549913.5 | 3736006 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.13E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.13E-04 |
| 68 | ALL | 549884 | 3735994 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.38E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.38E-04 |
| 69 | ALL | 549807 | 3735942 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.33E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.33E-04 |
| 70 | ALL | 549877.7 | 3735918 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.70E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.70E-04 |
| 71 | ALL | 549913.5 | 3735922 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.95E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.95E-04 |
| 72 | ALL | 549953.5 | 3735915 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.15E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.15E-04 |
| 73 | ALL | 549990.4 | 3735913 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.53E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.53E-04 |
| 74 | ALL | 550003.1 | 3735975 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.92E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.92E-04 |
| 75 | ALL | 550046.3 | 3735972 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.71E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.71E-04 |
| 76 | ALL | 549766.3 | 3735846 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.07E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.07E-04 |
| 77 | ALL | 549802.2 | 3735842 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.30E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.30E-04 |
| 78 | ALL | 549874.1 | 3735827 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.42E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.42E-04 |
| 79 | ALL | 549934.9 | 3735830 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.66E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.66E-04 |
| 80 | ALL | 550006.8 | 3735846 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.05E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.05E-04 |
| 81 | ALL | 550055.2 | 3735863 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.43E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.43E-04 |
| 82 | ALL | 549786.1 | 3735729 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.48E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.48E-04 |
| 83 | ALL | 549884.1 | 3735735 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.84E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.84E-04 |
| 84 | ALL | 549921.3 | 3735730 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.90E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.90E-04 |
| 85 | ALL | 549953.5 | 3735730 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.98E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.98E-04 |
| 86 | ALL | 549956 | 3735772 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.47E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.47E-04 |
| 87 | ALL | 549871.7 | 3735642 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.42E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.42E-04 |
| 88 | ALL | 549910.1 | 3735634 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.44E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.44E-04 |
| 89 | ALL | 549947.3 | 3735636 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.49E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.49E-04 |
| 90 | ALL | 549844.4 | 3735572 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.17E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.17E-04 |
| 91 | ALL | 549767.5 | 3735610 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-04 |
| 92 | ALL | 551029.9 | 3735920 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.44E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.44E-04 |
| 93 | ALL | 551062.5 | 3735985 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.82E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.82E-04 |
| 94 | ALL | 551099.6 | 3736003 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.08E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.08E-04 |
| 95 | ALL | 551109.3 | 3736041 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.85E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.85E-04 |
| 96 | ALL | 551158.7 | 3736084 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.93E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.93E-04 |
| 97 | ALL | 551201.1 | 3736122 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.24E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.24E-04 |
| 98 | ALL | 551255 | 3736176 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.48E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.48E-04 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 99 | ALL | 551277 | 3736215 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.16E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.16E-04 |
| 100 | ALL | 551299.1 | 3736207 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.97E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.97E-04 |
| 101 | ALL | 551264.7 | 3736149 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.42E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.42E-04 |
| 102 | ALL | 551212.6 | 3736099 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.13E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.13E-04 |
| 103 | ALL | 551178.2 | 3736070 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.66E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.66E-04 |
| 104 | ALL | 551134.9 | 3736039 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.40E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.40E-04 |
| 105 | ALL | 551101.4 | 3735977 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.05E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.05E-04 |
| 106 | ALL | 551066.9 | 3735952 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.72E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.72E-04 |
| 107 | ALL | 549996.6 | 3736647 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.91E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.91E-03 |
| 108 | ALL | 549995.9 | 3736674 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.72E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.72E-03 |
| 109 | ALL | 549995.9 | 3736700 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.57E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.57E-03 |
| 110 | ALL | 549995.9 | 3736725 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.45E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.45E-03 |
| 111 | ALL | 549995.9 | 3736745 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.36E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.36E-03 |
| 112 | ALL | 549997.3 | 3736776 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.24E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.24E-03 |
| 113 | ALL | 549995.9 | 3736801 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-03 |
| 114 | ALL | 549995.1 | 3736827 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.07E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.07E-03 |
| 115 | ALL | 549995.1 | 3736852 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.02E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.02E-03 |
| 116 | ALL | 550063 | 3736670 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.05E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.05E-03 |
| 117 | ALL | 550063 | 3736696 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.87E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.87E-03 |
| 118 | ALL | 550068.7 | 3736720 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.74E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.74E-03 |
| 119 | ALL | 550072.2 | 3736742 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.62E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.62E-03 |
| 120 | ALL | 550082.8 | 3736765 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E-03 |
| 121 | ALL | 550083.5 | 3736790 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.41E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.41E-03 |
| 122 | ALL | 550080 | 3736812 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.31E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.31E-03 |
| 123 | ALL | 550077.9 | 3736835 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.22E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.22E-03 |
| 124 | ALL | 550077.2 | 3736856 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.14E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.14E-03 |
| 125 | ALL | 550077.9 | 3736881 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.05E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.05E-03 |
| 126 | ALL | 550126 | 3736612 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.21E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.21E-03 |
| 127 | ALL | 550131.6 | 3736636 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.87E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.87E-03 |
| 128 | ALL | 550138.7 | 3736659 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.60E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.60E-03 |
| 129 | ALL | 550137.3 | 3736682 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.33E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.33E-03 |
| 130 | ALL | 550140.1 | 3736708 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.09E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.09E-03 |
| 131 | ALL | 550146.5 | 3736730 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.92E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.92E-03 |
| 132 | ALL | 550188.2 | 3736663 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.70E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.70E-03 |
| 133 | ALL | 550217.2 | 3736734 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.02E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.02E-03 |
| 134 | ALL | 550228.5 | 3736764 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.80E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.80E-03 |
| 135 | ALL | 550234.8 | 3736784 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.68E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.68E-03 |
| 136 | ALL | 550232.7 | 3736810 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E-03 |
| 137 | ALL | 550216.5 | 3736837 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.41E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.41E-03 |
| 138 | ALL | 550212.2 | 3736854 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.34E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.34E-03 |
| 139 | ALL | 550208 | 3736876 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.25E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.25E-03 |
| 140 | ALL | 550199.5 | 3736901 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.16E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.16E-03 |
| 141 | ALL | 550195.9 | 3736923 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.09E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.09E-03 |
| 142 | ALL | 550189.6 | 3736946 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.92E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.92E-04 |
| 143 | ALL | 550187.5 | 3736968 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.18E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.18E-04 |
| 144 | ALL | 550184.6 | 3736990 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.73E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.73E-04 |
| 145 | ALL | 550180.4 | 3736779 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.66E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.66E-03 |
| 146 | ALL | 550172.6 | 3736802 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E-03 |
| 147 | ALL | 550163.4 | 3736826 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.41E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.41E-03 |
| 148 | ALL | 550155.6 | 3736847 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.32E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.32E-03 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 149 | ALL | 550154.2 | 3736867 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.24E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.24E-03 |
| 150 | ALL | 550150 | 3736889 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.14E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.14E-03 |
| 151 | ALL | 550145.7 | 3736911 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.04E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.04E-03 |
| 152 | ALL | 550126 | 3736933 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.59E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.59E-04 |
| 153 | ALL | 550116.8 | 3736954 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.32E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.32E-04 |
| 154 | ALL | 550482.1 | 3736496 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.43E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.43E-02 |
| 155 | ALL | 550528.3 | 3736530 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.22E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.22E-03 |
| 156 | ALL | 550542.4 | 3736504 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.51E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.51E-02 |
| 157 | ALL | 550556.4 | 3736507 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-02 |
| 158 | ALL | 550587.2 | 3736447 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.40E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.40E-02 |
| 159 | ALL | 550571.1 | 3736422 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.65E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.65E-02 |
| 160 | ALL | 550549 | 3736403 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.76E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.76E-02 |
| 161 | ALL | 550501.9 | 3736380 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.14E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.14E-02 |
| 162 | ALL | 550473 | 3736374 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.94E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.94E-02 |
| 163 | ALL | 550463.2 | 3736382 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.99E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.99E-02 |
| 164 | ALL | 550469.2 | 3736415 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.12E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.12E-02 |
| 165 | ALL | 550461.9 | 3736439 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.75E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.75E-02 |
| 166 | ALL | 550484.3 | 3736465 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.04E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.04E-02 |

2.14E-02

HARP2 - HRACalc (dated 22118) 7/2/2024 12:02:27 PM - Output Log

GLCs loaded successfully
Pollutants loaded successfully
Pathway receptors loaded successfully
**********
RISK SCENARIO SETTINGS

Receptor Type: Resident
Scenario: Cancer
Calculation Method: HighEnd

**********
EXPOSURE DURATION PARAMETERS FOR CANCER

Start Age: -0.25
Total Exposure Duration: 1.75

Exposure Duration Bin Distribution
3rd Trimester Bin: 0.25
0<2 Years Bin: 1.75
2<9 Years Bin: 0
2<16 Years Bin: 0
16<30 Years Bin: 0
16 to 70 Years Bin: 0

**********
PATHWAYS ENABLED

NOTE: Inhalation is always enabled and used for all assessments.  The remaining pathways are only used for cancer and noncancer chronic assessments.

Inhalation: True
Soil: True
Dermal: True
Mother's milk: True
Water: False
Fish: False
Homegrown crops: True
Beef: False
Dairy: False
Pig: False
Chicken: False
Egg: False

**********
INHALATION

Daily breathing rate: RMP

**Worker Adjustment Factors**
Worker adjustment factors enabled: NO

**Fraction at time at home**
3rd Trimester to 16 years: OFF
16 years to 70 years: ON

**********
SOIL & DERMAL PATHWAY SETTINGS

Deposition rate (m/s): 0.02
Soil mixing depth (m): 0.01
Dermal climate: Warm

**********
HOMEGROWN CROP PATHWAY SETTINGS

Household type: HouseholdsthatGarden
Fraction leafy: 0.137
Fraction exposed: 0.137
Fraction protected: 0.137
Fraction root: 0.137

**********
TIER 2 SETTINGS

Tier2 adjustments were used in this assessment.  Please see the input file for details.
Tier2 - What was changed: ED or start age changed|
Calculating cancer risk
Cancer risk breakdown by pollutant and receptor saved to:
C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRACancerT4iCancerRisk.csv
Cancer risk total by receptor saved to: C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRACancerT4iCancerRiskSumByRec.csv
HRA ran successfully

*HARP - HRACalc v22118 7/2/2024 12:02:27 PM - Cancer Risk - Input File: C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRACancerT4iHRAInput.hra

| REC | GRP | NETID | X | Y | RISK_SUM | SCENARIO | INH_RISK | SOIL_RISK | DERMAL_F | MMILK_RIS | WATER_RI | FISH_RISK | CROP_RIS | BEEF_RISK | DAIRY_RIS | PIG_RISK | CHICKEN_ | EGG_RISK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ALL | | 550340.4 | 3736223 | 4.76E-06 | 1.75YrCan | 4.76E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 2 | ALL | | 550311.9 | 3736237 | 5.81E-06 | 1.75YrCan | 5.81E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 3 | ALL | | 550282.4 | 3736241 | 6.38E-06 | 1.75YrCan | 6.38E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 4 | ALL | | 550221.3 | 3736238 | 6.51E-06 | 1.75YrCan | 6.51E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 5 | ALL | | 550173.8 | 3736212 | 3.80E-06 | 1.75YrCan | 3.80E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 6 | ALL | | 550124.3 | 3736209 | 2.26E-06 | 1.75YrCan | 2.26E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 7 | ALL | | 550084.2 | 3736252 | 2.97E-06 | 1.75YrCan | 2.97E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 8 | ALL | | 550071.6 | 3736210 | 1.62E-06 | 1.75YrCan | 1.62E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 9 | ALL | | 550073.7 | 3736155 | 9.55E-07 | 1.75YrCan | 9.55E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 10 | ALL | | 550113.8 | 3736150 | 9.65E-07 | 1.75YrCan | 9.65E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 11 | ALL | | 550178 | 3736157 | 1.38E-06 | 1.75YrCan | 1.38E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 12 | ALL | | 550224.4 | 3736163 | 2.16E-06 | 1.75YrCan | 2.16E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 13 | ALL | | 550235 | 3736202 | 3.97E-06 | 1.75YrCan | 3.97E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 14 | ALL | | 550286.6 | 3736164 | 2.72E-06 | 1.75YrCan | 2.72E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 15 | ALL | | 550311.9 | 3736163 | 2.78E-06 | 1.75YrCan | 2.78E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 16 | ALL | | 550063.2 | 3736081 | 4.89E-07 | 1.75YrCan | 4.89E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 17 | ALL | | 550109.5 | 3736095 | 6.19E-07 | 1.75YrCan | 6.19E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 18 | ALL | | 550158 | 3736113 | 8.02E-07 | 1.75YrCan | 8.02E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 19 | ALL | | 550143.3 | 3736087 | 5.81E-07 | 1.75YrCan | 5.81E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 20 | ALL | | 550125.3 | 3736050 | 4.20E-07 | 1.75YrCan | 4.20E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 21 | ALL | | 550077.9 | 3736050 | 3.63E-07 | 1.75YrCan | 3.63E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 22 | ALL | | 550113.8 | 3735984 | 2.55E-07 | 1.75YrCan | 2.55E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 23 | ALL | | 550116.9 | 3735910 | 1.68E-07 | 1.75YrCan | 1.68E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 24 | ALL | | 550153.8 | 3735948 | 2.19E-07 | 1.75YrCan | 2.19E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 25 | ALL | | 550181.2 | 3735997 | 3.51E-07 | 1.75YrCan | 3.51E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 26 | ALL | | 550192.8 | 3736052 | 5.29E-07 | 1.75YrCan | 5.29E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 27 | ALL | | 550210.7 | 3736091 | 8.01E-07 | 1.75YrCan | 8.01E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 28 | ALL | | 550271.9 | 3736058 | 9.07E-07 | 1.75YrCan | 9.07E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 29 | ALL | | 550290.8 | 3736100 | 1.40E-06 | 1.75YrCan | 1.40E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 30 | ALL | | 550259.2 | 3736121 | 1.44E-06 | 1.75YrCan | 1.44E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 31 | ALL | | 550023.1 | 3736313 | 2.21E-06 | 1.75YrCan | 2.21E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 32 | ALL | | 549995.7 | 3736286 | 1.56E-06 | 1.75YrCan | 1.56E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 33 | ALL | | 550004.1 | 3736247 | 1.40E-06 | 1.75YrCan | 1.40E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 34 | ALL | | 550001 | 3736211 | 1.09E-06 | 1.75YrCan | 1.09E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 35 | ALL | | 549905.1 | 3736294 | 8.62E-07 | 1.75YrCan | 8.62E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 36 | ALL | | 549884 | 3736262 | 7.20E-07 | 1.75YrCan | 7.20E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 37 | ALL | | 549857.6 | 3736245 | 6.13E-07 | 1.75YrCan | 6.13E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 38 | ALL | | 549830.2 | 3736221 | 5.22E-07 | 1.75YrCan | 5.22E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 39 | ALL | | 549898.7 | 3736363 | 9.06E-07 | 1.75YrCan | 9.06E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 40 | ALL | | 549856.6 | 3736375 | 7.32E-07 | 1.75YrCan | 7.32E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 41 | ALL | | 549834.4 | 3736352 | 6.51E-07 | 1.75YrCan | 6.51E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 42 | ALL | | 549823.9 | 3736315 | 5.97E-07 | 1.75YrCan | 5.97E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 43 | ALL | | 549808.1 | 3736287 | 5.37E-07 | 1.75YrCan | 5.37E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | ALL | 549759.6 | 3736403 | 4.78E-07 | 1.75YrCan | 4.78E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 45 | ALL | 549731.1 | 3736332 | 4.18E-07 | 1.75YrCan | 4.18E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 46 | ALL | 549738.5 | 3736262 | 4.05E-07 | 1.75YrCan | 4.05E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 47 | ALL | 549716.4 | 3736253 | 3.71E-07 | 1.75YrCan | 3.71E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 48 | ALL | 549683.7 | 3736234 | 3.26E-07 | 1.75YrCan | 3.26E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 49 | ALL | 549665.8 | 3736211 | 3.00E-07 | 1.75YrCan | 3.00E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 50 | ALL | 549642.6 | 3736181 | 2.66E-07 | 1.75YrCan | 2.66E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 51 | ALL | 549634.2 | 3736117 | 1.61E-07 | 1.75YrCan | 1.61E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 52 | ALL | 549710.1 | 3736157 | 2.45E-07 | 1.75YrCan | 2.45E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 53 | ALL | 549742.7 | 3736180 | 3.17E-07 | 1.75YrCan | 3.17E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 54 | ALL | 549769.1 | 3736192 | 3.78E-07 | 1.75YrCan | 3.78E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 55 | ALL | 549717.4 | 3736058 | 1.48E-07 | 1.75YrCan | 1.48E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 56 | ALL | 549758.5 | 3736054 | 1.62E-07 | 1.75YrCan | 1.62E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 57 | ALL | 549794.4 | 3736119 | 2.57E-07 | 1.75YrCan | 2.57E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 58 | ALL | 549860.8 | 3736062 | 2.35E-07 | 1.75YrCan | 2.35E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 59 | ALL | 549886.1 | 3736097 | 2.98E-07 | 1.75YrCan | 2.98E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 60 | ALL | 549910.3 | 3736123 | 3.84E-07 | 1.75YrCan | 3.84E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 61 | ALL | 549945.1 | 3736134 | 4.57E-07 | 1.75YrCan | 4.57E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 62 | ALL | 550006.2 | 3736140 | 6.52E-07 | 1.75YrCan | 6.52E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 63 | ALL | 549999.9 | 3736108 | 4.70E-07 | 1.75YrCan | 4.70E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 64 | ALL | 549998.9 | 3736077 | 3.63E-07 | 1.75YrCan | 3.63E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 65 | ALL | 549997.8 | 3736031 | 2.64E-07 | 1.75YrCan | 2.64E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 66 | ALL | 549959.9 | 3736037 | 2.38E-07 | 1.75YrCan | 2.38E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 67 | ALL | 549913.5 | 3736006 | 1.90E-07 | 1.75YrCan | 1.90E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 68 | ALL | 549884 | 3735994 | 1.67E-07 | 1.75YrCan | 1.67E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 69 | ALL | 549807 | 3735942 | 1.03E-07 | 1.75YrCan | 1.03E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 70 | ALL | 549877.7 | 3735918 | 1.15E-07 | 1.75YrCan | 1.15E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 71 | ALL | 549913.5 | 3735922 | 1.23E-07 | 1.75YrCan | 1.23E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 72 | ALL | 549953.5 | 3735915 | 1.29E-07 | 1.75YrCan | 1.29E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 73 | ALL | 549990.4 | 3735913 | 1.41E-07 | 1.75YrCan | 1.41E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 74 | ALL | 550003.1 | 3735975 | 1.84E-07 | 1.75YrCan | 1.84E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 75 | ALL | 550046.3 | 3735972 | 2.09E-07 | 1.75YrCan | 2.09E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 76 | ALL | 549766.3 | 3735846 | 6.45E-08 | 1.75YrCan | 6.45E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 77 | ALL | 549802.2 | 3735842 | 7.14E-08 | 1.75YrCan | 7.14E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 78 | ALL | 549874.1 | 3735827 | 7.53E-08 | 1.75YrCan | 7.53E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 79 | ALL | 549934.9 | 3735830 | 8.25E-08 | 1.75YrCan | 8.25E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 80 | ALL | 550006.8 | 3735846 | 9.48E-08 | 1.75YrCan | 9.48E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 81 | ALL | 550055.2 | 3735863 | 1.06E-07 | 1.75YrCan | 1.06E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 82 | ALL | 549786.1 | 3735729 | 4.60E-08 | 1.75YrCan | 4.60E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 83 | ALL | 549884.1 | 3735735 | 5.70E-08 | 1.75YrCan | 5.70E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 84 | ALL | 549921.3 | 3735730 | 5.92E-08 | 1.75YrCan | 5.92E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 85 | ALL | 549953.5 | 3735730 | 6.17E-08 | 1.75YrCan | 6.17E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 86 | ALL | 549956 | 3735772 | 7.67E-08 | 1.75YrCan | 7.67E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 87 | ALL | 549871.7 | 3735642 | 4.42E-08 | 1.75YrCan | 4.42E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 88 | ALL | 549910.1 | 3735634 | 4.47E-08 | 1.75YrCan | 4.47E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 89 | ALL | 549947.3 | 3735636 | 4.64E-08 | 1.75YrCan | 4.64E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 90 | ALL | 549844.4 | 3735572 | 3.62E-08 | 1.75YrCan | 3.62E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 91 | ALL | 549767.5 | 3735610 | 3.58E-08 | 1.75YrCan | 3.58E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 92 | ALL | 551029.9 | 3735920 | 2.93E-07 | 1.75YrCan | 2.93E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 93 | ALL | 551062.5 | 3735985 | 2.74E-07 | 1.75YrCan | 2.74E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 94 | ALL | 551099.6 | 3736003 | 2.51E-07 | 1.75YrCan | 2.51E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 95 | ALL | 551109.3 | 3736041 | 2.44E-07 | 1.75YrCan | 2.44E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 96 | ALL | 551158.7 | 3736084 | 2.15E-07 | 1.75YrCan | 2.15E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 97 | ALL | 551201.1 | 3736122 | 1.94E-07 | 1.75YrCan | 1.94E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 98 | ALL | 551255 | 3736176 | 1.70E-07 | 1.75YrCan | 1.70E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 99 | ALL | 551277 | 3736215 | 1.60E-07 | 1.75YrCan | 1.60E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 100 | ALL | 551299.1 | 3736207 | 1.54E-07 | 1.75YrCan | 1.54E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 101 | ALL | 551264.7 | 3736149 | 1.68E-07 | 1.75YrCan | 1.68E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 102 | ALL | 551212.6 | 3736099 | 1.91E-07 | 1.75YrCan | 1.91E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 103 | ALL | 551178.2 | 3736070 | 2.07E-07 | 1.75YrCan | 2.07E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 104 | ALL | 551134.9 | 3736039 | 2.30E-07 | 1.75YrCan | 2.30E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 105 | ALL | 551101.4 | 3735977 | 2.50E-07 | 1.75YrCan | 2.50E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 106 | ALL | 551066.9 | 3735952 | 2.71E-07 | 1.75YrCan | 2.71E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 107 | ALL | 549996.6 | 3736647 | 5.92E-07 | 1.75YrCan | 5.92E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 108 | ALL | 549995.9 | 3736674 | 5.33E-07 | 1.75YrCan | 5.33E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 109 | ALL | 549995.9 | 3736700 | 4.87E-07 | 1.75YrCan | 4.87E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 110 | ALL | 549995.9 | 3736725 | 4.50E-07 | 1.75YrCan | 4.50E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 111 | ALL | 549995.9 | 3736745 | 4.22E-07 | 1.75YrCan | 4.22E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 112 | ALL | 549997.3 | 3736776 | 3.86E-07 | 1.75YrCan | 3.86E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 113 | ALL | 549995.9 | 3736801 | 3.59E-07 | 1.75YrCan | 3.59E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 114 | ALL | 549995.1 | 3736827 | 3.34E-07 | 1.75YrCan | 3.34E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 115 | ALL | 549995.1 | 3736852 | 3.16E-07 | 1.75YrCan | 3.16E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 116 | ALL | 550063 | 3736670 | 6.37E-07 | 1.75YrCan | 6.37E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 117 | ALL | 550063 | 3736696 | 5.80E-07 | 1.75YrCan | 5.80E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 118 | ALL | 550068.7 | 3736720 | 5.40E-07 | 1.75YrCan | 5.40E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 119 | ALL | 550072.2 | 3736742 | 5.04E-07 | 1.75YrCan | 5.04E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 120 | ALL | 550082.8 | 3736765 | 4.75E-07 | 1.75YrCan | 4.75E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 121 | ALL | 550083.5 | 3736790 | 4.39E-07 | 1.75YrCan | 4.39E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 122 | ALL | 550080 | 3736812 | 4.07E-07 | 1.75YrCan | 4.07E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 123 | ALL | 550077.9 | 3736835 | 3.78E-07 | 1.75YrCan | 3.78E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 124 | ALL | 550077.2 | 3736856 | 3.53E-07 | 1.75YrCan | 3.53E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 125 | ALL | 550077.9 | 3736881 | 3.26E-07 | 1.75YrCan | 3.26E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 126 | ALL | 550126 | 3736612 | 9.98E-07 | 1.75YrCan | 9.98E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 127 | ALL | 550131.6 | 3736636 | 8.91E-07 | 1.75YrCan | 8.91E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 128 | ALL | 550138.7 | 3736659 | 8.08E-07 | 1.75YrCan | 8.08E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 129 | ALL | 550137.3 | 3736682 | 7.25E-07 | 1.75YrCan | 7.25E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 130 | ALL | 550140.1 | 3736708 | 6.51E-07 | 1.75YrCan | 6.51E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 131 | ALL | 550146.5 | 3736730 | 5.98E-07 | 1.75YrCan | 5.98E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 132 | ALL | 550188.2 | 3736663 | 8.40E-07 | 1.75YrCan | 8.40E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 133 | ALL | 550217.2 | 3736734 | 6.27E-07 | 1.75YrCan | 6.27E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 134 | ALL | 550228.5 | 3736764 | 5.60E-07 | 1.75YrCan | 5.60E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 135 | ALL | 550234.8 | 3736784 | 5.22E-07 | 1.75YrCan | 5.22E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 136 | ALL | 550232.7 | 3736810 | 4.76E-07 | 1.75YrCan | 4.76E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 137 | ALL | 550216.5 | 3736837 | 4.38E-07 | 1.75YrCan | 4.38E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 138 | ALL | 550212.2 | 3736854 | 4.17E-07 | 1.75YrCan | 4.17E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 139 | ALL | 550208 | 3736876 | 3.90E-07 | 1.75YrCan | 3.90E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 140 | ALL | 550199.5 | 3736901 | 3.60E-07 | 1.75YrCan | 3.60E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 141 | ALL | 550195.9 | 3736923 | 3.38E-07 | 1.75YrCan | 3.38E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 142 | ALL | 550189.6 | 3736946 | 3.08E-07 | 1.75YrCan | 3.08E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 143 | ALL | 550187.5 | 3736968 | 2.85E-07 | 1.75YrCan | 2.85E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 144 | ALL | 550184.6 | 3736990 | 2.71E-07 | 1.75YrCan | 2.71E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 145 | ALL | 550180.4 | 3736779 | 5.16E-07 | 1.75YrCan | 5.16E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 146 | ALL | 550172.6 | 3736802 | 4.75E-07 | 1.75YrCan | 4.75E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 147 | ALL | 550163.4 | 3736826 | 4.39E-07 | 1.75YrCan | 4.39E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 148 | ALL | 550155.6 | 3736847 | 4.09E-07 | 1.75YrCan | 4.09E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 149 | ALL | 550154.2 | 3736867 | 3.84E-07 | 1.75YrCan | 3.84E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 150 | ALL | 550150 | 3736889 | 3.53E-07 | 1.75YrCan | 3.53E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 151 | ALL | 550145.7 | 3736911 | 3.24E-07 | 1.75YrCan | 3.24E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 152 | ALL | 550126 | 3736933 | 2.98E-07 | 1.75YrCan | 2.98E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 153 | ALL | 550116.8 | 3736954 | 2.90E-07 | 1.75YrCan | 2.90E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 154 | ALL | 550482.1 | 3736496 | 4.44E-06 | 1.75YrCan | 4.44E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 155 | ALL | 550528.3 | 3736530 | 2.86E-06 | 1.75YrCan | 2.86E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 156 | ALL | 550542.4 | 3736504 | 4.69E-06 | 1.75YrCan | 4.69E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 157 | ALL | 550556.4 | 3736507 | 3.58E-06 | 1.75YrCan | 3.58E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 158 | ALL | 550587.2 | 3736447 | 4.36E-06 | 1.75YrCan | 4.36E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 159 | ALL | 550571.1 | 3736422 | 5.11E-06 | 1.75YrCan | 5.11E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 160 | ALL | 550549 | 3736403 | 5.47E-06 | 1.75YrCan | 5.47E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 161 | ALL | 550501.9 | 3736380 | 6.65E-06 | 1.75YrCan | 6.65E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 162 | ALL | 550473 | 3736374 | 6.02E-06 | 1.75YrCan | 6.02E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 163 | ALL | 550463.2 | 3736382 | 6.17E-06 | 1.75YrCan | 6.17E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 164 | ALL | 550469.2 | 3736415 | 6.60E-06 | 1.75YrCan | 6.60E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 165 | ALL | 550461.9 | 3736439 | 5.42E-06 | 1.75YrCan | 5.42E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 166 | ALL | 550484.3 | 3736465 | 6.35E-06 | 1.75YrCan | 6.35E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

6.65E-06

6.65E+00

HARP2 - HRACalc (dated 22118) 7/2/2024 12:15:39 PM - Output Log

GLCs loaded successfully
Pollutants loaded successfully
Pathway receptors loaded successfully
**********
RISK SCENARIO SETTINGS

Receptor Type: Resident
Scenario: NCChronic
Calculation Method: Derived

**********
EXPOSURE DURATION PARAMETERS FOR CANCER
**Exposure duration are only adjusted for cancer assessments**

**********
PATHWAYS ENABLED

NOTE: Inhalation is always enabled and used for all assessments.  The remaining pathways are only used for cancer and noncancer chronic assessments.

Inhalation: True
Soil: True
Dermal: True
Mother's milk: True
Water: False
Fish: False
Homegrown crops: True
Beef: False
Dairy: False
Pig: False
Chicken: False
Egg: False

**********
INHALATION

Daily breathing rate: LongTerm24HR

**Worker Adjustment Factors**
Worker adjustment factors enabled: NO

**Fraction at time at home**
NOTE: Exposure duration (i.e., start age, end age, ED, & FAH) are only adjusted for cancer assessments.

**********
SOIL & DERMAL PATHWAY SETTINGS

Deposition rate (m/s): 0.02
Soil mixing depth (m): 0.01
Dermal climate: Warm

**********
HOMEGROWN CROP PATHWAY SETTINGS

Household type: HouseholdsthatGarden
Fraction leafy: 0.137
Fraction exposed: 0.137
Fraction protected: 0.137
Fraction root: 0.137

**********
TIER 2 SETTINGS

Tier2 adjustments were used in this assessment.  Please see the input file for details.
Tier2 - What was changed: ED or start age changed
Calculating chronic risk
Chronic risk breakdown by pollutant and receptor saved to:
C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRAChronicNCChronicRisk.csv
Chronic risk total by receptor saved to: C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRAChronicNCChronicRiskSumByRec.csv
HRA ran successfully

*HARP - HRACalc v22118 7/2/2024 12:15:39 PM - Chronic Risk - Input File: C:\Users\dlarocca\Desktop\HARP2 Files\RITZPALMSPRINGS\hra\ConstHRAChronicHRAInput.hra

| REC | GRP | NETID | X | Y | SCENARIO | CV | CNS | IMMUN | KIDNEY | GILV | REPRO/DE | RESP | SKIN | EYE | BONE/TEE | ENDO | BLOOD | ODOR | GENERAL | MAXHI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ALL | | 550340.4 | 3736223 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.16E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.16E-03 |
| 2 | ALL | | 550311.9 | 3736237 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.86E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.86E-03 |
| 3 | ALL | | 550282.4 | 3736241 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.24E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.24E-03 |
| 4 | ALL | | 550221.3 | 3736238 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.33E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.33E-03 |
| 5 | ALL | | 550173.8 | 3736212 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.53E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.53E-03 |
| 6 | ALL | | 550124.3 | 3736209 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.50E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.50E-03 |
| 7 | ALL | | 550084.2 | 3736252 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.97E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.97E-03 |
| 8 | ALL | | 550071.6 | 3736210 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.08E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.08E-03 |
| 9 | ALL | | 550073.7 | 3736155 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.34E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.34E-04 |
| 10 | ALL | | 550113.8 | 3736150 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.41E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.41E-04 |
| 11 | ALL | | 550178 | 3736157 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.18E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.18E-04 |
| 12 | ALL | | 550224.4 | 3736163 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.44E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.44E-03 |
| 13 | ALL | | 550235 | 3736202 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.64E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.64E-03 |
| 14 | ALL | | 550286.6 | 3736164 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.81E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.81E-03 |
| 15 | ALL | | 550311.9 | 3736163 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.85E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.85E-03 |
| 16 | ALL | | 550063.2 | 3736081 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.25E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.25E-04 |
| 17 | ALL | | 550109.5 | 3736095 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.11E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.11E-04 |
| 18 | ALL | | 550158 | 3736113 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.33E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.33E-04 |
| 19 | ALL | | 550143.3 | 3736087 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.86E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.86E-04 |
| 20 | ALL | | 550125.3 | 3736050 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.79E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.79E-04 |
| 21 | ALL | | 550077.9 | 3736050 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.41E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.41E-04 |
| 22 | ALL | | 550113.8 | 3735984 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.70E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.70E-04 |
| 23 | ALL | | 550116.9 | 3735910 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.11E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.11E-04 |
| 24 | ALL | | 550153.8 | 3735948 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.45E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.45E-04 |
| 25 | ALL | | 550181.2 | 3735997 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.33E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.33E-04 |
| 26 | ALL | | 550192.8 | 3736052 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.51E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.51E-04 |
| 27 | ALL | | 550210.7 | 3736091 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.32E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.32E-04 |
| 28 | ALL | | 550271.9 | 3736058 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.02E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.02E-04 |
| 29 | ALL | | 550290.8 | 3736100 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.32E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.32E-04 |
| 30 | ALL | | 550259.2 | 3736121 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.55E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.55E-04 |
| 31 | ALL | | 550023.1 | 3736313 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.47E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.47E-03 |
| 32 | ALL | | 549995.7 | 3736286 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.03E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.03E-03 |
| 33 | ALL | | 550004.1 | 3736247 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.30E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.30E-04 |
| 34 | ALL | | 550001 | 3736211 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.21E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.21E-04 |
| 35 | ALL | | 549905.1 | 3736294 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.73E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.73E-04 |
| 36 | ALL | | 549884 | 3736262 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.78E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.78E-04 |
| 37 | ALL | | 549857.6 | 3736245 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.07E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.07E-04 |
| 38 | ALL | | 549830.2 | 3736221 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.47E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.47E-04 |
| 39 | ALL | | 549898.7 | 3736363 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.02E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.02E-04 |
| 40 | ALL | | 549856.6 | 3736375 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.86E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.86E-04 |
| 41 | ALL | | 549834.4 | 3736352 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.32E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.32E-04 |
| 42 | ALL | | 549823.9 | 3736315 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.96E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.96E-04 |
| 43 | ALL | | 549808.1 | 3736287 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.57E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.57E-04 |
| 44 | ALL | | 549759.6 | 3736403 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.18E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.18E-04 |
| 45 | ALL | | 549731.1 | 3736332 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.78E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.78E-04 |
| 46 | ALL | | 549738.5 | 3736262 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.69E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.69E-04 |
| 47 | ALL | | 549716.4 | 3736253 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.46E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.46E-04 |
| 48 | ALL | | 549683.7 | 3736234 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.17E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.17E-04 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 49 | ALL | 549665.8 | 3736211 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.99E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.99E-04 |
| 50 | ALL | 549642.6 | 3736181 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.76E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.76E-04 |
| 51 | ALL | 549634.2 | 3736117 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.07E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.07E-04 |
| 52 | ALL | 549710.1 | 3736157 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.63E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.63E-04 |
| 53 | ALL | 549742.7 | 3736180 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.10E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.10E-04 |
| 54 | ALL | 549769.1 | 3736192 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.51E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.51E-04 |
| 55 | ALL | 549717.4 | 3736058 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.83E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.83E-05 |
| 56 | ALL | 549758.5 | 3736054 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.07E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.07E-04 |
| 57 | ALL | 549794.4 | 3736119 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.71E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.71E-04 |
| 58 | ALL | 549860.8 | 3736062 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.56E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.56E-04 |
| 59 | ALL | 549886.1 | 3736097 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.98E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.98E-04 |
| 60 | ALL | 549910.3 | 3736123 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.55E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.55E-04 |
| 61 | ALL | 549945.1 | 3736134 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.04E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.04E-04 |
| 62 | ALL | 550006.2 | 3736140 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.33E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.33E-04 |
| 63 | ALL | 549999.9 | 3736108 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.12E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.12E-04 |
| 64 | ALL | 549998.9 | 3736077 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.41E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.41E-04 |
| 65 | ALL | 549997.8 | 3736031 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.75E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.75E-04 |
| 66 | ALL | 549959.9 | 3736037 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.58E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.58E-04 |
| 67 | ALL | 549913.5 | 3736006 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.27E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.27E-04 |
| 68 | ALL | 549884 | 3735994 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.11E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.11E-04 |
| 69 | ALL | 549807 | 3735942 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.87E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.87E-05 |
| 70 | ALL | 549877.7 | 3735918 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.64E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.64E-05 |
| 71 | ALL | 549913.5 | 3735922 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.15E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.15E-05 |
| 72 | ALL | 549953.5 | 3735915 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.56E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.56E-05 |
| 73 | ALL | 549990.4 | 3735913 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.35E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.35E-05 |
| 74 | ALL | 550003.1 | 3735975 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.22E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.22E-04 |
| 75 | ALL | 550046.3 | 3735972 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.39E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.39E-04 |
| 76 | ALL | 549766.3 | 3735846 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.28E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.28E-05 |
| 77 | ALL | 549802.2 | 3735842 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.74E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.74E-05 |
| 78 | ALL | 549874.1 | 3735827 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.00E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.00E-05 |
| 79 | ALL | 549934.9 | 3735830 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.48E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.48E-05 |
| 80 | ALL | 550006.8 | 3735846 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.30E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.30E-05 |
| 81 | ALL | 550055.2 | 3735863 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.07E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.07E-05 |
| 82 | ALL | 549786.1 | 3735729 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.05E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.05E-05 |
| 83 | ALL | 549884.1 | 3735735 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.79E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.79E-05 |
| 84 | ALL | 549921.3 | 3735730 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.93E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.93E-05 |
| 85 | ALL | 549953.5 | 3735730 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.10E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.10E-05 |
| 86 | ALL | 549956 | 3735772 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.10E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.10E-05 |
| 87 | ALL | 549871.7 | 3735642 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.94E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.94E-05 |
| 88 | ALL | 549910.1 | 3735634 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.97E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.97E-05 |
| 89 | ALL | 549947.3 | 3735636 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.08E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.08E-05 |
| 90 | ALL | 549844.4 | 3735572 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.41E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.41E-05 |
| 91 | ALL | 549767.5 | 3735610 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.38E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.38E-05 |
| 92 | ALL | 551029.9 | 3735920 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.95E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.95E-04 |
| 93 | ALL | 551062.5 | 3735985 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.82E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.82E-04 |
| 94 | ALL | 551099.6 | 3736003 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.67E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.67E-04 |
| 95 | ALL | 551109.3 | 3736041 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.62E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.62E-04 |
| 96 | ALL | 551158.7 | 3736084 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.43E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.43E-04 |
| 97 | ALL | 551201.1 | 3736122 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.29E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.29E-04 |
| 98 | ALL | 551255 | 3736176 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.13E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.13E-04 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 99 | ALL | 551277 | 3736215 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.07E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.07E-04 |
| 100 | ALL | 551299.1 | 3736207 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.03E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.03E-04 |
| 101 | ALL | 551264.7 | 3736149 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.12E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.12E-04 |
| 102 | ALL | 551212.6 | 3736099 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.27E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.27E-04 |
| 103 | ALL | 551178.2 | 3736070 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.38E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.38E-04 |
| 104 | ALL | 551134.9 | 3736039 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E-04 |
| 105 | ALL | 551101.4 | 3735977 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.66E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.66E-04 |
| 106 | ALL | 551066.9 | 3735952 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.80E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.80E-04 |
| 107 | ALL | 549996.6 | 3736647 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.93E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.93E-04 |
| 108 | ALL | 549995.9 | 3736674 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.54E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.54E-04 |
| 109 | ALL | 549995.9 | 3736700 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.24E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.24E-04 |
| 110 | ALL | 549995.9 | 3736725 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.99E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.99E-04 |
| 111 | ALL | 549995.9 | 3736745 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.81E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.81E-04 |
| 112 | ALL | 549997.3 | 3736776 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.56E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.56E-04 |
| 113 | ALL | 549995.9 | 3736801 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.38E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.38E-04 |
| 114 | ALL | 549995.1 | 3736827 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.22E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.22E-04 |
| 115 | ALL | 549995.1 | 3736852 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.10E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.10E-04 |
| 116 | ALL | 550063 | 3736670 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.23E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.23E-04 |
| 117 | ALL | 550063 | 3736696 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.85E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.85E-04 |
| 118 | ALL | 550068.7 | 3736720 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.59E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.59E-04 |
| 119 | ALL | 550072.2 | 3736742 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.35E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.35E-04 |
| 120 | ALL | 550082.8 | 3736765 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.15E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.15E-04 |
| 121 | ALL | 550083.5 | 3736790 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.92E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.92E-04 |
| 122 | ALL | 550080 | 3736812 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.70E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.70E-04 |
| 123 | ALL | 550077.9 | 3736835 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.51E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.51E-04 |
| 124 | ALL | 550077.2 | 3736856 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.34E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.34E-04 |
| 125 | ALL | 550077.9 | 3736881 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.17E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.17E-04 |
| 126 | ALL | 550126 | 3736612 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.63E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.63E-04 |
| 127 | ALL | 550131.6 | 3736636 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.92E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.92E-04 |
| 128 | ALL | 550138.7 | 3736659 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.37E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.37E-04 |
| 129 | ALL | 550137.3 | 3736682 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.81E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.81E-04 |
| 130 | ALL | 550140.1 | 3736708 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.32E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.32E-04 |
| 131 | ALL | 550146.5 | 3736730 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.97E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.97E-04 |
| 132 | ALL | 550188.2 | 3736663 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.58E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.58E-04 |
| 133 | ALL | 550217.2 | 3736734 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.16E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.16E-04 |
| 134 | ALL | 550228.5 | 3736764 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.72E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.72E-04 |
| 135 | ALL | 550234.8 | 3736784 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.47E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.47E-04 |
| 136 | ALL | 550232.7 | 3736810 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.16E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.16E-04 |
| 137 | ALL | 550216.5 | 3736837 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.91E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.91E-04 |
| 138 | ALL | 550212.2 | 3736854 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.77E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.77E-04 |
| 139 | ALL | 550208 | 3736876 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.59E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.59E-04 |
| 140 | ALL | 550199.5 | 3736901 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.39E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.39E-04 |
| 141 | ALL | 550195.9 | 3736923 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.24E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.24E-04 |
| 142 | ALL | 550189.6 | 3736946 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.05E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.05E-04 |
| 143 | ALL | 550187.5 | 3736968 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.90E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.90E-04 |
| 144 | ALL | 550184.6 | 3736990 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.80E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.80E-04 |
| 145 | ALL | 550180.4 | 3736779 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.43E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.43E-04 |
| 146 | ALL | 550172.6 | 3736802 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.16E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.16E-04 |
| 147 | ALL | 550163.4 | 3736826 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.92E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.92E-04 |
| 148 | ALL | 550155.6 | 3736847 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.72E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.72E-04 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 149 | ALL | 550154.2 | 3736867 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.55E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.55E-04 |
| 150 | ALL | 550150 | 3736889 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.35E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.35E-04 |
| 151 | ALL | 550145.7 | 3736911 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.15E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.15E-04 |
| 152 | ALL | 550126 | 3736933 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.98E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.98E-04 |
| 153 | ALL | 550116.8 | 3736954 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.92E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.92E-04 |
| 154 | ALL | 550482.1 | 3736496 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.95E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.95E-03 |
| 155 | ALL | 550528.3 | 3736530 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.90E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.90E-03 |
| 156 | ALL | 550542.4 | 3736504 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.11E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.11E-03 |
| 157 | ALL | 550556.4 | 3736507 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.38E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.38E-03 |
| 158 | ALL | 550587.2 | 3736447 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.90E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.90E-03 |
| 159 | ALL | 550571.1 | 3736422 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.40E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.40E-03 |
| 160 | ALL | 550549 | 3736403 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.64E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.64E-03 |
| 161 | ALL | 550501.9 | 3736380 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.42E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.42E-03 |
| 162 | ALL | 550473 | 3736374 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.00E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.00E-03 |
| 163 | ALL | 550463.2 | 3736382 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.10E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.10E-03 |
| 164 | ALL | 550469.2 | 3736415 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.38E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.38E-03 |
| 165 | ALL | 550461.9 | 3736439 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.60E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.60E-03 |
| 166 | ALL | 550484.3 | 3736465 | NonCance | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.22E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.22E-03 |

4.42E-03

# **Appendix B**
Biological Resources Report

78-075 MAIN STREET, SUITE G-203
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February 21, 2022 11942

Phil Wolfgramm
Kam Sang Company Inc.
411 E. Huntington Drive, Suite 305
Arcadia, California 91006

*Subject: Biological Resources Assessment for the Ritz-Carlton Rancho Mirage – Sky Mesa Recreation Area Project, City of Rancho Mirage, Riverside County, California*

Dear Mr. Wolfgramm:

This biological resources assessment describes the existing biological conditions of the proposed Ritz-Carlton Rancho Mirage – Sky Mesa Recreation Area Project (project). The project site, totaling 4.5 acres, includes six parcels (Assessor's Parcel Numbers 689-020-012, 689-020-014, 689-330-031, 689-330-032, 689-330-034, and 689-331-018), will provide additional event space, a restaurant, and amenities such as a pool terrace and view opportunities of the surrounding areas. The project and special-status biological resources are analyzed in the context of the California Environmental Quality Act (CEQA) and in the context of the City of Rancho Mirage General Plan and the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP). The City of Rancho Mirage (City) is the lead agency responsible for CEQA compliance. The biological assessment report will support the CEQA document prepared for the development of the site.

This biological resources assessment is intended to describe the existing conditions of special-status biological resources on the project site (proposed project footprint) and within a 500-foot buffer where access was granted (study area), totaling 43.9 acres; quantify impacts to special-status biological resources that would result from implementation of the project and describe those impacts in terms of biological significance under both CEQA and the CVMSHCP; and recommend avoidance, minimization, and mitigation measures to avoid and reduce impacts to special-status biological resources, if necessary.

# 1 Introduction

## 1.1 Project Location

The project site is located at 68900 Frank Sinatra Drive, approximately 0.85 miles southwest of the intersection with State Route 111 in the City of Rancho Mirage, Riverside County (Assessor's Parcel Numbers 689-020-012, 689-020-014, 689-330-031, 689-330-032, 689-330-034, and 689,331-018) (Figure 1, Project Location Map; figures are provided in Attachment A). The majority of the 4.5-acre project site is currently vacant and lies east of the existing Ritz-Carlton Rancho Mirage Hotel. The project site is located in Section 3, Township 5 South, and Range 5 East of the San Bernardino Baseline and Meridian, U.S. Geological Survey Cathedral City 7.5-minute quadrangle. The approximate center of the project site corresponds to 33.767293 north latitude and -116.454342 west longitude.

## 1.2 Project Background and Description

In 2006, an environmental impact report (EIR) was prepared for the Lodge at Rancho Mirage Hotel Expansion Project, which encompassed a total of 39.01 acres that included the existing Lodge Hotel site, and other developed and entitled lands within the lower foothills of the Santa Rosa Mountains. The 2006 EIR analyzed portions of the Ritz-Carlton Residences site of the proposed project but did not analyze the Sky Mesa Recreation Area. Therefore, this biological resources assessment covers only the Sky Mesa Recreation Area. The proposed Sky Mesa Recreation Area would provide additional event space, a restaurant, and amenities such as a pool terrace and view opportunities of the surrounding areas (Figure 2, Site Plan). The Sky Mesa Recreation Area is an approximately 4.5-acre site located along Frank Sinatra Drive approximately 0.85 miles southwest of the intersection with California State Route 111 within the City of Rancho Mirage, Riverside County. It lies directly adjacent to existing development (Ritz-Carlton to one side, water tanks to the other) within a matrix of development between Cathedral City/Cathedral Canyon Cove/Rancho Mirage neighborhoods approximately 0.5 miles to the northwest, east, and southeast (Figure 1).

# 2 Regional Planning Context

## 2.1 Coachella Valley Multiple Species Habitat Conservation Plan

The project is located within the boundaries of the CVMSHCP (CVAG 2016) as administered by the Coachella Valley Conservation Commission. The CVMSHCP is a habitat conservation plan pursuant to Section 10(a) of the federal Endangered Species Act, which authorizes the issuance of take permits and establishes standards for the content of habitat conservation plans. It is also a natural community conservation plan pursuant to California Fish and Game Code Section 2835, which authorizes the California Department of Fish and Wildlife (CDFW) to permit the take of any covered species whose conservation and management are provided for in an approved natural community conservation plan. Compliance with the CVMSHCP (and associated permits) provides permittees with take authorization for covered species so long as the activity is covered by the CVMSHCP. Covered species include listed and non-listed species that are adequately conserved by the CVMSHCP.

The project is a covered activity under the CVMSHCP and would receive coverage for impacts to covered species. The project site is not located within a CVMSHCP conservation area. The nearest CVMSHCP conservation area, the Santa Rosa and San Jacinto Mountains Conservation Area, is located approximately 332 feet south of the project site (Figure 3, Coachella Valley MSHCP). The project site is mapped as Developed and Sonoran Creosote Brush Scrub in the CVMSHCP (see Figure 3-1 in CVAG 2016).

## 2.2 City of Rancho Mirage General Plan

The City of Rancho Mirage General Plan (City of Rancho Mirage 2017) sets forth goals, policies, and programs to manage its future growth. Several elements within the General Plan were established to address potential impacts to biological resources. Specifically, the Conservation and Open Space Element which establishes biological resources goals, policies, and programs toward preserving and effectively managing the valuable natural resources in Rancho Mirage.

The 4.5-acre project site is situated on all or portions of Assessor parcel numbers 689-330-031, -032, -34 and 689-331-018 which have a General Plan Land Use designation of Commercial: Resort Hotel (Rs-H) totaling 0.9 acres, and

also on parcels 689020012 and -14 carrying an Open Space: Mountain Reserve (MR) designation totaling 3.6 acres. The stated goal of the Resort Hotel (Rs-H) zone is for "the development of hotels and destination resorts with limited, ancillary commercial uses, such as spas, recreational facilities, restaurants, lounges, and small retail shops that directly support the primary use." The stated goal of the Mountain Reserve (MR) zone is "for public lands or property subject to conservation easements in the Santa Rosa Mountains. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation."

A zone change from Mountain Reserve (MR) to Resort Hotel (Rs-H) is concurrently proposed for the Sky Mesa Recreation Area. Under existing conditions, the Sky Mesa portion of the project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning to encompass the Sky Mesa portion of the site. As noted above, the MR zone was adopted for the purposed of avoiding or mitigating possible impacts on sensitive biological resources.

# 3 Methods

## 3.1 Literature Review

For this biological resources assessment, "special-status" species are those that are (1) listed, proposed for listing, or candidates for listing as threatened or endangered under the federal Endangered Species Act; (2) listed or candidates for listing as threatened or endangered under the California Endangered Species Act; (3) state fully protected species; (4) CDFW Species of Special Concern; (5) Fish and Game Code Section 4000 fur-bearing animal; (6) species listed on the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants with a California Rare Plant Rank of 1B or 2B; or (7) species requiring additional surveys under the CVMSHCP (CVAG 2016).

Other special-status biological resources include sensitive plant communities; wetlands, including riparian habitat; and wildlife corridors. Sensitive plant communities are those that are considered to support unique vegetation communities that have a rank of S1–S3 on the CDFW List of Terrestrial Communities or are considered locally important by a local planning document, such as the County of Riverside General Plan or the CVMSHCP.

Special-status biological resources present or potentially present on the project site were identified through a literature search using the following sources: U.S. Fish and Wildlife Service's (USFWS) Critical Habitat and Occurrence Data (USFWS 2021), CDFW's California Natural Diversity Database (CDFW 2021), and the CNPS's online Inventory of Rare, Threatened, and Endangered Plants (CNPS 2021a). Searches were completed for the following U.S. Geological Survey quadrangles (which include the quadrangle within which the study area is located and the eight surrounding quadrangles): Cathedral City, Desert Hot Springs, Seven Palms Valley, East Deception Canyon, Myoma, Palm Springs, Palm View Peak, Rancho Mirage, and La Quinta.

## 3.2 Field Reconnaissance

Dudek biologist Britney Strittmater conducted a general biological survey of the study area on June 29, 2021, from 6:10 a.m. to 8:35 a.m. The general biological survey was conducted on foot, and the undeveloped portions of the

study area (where legally accessible) were walked thoroughly to complete the resource inventory. Private properties and portions of the study area were not walked due to either private property or to steep topography. These sections of the study area were surveyed via binoculars from public roadways and from the undeveloped portions of the project site. The survey was conducted when weather conditions were favorable, with partly cloudy skies, wind speeds from 2 to 5 miles per hour, and temperatures ranging from 85°F to 89°F. All native and naturalized plant species encountered within the study area were identified and recorded. The potential for special-status plant and wildlife species to occur within the study area was evaluated based on the vegetation communities, soils present, and surrounding features. Vegetation communities and land covers on site were mapped directly in the field. A formal jurisdictional delineation was not conducted; however, an investigation was conducted of the extent and distribution of potential jurisdictional waters of the United States regulated by the U.S. Army Corps of Engineers, jurisdictional waters of the state regulated by the Regional Water Quality Control Board, and jurisdictional streambed and associated riparian vegetation regulated by the CDFW.

Latin and common names for plant species with a California Rare Plant Rank (formerly CNPS List) follow the CNPS On-Line Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2021a). For plant species without a California Rare Plant Rank, Latin names follow the Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California (Jepson Flora Project 2021), and common names follow the California Natural Community List (CDFW 2020) or the U.S. Department of Agriculture Natural Resources Conservation Service Plants Database (USDA 2021). Natural vegetation communities were mapped in the field following A Manual of California Vegetation, second edition (Sawyer et al. 2009) where feasible, with modifications to accommodate the lack of conformity of the observed communities to those of Oberbauer et al. (2008). Land cover types (i.e., areas that lack vegetation communities) were described in accordance with Draft Vegetation Communities of San Diego County (Oberbauer et al. 2008). Latin and common names of animals follow Crother (2017) for reptiles and amphibians, American Ornithological Society (AOS 2020) for birds, Wilson and Reeder (2005) for mammals, North American Butterfly Association (NABA 2016) or San Diego Natural History Museum (SDNHM 2002) for butterflies, and Moyle (2002) for fish.

Dudek used geographic information system software (ArcGIS) to map biological resources and prepare figures.

## 3.3 Survey Limitations

Access to a portion of the 500-foot buffer was not available during the survey because some of the properties are private and access was not granted, such as Coachella Valley Water District property, or portions of the study area were not accessible on foot due to steep topography. The 500-buffer, for areas that were inaccessible, were surveyed visually using binoculars. Therefore, vegetation mapping and habitat assessments were conducted from the project site or other public roads, in addition to being complimented with the use of aerial signatures of vegetation communities occurring within the study area.

The reconnaissance survey was conducted during the summer season, which resulted in detection and identification of most annual and perennial plant species that may potentially occur in the area. Due to the timing of the surveys, early spring annual and cryptic perennials may not have been detectable.

Conditions were suitable for detection of most wildlife species (i.e., partly cloudy skies, 85°F to 89°F temperatures, and light winds). Surveys specifically aimed at detection of the full range of wildlife species were not conducted.

However, notes were taken for incidental wildlife observations made during surveys to establish a general baseline of wildlife diversity within the study area. These surveys were conducted during the daytime, which usually results in few observations of mammals, many of which may be active at night. In addition, many species of reptiles and amphibians are nocturnal or cryptic in their habitats and are difficult to observe using standard meandering transects.

The current survey effort provides an accurate representation of the potential for special-status species to occur in the study area. The surveys conducted to date were thorough and comprehensive, and the results of the study contained herein provide a reasonable, accurate assessment of the study area.

# 4 Results

## 4.1 Site Description

The project site is located within the Colorado Desert, in the central portion of the Coachella Valley, which is generally bound by the San Bernardino Mountains and Little San Bernardino Mountains to the north, the San Jacinto and Santa Rosa Mountains to the south, and the Salton Sea and Imperial Valley to the east. The project site is relatively flat along the previously graded pad; however, elevations steeply slope to the northwest, north, northeast, and south of the graded pad. Elevation within the study area ranges from approximately 580 feet above mean sea level to approximately 650 feet above mean sea level in the central portion (i.e., graded plateau) of the study area.

The proposed project site is vacant, with a portion of the site that has been partially graded and the remaining areas containing native desert vegetation along steep slopes. The existing Ritz-Carlton Rancho Mirage Hotel is to the west of the project site. A hotel service access road borders the project site to the west, which leads to the proposed Sky Mesa Recreation Area (i.e., project site). To the south is Mirada Circle and the Mirada single-family residential development. Facing the project site across Frank Sinatra Drive to the northwest is a rough graded but undeveloped parcel.

Representative photographs of the project site and study area are included in Attachment B.

## 4.2 Soils

Two soil series are mapped within the study area: rock outcrop and rock outcrop-Lithic Torripsamments complex. The entirety of the project site is comprised of rock outcrop, and a small patch of rock outcrop-Lithic Torripsamments complex is only found within the western portion of the study area buffer. These soils are described in more detail below (USDA 1980), and the spatial distribution of these soils is depicted in Figure 4, Soils Map.

- **Rock Outcrop Series** occurs on very steep land types in mountainous areas. This series contains 75% to 100% of the soil surface containing outcrop of granite and sandstone. These soils support watershed and recreation, with some areas used for homesites. Vegetation includes stunted ceanothus (*Ceanothus* spp.), manzanita (*Arctostaphylos* spp.), desert agave (*Agave deserti*), brittle bush (*Encelia farinosa*), creosote bush (*Larrea tridentata*), and a few ocotillos (*Fouquieria splendens*) (USDA 1980).
- **Rock Outcrop-Lithic Torripsamment Series** consists well-drained soils that formed from metasedimentary rocks, granite, grandiorite, or gabbro. Rock Outcrop-Lithic Torripsamments soils are found along steep slopes of 9% to 50% and occur at elevations of 200 feet to 3,000 feet above mean sea level. These soils

support watershed, wildlife habitat, recreation, and some homesites. Vegetation includes brittle bush, desert agave, and ocotillo (USDA 1980).

## 4.3 Vegetation Communities and Land Covers

A total of six vegetation communities and land cover types occur within the study area based on general physiognomy and species composition. Four vegetation communities were mapped and include brittle bush scrub, creosote bush – brittle bush scrub, fountain grass swards, and tamarisk thickets, and two land covers (disturbed habitat and urban/developed) occur within the study area. Figure 5, Biological Resources Map, illustrates the distribution of land covers, and Table 1 provides a summary of each land cover's extent within the study area.

**Table 1. Vegetation Communities and Land Covers within the Study Area**

| Vegetation Community/Land Cover | Acreage |
|---|---|
| **Vegetation Communities** | |
| Brittle bush scrub | 4.1 |
| Creosote bush – brittle bush scrub[1] | 23.5 |
| Fountain grass swards | 0.5 |
| Tamarisk thickets | 1.4 |
| **Non-Natural Land Covers** | |
| Disturbed habitat | 4.7 |
| Urban/developed | 9.8 |
| **Total**[2] | **43.9** |

**Sources**: CDFW 2020; Oberbauer et al. 2008.
**Notes:**
1 Considered a Natural Community under CVMSHCP (CVAG 2016).
2 Totals may not add due to rounding.

### 4.3.1 Brittle Bush Scrub

Brittle bush scrub is dominated or co-dominated by brittle bush (*Encelia farinosa)* in the shrub layer with an open herbaceous layer, and emergent trees or tall shrubs may be present at low cover (Sawyer et al. 2009; CNPS 2021b). Other species within this association occurring at low cover include California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum),* and white sage *(Salvia apiana)* (Sawyer et al. 2009; CNPS 2021b).

Within the study area, brittle bush scrub is dominated by an open cover of brittle bush occurring in two patches within the northwestern portion of the study area and one patch within the northeastern portion of the study area. The community does not occur within the proposed project footprint. Associated species present within this community at low cover include fountain grass (*Pennisetum setaceum*), and California fagonbush (*Fagonia laevis*). The herbaceous layer is sparse and is composed of common Mediterranean grass (*Schismus barbatus*) and redstem stork's bill (*Erodium cicutarium*).

The brittle bush scrub alliance has a rank of G5S4 by CDFW (CDFW 2020), meaning that it is apparently secure both globally and within California. Therefore, CDFW does not consider this alliance to be a special-status vegetation community under CEQA (CDFW 2020).

### 4.3.2 Creosote Bush – Brittle Bush Scrub

The creosote bush-brittle bush scrub alliance includes creosote bush as the co-dominant shrub, forming an open to intermittent community less than approximately 3 meters (10 feet) in height and occurring along slopes and well-drained upper bajadas and alluvial fans (Sawyer et. al 2009).

Within the study area, Sonoran creosote bush – brittle bush is the most common occurring community and is co-dominated by an open cover of creosote bush and brittle bush. Associated species present within this community at a lower cover include California fagonbush, burrobush (*Ambrosia dumosa*), Wiggins' cholla (*Cylindropuntia echinocarpa*), Schott's dalea (*Psorothamnus schottii*), white ratany (*Krameria bicolor*), and desert trumpet (Eriogonum inflatum). The herbaceous layer is sparse and composed of common Mediterranean grass, redstem stork's bill, desert Indianwheat (*Plantago ovata*), and Thomas' buckheat (*Eriogonum thomasii*).

The *Larrea tridentata – Encelia farinosa* alliance has a rank of G5S5 by CDFW (CDFW 2020), meaning that it is apparently secure both globally and within the state. Therefore, CDFW does not consider this alliance to be a special-status vegetation community under CEQA (CDFW 2020). Sonoran creosote bush scrub is within the CVMSHCP and is considered a natural community to be conserved in CVMSHCP Conservation Areas (CVAG 2016).

### 4.3.3 Fountain Grass Swards

The fountain grass swards semi-natural stand includes fountain grass as the dominant or co-dominant herb; emergent trees and shrubs may also be present at low covers. This semi-natural stand forms an open to intermittent stand less than 1.5 meters (5 feet) in height (Sawyer et al. 2009).

Within the study area, fountain grass swards stand is dominated by an open cover of fountain grass and occurs along a canyon bottom within the northeastern portion of the study area. This stand does not occur within the proposed project footprint. Associated species present within this community include brittle bush.

The fountain grass swards alliance is a semi-natural stand that is not considered a special-status vegetation community under CEQA.

### 4.3.4 Tamarisk Thickets

This community includes tamarix as the dominant species in the shrub canopy and occurs along lake margins, ditches, wash, rivers and other watercourses (Sawyer et al. 2009).

Within the study area, tamarisk thickets occur within two patches, associated with canyon bottoms present within the study area, and is dominated by an intermittent cover of tamarix (*Tamarix ramosissima*). Tamarix thickets occur outside of the proposed project footprint, immediately north and south of the existing Ritz-Carlton Hotel within the study area buffer. Associated species present within this community at low covers include fountain grass, Washington fan palm (*Washingtonia robusta*), date palm (*Phoenix dactylifera*), and blue palo verde (*Parkinsonia florida*).

The tamarisk thickets alliance is a semi-natural stand that is not considered a special-status vegetation community under CEQA.

### 4.3.5 Disturbed Habitat

The classification of disturbed habitat is due to the predominance of bare ground, non-native plant species, and other disturbance-tolerant plant species. Oberbauer et al. (2008) describes disturbed habitat as areas that have been physically disturbed by previous human activity and are no longer recognizable as a native or naturalized vegetation association, but that continue to retain a soil substrate. Typically, vegetation, if present, is nearly exclusively composed of non-native annual plant species.

Within the study area, disturbed land consists of the previously graded areas (i.e., graded pad within the project site and a graded portion located within the southwestern portion of the study area buffer) and areas that have been disturbed that are associated with the Coachella Valley Water District water towers within the northern portion of the study area. These areas support a low cover (less than 10%) of vegetation.

Disturbed habitat is not a vegetation community; therefore, it is not considered a special-status vegetation community under CEQA (CDFW 2020).

### 4.3.6 Urban/Developed Land

Urban/developed areas include areas that have been constructed upon or otherwise physically altered to an extent that native vegetation is no longer supported. Developed land is characterized by permanent or semi-permanent structures, pavement or hardscape, and landscaped areas that often require irrigation (Oberbauer et al. 2008).

Within the study area, developed areas include existing Ritz-Carlton Rancho Mirage Hotel, ornamental plantings along Frank Sinatra Drive, a paved recreational path associated with the existing Ritz-Carlton Rancho Mirage Hotel, and Coachella Valley Water District water towers and associated access road.

Developed land is not a vegetation community; therefore, it is not considered a special-status vegetation community under CEQA (CDFW 2020).

### 4.3.7 Floral Diversity

A total of 26 species of vascular plants, including 18 native (69%) and 8 non-native (31%), were recorded within the study area. This low plant diversity reflects the steep terrain and rocky conditions within the study area. Plant species observed within the study area are listed in Attachment C, Vascular Plant Species.

## 4.4 Wildlife

Five bird species were detected within the study area: house finch (*Haemorhous mexicanus*), Anna's hummingbird (*Calypte anna*), common raven (*Corvus corax*), mourning dove (*Zenaida macroura*), and mountain chickadee (*Poecile gambeli*). No nests were observed during the survey. No amphibian species were observed, and none are expected to occur. No reptile species were observed within the study area; however, common reptiles that may occur include common side-blotched lizard (*Uta stansburiana*). One mammal species were detected during the survey: coyote (*Canis latrans*). No invertebrate species were observed during the survey. Wildlife species observed within the study area are listed in Attachment D, Wildlife Species Compendium.

## 4.5 Special-Status Plant Species

Attachment E, Special-Status Plant Species Detected or Potentially Occurring in the Study Area, lists special-status plant species that were identified by the literature review. For each species listed, a determination was made regarding the potential for the species to occur in the study area based on information gathered during the field reconnaissance, including the location of the site, habitats present, current site conditions, and past and present land use.

No focused special-status plant surveys were conducted. No special-status plants were incidentally observed during the June 2021 survey. No federally or state-listed species have a potential to occur within the study area. No non-listed special-status species were determined to have a moderate to high potential to occur within the biological study area (Attachment E). Those special-status plant species that occur in the region, but that are not expected, or have low potential to occur in the study area due to the site being outside of the species' known elevation range or a lack of suitable habitat or soils, are also included in Attachment E; however, these species are not discussed further because no significant direct or indirect impacts are expected.

## 4.6 Special-Status Wildlife Species

Attachment F, Special-Status Wildlife Species Detected or Potentially Occurring in the Study Area, lists special-status wildlife species that were identified in the literature review. For each species listed, a determination was made regarding potential use of the project site based on information gathered during the field reconnaissance, known habitat preferences, and knowledge of the species' relative distributions in the area.

No focused special-status wildlife surveys were conducted. No listed or non-listed special-status wildlife species were incidentally detected within the study area during the June 2021 survey. One federally and state-listed species has a moderate potential to occur within the study area: Peninsular bighorn sheep (*Ovis canadensis nelsoni* pop. 2 DPS); however, this species is covered under the CVMSHCP. One other non-listed species has a moderate potential to occur within the study area: red diamondback rattlesnake (*Crotalus ruber*), which is not covered under the CVMSHCP. One other non-listed species has a low potential to occur within the flatter portions of the study area: burrowing owl (*Athene cunicularia*), which is covered under the CVMSHCP.

One federally and state-listed threatened species, desert tortoise, is not expected to occur; however, this species is covered by the CVMSHCP and has additional requirements under the CVMSHCP; therefore, this species is included for further discussion.

## 4.7 Nesting Birds

The study area contains ornamental trees and shrubs that provide potential habitat for commonly occurring nesting birds, such as Anna's hummingbird. No nests were observed within the study area during the 2021 reconnaissance survey.

## 4.8 Wildlife Corridors and Habitat Linkages

Wildlife corridors are linear features that connect large patches of natural open space and provide avenues for the migration of animals. Habitat linkages are small patches that join larger blocks of habitat and help reduce the

adverse effects of habitat fragmentation; they may be continuous habitat or discrete habitat islands that function as stepping stones for wildlife dispersal. Wildlife movement within the project site is unlikely due to the steep topography and urbanized area to the west (i.e., existing Ritz-Carlton Hotel). However, the remainder of the study area and the surrounding environment consist of open desert scrub habitat that likely function as open habitat but do not function as a corridor for wildlife. Furthermore, the CVMSHCP addresses regional wildlife linkages and crossings, and the project site is not within a designated linkage (Figure 3).

## 4.9 Local Regulatory Setting

### 4.9.1 CVMSHCP Consistency Analysis

The lead agency for this project is the City of Rancho Mirage, which is a Permittee of the CVMSHCP. Compliance with the CVMSHCP provides Permittees with take authorization for covered species for all covered activities, which includes development outside of CVMSHCP conservation areas. Therefore, the project is a covered activity, and compliance with the CVMSHCP would provide take authorization for covered species. No CVMSHCP covered species were incidentally observed within the study area during the 2021 site visit. One federally and state-listed species that is covered under the CVMSHCP has a moderate potential to occur: Peninsular bighorn sheep. No non-listed CVMSHCP covered species had a moderate or high potential to occur within the project site. The following provides a summary of the requirements of the CVMSHCP as they relate to the project.

Section 4.5 of the CVMSHCP provides land use adjacency guidelines for new land uses adjacent to conservation areas. The project is located adjacent to the Santa Rosa and San Jacinto Mountains Conservation Area within the southwestern corner of the study area buffer; therefore, these measures apply to the project.

Section 9 of the CVMSHCP sets forth species-specific conservation goals and objectives for each of the covered species. Peninsular bighorn sheep, a covered species under the CVMSHCP, was determined to have a moderate potential to occur within the project site. Section 9 of the CVMSHCP does not identify any avoidance, minimization, or mitigation measures for this species for areas outside of the conservation areas.

The CVMSHCP shows desert tortoise modeled habitat overlapping the study area (Figure 3). As noted previously, Chapter 9 of the CVMSHCP does not identify any avoidance, minimization, or mitigation measures for areas outside of the conservation areas for desert tortoise, and desert tortoise is not expected to occur within the project site (Attachment F). However, according to the USFWS CVMSHCP amended permit (TE-104601-1), permit term and condition no. 45 states for projects located outside of the proposed conservation areas within the 50,272 acres of naturally occurring desert tortoise habitat anticipated to be impacted, the Permittee (i.e., City of Rancho Mirage) shall either (1) notify the USFWS 45 days prior to the issuance of a grading permit to allow for the potential salvage of adult tortoises within this notification time period or (2) condition such projects to conduct desert tortoise clearance surveys per the USFWS's protocol. The project site overlaps modeled desert tortoise habitat (Figure 3); however, since it was determined to not support suitable habitat for desert tortoise as discussed in Attachment F, it is recommended that the Permittee notify the USFWS 45 days prior to issuance of a grading permit.

Section 10 of the CVMSHCP sets forth conservation goals and objectives for each of the covered natural communities. Covered natural communities present in the study area include Sonoran creosote bush scrub. No

measures are required outside of conservation areas for this community. Payment of the CVMSHCP development fee would provide coverage for sensitive natural communities that will be impacted.

A fee is required for all projects located within the CVMSHCP plan area. With payment of this fee, adherence to Land Use Adjacency Guidelines within Section 4.5 of the CVMSHCP, and adherence to USFWS CVMSHCP amended permit (TE-104601-1), permit term and condition no. 45, the project would be consistent with the CVMSHCP.

### 4.9.2 City of Rancho Mirage General Plan

As discussed in Section 2.2, several elements within the City's General Plan were established to address potential impacts to biological resources. Specifically, the Conservation and Open Space Element which establishes biological resources goals, policies, and programs toward preserving and effectively managing the valuable natural resources in the City. The following goals and policies are outlined in Chapter 5 (Conservation and Open Space Element) of the General Plan:

- **Goal COS 3:** The protection and preservation of biological resources in Rancho Mirage, especially sensitive and special status wildlife species and their natural habitats.
    - Policy COS 3.1: The City shall support and participate in local and regional efforts to evaluate and protect natural habitats, including suitable habitats for rare and endangered species occurring in Rancho Mirage and vicinity.
        - Program COS 3.1A: Review and evaluate all development proposals on vacant lands for their impacts on existing habitats and wildlife.
        - Program COS 3.1B: Maintain an accurate and regularly updated map and information base on sensitive species and habitats in Rancho Mirage and vicinity.
        - Program COS 3.1C: Continue to participate in the implementation of the CVMSHCP/NCPP with special emphasis on habitats located in the Santa Rosa Mountain areas.
        - Program COS 3.1D: Continue to require new developments to prepare wildlife and plant surveys and implement the requirements of the CVMSHCP/NCPP.
    - Policy COS 3.2: The City shall encourage and promote an understanding and appreciation of sensitive biological resources in Rancho Mirage and the vicinity.
        - Program COS 3.2A: Provide developers direction and information on preservation and reuse of valuable topsoil and use of locally appropriate xeriscape design concepts.
        - Program COS 3.2B: Discourage unnecessary clearing of native desert landscape.
        - Program COS 3.2C: Explore the feasibility and appropriateness of establishing an interpretive trail system in the City's mountain preserve or other similar area to enhance the public appreciation for the natural resources in Rancho Mirage.

- Policy COS 3.3: The City shall encourage the use of naturally occurring desert plant materials in landscaping for development projects, to the greatest extent possible, and discourage the use of non-native plant materials that are harmful to native plant and animal species.

    - Program COS 3.3A: Request that developers salvage naturally occurring desert plant materials, to the greatest extent possible, for integration into project landscaping as a way to provide or enhance wildlife habitat and to extend the local desert environment into the urban design of Rancho Mirage. Incorporation of these indigenous materials shall be integrated into project landscape plans, and shall be submitted to the City for approval.

    - Program COS 3.3B: Prepare a comprehensive planting materials list, which shall include native and non-native, drought tolerant trees, shrubs, and groundcovers that complement the local environment, provide habitat for local wildlife, and extend the desert into the built environment. A list of prohibited plant materials shall also be prepared.

In addition, a zone change from Mountain Reserve (MR) to Resort Hotel (Rs-H) is concurrently proposed for the Sky Mesa Recreation Area. Under existing conditions, the project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning of the existing Ritz Carlton to encompass the Sky Mesa site. As noted, the MR zone was adopted for the purposed of avoiding or mitigating possible impacts on sensitive biological resources.

# 5 Impacts and Recommendations

This section addresses potential impacts (permanent, temporary, direct, and indirect), as defined below, to special-status biological resources that could result from implementation of the project. This section addresses each CEQA significance threshold, identifies potential impacts, and provides mitigation measures, as applicable.

**Permanent Impacts** result in the permanent long-term loss of a biological resource (e.g., loss of suitable habitat for special-status plant and wildlife species). Permanent impacts associated with the proposed project would occur from construction of additional event space, restaurant, and amenities such as a pool terrace and view opportunities of the surrounding areas with paved pathways.

**Temporary Impacts** refer to areas directly and indirectly impacted. No temporary impacts would result from project implementation; any staging for the proposed project would be within the existing development footprint of the 2006 EIR analyzed portions of the Ritz-Carlton Residences site.

**Direct Impacts** are the alteration, disturbance, or destruction of biological resources that would result from project-related activities. Direct impacts can include temporary impacts, such as the disturbance or removal of vegetation that returns to pre-activity conditions, or permanent impacts, which could result, for example, from placement of the new turbine pads that precludes the regeneration of vegetation.

**Indirect Impacts** are reasonably foreseeable effects caused by project implementation on biological resources outside of the area of direct impact (usually the limits of work areas). Indirect impacts may include increased human activity, decreased water quality and altered hydrology, soil compaction, elevated noise and dust levels, and the

introduction of invasive wildlife or plant species. Temporary indirect impacts may include temporary increases in noise or dust, whereas permanent indirect impacts could result from long-term effects to surrounding habitat such as the introduction of invasive species.

Table 2 summarizes direct impacts to vegetation communities and land covers as a result of the proposed project and are depicted on Figure 6, Biological Resources Impacts. As described in Section 1.2 of this report, the project would include construction of the event space, a restaurant, and amenities such as a pool terrace and view opportunities/trails of the surrounding areas. All proposed additional event spaces and amenities are considered permanent impacts to vegetation communities. The proposed project would not result in any temporary impacts.

## Table 2. Impacts to Vegetation Communities and Land Covers within the Project Site

| Vegetation Community/Land Cover | Permanent Impact (acres) |
|---|---|
| **Vegetation Communities** | |
| Brittle bush scrub | – |
| Creosote bush – brittle bush scrub[1] | 0.68 |
| Fountain grass swards | – |
| Tamarisk thickets | – |
| **Non-Natural Land Covers** | |
| Disturbed habitat | 0.85 |
| Urban/developed | 0.04 |
| **Total[1]** | **1.57** |

**Note:**
[1] Totals may not sum due to rounding.

### CEQA Significance Thresholds

The following are the significance thresholds for biological resources provided in the CEQA Appendix G Environmental Checklist, which states that project activities could potentially have a significant affect if they:

1. **Impact-BIO-1**: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS (Threshold Bio-1).
2. **Impact-BIO-2:** Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS (Threshold Bio-2).
3. **Impact-BIO-3:** Have a substantial adverse effect on state and federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (Threshold Bio-3).
4. **Impact-BIO-4:** Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites (Threshold Bio-4).
5. **Impact-BIO-5:** Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (Threshold Bio-5).

6. **Impact-BIO-6:** Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan (Threshold Bio-6).

## 5.1 Impact-BIO-1: Special-Status Species

### 5.1.1 Special-Status Plants

No federally or state-listed plant species have a potential to occur within the project site. There are no special-status plant species with a moderate or high potential to occur. Therefore, the project would not result in direct or indirect impacts to special-status plant species. As such, impacts to special-status plant species would be less than significant.

### 5.1.2 Special-Status Wildlife

No listed or non-listed special-status wildlife species were incidentally observed during the June 2021 biological survey. One federally and state-listed species has a moderate potential to occur within the study area: Peninsular bighorn sheep. Peninsular bighorn sheep is covered under the CVMSHCP. One non-listed species has a moderate potential to occur within the project site: red diamondback rattlesnake. Red diamondback rattlesnake is not covered under the CVMSHCP. No other non-listed species have a moderate or high potential to occur within the project site. Burrowing owl, which is covered under the CVMSHCP, has a low potential to occur within the project site.

#### 5.1.2.1 Birds

One non-listed special-status species, burrowing owl, has a low potential to occur within the flatter portions of the project site. This species is covered by the CVMSHCP; therefore, with consistency with the CVMSHCP, including payment of the CVMSHCP development mitigation fee (**Mitigation Measure BIO-1**) and adherence to the Land Use Adjacency Guidelines (**Mitigation Measure BIO-2**), there would be no significant impacts to this special-status wildlife species. This species is also protected under the Migratory Bird Treaty Act and California Fish and Game Code Section 3516, which protect nesting birds. Implementation of **Mitigation Measure BIO-3**, Nesting Birds, and **Mitigation Measure BIO-4**, Burrowing Owl Pre-Con Survey, would reduce potential impacts to less than significant.

#### 5.1.2.2 Reptiles

One special-status reptile has a moderate potential to occur within the project site: red diamondback rattlesnake. This species is not covered by the CVMSHCP, and impacts could be potentially significant absent mitigation. Due to the amount of adjacent and nearby habitat, loss of fragmented habitat is considered less than significant. Direct impacts could occur through crushing of individuals during grading, entombment of burrowing species, and removal of habitat.

Most reptile species exhibit a "flight" response to disturbance, resulting in temporary displacement, or if disturbance is constant, permanent displacement. The project contains suitable habitat (i.e., desert scrub and rocky conditions) that may be impacted as a result of project implementation; however, suitable habitat will be available adjacent to the affected region, and individuals would be expected to move away from construction activities. Entombment of individuals would be avoided through implementation of **Mitigation Measure BIO-5**, Best Management Practices, which would include covering open trenches. Direct impacts to the few individuals that may be harmed by construction activities would be less than significant.

Potential indirect impacts to red diamondback rattlesnake would be limited to short-term impacts from construction activities and could result from fugitive dust that can degrade habitat and result in health implications for wildlife species; noise and vibration that can stress wildlife species or cause them to leave an area of otherwise suitable habitat; increased human presence, which can also disrupt daily activities of wildlife and cause them to leave an area; and release of chemical pollutants, such as from oil leaks from construction vehicles and machinery. Therefore, indirect impacts to red diamondback rattlesnake could be significant absent mitigation. Although red diamondback rattlesnake is not covered under the CVMSHCP, the project would be required to implement the Land Use Adjacency Guidelines outlined in the CVMSHCP (**Mitigation Measure BIO-2**), which includes construction best management practices and compliance; therefore, implementation of the **Mitigation Measure BIO-2** (Land Use Adjacency Guidelines) would reduce indirect impacts to a less-than-significant level.

One federally and state-listed threatened species, desert tortoise, has additional requirements under the CVMSHCP. This species is covered by the CVMSHCP; however, according to the USWFS CVMSHCP amended permit (TE-104601-1), permit term and condition no. 45 states for projects located outside of the proposed conservation areas within the 50,272 acres of naturally occurring desert tortoise habitat anticipated to be impacted, the Permittee shall either (1) notify the USFWS 45 days prior to the issuance of a grading permit to allow for the potential salvage of adult tortoises within this notification time period or (2) condition such projects to conduct desert tortoise clearance surveys per the USFWS's protocol. The project site overlaps modeled desert tortoise habitat (Figure 3); however, since it was determined to not support suitable habitat for desert tortoise as discussed in Attachment F, it is recommended that the Permittee notify the USFWS 45 days prior to issuance of a grading permit. Therefore, with compliance with the CVMSHCP, including payment of the CVMSHCP development mitigation fee (**Mitigation Measure BIO-1**), Land Use Adjacency Guidelines delineated in the CVMSHCP (**Mitigation Measure BIO-2**), and adherence to the USFWS CVMSHCP amended permit term and condition no. 45 (**Mitigation Measure BIO-6**), potential impacts to desert tortoise would be reduced to less than significant.

#### 5.1.2.3 Mammals

One federally and state-listed species has a moderate potential to occur within the study area: Peninsular bighorn sheep; however, this species is covered under the CVMSHCP. Therefore, with consistency with the CVMSHCP, including payment of the CVMSHCP development mitigation fee (**Mitigation Measure BIO-1**) and adherence to the Land Use Adjacency Guidelines (**Mitigation Measure BIO-2**), there would be no significant impacts to Peninsular bighorn sheep.

## 5.2 Impact-BIO-2: Riparian and Special-Status Vegetation Communities

The project site does not contain any riparian habitat or other sensitive natural community identified by CDFW or USFWS. However, the project includes Sonoran creosote bush scrub, which is a natural community covered under the CVMSHCP. To comply with the CVMSHCP, development fees will be required to mitigate habitat loss. Therefore, with compliance with the CVMSHCP, including payment of the CVMSHCP development mitigation fee (**Mitigation Measure BIO-1**) and adherence to the Land Use Adjacency Guidelines (**Mitigation Measure BIO-2**), there would be no significant impacts to special-status vegetation communities, and the project would not be in conflict with the CVMSHCP.

## 5.3 Impact-BIO-3: Jurisdictional Waters

The project site does contain any jurisdictional waters; therefore, the proposed project would not result in impacts to this resource.

## 5.4 Impact-BIO-4: Migratory Birds and Wildlife Corridor/Nursery Sites

### 5.4.1 Nesting Birds

Project construction could result in direct and indirect impacts to nesting birds, including the loss of nests, eggs, and fledglings if ground-disturbing activities occur during the nesting season (generally February 15 through August 31). Construction activities during this time may result in reduced reproductive success and may violate the federal Migratory Bird Treaty Act and California Fish and Game Code. If construction (including any ground-disturbing activities) occurs during the nesting season, a nesting bird survey must be conducted by a qualified biologist prior to grading activities, and impacts to nests must be avoided. With implementation of **Mitigation Measure BIO-3**, no significant impacts to nesting birds would occur.

### 5.4.2 Wildlife Corridors and Nursery Sites

The project site does not function as a wildlife corridor and does not support any wildlife nursery sites. As a result, implementation of the project would not result in impacts to these resources.

## 5.5 Impact-BIO-5: Other Local Ordinances

The City of Rancho Mirage General Plan contains several elements that were established to address potential impacts to biological resources. Specifically, the Conservation and Open Space Element establishes biological resources goals, policies, and programs that address potential impacts to candidate, sensitive, or special-status species and their habitats. The City is a Permittee of the CVMSHCP; therefore, compliance with the CVMSHCP provides Permittees with take authorization for covered species for all covered activities, which includes development outside of CVMSHCP conservation areas. Therefore, the project is a covered activity, and compliance with the CVMSHCP would provide take authorization for covered species. Therefore, with payment of the CVMSHCP development mitigation fee (**Mitigation Measure BIO-1**); adherence to the CVMSHCP Land Use Adjacency Guidelines (**Mitigation Measure BIO-2**); and adherence to USFWS CVMSHCP amended permit (TE-104601-1), permit term and condition no. 45 (**Mitigation Measure BIO-6**), in addition to implementation of a nesting bird pre-construction survey, burrowing owl pre-construction survey, and general avoidance and minimization Measures (**Mitigation Measures BIO-3** through **BIO-5**); the project would not be in conflict with the City of Rancho Mirage General Plan.

In addition, as noted in Section 2.2, a zone change from Mountain Reserve (MR) to Resort Hotel (Rs-H) is concurrently proposed for the Sky Mesa Recreation Area. Under existing conditions, the Sky Mesa project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning of the existing Ritz Carlton to encompass the Sky Mesa site. As noted, the MR zone was adopted for the purposed of avoiding or mitigating possible impacts on sensitive biological resources and with implementation and

adherence of the above mitigation measures, the project would not be in conflict with the City of Rancho Mirage General Plan.

## 5.6 Impact-BIO-6: Habitat Conservation Plans

The project site is within the CVMSHCP area. The project site is not located within any CVMSHCP conservation areas; however, it is adjacent to the Santa Rosa and San Jacinto Mountains Conservation Area. A fee is required for all projects located within the CVMSHCP plan area. With payment of this fee (**Mitigation Measure BIO-1**) and adherence to Land Use Adjacency Guidelines in Section 4.5 of the CVMSHCP (**Mitigation Measure BIO-2**), the project would be consistent with the CVMSHCP.

# 6 Avoidance, Minimization, and Mitigation Measures

**Mitigation Measure BIO-1 Coachella Valley Multiple Species Habitat Conservation Plan Fee Payment**

As a signatory to the Coachella Valley Multiple Species Habitat Conservation Plan, the City of Rancho Mirage shall require a local development mitigation fee prior to the issuance of building permits for the proposed use on the project site at the rates applicable at the time of payment of the fee as set forth in the most recent fee schedule. The project applicant shall be required to provide documentation to the City of Rancho Mirage confirming the payment of the local development mitigation fee.

**Mitigation Measure BIO-2 Coachella Valley Multiple Species Habitat Conservation Plan Land Use Adjacency Guidelines**

The project applicant shall implement the following Land Use Adjacency Guidelines (Coachella Valley Multiple Species Habitat Conservation Plan [CVMSHCP], Section 4.5) to minimize and avoid indirect effects from development adjacent to conservation areas (i.e., Santa Rosa and San Jacinto Mountains Conservation Area), where applicable:

- **Drainage**: Proposed Development adjacent to or within a Conservation Area shall incorporate plans to ensure that the quantity and quality of runoff discharged to the adjacent Conservation Area is not altered in an adverse way when compared with existing conditions. Stormwater systems shall be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials, or other elements that might degrade or harm biological resources or ecosystem processes within the adjacent Conservation Area.
- **Toxics**: Land uses proposed adjacent to or within a Conservation Area that use chemicals or generate bioproducts such as manure that are potentially toxic or may adversely affect wildlife and plant species, habitat, or water quality shall incorporate measures to ensure that application of such chemicals does not result in any discharge to the adjacent Conservation Area.
- **Lighting**: For proposed development adjacent to or within a Conservation Area, lighting shall be shielded and directed toward the developed area. Landscape shielding or other appropriate methods shall be incorporated in project designs to minimize the effects of lighting adjacent to

or within the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual.

- **Noise**: Proposed development adjacent to or within a Conservation Area that generates noise in excess of 75 A-weighted decibels sound equivalent level hourly shall incorporate setbacks, berms, or walls, as appropriate, to minimize the effects of noise on the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual.
- **Invasives**: Invasive, non-native plant species shall not be incorporated in the landscape for land uses adjacent to or within a Conservation Area. Landscape treatments within or adjacent to a Conservation Area shall incorporate native plant materials to the maximum extent feasible; recommended native species are listed in Table 4-112 [CVMSHCP, Section 4.5.5]. The plants listed in Table 4-113 shall not be used within or adjacent to a Conservation Area. This list may be amended from time to time through a Minor Amendment with Wildlife Agency Concurrence.
- **Barriers**: Land uses adjacent to or within a Conservation Area shall incorporate barriers in individual project designs to minimize unauthorized public access, domestic animal predation, illegal trespass, or dumping in a Conservation Area. Such barriers may include native landscaping, rocks/boulders, fencing, walls and/or signage.
- **Grading/Land Development**: Manufactured slopes associated with site development shall not extend into adjacent land in a Conservation Area.

**Mitigation Measure BIO-3 Nesting Birds**

To maintain compliance with the Migratory Bird Treaty Act and California Fish and Game Code, if ground-disturbing and/or vegetation clearance activities are scheduled to occur during the avian nesting season (typically February 15 through August 31), a qualified biologist shall conduct a pre-construction nesting bird survey within the project impact footprint and a 500-foot buffer where legal access is granted around the disturbance footprint. Surveys shall be conducted within 3 days prior to initiation of ground-disturbing activities.

If an active nest is detected during the nesting bird survey, avoidance buffers shall be implemented as determined by a qualified biologist (typically 300 feet for passerines and 500 feet for raptors and special-status species). The buffer shall be of a distance to ensure avoidance of adverse effects to the nesting bird by accounting for topography, ambient conditions, species, nest location, and activity type. All nests shall be monitored as determined by the qualified biologist until nestlings have fledged and dispersed or it is confirmed that the nest has been unsuccessful or abandoned. The qualified biologist shall halt all construction activities within proximity to an active nest if it is determined that the activities are harassing the nest and may result in nest abandonment or take. The qualified biologist shall also have the authority to require implementation of avoidance measures related to noise, vibration, or light pollution if indirect impacts are resulting in harassment of the nest.

**Mitigation Measure BIO-4 Burrowing Owl**

Pre-construction surveys for burrowing owls shall be completed within areas of suitable habitat (i.e., flatter portions of the site) in accordance with the *Staff Report on Burrowing Owl Mitigation* (CDFG

2012), with the first survey no less than 14 days prior to initiation of project-related activities, and the second within 24 hours of project-related activities. If an active burrowing owl burrow is detected within 500 feet of the impact footprint, avoidance and minimization measures shall be implemented in accordance with the *Staff Report on Burrowing Owl Mitigation* guidelines or agreed upon by the California Department of Fish and Wildlife, including implementation of a non-disturbance buffer and monitoring of the nest to ensure activities are not adversely affecting the nest. If the project will occur within this zone, then work must occur outside the nesting season, or until it can be shown that the birds have finished nesting, at which point passive relocation may occur.

**Mitigation Measure BIO-5 General Avoidance and Minimization Measures**

The following avoidance and minimization measures shall be implemented during project construction activities:

- To prevent inadvertent entrapment of special-status wildlife during construction, all excavated steep-walled holes or trenches more than 2 feet deep shall be covered with plywood or similar materials at the close of each working day, or be provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped wildlife. If trapped animals are observed, escape ramps or structures shall be installed immediately to allow escape.

**Mitigation Measure BIO-6 Desert Tortoise**

Because the project is located outside of a Conservation Area but within the 50,272 acres of naturally occurring desert tortoise habitat anticipated to be impacted under the Coachella Valley Multiple Species Habitat Conservation Plan, the project applicant shall notify the U.S. Fish and Wildlife Service 45 days prior to the issuance of a grading permit to allow for the potential salvage of adult tortoises within this notification time period.

# 7 Conclusion

With implementation of the recommended mitigation measures, payment of the CVMSHCP development mitigation fee, adherence to the CVMSHCP Land Use Adjacency Guidelines, and adherence to USFWS CVMSHCP amended permit (TE-104601-1), permit term and condition no. 45, the project would not result in significant impacts to biological resources.

If you have any questions regarding this biological resources assessment, please contact me at bstrittmater@dudek.com or 760.685.1231.

Sincerely,

Britney Strittmater

Britney Strittmater
Biologist

*Att.: Attachment A – Figures*

*Attachment B – Site Photographs*
*Attachment C – Vascular Plant Species Compendium*
*Attachment D – Wildlife Species Compendium*
*Attachment E – Special-Status Plant Species Detected or Potentially Occurring in the Study Area*
*Attachment F – Special-Status Wildlife Species Detected or Potentially Occurring in the Study Area*

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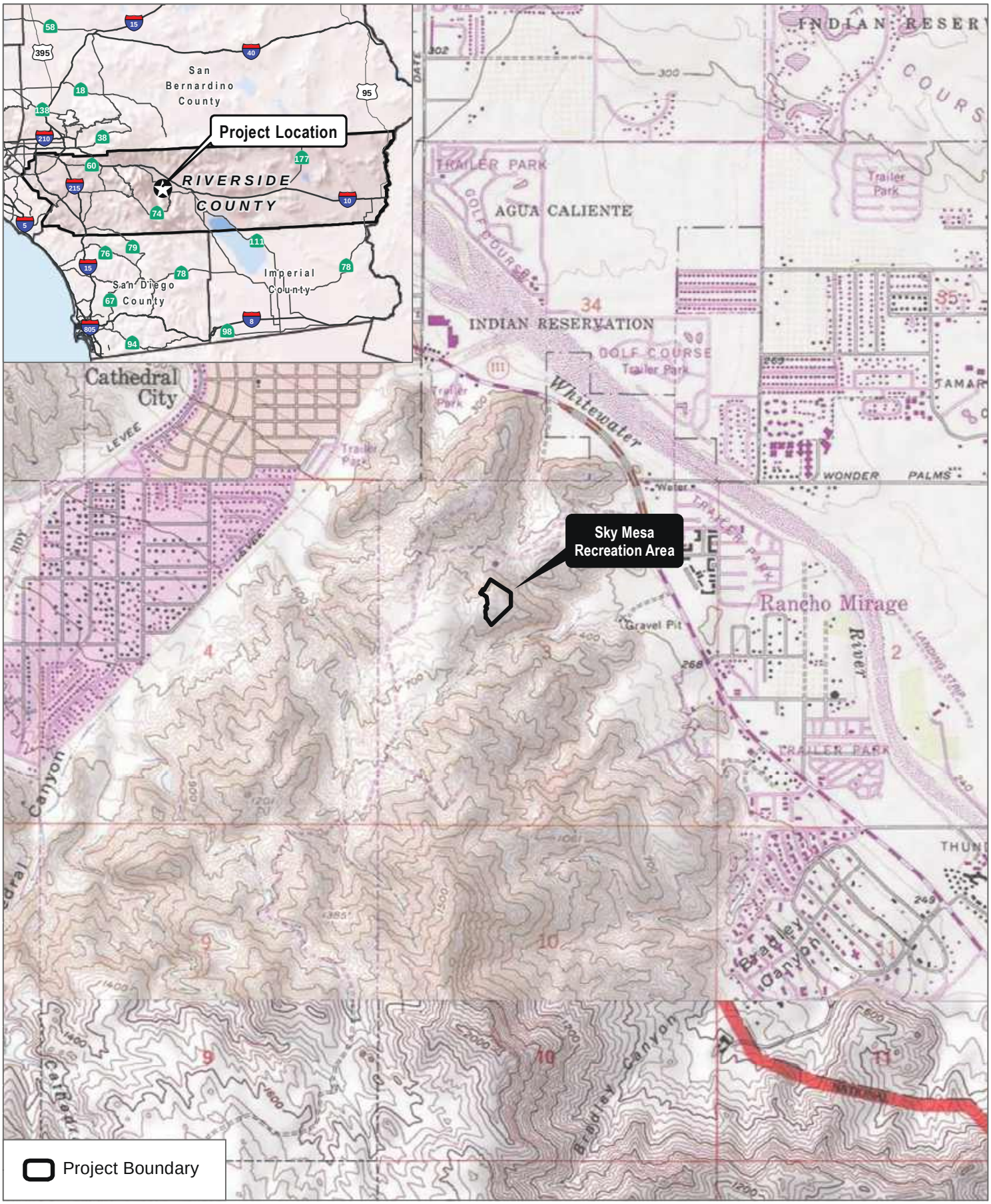
# Attachment A

## Figures




SOURCE: USGS 7.5-Minute Series Cathedral City Quadrangle

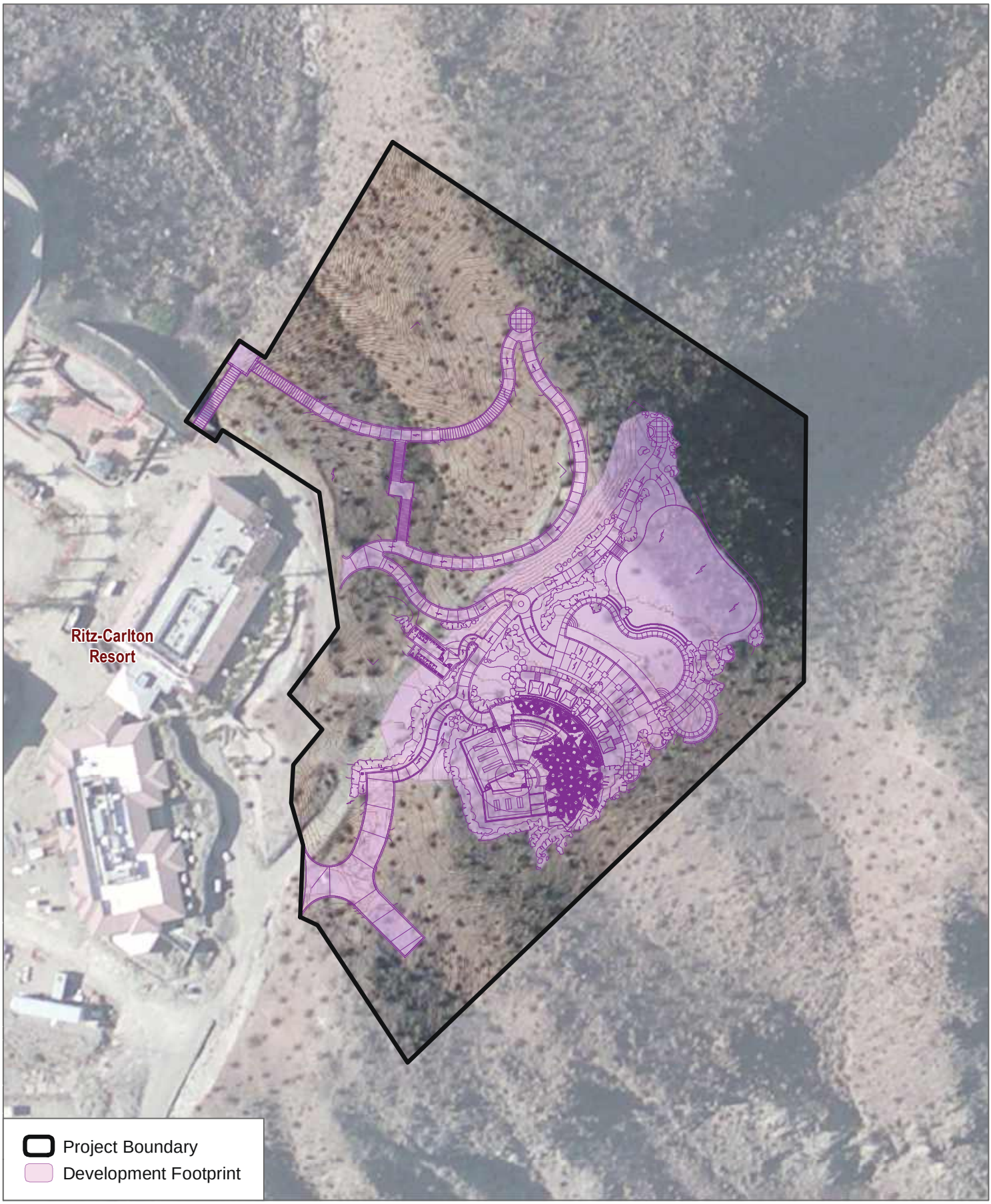
DUDEK

0 1,000 2,000 Feet

**FIGURE 1**

Project Location

Ritz-Carlton Rancho Mirage - Sky Mesa Recreation Area




SOURCE: ESRI Clarity Imagery 2021

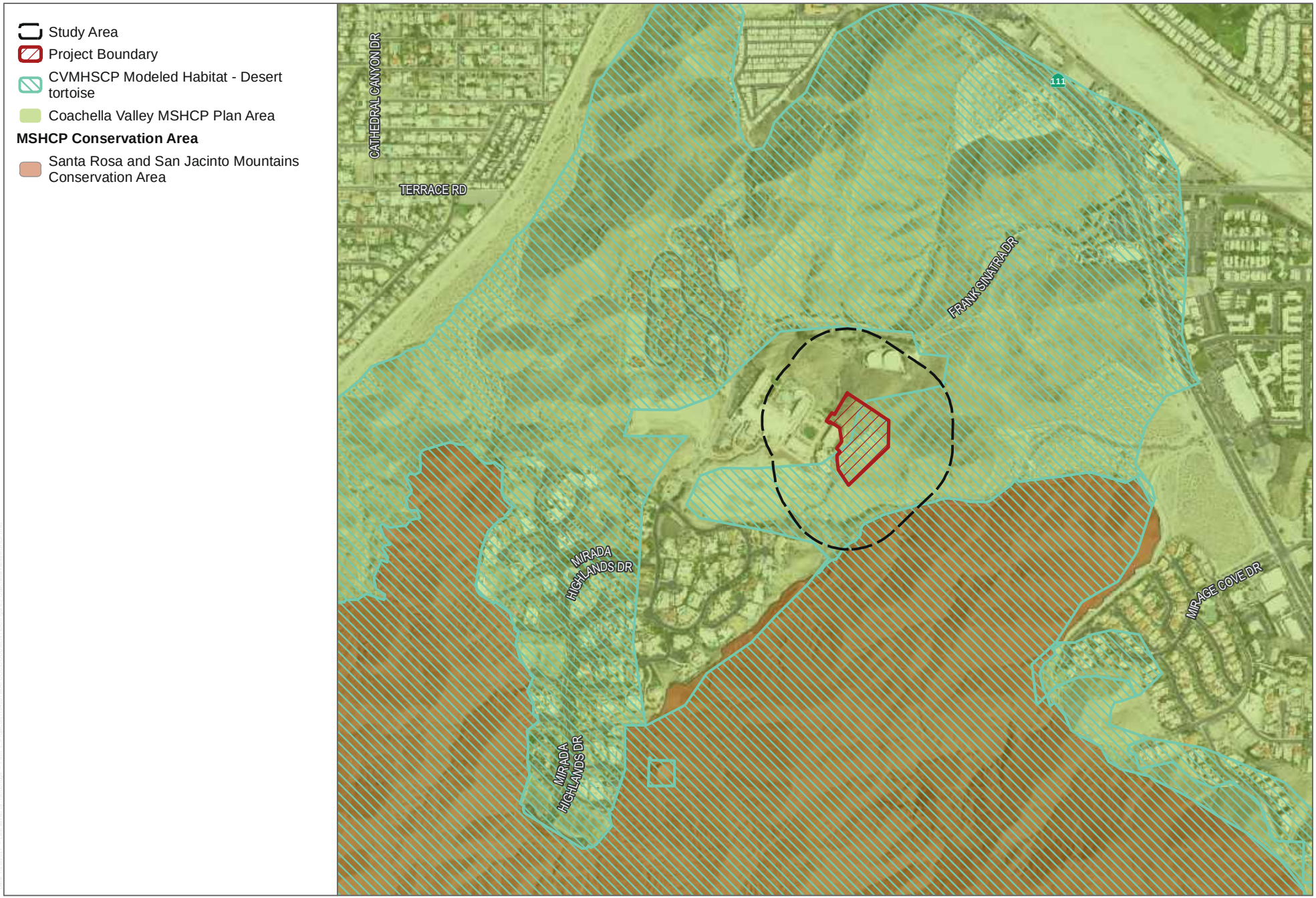
DUDEK

0 50 100 Feet

**FIGURE 2**

Site Plan

Ritz-Carlton Rancho Mirage - Sky Mesa Recreation Area




SOURCE: Coachella Valley MSHCP 2019, Esri Clarity Imagery 2021

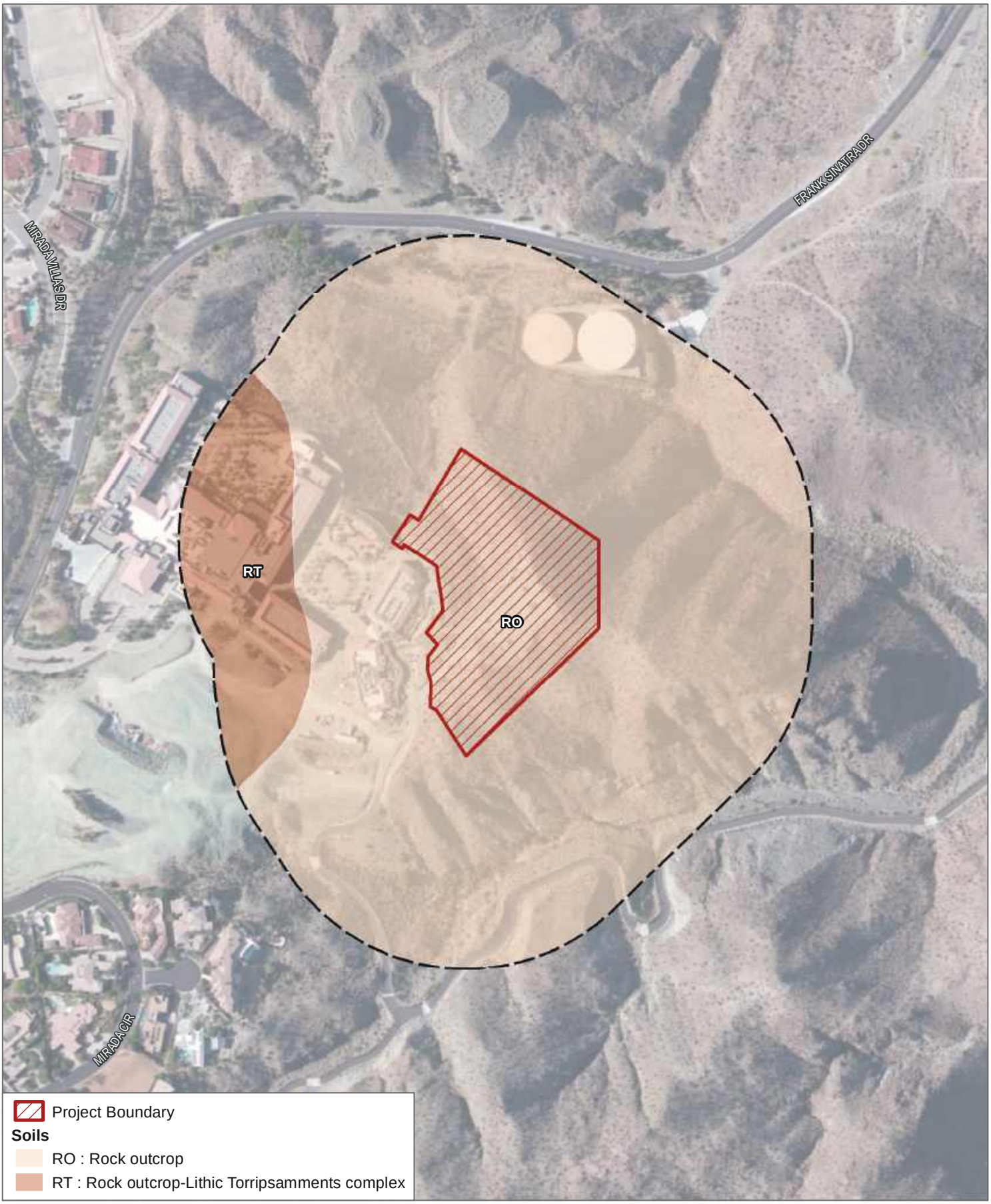
DUDEK

0 500 1,000 Feet

**FIGURE 3**

Coachella Valley MSHCP

Ritz-Carlton Rancho Mirage - Sky Mesa Recreation Area




SOURCE: USDA 2008 / 2018, Esri Clarity Imagery 2021

DUDEK

0 150 300 Feet

**FIGURE 4**

Soils Map

Ritz-Carlton Rancho Mirage - Sky Mesa Recreation Area




SOURCE: Esri Clarity Imagery 2021

DUDEK

0 150 300 Feet

**FIGURE 5**

Biological Resources Map

Ritz-Carlton Rancho Mirage - Sky Mesa Recreation Area




SOURCE: Esri Clarity Imagery 2021

DUDEK

0 150 300 Feet

**FIGURE 6**

Biological Resources Impacts

Ritz-Carlton Rancho Mirage - Sky Mesa Recreation Area

# Attachment B

## Site Photographs




**Location 1:** Facing southwest. View of creosote bush - brittle bush scrub within southern portion of the proposed impact area.



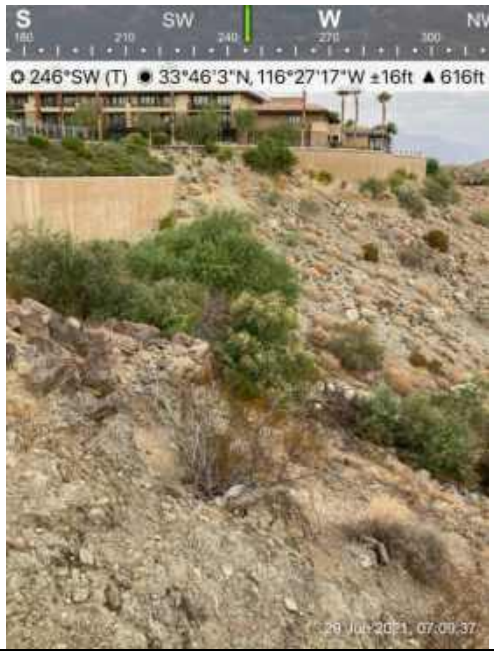
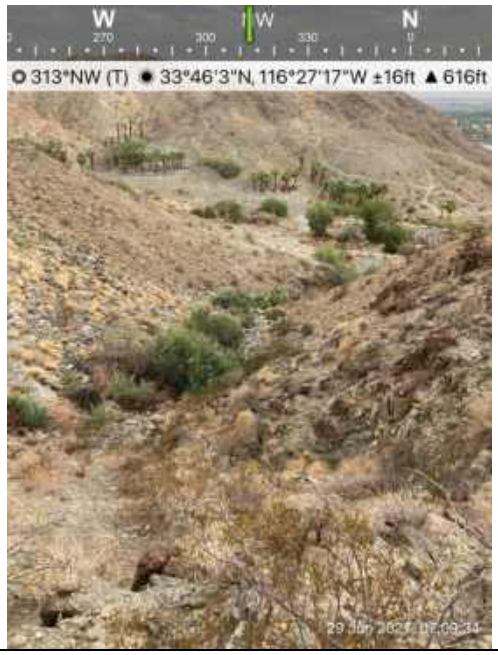

**Location 2:** Facing southwest. View of disturbed habitat with less than 10% cover of creosote bush, within the eastern portion of the proposed impact area.




**Location 3:** Facing southwest. View of creosote bush - brittle bush scrub within northeastern portion of the proposed impact area.




**Location 4:** Facing southeast. View of creosote bush - brittle bush scrub within the northern portion of the proposed impact area.

| | |
|---|---|
|  |  |
| **Location 5:** Facing southwest. View of tamarisk thickets located along upstream portion of drainage, outside of the proposed project impact area and within the northwestern portion of the study area. | **Location 6:** Facing northwest. View of tamarisk thickets located along downstream portion drainage, outside of the proposed project impact area and within the northwestern portion of the study area. |
|  |  |
| **Location 7:** Facing northwest. View of creosote bush - brittle bush scrub within the study area (outside of proposed project impact area). | **Location 8**: Facing west. View of rocky steep slopes and creosote bush - brittle bush scrub present throughout most of the proposed project impact area and study area. |

# Attachment C

## Vascular Plant Species Compendium

# Vascular Species

## *Eudicots*

### ASTERACEAE—SUNFLOWER FAMILY

*Ambrosia dumosa*—white bursage
*Ambrosia salsola*—cheesebush
*Bebbia juncea*—sweetbush
*Chaenactis fremontii*—pincushion flower
*Encelia farinosa*—brittle bush
* *Lactuca serriola*—prickly lettuce
*Malacothrix glabrata*—smooth desertdandelion
* *Oncosiphon piluliferum*—stinknet
*Palafoxia arida*—desert palafox
*Psathyrotes ramosissima*—velvet turtleback
*Rafinesquia californica*—California plumeseed
* *Sonchus oleraceus*—common sowthistle
*Stephanomeria pauciflora*—brownplume wirelettuce

### BORAGINACEAE—BORAGE FAMILY

*Amsinckia intermedia*—common fiddleneck
*Cryptantha angustifolia*—Panamint cryptantha
*Cryptantha circumscissa*—cushion cryptantha
*Pectocarya penicillata*—sleeping combseed
*Pectocarya recurvata*—curvenut combseed
*Phacelia crenulata*—cleftleaf wildheliotrope
*Tiquilia plicata*—fanleaf crinklemat

### BRASSICACEAE—MUSTARD FAMILY

* *Brassica tournefortii*—Tournefort's mustard
* *Hirschfeldia incana*—shortpod mustard
* *Sisymbrium irio*—London rocket

### CACTACEAE—CACTUS FAMILY

*Cylindropuntia bigelovii*—teddy bear cholla
*Cylindropuntia echinocarpa*—Wiggins' cholla
*Ferocactus cylindraceus*—California barrel cactus

### CHENOPODIACEAE—GOOSEFOOT FAMILY

*Atriplex canescens*—fourwing saltbush

CLEOMACEAE—CLEOME FAMILY

*Peritoma arborea*—bladderpod

CUCURBITACEAE—GOURD FAMILY

*Cucurbita palmata*—coyote gourd

EUPHORBIACEAE—SPURGE FAMILY

*Croton californicus*—California croton
*Ditaxis serrata*—Yuma silverbush
*Euphorbia albomarginata*—whitemargin sandmat
*Stillingia paucidentata*—Mojave toothleaf

FABACEAE—LEGUME FAMILY

*Parkinsonia florida*—blue palo verde

GERANIACEAE—GERANIUM FAMILY

* *Erodium cicutarium*—redstem stork's bill

LOASACEAE—LOASA FAMILY

*Mentzelia involucrata*—whitebract blazingstar
*Petalonyx thurberi*—Thurber's sandpaper plant

NYCTAGINACEAE—FOUR O'CLOCK FAMILY

*Abronia villosa* var. *villosa*—desert sand verbena

ONAGRACEAE—EVENING PRIMROSE FAMILY

*Camissonia contorta*—plains evening primrose
*Camissonia strigulosa*—sandysoil suncup
*Camissoniopsis pallida*—paleyellow suncup
*Chylismia claviformis*—browneyes

PLANTAGINACEAE—PLANTAIN FAMILY

*Plantago ovata*—desert Indianwheat

POLEMONIACEAE—PHLOX FAMILY

*Eriastrum eremicum*—desert woollystar
*Loeseliastrum schottii*—Schott's calico

POLYGONACEAE—BUCKWHEAT FAMILY

*Chorizanthe brevicornu*—brittle spineflower
*Eriogonum thomasii*—Thomas' buckwheat

**SIMMONDSIACEAE—JOJOBA FAMILY**

*Simmondsia chinensis*—jojoba

*Zygophyllaceae*—Caltrop Family

*Larrea tridentata*—creosote bush

## *Monocots*

**POACEAE—GRASS FAMILY**

* *Hordeum murinum*—mouse barley
* *Schismus barbatus*—common Mediterranean grass

* signifies introduced (non-native) species

# Attachment D

## Wildlife Species Compendium

# Bird

## *Blackbirds, Orioles and Allies*

**ICTERIDAE—BLACKBIRDS**

*Icterus bullockii*—Bullock's oriole

## *Old World Warblers and Gnatcatchers*

**SYLVIIDAE—SYLVIID WARBLERS**

*Polioptila melanura*—black-tailed gnatcatcher

## *Shrikes*

**LANIIDAE—SHRIKES**

*Lanius ludovicianus*—loggerhead shrike

## *Swallows*

**HIRUNDINIDAE—SWALLOWS**

*Hirundo rustica*—barn swallow

## *Wood Warblers and Allies*

**PARULIDAE—WOOD-WARBLERS**

*Setophaga coronata*—yellow-rumped warbler

# Invertebrate

## *Butterflies*

**NYMPHALIDAE—BRUSH-FOOTED BUTTERFLIES**

*Vanessa cardui*—painted lady

# Mammal

## *Hares and Rabbits*

**LEPORIDAE—HARES AND RABBITS**

*Lepus californicus*—black-tailed jackrabbit

*Sylvilagus audubonii*—desert cottontail

## *Squirrels*

**SCIURIDAE—SQUIRRELS**

*Ammospermophilus leucurus*—white-tailed antelope squirrel

# Reptile

## *Lizards*

**PHRYNOSOMATIDAE—IGUANID LIZARDS**

*Uta stansburiana*—common side-blotched lizard

# Attachment E

## Special-Status Plant Species Detected or Potentially Occurring in the Study Area

| Scientific Name | Common Name | Status (Federal/State/CRPR) | Coachella Valley MSHCP | Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet) | Potential to Occur |
|---|---|---|---|---|---|
| *Abronia villosa* var. *aurita* | chaparral sand-verbena | None/None/1B.1 | None | Chaparral, Coastal scrub, Desert dunes; sandy/annual herb/(Jan) Mar–Sep/246–5,245 | Not expected to occur. The site is located within the species' known elevation range; however, there is no suitable vegetation present to support this species. |
| *Acmispon haydonii* | pygmy lotus | None/None/1B.3 | None | Pinyon and juniper woodland, Sonoran desert scrub; rocky/perennial herb/Jan–June/ 1,705–3,935 | Not expected to occur. The site is outside of the species' known elevation range. |
| *Almutaster pauciflorus* | alkali marsh aster | None/None/2B.2 | None | Meadows and seeps; alkaline/perennial herb/June–Oct/787–2,620 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Ambrosia monogyra* | singlewhorl burrobrush | None/None/2B.2 | None | Chaparral, Sonoran desert scrub; sandy/perennial shrub/Aug–Nov/33–1,640 | Low potential to occur. The site is located within the species' known elevation range and suitable desert scrub vegetation is present; however, the site lacks sandy soils, and the nearest documented occurrence was recorded in 1920 and is approximately 6.2 miles northeast of the site (CDFW 2021). This conspicuous perennial shrub would likely have been detected if present. |
| *Astragalus bernardinus* | San Bernardino milk-vetch | None/None/1B.2 | None | Joshua tree woodland, Pinyon and juniper woodland; Often granitic or carbonate/ perennial herb/Apr–June/2,950–6,560 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Astragalus hornii* var. *hornii* | Horn's milk-vetch | None/None/1B.1 | None | Meadows and seeps, Playas; lake margins, alkaline/annual herb/May–Oct/197–2,785 | Not expected to occur. The site is located within the species' known elevation range; however, there is no suitable vegetation present to support this species. |
| *Astragalus lentiginosus* var. *coachellae* | Coachella Valley milk-vetch | FE/None/1B.2 | Covered | Desert dunes, Sonoran desert scrub (sandy)/annual / perennial herb/ Feb–May/131–2,145 | Not expected to occur. While the site is located within the species' known elevation range and there is desert scrub present, this species occurs in dunes and sandy flats along margins of sandy washes and is strongly affiliated with sandy substrates (CVAG 2016). The site supports rocky substates and does not support suitable sandy soils, dunes, or sandy washes to support this species. The nearest documented occurrence is approximately 2.2 miles north of the site (CDFW 2021). |
| *Astragalus preussii* var. *laxiflorus* | Lancaster milk-vetch | None/None/1B.1 | None | Chenopod scrub/perennial herb/ Mar–May/2,295–2,295 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Astragalus tricarinatus* | triple-ribbed milk-vetch | FE/None/1B.2 | Covered | Joshua tree woodland, Sonoran desert scrub; sandy or gravelly/perennial herb/Feb–May/1,475–3,900 | Not expected to occur. The site is outside of the species' known elevation range. |
| *Atriplex parishii* | Parish's brittlescale | None/None/1B.1 | None | Chenopod scrub, Playas, Vernal pools; alkaline/annual herb/June–Oct/82–6,230 | Not expected to occur. The site is located within the species' known elevation range; however, there is no suitable vegetation present to support this species. |
| *Ayenia compacta* | California ayenia | None/None/2B.3 | None | Mojavean desert scrub, Sonoran desert scrub; rocky/perennial herb/Mar–Apr/492–3,590 | Low potential to occur. The site is located within the species' known elevation range and suitable desert scrub and rocky soils are present; however, this species is more associated with sandy and gravelly washes within canyons (Jepson Flora Project 2021). In addition, the nearest documented occurrence is from 1919 and is approximately 4.9 miles west of the site (CDFW 2021). |
| *Boechera johnstonii* | Johnston's rockcress | None/None/1B.2 | None | Chaparral, Lower montane coniferous forest; often on eroded clay/perennial herb/ Feb–June/4,425–7,050 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Calochortus palmeri* var. *munzii* | San Jacinto mariposa lily | None/None/1B.2 | None | Chaparral, Lower montane coniferous forest, Meadows and seeps/perennial bulbiferous herb/Apr–July/2,805–7,215 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Chaenactis parishii* | Parish's chaenactis | None/None/1B.3 | None | Chaparral (rocky)/perennial herb/ May–July/4,265–8,200 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |

| Scientific Name | Common Name | Status (Federal/State/CRPR) | Coachella Valley MSHCP | Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet) | Potential to Occur |
|---|---|---|---|---|---|
| *Chorizanthe parryi* var. *parryi* | Parry's spineflower | None/None/1B.1 | None | Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland; sandy or rocky, openings/annual herb/Apr–June/ 902–4,000 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Chorizanthe polygonoides* var. *longispina* | long-spined spineflower | None/None/1B.2 | None | Chaparral, Coastal scrub, Meadows and seeps, Valley and foothill grassland, Vernal pools; often clay/annual herb/Apr–July/98–5,015 | Not expected to occur. The site is located within the species' known elevation range; however, there is no suitable vegetation present to support this species. |
| *Chorizanthe xanti* var. *leucotheca* | white-bracted spineflower | None/None/1B.2 | None | Coastal scrub (alluvial fans), Mojavean desert scrub, Pinyon and juniper woodland; sandy or gravelly/annual herb/Apr–June/984–3,935 | Not expected to occur. The site is outside of the species' known elevation range. |
| *Deinandra mohavensis* | Mojave tarplant | None/SE/1B.3 | None | Chaparral, Coastal scrub, Riparian scrub; mesic/annual herb/(May) June–Oct (Jan)/ 2,095–5,245 | Not expected to occur. The site is outside of the species' known elevation range. |
| *Ditaxis claryana* | glandular ditaxis | None/None/2B.2 | None | Mojavean desert scrub, Sonoran desert scrub; sandy/perennial herb/Oct, Dec, Jan, Feb, Mar/ 0–1,525 | Low potential to occur. The site is located within the species' known elevation range, and suitable desert scrub vegetation is present; however, the site lacks sandy soils. The nearest documented occurrence is approximately 2.4 miles southeast of the site (CDFW 2021). |
| *Dodecahema leptoceras* | slender-horned spineflower | FE/SE/1B.1 | None | Chaparral, Cismontane woodland, Coastal scrub (alluvial fan); sandy/annual herb/ Apr–June/656–2,490 | Not expected to occur. The site is located within the species' known elevation range; however, there is no suitable vegetation present to support this species. |
| *Eremothera boothii* ssp. *boothii* | Booth's evening-primrose | None/None/2B.3 | None | Joshua tree woodland, Pinyon and juniper woodland/annual herb/Apr–Sep/2,670–7,870 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Eriastrum harwoodii* | Harwood's eriastrum | None/None/1B.2 | None | Desert dunes/annual herb/Mar–June/ 410–3,000 | Not expected to occur. The site is located within the species' known elevation range; however, there is no suitable vegetation present to support this species. |
| *Erigeron parishii* | Parish's daisy | FT/None/1B.1 | None | Mojavean desert scrub, Pinyon and juniper woodland; usually carbonate, sometimes granitic/perennial herb/May–Aug/2,620–6,560 | Not expected to occur. The site is outside of the species' known elevation range. |
| *Euphorbia abramsiana* | Abrams' spurge | None/None/2B.2 | None | Mojavean desert scrub, Sonoran desert scrub; sandy/annual herb/(Aug) Sep–Nov/-16–4,295 | Low potential to occur. The site is located within the species' known elevation range and suitable desert scrub vegetation is present; however, the site lacks sandy soils. The nearest documented occurrence is approximately 6.2 miles east of the site (CDFW 2021). |
| *Euphorbia arizonica* | Arizona spurge | None/None/2B.3 | None | Sonoran desert scrub (sandy)/perennial herb/Mar–Apr/164–985 | Low potential to occur. The site is located within the species' known elevation range, and suitable desert scrub vegetation is present; however, the site lacks sandy soils. The nearest documented occurrence is approximately 2.5 miles west of the site (CDFW 2021). |
| *Euphorbia misera* | cliff spurge | None/None/2B.2 | None | Coastal bluff scrub, Coastal scrub, Mojavean desert scrub; rocky/perennial shrub/Dec–Aug (Oct)/33–1,640 | Low potential to occur. The site is located within the species' known elevation range, and suitable desert scrub vegetation is present; however, the nearest documented occurrence is approximately 14 miles northwest of the site (CDFW 2021). This conspicuous perennial shrub would likely have been detected if present. |
| *Euphorbia platysperma* | flat-seeded spurge | None/None/1B.2 | None | Desert dunes, Sonoran desert scrub (sandy)/annual herb/Feb–Sep/213–330 | Not expected to occur. The site is outside of the species' known elevation range. |
| *Heuchera hirsutissima* | shaggy-haired alumroot | None/None/1B.3 | None | Subalpine coniferous forest, Upper montane coniferous forest; rocky, granitic/perennial rhizomatous herb/(May) June–July/ 4,985–11,480 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |

| Scientific Name | Common Name | Status (Federal/State/CRPR) | Coachella Valley MSHCP | Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet) | Potential to Occur |
|---|---|---|---|---|---|
| *Imperata brevifolia* | California satintail | None/None/2B.1 | None | Chaparral, Coastal scrub, Mojavean desert scrub, Meadows and seeps (often alkali), Riparian scrub; mesic/perennial rhizomatous herb/Sep–May/0–3,985 | Low potential to occur. The site is located within the species' known elevation range, and suitable desert scrub vegetation is present; however, the site lacks alkali soils to support this species. The nearest documented occurrence is approximately 5.4 miles west of the site (CDFW 2021). |
| *Lilium parryi* | lemon lily | None/None/1B.2 | None | Lower montane coniferous forest, Meadows and seeps, Riparian forest, Upper montane coniferous forest; mesic/perennial bulbiferous herb/July–Aug/4,000–9,005 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Linanthus jaegeri* | San Jacinto linanthus | None/None/1B.2 | None | Subalpine coniferous forest, Upper montane coniferous forest; granitic, rocky/perennial herb/July–Sep/7,200–10,005 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Linanthus maculatus* ssp. *maculatus* | Little San Bernardino Mtns. linanthus | None/None/1B.2 | Covered | Desert dunes, Joshua tree woodland, Mojavean desert scrub, Sonoran desert scrub; Sandy/annual herb/Mar–May/459–4,000 | Not expected to occur. The site is located within the species' known elevation range, and desert scrub vegetation is present; however, this species is known to occur in loose soft sandy soils on low benches along washes (CVAG 2016), which are absent. The nearest documented occurrence is approximately 5.9 miles northwest of the site (CDFW 2021). |
| *Marina orcuttii* var. *orcuttii* | California marina | None/None/1B.3 | None | Chaparral, Pinyon and juniper woodland, Sonoran desert scrub; rocky/perennial herb/May–Oct/3,440–3,805 | Not expected to occur. The site is outside of the species' known elevation range. |
| *Matelea parvifolia* | spearleaf | None/None/2B.3 | None | Mojavean desert scrub, Sonoran desert scrub; rocky/perennial herb/Mar–May (July)/1,440–3,590 | Not expected to occur. The site is outside of the species' known elevation range. |
| *Mentzelia tricuspis* | spiny-hair blazing star | None/None/2B.1 | None | Mojavean desert scrub; sandy, gravelly, slopes, and washes/annual herb/Mar–May/ 492–4,195 | Low potential to occur. The site is located within the species' known elevation range, and desert scrub vegetation is present along with gravelly/rocky slopes; however, the site lacks sandy soils. The nearest documented occurrence is approximately 13.8 miles northwest of the site (CDFW 2021). |
| *Nemacaulis denudata* var. *gracilis* | slender cottonheads | None/None/2B.2 | None | Coastal dunes, Desert dunes, Sonoran desert scrub/annual herb/(Mar) Apr–May/ -165–1,310 | Low potential to occur. The site is located within the species' known elevation range; desert scrub vegetation is present; and there is a documented occurrence slightly overlapping the site; however, this occurrence was documented in 1942 and was listed as needing more fieldwork (CDFW 2021). According to CalFlora (2021), this species occurs more in dune habitats. |
| *Penstemon californicus* | California beardtongue | None/None/1B.2 | None | Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland; sandy/perennial herb/May–June (Aug)/3,835–7,545 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Petalonyx linearis* | narrow-leaf sandpaper-plant | None/None/2B.3 | None | Mojavean desert scrub, Sonoran desert scrub; Sandy or rocky canyons/perennial shrub/ (Jan–Feb)Mar–May (June–Dec)/-82–3,655 | Low potential to occur. The site is located within the species' known elevation range, and there is desert scrub vegetation and rocky soils present; however, the site lacks sandy soils. The nearest documented occurrence is approximately 6.5 miles southeast of the site (CDFW 2021). This conspicuous perennial shrub would likely have been detected if present. |
| *Pseudorontium cyathiferum* | Deep Canyon snapdragon | None/None/2B.3 | None | Sonoran desert scrub (rocky)/annual herb/ Feb–Apr/0–2,620 | Low potential to occur. The site is located within the species' known elevation range and there is desert scrub and rocky soils present; however, this species has only been documented in the Coachella Valley within Coyote Creek, approximately 8.9 miles southeast of the site and was documented in 1978 (CDFW 2021). |
| *Saltugilia latimeri* | Latimer's woodland-gilia | None/None/1B.2 | None | Chaparral, Mojavean desert scrub, Pinyon and juniper woodland; rocky or sandy, often | Not expected to occur. The site is outside of the species' known elevation range. |

| Scientific Name | Common Name | Status (Federal/State/CRPR) | Coachella Valley MSHCP | Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet) | Potential to Occur |
|---|---|---|---|---|---|
| | | | | granitic, sometimes washes/annual herb/Mar–June/1,310–6,230 | |
| *Selaginella eremophila* | desert spike-moss | None/None/2B.2 | None | Chaparral, Sonoran desert scrub (gravelly or rocky)/perennial rhizomatous herb/(May) June (July)/656–4,245 | Low potential to occur. The site is located within the species' known elevation range, and desert scrub vegetation is present; however, the nearest documented occurrence is from 1938 and was approximately 1.72 miles northwest of the site (CDFW 2021). |
| *Senna covesii* | Coves' cassia | None/None/2B.2 | None | Sonoran desert scrub; Dry, sandy desert washes and slopes/perennial herb/Mar–June (Aug)/738–4,245 | Low potential to occur. The site is located within the species' known elevation range, and desert scrub vegetation is present; however, the site lacks suitable sandy desert washes and slopes to support this species. The site is comprised of rocky soils. The nearest documented occurrence is approximately 10.1 miles south of the site (CDFW 2021). |
| *Sidotheca emarginata* | white-margined oxytheca | None/None/1B.3 | None | Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland/annual herb/(Feb) Apr–July (Aug)/3,935–8,200 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Stemodia durantifolia* | purple stemodia | None/None/2B.1 | None | Sonoran desert scrub (often mesic, sandy)/perennial herb/(Jan) Apr, June, Aug, Sep, Oct, Dec/591–985 | Low potential to occur. The site is located within the species' known elevation range, and desert scrub vegetation is present; however, the site lacks mesic and sandy soils to support this species. The nearest documented occurrence is approximately 1 mile west of the site (CDFW 2021). |
| *Streptanthus campestris* | southern jewelflower | None/None/1B.3 | None | Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland; rocky/perennial herb/(Apr) May–July/2,950–7,545 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Thelypteris puberula* var. *sonorensis* | Sonoran maiden fern | None/None/2B.2 | None | Meadows and seeps (seeps and streams)/perennial rhizomatous herb/ Jan–Sep/164–2,000 | Not expected to occur. The site is located within the species' known elevation range; however, there is no suitable vegetation present to support this species. |
| *Thysanocarpus rigidus* | rigid fringepod | None/None/1B.2 | None | Pinyon and juniper woodland; Dry rocky slopes/annual herb/Feb–May/1,965–7,215 | Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present to support this species. |
| *Xylorhiza cognata* | Mecca-aster | None/None/1B.2 | Covered | Sonoran desert scrub/perennial herb/Jan–June/66–1,310 | Low potential to occur. The site is located within the species' known elevation range and desert scrub vegetation is present; however, the species is known to occur in arid canyons in washes (Jepson Flora Project 2021). While the site supports steep slopes, suitable canyons and washes are absent. The nearest documented occurrence is approximately 5.9 miles northwest of the site (CDFW 2021). |

**Status Legend**
**Federal**
FE: Federally listed as endangered
FT: Federally listed as threatened
**State**
**SE: State listed as endangered**
**CRPR: California Rare Plant Rank**
1B: Plants rare, threatened, or endangered in California and elsewhere
2B: Plants rare, threatened, or endangered in California, but more common elsewhere
**Threat Rank**
0.1 – Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 – Moderately threatened in California (20%–80% occurrences threatened/moderate degree and immediacy of threat)
0.3 – Not very threatened in California (less than 20% of occurrences threatened/low degree and immediacy of threat or no current threats known)

# Attachment F

## Special-Status Wildlife Species Detected or Potentially Occurring in the Study Area

| Scientific Name | Common Name | Status (Federal/State) | Coachella Valley MSHCP | Habitat | Potential to Occur |
|---|---|---|---|---|---|
| **Amphibians** | | | | | |
| *Rana draytonii* | California red-legged frog | FT/SSC | None | Lowland streams, wetlands, riparian woodlands, livestock ponds; dense, shrubby or emergent vegetation associated with deep, still or slow-moving water; uses adjacent uplands | Not expected to occur. The site lacks suitable aquatic resources to support this species. The nearest documented occurrence is approximately 4.7 miles west of the site (CDFW 2021). |
| *Rana muscosa* | mountain yellow-legged frog | FE/SE, WL | None | Lakes, ponds, meadow streams, isolated pools, and open riverbanks; rocky canyons in narrow canyons and in chaparral | Not expected to occur. The site lacks suitable aquatic resources to support this species. The nearest documented occurrence is approximately 5.3 miles west of the site (CDFW 2021). |
| **Reptiles** | | | | | |
| *Crotalus ruber* | red diamondback rattlesnake | None/SSC | None | Coastal scrub, chaparral, oak and pine woodlands, rocky grasslands, cultivated areas, and desert flats | Moderate potential to occur. The site support suitable rocky areas to support this species. The nearest documented occurrence is approximately 1.5 miles south of the site (CDFW 2021). |
| *Gopherus agassizii* | Mojave desert tortoise | FT/ST | Covered | Arid and semi-arid habitats in Mojave and Sonoran Deserts, including sandy or gravelly locations along riverbanks, washes, sandy dunes, canyon bottoms, desert oases, rocky hillsides, creosote flats, and hillsides | Not expected to occur. While the site does support desert habitat and rocky hillsides, the site did not include any burrows to support this species. The nearest documented occurrence is approximately 6.8 miles southeast of the site, east of Highway 74 (CDFW 2021). |
| *Phrynosoma blainvillii* | Blainville's horned lizard | None/SSC | None | Open areas of sandy soil in valleys, foothills, and semi-arid mountains including coastal scrub, chaparral, valley–foothill hardwood, conifer, riparian, pine–cypress, juniper, and annual grassland habitats | Not expected to occur. The site lacks suitable vegetation and sandy soils to support this species. |
| *Phrynosoma mcallii* | flat-tailed horned lizard | None/SSC | Covered | Desert washes and flats with sparse low-diversity vegetation cover and sandy soils | Not expected to occur. The nearest documented occurrence is approximately 0.5 miles south of the site (CDFW 2021); however, the site lacks suitable desert washes and sandy soils to support this species. |
| *Uma inornata* | Coachella fringe-toed lizard | FT/SE | Covered | Sand dunes in sparse desert scrub, alkali scrub, and desert wash | Not expected to occur. While the site does contain desert scrub, the site lacks suitable sand dunes and wind-blown aeolian soils to support this species. The nearest documented occurrence is located 2.2 miles north of the site (CDFW 2021). |
| **Birds** | | | | | |
| *Aquila chrysaetos* (nesting and wintering) | golden eagle | BCC/FP, WL | None | Nests and winters in hilly, open/semi-open areas, including shrublands, grasslands, pastures, riparian areas, mountainous canyon land, open desert rimrock terrain; nests in large trees and on cliffs in open areas and forages in open habitats | Not expected to nest or winter. The site lacks suitable large trees and cliffs for nesting. The nearest documented occurrence is approximately 7.3 miles south of the site (CDFW 2021). |
| *Athene cunicularia* (burrow sites and some wintering sites) | burrowing owl | BCC/SSC | Covered | Nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows | Low potential to occur. The study area contains desert scrub vegetation; however, no small mammal burrows suitable for burrowing owl were observed and the site contains rocky and steep slopes. The nearest documented occurrence is located approximately 4.5 miles to the northeast (CDFW 2021). |
| *Cypseloides niger* (nesting) | black swift | BCC/SSC | None | Nests in moist crevices, caves, and cliffs behind or adjacent to waterfalls in deep canyons; forages over a wide range of habitats | Not expected to nest. The site lacks suitable crevices, caves, cliffs, and waterfalls. |
| *Empidonax traillii extimus* (nesting) | southwestern willow flycatcher | FE/SE | Covered | Nests in dense riparian habitats along streams, reservoirs, or wetlands; uses variety of riparian and shrubland habitats during migration | Not expected to occur. The site lacks suitable dense riparian habitat to support this species. The nearest documented occurrence of this species is located approximately 1.9 miles south of the site (CDFW 2021). |

| Scientific Name | Common Name | Status (Federal/State) | Coachella Valley MSHCP | Habitat | Potential to Occur |
|---|---|---|---|---|---|
| *Lanius ludovicianus* (nesting) | loggerhead shrike | BCC/SSC | None | Nests and forages in open habitats with scattered shrubs, trees, or other perches | Low potential to occur. Suitable open habitat is present; however, the site supports a low cover of scattered shrubs and perching opportunities. The nearest documented occurrence is approximately 7.8 miles east of the site (CDFW 2021). |
| *Polioptila californica californica* | coastal California gnatcatcher | FT/SSC | None | Nests and forages in various sage scrub communities, often dominated by California sagebrush and buckwheat; generally avoids nesting in areas with a slope of greater than 40%; majority of nesting at less than 1,000 feet above mean sea level | Not expected to occur. The site lacks suitable sage scrub communities to support this species, and the site contains steep slopes. |
| *Progne subis* (nesting) | purple martin | None/SSC | None | Nests and forages in woodland habitats including riparian, coniferous, and valley foothill and montane woodlands; in the Sacramento region often nests in weep holes under elevated freeways | Not expected to nest. The site lacks suitable woodland habits to support this species. |
| *Pyrocephalus rubinus* (nesting) | vermilion flycatcher | None/SSC | None | Nests in riparian woodlands, riparian scrub, and freshwater marshes; typical desert riparian with cottonwood, willow, mesquite adjacent to irrigated fields, ditches, or pastures | Not expected to occur. The site lacks suitable riparian habitat and adjacent fields or pastures to support this species. |
| *Toxostoma crissale* | Crissal thrasher | None/SSC | Covered | Nests and forages in desert riparian and desert wash; dense thickets of sagebrush and other shrubs such as mesquite, iron catclaw acacia, and arrowweed willow within juniper and pinyon–juniper woodlands | Not expected to occur. The site lacks suitable riparian and sagebrush habitats to support this species. The nearest documented occurrence is approximately 5.9 miles northwest of the site (CDFW 2021). |
| *Toxostoma lecontei* | LeConte's thrasher | BCC/SSC | Covered | Nests and forages in desert wash, desert scrub, alkali desert scrub, desert succulent, and Joshua tree habitats; nests in spiny shrubs or cactus | Not expected to nest, moderate potential to forage. The site supports suitable desert scrub habitat for foraging; however, the site lacks suitable spiny shrubs for nesting. The site supports minimal cactus species. The nearest documented occurrence is located approximately 2.7 miles north of the site (CDFW 2021). |
| *Vireo bellii pusillus* (nesting) | least Bell's vireo | FE/SE | Covered | Nests and forages in low, dense riparian thickets along water or along dry parts of intermittent streams; forages in riparian and adjacent shrubland late in nesting season | Not expected to occur. The site lacks suitable dense riparian habitat to support this species. The nearest documented occurrence of this species is located approximately 4.6 miles west of the site (CDFW 2021). |
| **Fishes** | | | | | |
| *Cyprinodon macularius* | desert pupfish | FE/SE | Covered | Desert springs, small streams, and marshes below 1,515 meters (5,000 feet) above mean sea level; tolerates high salinities, high water temperatures, and low dissolved-oxygen concentrations | Not expected to occur. The site lacks suitable aquatic resources to support this species. |
| **Mammals** | | | | | |
| *Chaetodipus fallax pallidus* | pallid San Diego pocket mouse | None/SSC | None | Desert wash, desert scrub, desert succulent scrub, and pinyon–juniper woodland | Not expected to occur. The site contains desert scrub; however, no small mammal burrows were observed and the site contains rocky and steep slopes. The nearest documented occurrence is approximately 4.1 miles southeast of the site (CDFW 2021). |
| *Corynorhinus townsendii* | Townsend's big-eared bat | None/SSC | None | Mesic habitats characterized by coniferous and deciduous forests and riparian habitat, but also xeric areas; roosts in limestone caves and lava tubes, man-made structures, and tunnels | Not expected to occur. The site lacks suitable riparian, coniferous, or deciduous forests. The nearest documented occurrence is 9.7 miles southwest of the site (CDFW 2021). |

| Scientific Name | Common Name | Status (Federal/State) | Coachella Valley MSHCP | Habitat | Potential to Occur |
|---|---|---|---|---|---|
| *Lasiurus xanthinus* | western yellow bat | None/SSC | Covered | Valley–foothill riparian, desert riparian, desert wash, and palm oasis habitats; below 2,000 feet above mean sea level; roosts in riparian and palms | Not expect to roost or forage within project site; low potential to roost and forage within study area. There are no palms within the proposed project development; however, there are palms located within the study area buffer that may provide roosting habitat. The nearest documented occurrence is approximately 2.1 miles southeast of the site (CDFW 2021). |
| *Neotoma lepida intermedia* | San Diego desert woodrat | None/SSC | None | Coastal scrub, desert scrub, chaparral, cacti, rocky areas | Not expected to occur. The site contains desert scrub and rocky areas; however, no middens were observed, and the nearest documented occurrence is approximately 7.9 miles northeast of the site (CDFW 2021). |
| *Nyctinomops femorosaccus* | pocketed free-tailed bat | None/SSC | None | Pinyon–juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oases; roosts in high cliffs or rock outcrops with drop-offs, caverns, and buildings | Not expected to roost within project site; moderate potential to forage within project site. This species tends to prefer rocky outcrops and high cliffs for roosting, which are not present within the site. The desert scrub can provide suitable habitat for foraging. The nearest documented occurrence is approximately 6.1 miles northwest of the site (CDFW 2021). |
| *Nyctinomops macrotis* | big free-tailed bat | None/SSC | None | Rocky areas; roosts in caves, holes in trees, buildings, and crevices on cliffs and rocky outcrops; forages over water | Not expected to occur. There are no suitable rocky outcrops or cliffs for roosting. Additionally, the site lacks water needed for foraging. The nearest documented occurrence is approximately 6.1 miles northwest of the site (CDFW 2021). |
| *Ovis canadensis nelsoni* | Nelson's bighorn sheep | None/FP | None | Steep slopes and cliffs, rough and rocky topography, sparse vegetation; also canyons, washes, and alluvial fans | Not expected to occur. The site is located outside of this species' known geographic range; this species occurs within the San Bernardino Mountain range (CDFW 2021). |
| *Ovis canadensis nelsoni* pop. 2 DPS | Peninsular bighorn sheep DPS | FE/FP, ST | Covered | Dry, rocky, low-elevation desert slopes, canyons, and washes; females near water during lambing season | Moderate potential to occur. The site supports rocky desert slopes. The nearest known occurrence is approximately 1.7 miles south of the site (CDFW 2021). |
| *Perognathus longimembris bangsi* | Palm Springs pocket mouse | None/SSC | Covered | Creosote scrub, desert scrub, and grasslands; sparse to moderately dense vegetative cover | Not expected to occur. The site contains sparse desert scrub; however, no small mammal burrows were observed, and the site contains rocky and steep slopes. The nearest documented occurrence is approximately 7.6 miles east of the site (CDFW 2021). |
| *Perognathus longimembris brevinasus* | Los Angeles pocket mouse | None/SSC | None | Lower-elevation grassland, alluvial sage scrub, and coastal scrub | Not expected to occur. The site lacks suitable grassland, sage scrub, and coastal scrub to support this species. |
| *Spermophilus* (Xerospermophilus) *tereticaudus chlorus* | Palm Springs round-tailed ground squirrel | None/SSC | Covered | Sandy arid regions of Lower Sonoran Life Zone including creosote bush scrub and creosote–palo verde | Not expected to occur. The site contains creosote bush scrub; however, the site lacks suitable sandy soils and no small mammal burrows were observed. The nearest documented occurrence is approximately 3.6 miles northeast of the site (CDFW 2021). |
| **Invertebrates** | | | | | |
| *Dinacoma caseyi* | Casey's June beetle | FE/None | None | Found only in two populations in a small area of southern Palm Springs | Not expected potential to occur. Species is only known from two populations along the Whitewater River and within Tahquitz Creek within Palm Springs (CDFW 2021). |

**Status Legend**
**Federal**
BCC: USFWS—Birds of Conservation Concern
FE: Federally listed as endangered
FT: Federally listed as threatened
**State**
FP: CDFW Fully Protected species
SE: State listed as endangered
ST: State listed as threatened
SSC: California Species of Special Concern
WL: CDFW Watch List species

# **Appendix C**
Cultural Report

**CRM TECH**
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

September 26, 2019

Michael Kao
Kam Sang Company, Inc.
411 E. Huntington Drive, Suite 305
Arcadia, CA 91006

Re: Update and Addendum to Historical/Archaeological Resources Survey
Ritz-Carlton Hotel Expansion and Sky Mesa Recreation Area Project
City of Rancho Mirage, Riverside County, California
CRM TECH Project Nos. 3502 and 3539

Dear Mr. Kao:

At your request, CRM TECH has completed a cultural resources study for the project referenced above, which entails the proposed expansion of the Ritz-Carlton Hotel at Rancho Mirage, including the construction of an event venue plaza and a recreation area known as Sky Mesa. The subject property of the study consists of approximately 18.2 acres of undeveloped land lying adjacent to the south and the east of the existing hotel at 68900 Frank Sinatra Drive, on the western edge of the City of Rancho Mirage, Riverside County (Figs. 1, 2). The project area comprises a portion the northwest quarter of Section 3, T5S R5E, San Bernardino Baseline and Meridian (Fig. 1).

**Background**

As you know, most of the current project area was previously included in a cultural resource survey completed by CRM TECH in 2006 (Hogan and Tang 2006). That study consisted of a historical/ archaeological resources records search, historical background research, Native American consultation, and a systematic field survey (*ibid*.). The records search results indicated that a segment of a prehistoric trail, designated 33-000628 (CA-RIV-628t), had been recorded in 1979 as extending into the 39-acre area covered by the 2006 study, but the field survey revealed that that segment of the original trail was no longer extant (*ibid*.:1, 3). In any event, the location of the prehistoric trail recorded in 1979 was well outside the current project boundary.

At the completion of the 2006 study, it was concluded that no cultural resources were extant in the area surveyed at that time (Hogan and Tang 2006:3). Subsequently, CRM TECH undertook an archaeological monitoring program on the property between December 2006 and September 2007 (Tang 2008). The field procedures for the archaeological monitoring program consisted of intermittent "spot-checking" during earth-moving operations in the areas designated for the Hotel Villas, Tennis Villas, and the spa (*ibid*.:3). Again, no evidence of any archaeological deposits was found during the monitoring program (*ibid*.).

Since these previous studies are now more than 10 years old, and since a portion of the current project area was not included in the 2006-2007 studies, the present study was designed and implemented as an update and an addendum for statutory compliances purposes under provisions of

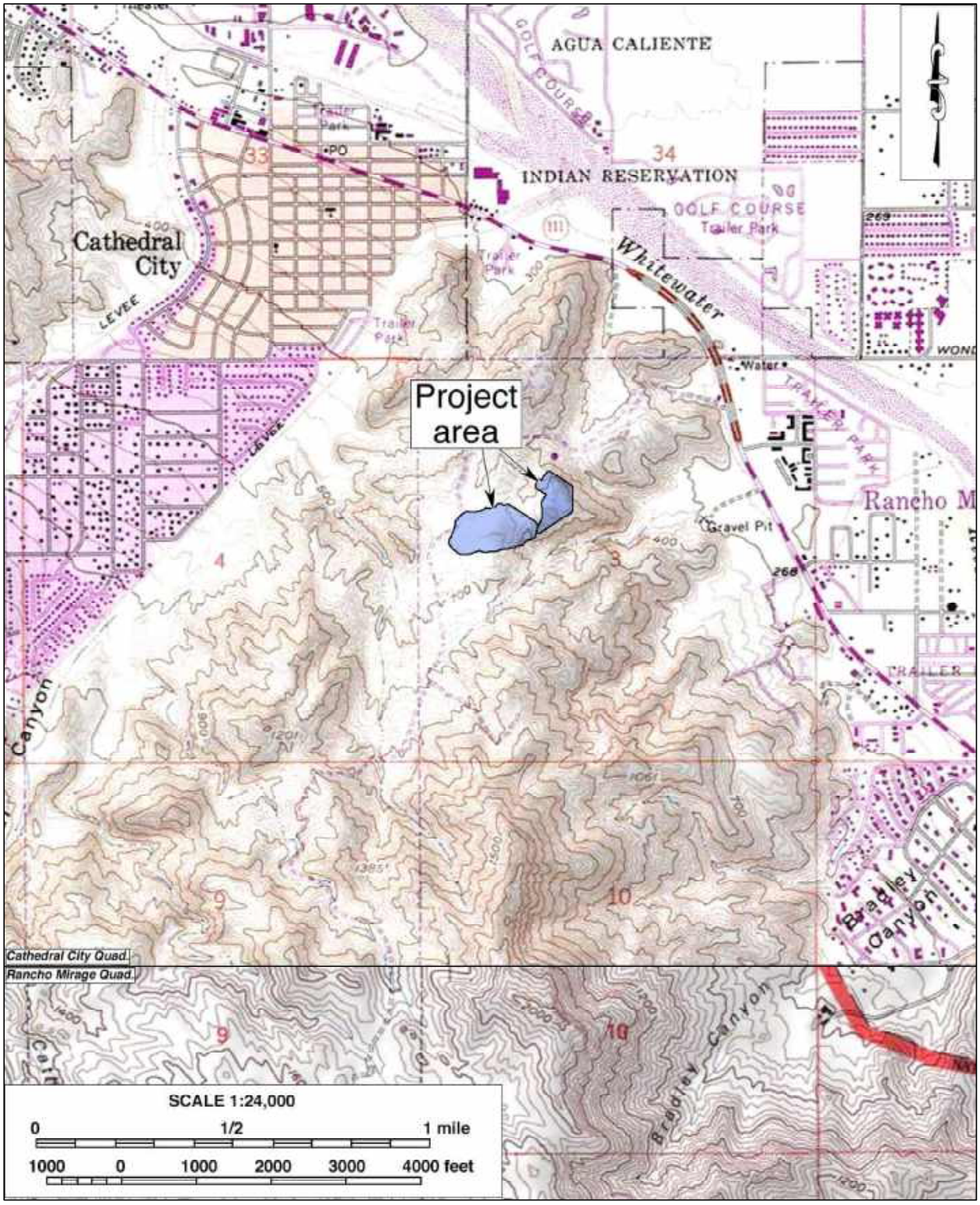



Figure 1. Project location. (Based on USGS Cathedral City and Rancho Mirage, Calif., 7.5' quadrangles [USGS 1981; 1988])




Figure 2. Aerial view of the project area.

the California Environmental Quality Act (CEQA). The scope of this study includes updates to the records search and the historical background research, further consultation with Native American representatives, and a systematic field survey at intensive and reconnaissance levels as appropriate. A summary of the methods, results, and final conclusion of the study is presented below.

**Records Search**

The records search update was conducted on June 14, 2019, by CRM TECH archaeologist Nina Gallardo, B.A., at the Eastern Information Center (EIC), University of California, Riverside. The results indicate that no further studies have occurred in the current project area since 2007, and no cultural resources have been identified on the property. Outside the project area but within a one-mile radius, a total of 38 cultural resources studies have been reported to the EIC, 17 of them completed since 2006. In all, more than 75% of the land within the scope of the records search has now been surveyed (Fig. 3).

The records search results further indicate that 67 historic-period sites have been recorded within the one-mile radius, including 62 building, two roads, and three utility lines, all clustered one-half mile or more to the north and northwest of the project area. Site 33-000628 (CA-RIV-628t), the trail noted above, and a single ceramic pot drop nearly a mile to the west represent the only prehistoric cultural resources recorded within the records search scope. At these distances, the proposed project has no potential to impact any of these 69 known cultural resources. Therefore, they require no further consideration in the CEQA-compliance process for this project.

**Historical Background Research**

Historical background research for this study was conducted by CRM TECH historian Terri Jacquemain, M.A. In addition to the sources consulted during the 2006 study (Hogan and Tang 2006:3), aerial photographs that have become available since then were also examined for further information. Taken between 1972 and 2018, the aerial photographs are available at the Nationwide Environmental Title Research (NETR) Online website and through the Google Earth software.

The historic maps show no man-made features in or near the current project area throughout the 1850s-1950s era (Figs. 4-7). The earliest man-made features known to be present within the project boundaries were a leveled pad on a hilltop in the eastern—i.e., Sky Mesa—portion of the project area and part of a winding dirt road leading to it, both of which were first noted in 1972 (NETR Online 1972). The hotel and the roadways now surrounding the project area were constructed between 1972 and 1996 (NETR Online 1972; 1996; Google Earth 1996).

The western portion of the project area received limited disturbance until 2006-2007, when the ground surface in the entire area was cleared and apparently graded (NETR Online 1996-2009; Google Earth 1996-2009; Tang 2008). As a result, all preexisting features in that portion of the project area, including a segment the dirt road, were obliterated (NETR Online 2009; Google Earth 2009). To date, however, the property has remained undeveloped and was used only for materials stockpiling, construction staging, and occasional parking (NETR Online 2009-2014; Google Earth 2009-2018). In the eastern portion, meanwhile, the dirt road and the leveled pad observed in 1972 have been the only notable man-made features known to exist (NETR Online 1972-2014; Google Earth 1996-2018).

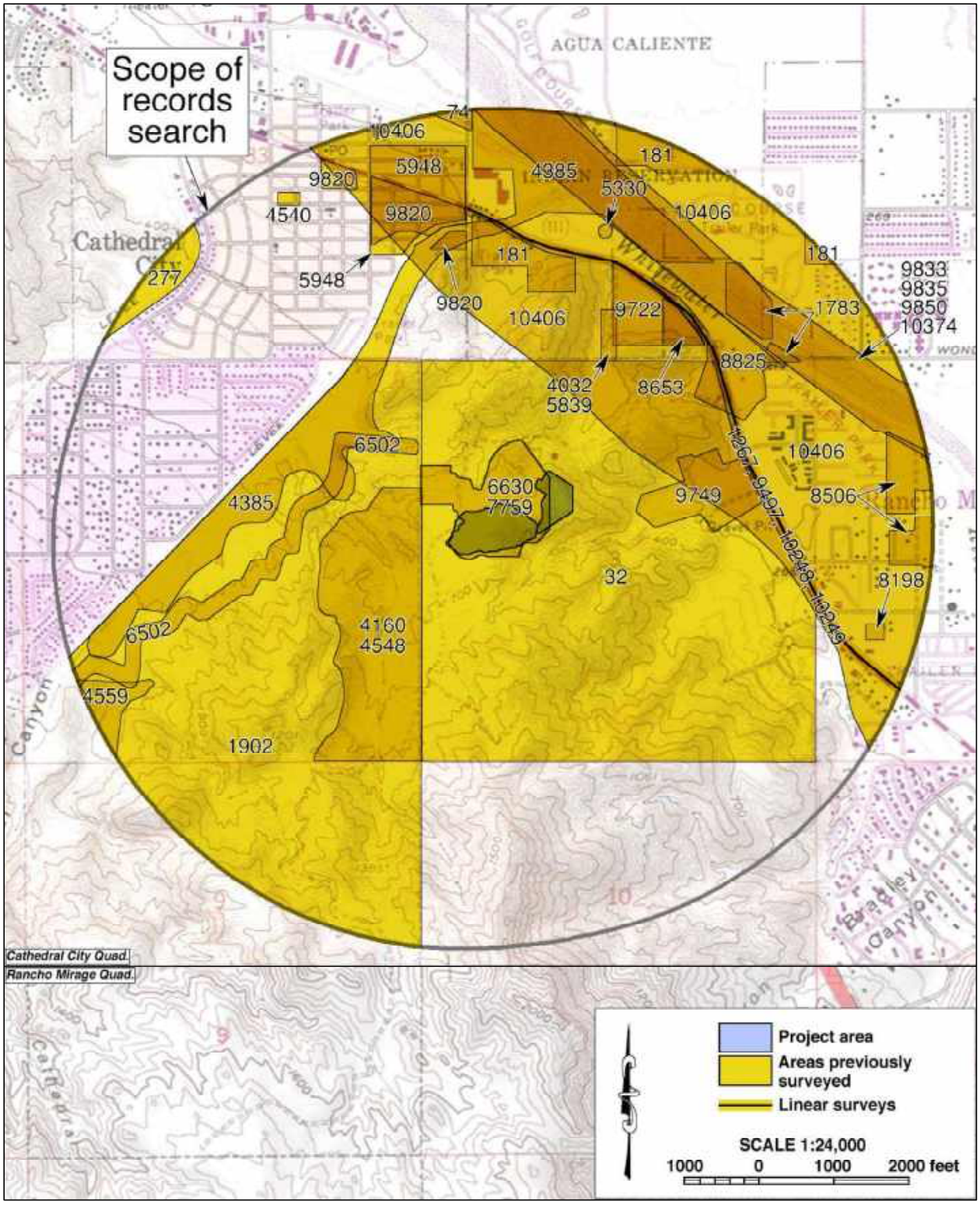



Figure 3. Previous cultural resources studies in the vicinity of the project area, listed by EIC file number (cf. Hogan and Tang 2006:2). Locations of historical/archaeological sites are not shown as a protective measure.

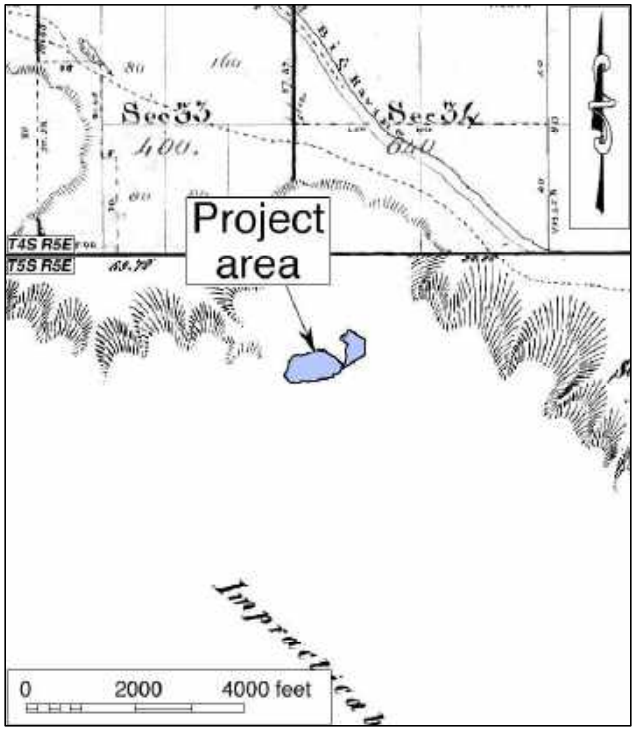



Figure 4. The project area and vicinity in 1855-1856. (Source: GLO 1856a; 1856b)

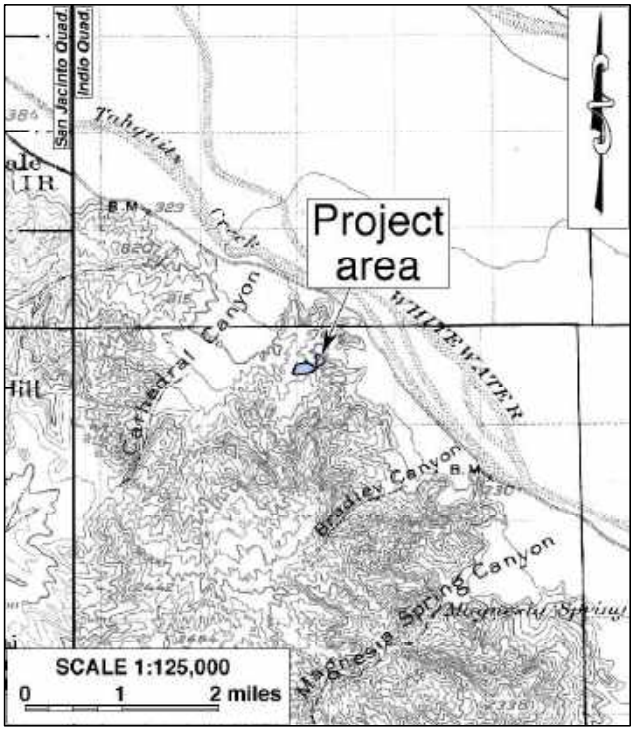



Figure 5. The project area and vicinity in 1897-1901. (Source: USGS 1901; 1904)

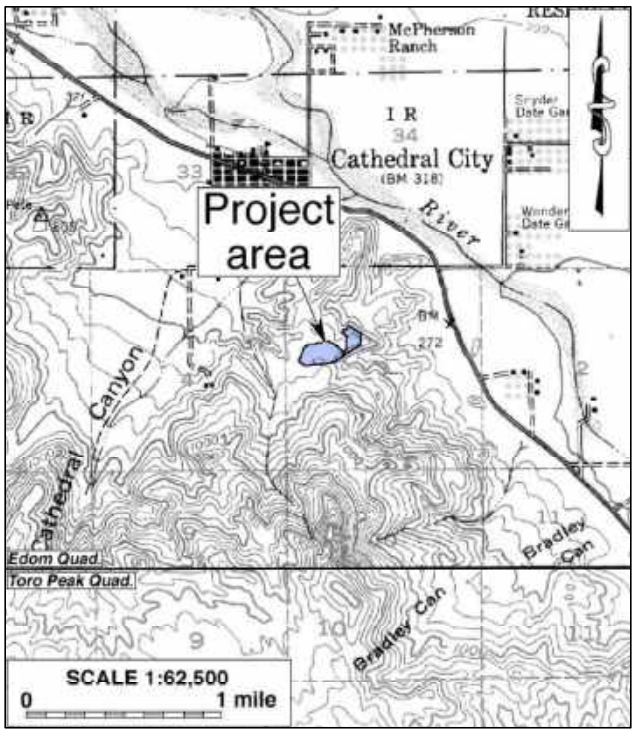



Figure 6. The project area and vicinity in 1941. (Source: USGS 1941a; 1941b)

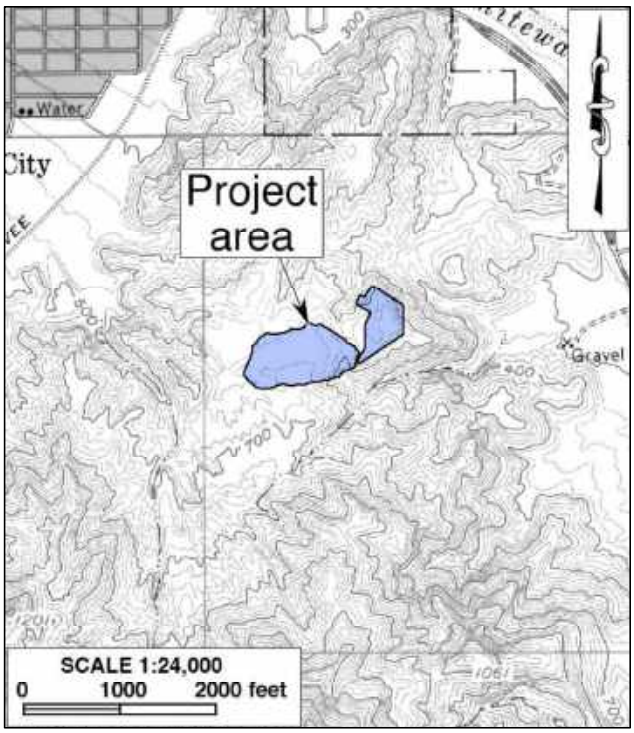



Figure 7. The project area and vicinity in 1956. (Source: USGS 1958)

## Field Inspection

On June 21 and September 6, 2019, CRM TECH archaeologist Daniel Ballester, M.S., carried out the field survey of the western and eastern portions of the project area, respectively. In light of the extensive past ground disturbance, the western portion was surveyed at a reconnaissance level by walking a series of parallel north-south transects at 25-meter (approximately 75-foot) intervals. The less disturbed eastern portion, including the area not covered by the 2006-2007 studies, was surveyed at an intensive level by walking along parallel north-south transects at five-meter (approximately 15-foot) intervals in the relatively level areas and along the contours on the slopes.

Using these methods, the ground surface of the entire project area was systematically and carefully examined for any evidence of human activities dating to the prehistoric or historic period (i.e., 50 years or older). Ground visibility was excellent (90-100%) due to the lack of any substantial vegetation growth in either portion of the project area (Fig. 8). In addition, bedrock outcrops on the slopes in the eastern portion of the property were closely inspected for any evidence of prehistoric milling features.

The field survey encountered no potential "historical resources" within or adjacent to the project boundaries. In the western portion, past grading of the ground surface has leveled most of the land and removed bedrock outcrops, resulting in a sizable rock pile near the center of the property. In the eastern portion, the slopes beyond the leveled hilltop and the dirt access road retain more of the area's native landscape, with some bedrock boulders exposed naturally on the surface. The badly exfoliating boulders (Fig. 9), however, presents a poor material for use as milling surfaces by the Native people or for preservation of any evidence of such use.

## Native American Consultation

On June 11, 2019, CRM TECH submitted a written request to the State of California Native American Heritage Commission (NAHC) for a records search in the commission's Sacred Lands File (see App. 1). In the meantime, CRM TECH notified the nearby Agua Caliente Band of Cahuilla Indians prior to each part of the archaeological fieldwork and invited tribal participation (see App.



Figure 8. Typical landscapes in the project area. *Left*: western portion of the project area, view to the north (photograph taken on June 21, 2019); *right*: eastern portion of the project area, view to the northeast (photograph taken on September 6, 2019).

1). In response, the Agua Caliente Tribal Historic Preservation Office stated by e-mail on both occasions that the tribe would not be able to participate (see App. 1).



Figure 9. Typical bedrock outcrop in the eastern portion of the project area (photograph taken on September 6, 2019).

In a letter dated June 25, 2019, the NAHC reports that the Sacred Lands File identified no Native American cultural resources in the project vicinity but recommends further consultation with local Native American groups. For that purpose, the NAHC provided a list of potential contacts in the region (see App. 1). Upon receiving the NAHC's reply, on June 26, CRM TECH sent written requests for comments to all 11 tribal organizations on the referral list (see App. 1). For some of the tribes, the designated spokespersons on cultural resources issues were contacted in lieu of the tribal political leaders on the referral list, as recommended in the past by tribal government staff. The 11 tribal representatives contacted during this study are listed below:

- Patricia Garcia-Plotkin, Tribal Historic Preservation Officer, Agua Caliente Band of Cahuilla Indians;
- Amanda Vance, Chairperson, Augustine Band of Cahuilla Indians;
- Judy Stapp, Director of Cultural Affairs, Cabazon Band of Mission Indians;
- BobbyRay Esparza, Cultural Resources Coordinator, Cahuilla Band of Indians;
- Shane Chapparosa, Chairperson, Los Coyotes Band of Cahuilla and Cupeño Indians;
- Travis Armstrong, Tribal Historic Preservation Officer, Morongo Band of Mission Indians;
- John Gomez, Jr., Cultural Resource Coordinator, Ramona Band of Cahuilla Indians;
- Mercedes Estrada, Tribal Administrative Assistant, Santa Rosa Band of Cahuilla Indians;
- Joseph Ontiveros, Tribal Historic Preservation Officer, Soboba Band of Luiseño Indians;
- Michael Mirelez, Cultural Resources Coordinator, Torres Martinez Desert Cahuilla Indians;
- Anthony Madrigal, Jr., Tribal Historic Preservation Officer, Twenty-Nine Palms Band of Mission Indians.

As of this time, four of the tribes have responded to the inquiry (see App. 1). Among them, BobbyRay Esparza of the Cahuilla Band and Travis Armstrong of the Morongo Band stated that their tribes had no additional information on any Native American cultural resources in the project vicinity, and both deferred further consultation to the Agua Caliente Band. Victoria Martin, Tribal Secretary for the Augustine Band, similarly indicated that the tribe was not aware of any Native American cultural resources that might be affected by the project and requested to be notified of any discovery of such resources.

On behalf of the Agua Caliente Band, Lacy Padilla, Archaeologist with the Tribal Historic Preservation Office, identified the project location as a part of the tribe's traditional use area. Therefore, Ms. Padilla requested the presence of approved Agua Caliente Native American Cultural Resource Monitor(s) during ground-disturbing activities and tribal review of all cultural resources documentation generated for this project.

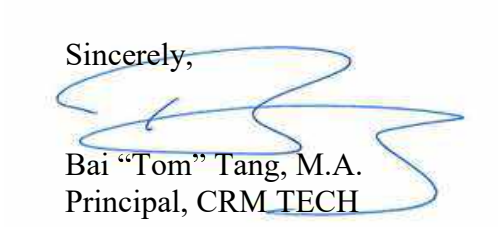
**Conclusion and Recommendations**

Based on the research results summarized above, CRM TECH concludes that the original finding of the 2006 survey remain valid and appropriate regarding the current project area. Accordingly, CRM TECH presents the following recommendations to the City of Rancho Mirage:

- No "historical resources" exist within or adjacent to the project area, and thus the proposed project will not cause a substantial adverse change to any known "historical resources."
- No further cultural resources investigation is necessary for the proposed project unless development plans undergo such changes as to include areas not covered by this study.
- If buried cultural materials are discovered during any earth-moving operations associated with the project, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

Thank you for this opportunity to be of service. If you have any questions or need further information regarding this study, please do not hesitate to contact our office.

Sincerely,



Bai "Tom" Tang, M.A.
Principal, CRM TECH

**References Cited:**


GLO (General Land Office, U.S. Department of the Interior)
1856a Plat map: Township No. IV South Range No. V East, SBBM; surveyed in 1855-1856.
1856b Plat map: Township No. V South Range No. V East, SBBM; surveyed in 1855-1856.

Google Earth
1996-2018 Aerial photographs of the project vicinity; taken in 1996, 2002, 2004-2006, 2009, and 2011-2018. Available through the Google Earth software.

Hogan, Michael, and Bai "Tom" Tang
2006 Historical and Archaeological Resources Investigation: The Lodge at Rancho Mirage, Approximately 39 Acres, City of Rancho Mirage, Riverside County, California. On file, Eastern Information Center, University of California, Riverside.

NETR Online
1972-2014 Aerial photographs of the project vicinity; taken in 1972, 1996, 2002, 2005, 2009, 2010, 2012, and 2014. http://www.historicaerials.com.

Tang, Bai "Tom"
2008 Archaeological Monitoring of Earth-Moving Operations: The Lodge Hotel Expansion Project, 68-900 Frank Sinatra Drive, City of Rancho Mirage, Riverside County, California. On file, Eastern Information Center, University of California, Riverside.

USGS (United States Geological Survey, U.S. Department of the Interior)
1901 Map: San Jacinto, Calif. (30', 1:125,000); surveyed in 1897-1898.
1904 Map: Indio, Calif. (30', 1:125,000); surveyed in 1901.
1941a Map: Edom, Calif. (15', 1:62,500); aerial photographs taken in 1941.

1941b Map: Toro Peak, Calif. (15', 1:62,500); aerial photographs taken in 1941.
1958 Map: Cathedral City, Calif. (7.5', 1:24,000); aerial photographs taken in 1956.
1981 Map: Cathedral City, Calif. (7.5', 1:24,000); 1958 edition photorevised in 1978.
1988 Map: Rancho Mirage, Calif. (7.5', 1:24,000); 1957 edition photorevised in 1984.

## APPENDIX 1

# CORRESPONDENCE WITH NATIVE AMERICAN REPRESENTATIVES*

* Eleven local Native American representatives were contacted; a sample letter is included in the appendix.

# SACRED LANDS FILE & NATIVE AMERICAN CONTACTS LIST REQUEST

**NATIVE AMERICAN HERITAGE COMMISSION**
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
(916)373-3710
(916)373-5471 (Fax)
nahc@nahc.ca.gov

**Project:** Proposed Ritz Carlton Residences, Rancho Mirage Project (CRM TECH No. 3502)

**County:** Riverside

**USGS Quadrangle Name:** Cathedral City and Rancho Mirage, Calif.

**Township** 5 South **Range** 5 East SB **BM; Section(s)** 3

**Company/Firm/Agency:** CRM TECH

**Contact Person:** Nina Gallardo

**Street Address:** 1016 E. Cooley Drive, Suite A/B

**City:** Colton, CA **Zip:** 92324

**Phone:** (909) 824-6400 **Fax:** (909) 824-6405

**Email:** ngallardo@crmtech.us

**Project Description:** The primary component of the project is a residential development on approximately 13 acres of land along Frank Sinatra Drive, near the Ritz Carlton Hotel, in the southern part of the City of Rancho Mirage, Riverside County, California.

*June 11, 2019*

**From**: Nina Gallardo <ngallardo@crmtech.us>
**Sent:** Tuesday, June 11, 2019 2:35 PM
**To**: Agua Caliente Tribal Historic Preservation Office (ACBCI-THPO@aguacaliente.net); lpadilla@aguacaliente.net; 'Feeney, Hannah (TRBL)'
**Subject:** Update to Cultural Study and Participation in Field Inspection for the Proposed Ritz Carlton Residences Project in the Southern Part of the City of Rancho Mirage, Riverside County (CRM TECH No. 3502)

Hello,

I'm writing to inform you that CRM TECH will be conducting an update to the previous cultural resources study for the proposed Ritz Carlton Residences Project in the southern part of the City of Rancho Mirage, Riverside County (CRM TECH No. 3502). Specifically, I am contacting you to see if the tribe would like to participate in the field inspection. We conducted an intensive-level survey back in 2006 and then an archaeological monitoring program in late 2006 and 2007 on the same property. We are currently concerned with only 13 acres of the previous project area, as depicted in the enclosed map. We will contact you again when we have a specific time and date for the fieldwork. We would also appreciate any information that the tribe can provided about the project location. Please feel free to email back with any questions regarding the proposed project and possible availability for the field inspection.

Thank you for your time and input on this project.

Nina Gallardo
(909) 824-6400 (phone)
(909) 824-6405 (fax)
CRM TECH
1016 E. Cooley Drive, Ste. A/B
Colton, CA 92324

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**From**: Nina Gallardo <ngallardo@crmtech.us>
**Sent**: Tuesday, June 18, 2019 12:01 PM
**To:** lpadilla@aguacaliente.net; 'Feeney, Hannah (TRBL)'; Katherine Croft (TRBL) (kcroft@aguacaliente.net); Agua Caliente Tribal Historic Preservation Office (ACBCI-THPO@aguacaliente.net)
**Subject**: FW: Update to Cultural Study and Participation in Field Inspection for the Proposed Ritz Carlton Residences Project in the Southern Part of the City of Rancho Mirage, Riverside County (CRM TECH No. 3502)

Hello,

I'm emailing to see if the tribe would be available later this week to join us for the field inspection of the above-referenced project area. We were thinking about conducting it either Thursday morning (6/20) or Friday morning (6/21). Please let me know if the tribe is interested in joining us or if these dates are convenient for the tribe.

Thanks again for your time,

Nina Gallardo
CRM TECH
909-824-6400

---

**From**: Feeney, Hannah (TRBL) <hfeeney@aguacaliente.net>
**Sent**: Wednesday, June 19, 2019 5:03 PM
**To:** ngallardo@crmtech.us; Padilla, Lacy (TRBL); Croft, Katherine (TRBL); THPO Consulting
**Subject:** RE: Update to Cultural Study and Participation in Field Inspection for the Proposed Ritz Carlton Residences Project in the Southern Part of the City of Rancho Mirage, Riverside County (CRM TECH No. 3502)

Hello Nina,

Unfortunately we are juggling a lot this week and we will have to pass on the field inspection for this project. Please keep us updated.

Thank you,

Hannah Feeney
Cultural Resources Analyst
Agua Caliente Band of Cahuilla Indians
760-699-6828 (desk)
760-413-5836 (cell)

**NATIVE AMERICAN HERITAGE COMMISSION**
**Cultural and Environmental Department**
**1550 Harbor Blvd., Suite 100**
**West Sacramento, CA 95691**
**Phone: (916) 373-3710**
**Email: nahc@nahc.ca.gov**
**Website: http://www.nahc.ca.gov**
**Twitter: @CA_NAHC**

June 25, 2019

Nina Gallardo
CRM Tech

VIA Email to: ngallardo@crmtech.us

RE: Proposed Ritz Carlton Residences, Rancho Mirage Project, Riverside County

Dear Ms. Gallardo:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our lists contain current information. If you have any questions or need additional information, please contact me at my email address: steven.quinn@nahc.ca.gov.

Sincerely,

Steven Quinn
Associate Governmental Program Analyst

Attachment

**Native American Heritage Commission**
**Native American Contact List**
**Riverside County**
**6/25/2019**

***Agua Caliente Band of Cahuilla Indians***
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6907
Fax: (760) 699-6924
ACBCI-THPO@aguacaliente.net

***Agua Caliente Band of Cahuilla Indians***
Jeff Grubbe, Chairperson
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6800
Fax: (760) 699-6919

***Augustine Band of Cahuilla Mission Indians***
Amanda Vance, Chairperson
P.O. Box 846 — Cahuilla
Coachella, CA, 92236
Phone: (760) 398 - 4722
Fax: (760) 369-7161
hhaines@augustinetribe.com

***Cabazon Band of Mission Indians***
Doug Welmas, Chairperson
84-245 Indio Springs Parkway — Cahuilla
Indio, CA, 92203
Phone: (760) 342 - 2593
Fax: (760) 347-7880
jstapp@cabazonindians-nsn.gov

***Cahuilla Band of Indians***
Daniel Salgado, Chairperson
52701 U.S. Highway 371 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 5549
Fax: (951) 763-2808
Chairman@cahuilla.net

***Los Coyotes Band of Cahuilla and Cupeño Indians***
John Perada, Environmental Director
P. O. Box 189 — Cahuilla
Warner Springs, CA, 92086
Phone: (760) 782 - 0712
Fax: (760) 782-2730

***Los Coyotes Band of Cahuilla and Cupeño Indians***
Shane Chapparosa, Chairperson
P.O. Box 189 — Cahuilla
Warner Springs, CA, 92086-0189
Phone: (760) 782 - 0711
Fax: (760) 782-0712
Chapparosa@msn.com

***Morongo Band of Mission Indians***
Denisa Torres, Cultural Resources Manager
12700 Pumarra Rroad — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

***Morongo Band of Mission Indians***
Robert Martin, Chairperson
12700 Pumarra Rroad — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

***Ramona Band of Cahuilla***
John Gomez, Environmental Coordinator
P. O. Box 391670 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
jgomez@ramona-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Proposed Ritz Carlton Residences, Rancho Mirage Project, Riverside County.

**Native American Heritage Commission**
**Native American Contact List**
**Riverside County**
**6/25/2019**

***Ramona Band of Cahuilla***
Joseph Hamilton, Chairperson
P.O. Box 391670 Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
admin@ramona-nsn.gov

***Santa Rosa Band of Cahuilla Indians***
Steven Estrada, Chairperson
P.O. Box 391820 Cahuilla
Anza, CA, 92539
Phone: (951) 659 - 2700
Fax: (951) 659-2228
mflaxbeard@santarosacahuilla-nsn.gov

***Santa Rosa Band of Cahuilla Indians***
Mercedes Estrada,
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Anza, CA, 92539
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***Soboba Band of Luiseno Indians***
Scott Cozart, Chairperson
P. O. Box 487 Cahuilla
San Jacinto, CA, 92583 Luiseno
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jontiveros@soboba-nsn.gov

***Soboba Band of Luiseno Indians***
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 Cahuilla
San Jacinto, CA, 92581 Luiseno
Phone: (951) 663 - 5279
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

***Torres-Martinez Desert Cahuilla Indians***
Michael Mirelez, Cultural Resource Coordinator
P.O. Box 1160 Cahuilla
Thermal, CA, 92274
Phone: (760) 399 - 0022
Fax: (760) 397-8146
mmirelez@tmdci.org

***Twenty-Nine Palms Band of Mission Indians***
Anthony Madrigal, Tribal Historic Preservation Officer
46-200 Harrison Place Chemehuevi
Coachella, CA, 92236
Phone: (760) 775 - 3259
amadrigal@29palmsbomi-nsn.gov

***Twenty-Nine Palms Band of Mission Indians***
Darrell Mike, Chairperson
46-200 Harrison Place Chemehuevi
Coachella, CA, 92236
Phone: (760) 863 - 2444
Fax: (760) 863-2449
29chairman@29palmsbomi-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Proposed Ritz Carlton Residences, Rancho Mirage Project, Riverside County.

June 26, 2019

Patricia Garcia-Plotkin, Tribal Historic Preservation Officer
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92264

RE: Proposed Ritz Carlton Residences, Rancho Mirage Project
13 Acres in the City of Rancho Mirage, Riverside County, California
CRM TECH Contract #3502

Dear Ms. Garcia-Plotkin:

I am writing to bring your attention to an ongoing CEQA-compliance study for the proposed project referenced above. The project entails the construction of a hotel venue space and residential units on approximately 13 acres of land along Frank Sinatra Drive, just south of the Ritz Carlton Hotel, in the City of Rancho Mirage. Between 2006-2007, CRM TECH conducted a cultural resources survey and an archaeological monitoring program on this property as a part of the Lodge at Rancho Mirage Project. The accompanying map, based on the USGS Cathedral City and Rancho Mirage, Calif., 7.5' quadrangles, depicts the location of the project area in Section 3, T5S R5E, SBBM.

In a letter dated June 25, 2019, the Native American Heritage Commission reports that the sacred lands record search identified no Native American cultural resources within the project area, but recommends that local Native American groups be contacted for further information (see attached). Therefore, as part of the cultural resources study for this project, I am writing to request your input on potential Native American cultural resources in or near the project area.

Please respond at your earliest convenience if you have any specific knowledge of sacred/religious sites or other sites of Native American traditional cultural value in or near the project area, or any other information to consider during the cultural resources investigations. Any information or concerns may be forwarded to CRM TECH by telephone, e-mail, facsimile, or standard mail. Requests for documentation or information we cannot provide will be forwarded to our client and/or the lead agency, namely the City of Coachella.

We would also like to clarify that, as the cultural resources consultant for the project, CRM TECH is not involved in the AB 52-compliance process or in government-to-government consultations. The purpose of this letter is to seek any information that you may have to help us determine if there are cultural resources in or near the project area that we should be aware of and to help us assess the sensitivity of the project area. Thank you for your time and effort in addressing this important matter.

Respectfully,

Nina Gallardo
Project Archaeologist/Native American liaison
CRM TECH
Email: ngallardo@crmtech.us

Encl.: NAHC response letter and project location map

**From**: Cultural Department <culturaldirector@cahuilla.net>
**Sent**: Wednesday, June 26, 2019 3:54 PM
**To**: ngallardo@crmtech.us; anthonymad2002@gmail.com
**Subject**: Re: NA Scoping Letter for the Proposed Ritz Carlton Residences, Rancho Mirage Project, in the City of Rancho Mirage, Riverside County (CRM TECH No. 3502)

Good Afternoon Ms. Gallardo,

The Cahuilla Band of Indians received your letter of June 26, 2019 regarding the above project located in the City of Rancho Mirage, Riverside County, Ca. We do not have knowledge of any cultural resources near or within the project area. We request that you reach out the Agua Caliente Band of Indians regarding this project and to continue the consulting process with them. We appreciate your help in preserving Tribal Cultural Resources in your project.

Respectfully,

BobbyRay Esparza
Cultural Coordinator
Cahuilla Band of Indians
Cell: (760)423-2773
Office: (951)763-5549
Fax:(951)763-2808

AGUA CALIENTE BAND OF CAHUILLA INDIANS

TRIBAL HISTORIC PRESERVATION

*03-008-2006-001*

June 27, 2019

[VIA EMAIL TO:ngallardo@crmtech.us]
CRM TECH
Ms. Nina Gallardo
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

**Re: Ritz Carlton Residences**

Dear Ms. Nina Gallardo,

The Agua Caliente Band of Cahuilla Indians (ACBCI) appreciates your efforts to include the Tribal Historic Preservation Office (THPO) in the The Lodge at Rancho Mirage project. The project area is not located within the boundaries of the ACBCI Reservation. However, it is within the Tribe's Traditional Use Area. For this reason, the ACBCI THPO requests the following:

*A copy of the records search with associated survey reports and site records from the information center.

*Copies of any cultural resource documentation (report and site records) generated in connection with this project.

*The presence of an approved Agua Caliente Native American Cultural Resource Monitor(s) during any ground disturbing activities (including archaeological testing and surveys). Should buried cultural deposits be encountered, the Monitor may request that destructive construction halt and the Monitor shall notify a Qualified Archaeologist (Secretary of the Interior's Standards and Guidelines) to investigate and, if necessary, prepare a mitigation plan for submission to the State Historic Preservation Officer and the Agua Caliente Tribal Historic Preservation Office.

Again, the Agua Caliente appreciates your interest in our cultural heritage. If you have questions or require additional information, please call me at (760)699-6956. You may also email me at ACBCI-THPO@aguacaliente.net.

Cordially,

Lacy Padilla
Archaeologist
Tribal Historic Preservation Office
AGUA CALIENTE BAND
OF CAHUILLA INDIANS

**From:** Tribal Historic Preservation Office <thpo@morongo-nsn.gov>
**Sent:** Monday, July 1, 2019 4:02 PM
**To:** 'ngallardo@crmtech.us'
**Subject:** Ritz Carlton Residences, Rancho Mirage

Hello,

Thank you for your letter regarding the project.

We have no additional information to provide at this time and will likely defer to the Agua Caliente Band of Cahuilla for this project during AB 52 consultation.

Thank you for reaching out to our office.

Sincerely,

Travis Armstrong
Tribal Historic Preservation Officer
Morongo Band of Mission Indians
951-755-5259
Email: thpo@morongo-nsn.gov

# AUGUSTINE BAND OF CAHUILLA INDIANS

**PO Box 846 84-481 Avenue 54 Coachella CA 92236**
**Telephone: (760) 398-4722**
**Fax (760) 369-7161**
**Tribal Chairperson: Amanda Vance**
**Tribal Vice-Chairperson: William Vance**
**Tribal Secretary: Victoria Martin**


August 28, 2019

Nina Gallardo
CRM Tech
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

RE: Proposed Ritz Carlton Residents, Ranch Mirage Project
13 Acres in the City of Rancho Mirage, Riverside County, California
CRM TECH Contract #3502

Dear Ms. Gallardo-

Thank you for the opportunity to offer input concerning the development of the above-identified project. We appreciate your sensitivity to the cultural resources that may be impacted by your project, and the importance of these cultural resources to the Native American peoples that have occupied the land surrounding the area of your project for thousands of years. Unfortunately, increased development and lack of sensitivity to cultural resources has resulted in many significant cultural resources being destroyed or substantially altered and impacted. Your invitation to consult on this project is greatly appreciated.

At this time, we are unaware of specific cultural resources that may be affected by the proposed project, however in the event you should discover any cultural resources during the development of this project please contact our office immediately for further evaluation.

Very truly yours,

Augustine Band of Cahuilla Indians

Victoria Martin
Tribal Secretary

AUG 30 2019

**From:** Nina Gallardo <ngallardo@crmtech.us>
**Sent:** Wednesday, September 4, 2019 11:29 AM
**To:** lpadilla@aguacaliente.net; 'Feeney, Hannah (TRBL)'; Agua Caliente Tribal Historic Preservation Office (ACBCI-THPO@aguacaliente.net)
**Subject:** Cultural Study and participation in Field Survey for the Proposed Sky Mesa Recreation Area Project at the Ritz-Carlton, City of Rancho Mirage, Riverside Co. (CRM TECH No. 3539)

Hello,

I'm writing to inform you that CRM TECH will be conducting the cultural resources study for the proposed Sky Mesa Recreation Area Project at the Ritz-Carlton, in the western part of the City of Rancho Mirage, Riverside County (CRM TECH No. 3539). The project is located just east of the Ritz Carlton Residences Project (CRM TECH No. 3502) that was surveyed a few months ago. Specifically, I am contacting you to see if the tribe would like to participate in the field survey, which we would like to do this Friday morning (9/6). We would also appreciate any information that the tribe can provided about the project location. Please feel free to email back with any questions regarding the project and possible availability for the field survey.

Thank you for your time and input on this project.

Nina Gallardo
(909) 824-6400 (phone)
(909) 824-6405 (fax)
CRM TECH
1016 E. Cooley Drive, Ste. A/B
Colton, CA 92324

---

**From:** Nina Gallardo <ngallardo@crmtech.us>
**Sent:** Thursday, September 5, 2019 12:53 PM
**To:** lpadilla@aguacaliente.net; 'Feeney, Hannah (TRBL)'; Katherine Croft (TRBL) (kcroft@aguacaliente.net); Agua Caliente Tribal Historic Preservation Office (ACBCI-THPO@aguacaliente.net)
**Subject:** FW: Cultural Study and participation in Field Survey for the Proposed Sky Mesa Recreation Area Project at the Ritz-Carlton, City of Rancho Mirage, Riverside Co. (CRM TECH No. 3539)

Hello,

I'm emailing to see if tomorrow morning (9/6) for the above-mentioned project is convenient for the tribe to join us on the survey. If it's not possible, then is next Monday morning (Sept. 9th) more convenient for the tribe?

Thanks,

Nina
CRM TECH
909-824-6400

**From:** Padilla, Lacy (TRBL) <lpadilla@aguacaliente.net>
**Sent:** Thursday, September 5, 2019 1:23 PM
**To:** ngallardo@crmtech.us
**Subject:** RE: Cultural Study and participation in Field Survey for the Proposed Sky Mesa Recreation Area Project at the Ritz-Carlton, City of Rancho Mirage, Riverside Co. (CRM TECH No. 3539)

Hi Nina,

We are still very busy in our office and will be unable to make it to the survey. If you could please let us know if you find anything, we would appreciate it.

Thank you,
Lacy

# **Appendix D**
Drainage Study

# Preliminary Drainage Study
## for
# Ritz Carlton Rancho Mirage
## City of Rancho Mirage

Prepared for:
Kam Sang Company, Inc.
411 E. Huntington Drive #305
Arcadia, CA 91006

September 3, 2019

Prepared by:

Tory Walker, PE, CFM, LEED GA
R.C.E. 45005

TORY R. WALKER ENGINEERING
RELIABLE SOLUTIONS IN WATER RESOURCES
122 CIVIC CENTER DR, STE 206, VISTA, CA 92084 · 760-414-9212

TORY R. WALKER ENGINEERING
RELIABLE SOLUTIONS IN WATER RESOURCES

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**REFERENCES**

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1. Site Maps
2. RCFC&WCD Hydrology Manual Charts and NOAA Atlas 14 Rainfall Data
3. Rational Method Hydrology Calculations
4. Onsite Detention Analysis

# CHAPTER 1 - BACKGROUND

## 1.1 – Introduction

The purpose of this report is to summarize the preliminary (CEQA level) hydrologic analysis of the proposed Ritz Carlton Rancho Mirage project, which includes the proposed Residences and Sky Mesa Recreation Area. The project site is located just east of the intersection of Frank Sinatra Drive and Mirada Circle, in the City of Rancho Mirage, CA. An increase in runoff is anticipated for the Residences portion of the project due to diversion of some drainage areas, and since the total impervious area will be greater in developed conditions. Therefore, a detention routing analysis is necessary to demonstrate that the developed condition 100-year peak flow is below the existing condition level. This study analyzes the following:

1. 100-Year Rational Method hydrology for the existing and proposed conditions
2. 100-Year Unit Hydrograph hydrology for demonstration of onsite detention for the Residences

## 1.2 – Summary of Existing Conditions

### The Residences

The majority of the existing site is mass graded and there is little to no vegetative cover. The total drainage area of the project site is approximately 14 acres with Hydrologic Soil Group Type B soils. The soil type was assumed based on the project's geotechnical study (the project is not mapped by the Riverside County hydrology manual or the NRCS Web Soil Survey).

Onsite runoff is conveyed via sheet flow and shallow drainage courses to the project's discharge points along the western and eastern property boundary (see Existing Condition Hydrology Map in Appendix 1). The existing site is divided into three basins, Basin 100 (denoted by 100 series nodes), Basin 200 (denoted by 200 series nodes), and Basin 300 (denoted by 300 series nodes). Basin 100 drains generally west to the gutter on Frank Sinatra Drive (Discharge Point 1). From Discharge Point 1, flow is conveyed north in the Frank Sinatra Drive gutter to an existing inlet and storm drain system, which eventually discharges to a natural drainage channel. Basin 200 drains generally east to Discharge Point 2 in the natural drainage channel located east of the site. Basin 300 drains west to Discharge Point 3 at the Mirada Circle gutter, which flows west and eventually discharges to a natural drainage channel.

### Sky Mesa Recreation Area

The existing site is partially graded with generally poor desert vegetative cover. The total drainage area of the project site is approximately 2.6 acres with Hydrologic Soil Group Type B soils. The soil type was assumed based on the project's geotechnical study (the project is not mapped by the Riverside County hydrology manual or the NRCS Web Soil Survey).

Onsite runoff is conveyed via sheet flow and shallow drainage courses to the project's discharge points along the western property boundary (see Existing Condition Hydrology Map in Appendix 1). The existing site is divided into two basins, Basin 400 (denoted by 400 series nodes), and Basin 500 (denoted by 500 series nodes). Basin 400 drains generally west to the existing Ritz Carlton development (Discharge Point 4). Basin 500 drains northwest to Discharge Point 5 in the existing natural drainage channel west of the site.

## 1.3 – Summary of Proposed Conditions

The Residences

The proposed development project includes residential condo and townhome type buildings, road, driveway, parking, patio, and landscaped areas. The project site will be divided into three major drainage basins such that the overall site drainage patterns will remain similar to the existing condition. Basin 100 (100 series nodes) will drain to Discharge Point 1, Basin 200 (200 series nodes) will drain to Discharge Point 2, and Basin 300 (300 series nodes) will drain to Discharge Point 3 (see Proposed Condition Hydrology Map in Appendix 1). The development will increase the impervious area and the drainage area for Discharge Points 1 and 2; therefore, underground detention vaults are proposed to mitigate the increase in peak flow to below existing levels. For Discharge Point 1, the portion of Basin 100 draining to Node 102 will enter detention Vault-1. Detained flow from Vault-1 will be discharged via storm drain and a curb outlet to Frank Sinatra Drive, where it will join with flow from the remaining area that bypasses the vault. For Discharge Point 2, the portion of Basin 200 draining to Node 204 will enter detention Vault-2. Detained flow from Vault-2 will be discharged via storm drain to the existing natural channel, where it will join with flow from the remaining area that bypasses the vault.

Sky Mesa Recreation Area

The Sky Mesa Recreation Area includes a restaurant with roof top garden (built into the natural hillside), driveway, patio, pool, sidewalk, lawn, and desert landscape areas. The project site will be divided into two major drainage basins such that the overall site drainage patterns will remain similar to the existing condition. Basin 400 (400 series nodes) will drain to Discharge Point 4, and Basin 500 (500 series nodes) will drain to Discharge Point 5 (see Proposed Condition Hydrology Map in Appendix 1). The project reduces the average onsite slope, maximizes pervious area by incorporating roof top garden areas for the restaurant, and provides extensive landscape areas throughout the site. Therefore, no increase in peak flow rates is anticipated in the proposed condition.

# CHAPTER 2 – HYDROLOGIC ANALYSIS

## 2.1 – Methodology

Methodology used for the computation of storm runoff is consistent with criteria set forth in the Riverside County Flood Control and Water Conservation District (RCFC&WCD) Hydrology Manual. Advanced Engineering Software (AES) was used for computing hydrologic calculations, which integrates the RCFC&WCD methodology and standards.

### 2.1.1 Design Storms

The 100-year storm was analyzed using the Rational Method from Section D of the RCFC&WCD Hydrology Manual. The 100-year peak flow was determined for each of the project's discharge points for existing and proposed conditions in order to quantify the project's hydrologic impacts.

### 2.1.2 Rational Method

The Rational Method, as described in the RCFC&WCD Hydrology Manual, was used to generate peak flows for this project. The Rational Method is an appropriate methodology because the drainage area size is relatively small (less than 300 to 500 acres). The Rational Method inputs include the land cover type, flow length, elevation, and drainage area.

### 2.1.3 "Short Cut" Synthetic Unit Hydrograph Method

The "Short Cut" Synthetic Unit Hydrograph Method," as described in the RCFC&WCD Hydrology Manual, was used to determine the detained peak flow from the Residences project site. The Short Cut Method is an appropriate methodology because of the small drainage area and need to route the site-specific hydrograph through the proposed underground detention vaults.

## 2.2 – Existing Condition Hydrology Approach and Results

### 2.2.1 Soil Type and Land Cover

The soil type for the project site is not mapped within the RCFC&WCD Hydrology Manual or the NRCS Web Soil Survey. The geotechnical report indicated a mixture of sandy soils, underlying rock layers, rocky areas, and exposed rock layers. The sandy soils would typically infiltrate well (Type A or B soil), while the rock areas will have poor infiltration (Type C or D). Therefore, an average condition of Soil Type B was assumed to represent the entire project site. The land cover consists primarily of open graded dirt areas and rocky slopes with poor vegetation cover (low density desert vegetation). Some areas around the perimeter of the site include paved road and driveway areas. Runoff coefficient C-values were assigned based on the combinations of land cover, paved, and building surfaces/types, as well as the percent impervious area for each subarea.

### 2.2.2 Peak Flow Determination

The Rational Method was used to analyze the 100-year storm for the existing condition. Pre-developed peak flows were computed by AES Rational Method software for Riverside County and are presented in Table 1a and 1b below. Supporting calculations are provided in Appendix 3.

**TABLE 1a: Existing Condition Peak Flow Table (The Residences)**

| Location | Area (ac) | $Q_{100}$ (cfs) |
|---|---|---|
| Discharge Point 1 (Basin 100) | 3.5 | 17.0 |
| Discharge Point 2 (Basin 200) | 8.3 | 37.5 |
| Discharge Point 3 (Basin 300) | 1.9 | 9.2 |
| TOTAL | 13.7 | |

**TABLE 1b: Existing Condition Peak Flow Table (Sky Mesa)**

| Location | Area (ac) | $Q_{100}$ (cfs) |
|---|---|---|
| Discharge Point 4 (Basin 400) | 0.50 | 2.91 |
| Discharge Point 5 (Basin 500) | 2.04 | 10.7 |
| TOTAL | 2.54 | |

## 2.3 – Proposed Condition Hydrology Approach and Results

### 2.3.1 Soil Type and Land Cover

The Residences portion of the project site predominantly consists of Soil Type D, based on the extensive rock layers noted in the geotechnical report, and the assumption that most of the site's soil will be compacted for development. For the Sky Mesa Recreation Area, Type B soil was assumed to represent the proposed landscape and undisturbed natural areas. The land cover consists of rooftop, paved parking, driveway, patio, pool, sidewalk, lawn, desert landscaped areas, and natural areas with desert vegetation. Runoff coefficient C-values were assigned based on the combinations of land cover, paved, and building surfaces/types, as well as the percent impervious area for each subarea.

### 2.3.2 Peak Flow Determination

The Rational Method was used to analyze the 100-year storm for the proposed condition. Post-developed peak flows were computed by AES Rational Method software for Riverside County and are presented in Table 2a and 2b below. Supporting calculations are provided in Appendix 3.

As the Residences project increases the 100-year peak flow for Discharge Points 1 and 2, a detention analysis was carried out to reduce the proposed peak flow below existing condition level (see Section 2.3.3 below). Due to the reduction in drainage area for Discharge Point 3, the proposed peak flow is less than existing conditions and no detention is required.

The Sky Mesa Recreation Area project reduces the average onsite slope, maximizes pervious area by incorporating roof top garden areas for the restaurant, and provides extensive landscape areas throughout the site. Therefore, the proposed peak flow is less than existing conditions and no detention is required.

**TABLE 2a: Proposed Condition Peak Flow Table (The Residences)**

| Location | Area (ac) | $Q_{100}$ (cfs) |
|---|---|---|
| Discharge Point 1 (Basin 100) | 4.5 | 24.4 |
| Discharge Point 2 (Basin 200) | 8.1 | 42.0 |
| Discharge Point 3 (Basin 300) | 1.1 | 6.4 |
| TOTAL | 13.7 | |

**TABLE 2b: Proposed Condition Peak Flow Table (Sky Mesa)**

| Location | Area (ac) | $Q_{100}$ (cfs) |
|---|---|---|
| Discharge Point 4 (Basin 400) | 0.49 | 2.39 |
| Discharge Point 5 (Basin 500) | 2.15 | 9.42 |
| TOTAL | 2.64 | |

### 2.3.3 Detention Analysis

To analyze the onsite detention provided by the proposed underground detention vaults, "Shortcut Method" Synthetic Unit Hydrographs were created for the existing and proposed conditions. For the proposed condition, hydrographs were generated for the tributary area to each vault (inflow hydrograph), and for the bypass area not draining to the vault. The hydrographs were entered into HEC-HMS, which was used to route the inflow hydrograph through the detention vault to size the outlet structure and vault, as required to reduce the peak flow below existing conditions. The results are summarized in Table 3:

**TABLE 3 – Existing vs. Proposed Condition Peak Flows**

| Synthetic Unit Hydrograph 100-year, 24-hour Peak Flow Rate (cfs) | | | | |
|---|---|---|---|---|
| **Location** | **Existing** | **Proposed** | **Detained** | **Diff** |
| Discharge Point 1 | 2.03 | 2.97 | 2.01 | -0.02 |
| Discharge Point 2 | 4.74 | 5.32 | 4.63 | -0.11 |

Vault 1 is located at Node 102 and provides 100-year detention for Discharge Point 1. Vault 2 is located at Node 204 and provides 100-year detention for Discharge Point 2. The conceptual location and footprint of each vault is shown on the Proposed Condition Hydrology Map in Appendix 1. Preliminary vault and outlet structure dimensions are provided in Tables 4.1 and 4.2:

**TABLE 4.1: Detention Vault Dimensions**

| Detention Vault ID | Depth (ft) | Footprint Area (sf) | Total Volume (cf) (Assumed Vault Porosity = 0.95) |
|---|---|---|---|
| Vault-1 | 6.0 | 2,600 | 14,820 |
| Vault-2 | 6.0 | 1,000 | 5,700 |

**TABLE 4.2: Outlet Structure Dimensions**

| Detention Vault ID | RISER DIMENSIONS FOR POC-1 | | | | |
|---|---|---|---|---|---|
| | LOWER OUTLET | | | EMERGENCY OVERFLOW WEIR | |
| | Outlet Type | Invert Elevation (ft) | Diameter (in) | Invert Elevation (ft) | Weir Length (ft) |
| 1 | Orifice | 0.00 | 3.375 | 6.00 | 6.0 |
| 2 | Orifice | 0.00 | 6.5 | 6.00 | 9.0 |

# CHAPTER 3 – CONCLUSION

The proposed Ritz Carlton Residences and Sky Mesa Recreation Area projects, as designed, will not substantially alter the existing drainage pattern. The total overall 100-year peak flowrate will not increase from pre- to post- project condition at the project's discharge points; therefore runoff from the proposed project will not exceed the capacity of the downstream drainage system. For the Residences, this will be achieved by adequately detaining the 100-year storm in the proposed underground detention vaults, and providing proper energy dissipation at each of the project's discharge points.

Additional impacts to streams or rivers are not anticipated for this project. This is because there are no streams or rivers running through or immediately around the project site, and proposed onsite peak flows are less than existing levels. Therefore, the project will not result in any on- or off-site erosion, siltation, or flooding.

Based on topography and FEMA floodplain maps, the project site is not located near a 100-year flood hazard area boundary. No housing is proposed within a 100-year flood hazard area, and no structures are proposed within a 100-year flood hazard area which would impede or redirect flood flows. Furthermore, the project will not expose people or structures to a significant risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam, as there are no levees or dams impacted by the project site.

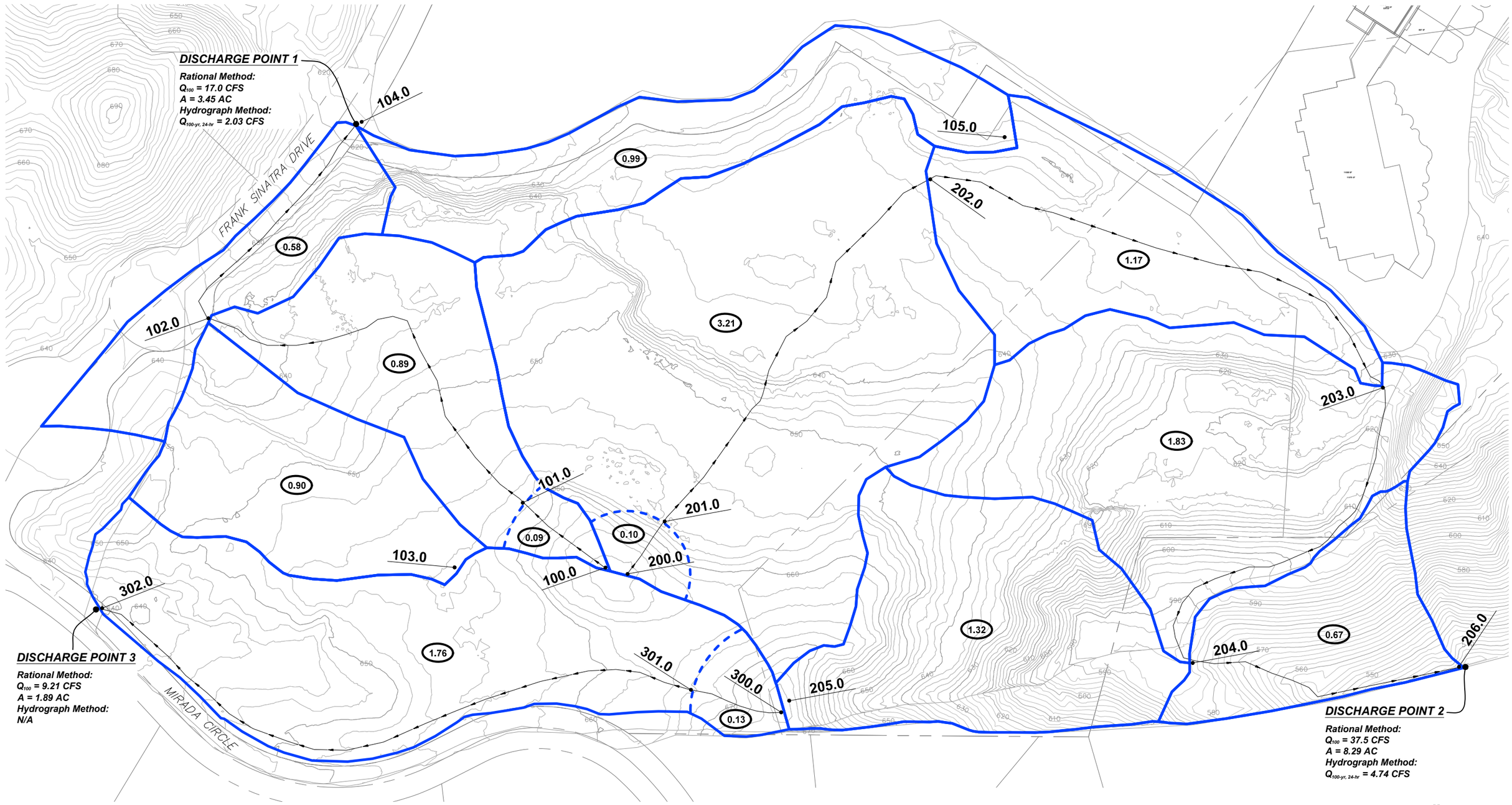
## REFERENCES

1. Riverside County Flood Control and Water Conservation District, *Hydrology Manual,* April 1978.
2. *Planning-Level Geotechnical Feasibility Report Proposed Expansion Project The Lodge at Rancho Mirage*, prepared by Earth Systems Southwest, March 15, 2006.

# APPENDIX 1

## Site Maps

- Existing and Proposed Hydrology Maps
- Conceptual Grading Study




## LEGEND

- SUBAREA DRAINAGE BOUNDARY
- INITIAL SUBAREA BOUNDARY
- FLOWPATH
- 100.0 — RATIONAL METHOD NODE
- 0.08 — SUBAREA DRAINAGE AREA (AC)
- 610 — EXISTING CONTOUR

N W E S

0 40 80 FEET

SCALE: 1" = 40'

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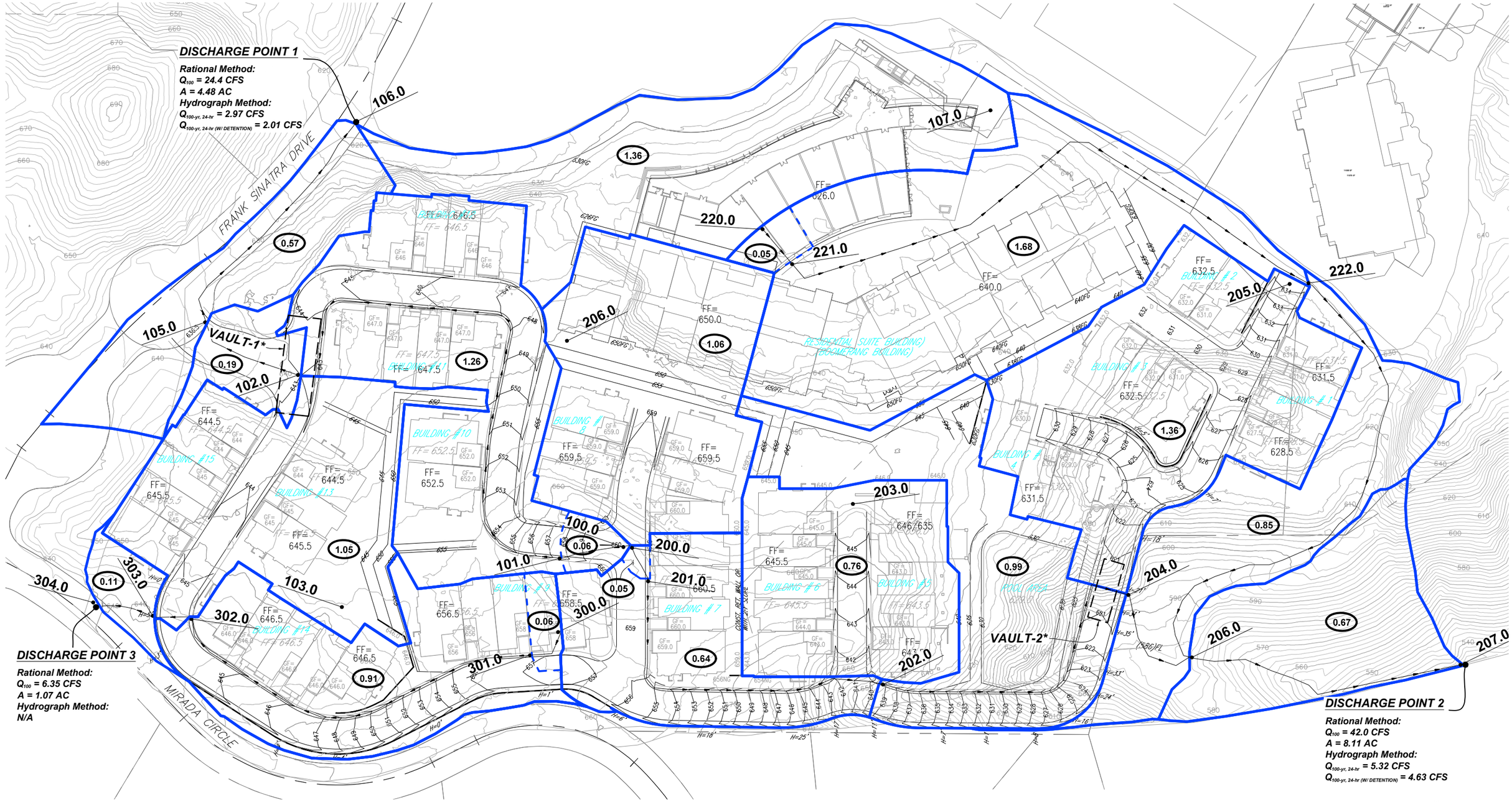
# RITZ CARLTON RESIDENCES RANCHO MIRAGE

## EXISTING CONDITION HYDROLOGY MAP




## LEGEND

- SUBAREA DRAINAGE BOUNDARY
- INITIAL SUBAREA BOUNDARY
- FLOWPATH
- 100.0 — RATIONAL METHOD NODE
- 0.08 — SUBAREA DRAINAGE AREA (AC)
- 610 — PROPOSED CONTOUR/SURFACE
- 610 — EXISTING CONTOUR

*NOTE: PRELIMINARY LOCATION OF UNDERGROUND DETENTION VAULTS (VAULT–1 AND VAULT–2). REFER TO REPORT SECTION 2.3.3 FOR ADDITIONAL INFORMATION.

N W E S

0 40 80 FEET

SCALE: 1" = 40'

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**RITZ CARLTON RESIDENCES**
**RANCHO MIRAGE**

# PROPOSED CONDITION HYDROLOGY MAP




BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

BENCH MARK
2 1/2" BRASS DISK STAMPED "COUNTY OF RIVERSIDE PD-21, DEC. 1963" SET IN HEADWALL ON SOUTH SIDE OF HWY 111, 360 FEET NW OF FRANK SINATRA DRIVE


OWNER:
KAM SANG COMPANY, INC.
411 E. HUNTINGTON DRIVE, #305
ARCADIA, CA 91006
TEL: (626) 446-2988
FAX: (626) 446-3392
E-MAIL: www.kamsangcompany.com

ARCHITECT:
LCRA
ARCHITECTURE & PLANNING
35 HUGUS ALLEY, SUITE 220
PASADENA, CA 91103
TEL. (626) 449-9698
E-MAIL: www.lcra-architects.com

PREPARED BY:
FOCUS ENGINEERING, INC.
25 MAUCHLY, SUITE 317
IRVINE, CA 92618
TEL: (949) 450-0590
FAX: (949) 450-0592
E-MAIL: focusengring@sbcglobal.net


REGISTERED PROFESSIONAL ENGINEER
CHUA LIN LTD
No. 41497
EXP. 12/31/19
CIVIL
STATE OF CALIFORNIA

REVISIONS

| NO. | DATE | DESCRIPTION |
|---|---|---|
| | | |

# CITY OF RANCHO MIRAGE

## CONCEPTUAL GRADING STUDY FOR RANCHO MIRAGE – RITZ II

## SITE GRADING WITHOUT EXISTING TOPO

PRINT DATE: 2018-06-26

SHEET
OF
1

**DISCHARGE POINT 4**

*Rational Method:*
$Q_{100}$ = 2.91 CFS
A = 0.50 AC

**DISCHARGE POINT 5**

*Rational Method:*
$Q_{100}$ = 10.7 CFS
A = 2.04 AC

402.0
503.0
500.0
401.0
501.0
400.0
502.0
0.46
0.02
0.04
1.25
0.78

## LEGEND

- SUBAREA DRAINAGE BOUNDARY
- INITIAL SUBAREA BOUNDARY
- FLOWPATH
- 400.0 RATIONAL METHOD NODE
- 0.08 SUBAREA DRAINAGE AREA (AC)
- 610 EXISTING CONTOUR

N S E W

0 20 40 FEET

SCALE: 1" = 20'

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**RITZ CARLTON**
**SKY MESA RECREATION AREA**

# EXISTING CONDITION HYDROLOGY MAP

**DISCHARGE POINT 4**

*Rational Method:*
*$Q_{100}$ = 2.39 CFS*
*A = 0.49 AC*

**DISCHARGE POINT 5**

*Rational Method:*
*$Q_{100}$ = 9.42 CFS*
*A = 2.15 AC*

403.0
402.0
401.0
400.0
501.0
500.0
502.0
505.0
504.0
503.0
506.0

0.30
0.08
0.10
0.36
0.04
0.44
1.14
0.17

## LEGEND

- SUBAREA DRAINAGE BOUNDARY
- INITIAL SUBAREA BOUNDARY
- FLOWPATH
- 100.0 RATIONAL METHOD NODE
- (0.08) SUBAREA DRAINAGE AREA (AC)
- 610 PROPOSED CONTOUR/SURFACE
- 610 EXISTING CONTOUR
- ROOF TOP DESERT GARDEN AREA

0 20 40 FEET
SCALE: 1" = 20'


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# RITZ CARLTON
# SKY MESA RECREATION AREA

## *PROPOSED CONDITION HYDROLOGY MAP*

# APPENDIX 2

## RCFC&WCD Hydrology Manual Charts
## And NOAA Atlas 14 Rainfall Data

## ACTUAL IMPERVIOUS COVER

| Land Use (1) | Range-Percent | Recommended Value For Average Conditions-Percent(2) |
|---|---|---|
| Natural or Agriculture | 0 - 10 | 0 |
| Single Family Residential: (3) | | |
| 40,000 S. F. (1 Acre) Lots | 10 - 25 | 20 |
| 20,000 S. F. (½ Acre) Lots | 30 - 45 | 40 |
| 7,200 - 10,000 S. F. Lots | 45 - 55 | 50 |
| Multiple Family Residential: | | |
| Condominiums | 45 - 70 | 65 |
| Apartments | 65 - 90 | 80 |
| Mobile Home Park | 60 - 85 | 75 |
| Commercial, Downtown Business or Industrial | 80 -100 | 90 |

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

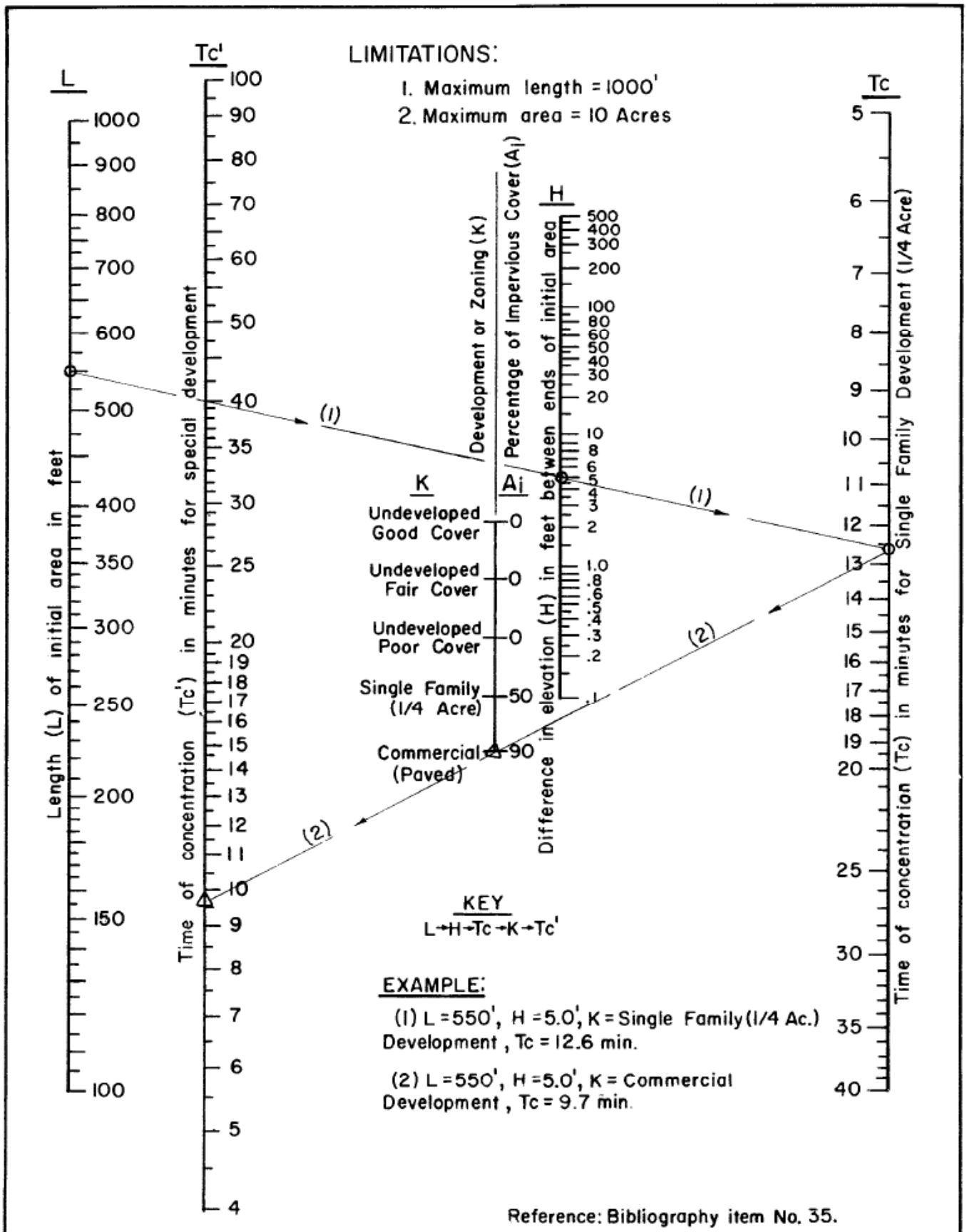
2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

**RCFC & WCD**
HYDROLOGY MANUAL

IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE D-5.6




Reference: Bibliography item No. 35.

**RCFC & WCD**

HYDROLOGY MANUAL

# TIME OF CONCENTRATION FOR INITIAL SUBAREA

PLATE D-3

**NOAA Atlas 14, Volume 6, Version 2**
**Location name: Rancho Mirage, California, USA***
**Latitude: 33.766°, Longitude: -116.4573°**
**Elevation: 661.75 ft****
* source: ESRI Maps
** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **0.900** (0.756-1.09) | **1.48** (1.22-1.79) | **2.39** (1.98-2.90) | **3.29** (2.71-4.03) | **4.78** (3.80-6.06) | **6.18** (4.81-8.00) | **7.86** (5.98-10.4) | **10.2** (7.54-14.0) | **16.3** (11.5-23.3) | **23.3** (15.9-34.5) |
| 10-min | **0.642** (0.540-0.780) | **1.06** (0.876-1.28) | **1.72** (1.42-2.08) | **2.36** (1.94-2.89) | **3.43** (2.72-4.34) | **4.43** (3.45-5.74) | **5.63** (4.28-7.49) | **7.31** (5.39-10.0) | **11.7** (8.27-16.7) | **16.7** (11.4-24.7) |
| 15-min | **0.520** (0.432-0.628) | **0.852** (0.708-1.03) | **1.38** (1.15-1.68) | **1.90** (1.56-2.33) | **2.76** (2.20-3.50) | **3.57** (2.78-4.62) | **4.54** (3.45-6.04) | **5.89** (4.35-8.06) | **9.43** (6.67-13.5) | **13.5** (9.19-19.9) |
| 30-min | **0.420** (0.350-0.510) | **0.688** (0.574-0.834) | **1.12** (0.928-1.36) | **1.54** (1.27-1.89) | **2.23** (1.78-2.84) | **2.89** (2.25-3.75) | **3.68** (2.79-4.89) | **4.77** (3.52-6.53) | **7.63** (5.40-10.9) | **10.9** (7.44-16.1) |
| 60-min | **0.290** (0.242-0.351) | **0.474** (0.395-0.575) | **0.771** (0.640-0.937) | **1.06** (0.873-1.30) | **1.54** (1.23-1.95) | **1.99** (1.55-2.58) | **2.53** (1.93-3.37) | **3.29** (2.43-4.50) | **5.26** (3.72-7.51) | **7.51** (5.13-11.1) |
| 2-hr | **0.194** (0.162-0.234) | **0.318** (0.265-0.386) | **0.506** (0.420-0.616) | **0.680** (0.560-0.834) | **0.952** (0.758-1.21) | **1.19** (0.928-1.54) | **1.47** (1.11-1.95) | **1.78** (1.32-2.44) | **2.66** (1.88-3.79) | **3.79** (2.59-5.61) |
| 3-hr | **0.153** (0.127-0.185) | **0.250** (0.208-0.303) | **0.393** (0.327-0.478) | **0.522** (0.431-0.641) | **0.720** (0.573-0.913) | **0.889** (0.693-1.15) | **1.08** (0.820-1.44) | **1.30** (0.956-1.77) | **1.79** (1.26-2.55) | **2.55** (1.74-3.77) |
| 6-hr | **0.102** (0.085-0.124) | **0.165** (0.138-0.201) | **0.256** (0.213-0.311) | **0.336** (0.277-0.412) | **0.454** (0.361-0.576) | **0.553** (0.431-0.717) | **0.661** (0.502-0.879) | **0.781** (0.577-1.07) | **0.959** (0.679-1.37) | **1.29** (0.883-1.91) |
| 12-hr | **0.063** (0.053-0.077) | **0.101** (0.084-0.122) | **0.154** (0.128-0.187) | **0.200** (0.164-0.245) | **0.267** (0.212-0.339) | **0.323** (0.251-0.418) | **0.383** (0.291-0.509) | **0.449** (0.331-0.614) | **0.545** (0.386-0.778) | **0.649** (0.443-0.959) |
| 24-hr | **0.038** (0.033-0.043) | **0.059** (0.052-0.068) | **0.089** (0.079-0.103) | **0.115** (0.101-0.135) | **0.153** (0.130-0.185) | **0.185** (0.153-0.227) | **0.219** (0.177-0.275) | **0.255** (0.202-0.330) | **0.309** (0.234-0.416) | **0.354** (0.259-0.492) |
| 2-day | **0.022** (0.019-0.025) | **0.034** (0.030-0.039) | **0.050** (0.044-0.058) | **0.065** (0.057-0.076) | **0.087** (0.073-0.104) | **0.104** (0.087-0.128) | **0.124** (0.100-0.156) | **0.145** (0.114-0.187) | **0.176** (0.133-0.236) | **0.201** (0.148-0.280) |
| 3-day | **0.015** (0.014-0.018) | **0.024** (0.021-0.027) | **0.035** (0.031-0.041) | **0.046** (0.040-0.053) | **0.061** (0.052-0.074) | **0.074** (0.061-0.091) | **0.088** (0.071-0.110) | **0.103** (0.081-0.133) | **0.126** (0.095-0.169) | **0.145** (0.106-0.201) |
| 4-day | **0.012** (0.011-0.014) | **0.018** (0.016-0.021) | **0.027** (0.024-0.032) | **0.035** (0.031-0.041) | **0.047** (0.040-0.057) | **0.057** (0.047-0.070) | **0.068** (0.055-0.085) | **0.080** (0.063-0.103) | **0.097** (0.074-0.131) | **0.112** (0.082-0.156) |
| 7-day | **0.007** (0.007-0.009) | **0.011** (0.010-0.013) | **0.017** (0.015-0.020) | **0.022** (0.019-0.026) | **0.029** (0.025-0.035) | **0.035** (0.029-0.044) | **0.042** (0.034-0.053) | **0.050** (0.039-0.064) | **0.061** (0.046-0.082) | **0.070** (0.051-0.097) |
| 10-day | **0.006** (0.005-0.006) | **0.008** (0.007-0.010) | **0.013** (0.011-0.015) | **0.016** (0.014-0.019) | **0.022** (0.018-0.026) | **0.026** (0.022-0.032) | **0.031** (0.025-0.039) | **0.037** (0.029-0.048) | **0.045** (0.034-0.061) | **0.052** (0.038-0.073) |
| 20-day | **0.003** (0.003-0.004) | **0.005** (0.004-0.005) | **0.007** (0.006-0.008) | **0.009** (0.008-0.011) | **0.012** (0.010-0.015) | **0.015** (0.012-0.018) | **0.018** (0.014-0.022) | **0.021** (0.017-0.027) | **0.026** (0.020-0.035) | **0.030** (0.022-0.042) |
| 30-day | **0.002** (0.002-0.003) | **0.004** (0.003-0.004) | **0.005** (0.005-0.006) | **0.007** (0.006-0.008) | **0.009** (0.008-0.011) | **0.012** (0.010-0.014) | **0.014** (0.011-0.017) | **0.016** (0.013-0.021) | **0.020** (0.015-0.027) | **0.023** (0.017-0.032) |
| 45-day | **0.002** (0.002-0.002) | **0.003** (0.002-0.003) | **0.004** (0.004-0.005) | **0.005** (0.005-0.006) | **0.007** (0.006-0.009) | **0.009** (0.007-0.011) | **0.010** (0.009-0.013) | **0.012** (0.010-0.016) | **0.015** (0.012-0.021) | **0.018** (0.013-0.025) |
| 60-day | **0.001** (0.001-0.002) | **0.002** (0.002-0.003) | **0.003** (0.003-0.004) | **0.004** (0.004-0.005) | **0.006** (0.005-0.007) | **0.007** (0.006-0.009) | **0.009** (0.007-0.011) | **0.010** (0.008-0.013) | **0.013** (0.010-0.017) | **0.015** (0.011-0.021) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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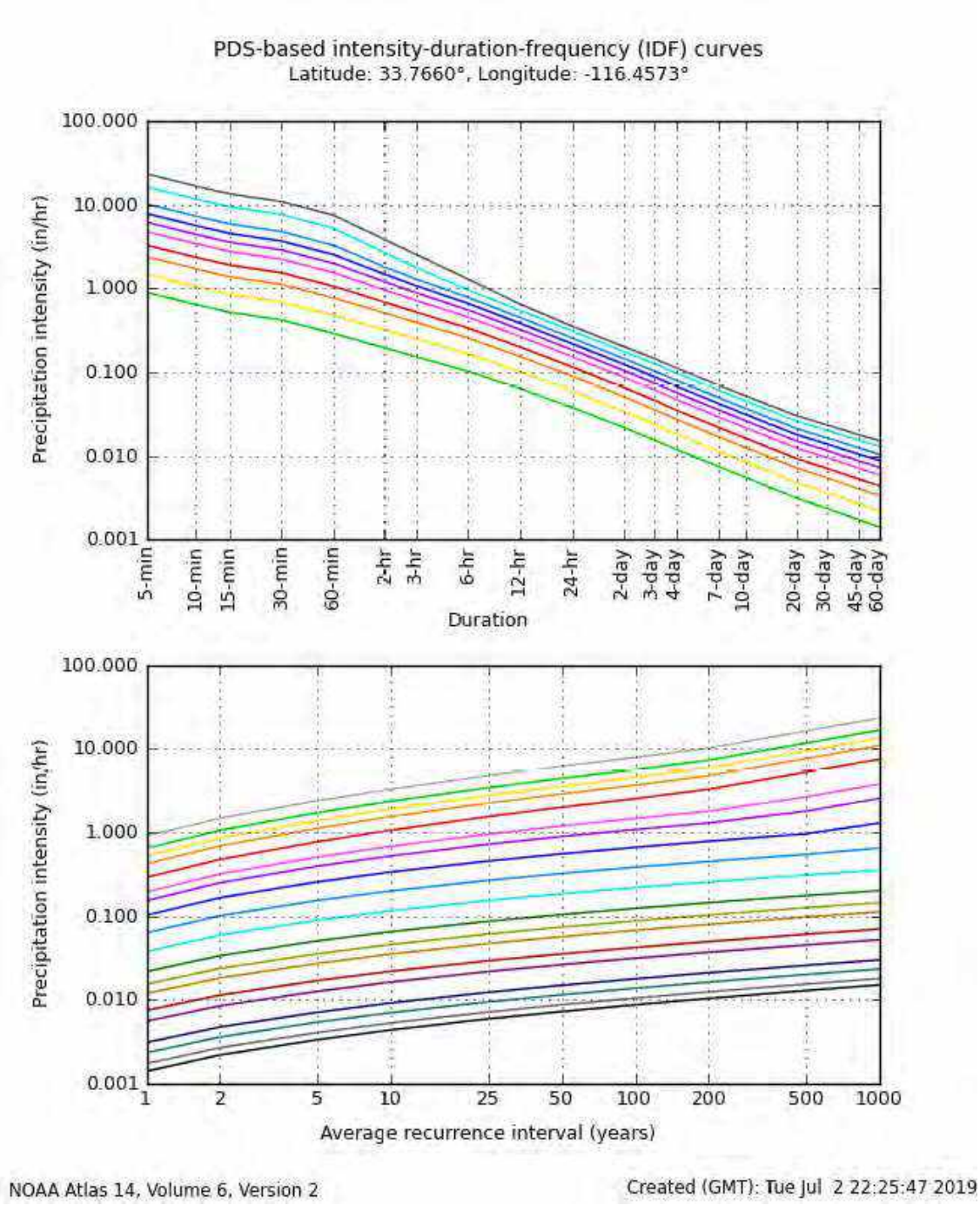
## PF graphical




NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Tue Jul 2 22:25:47 2019

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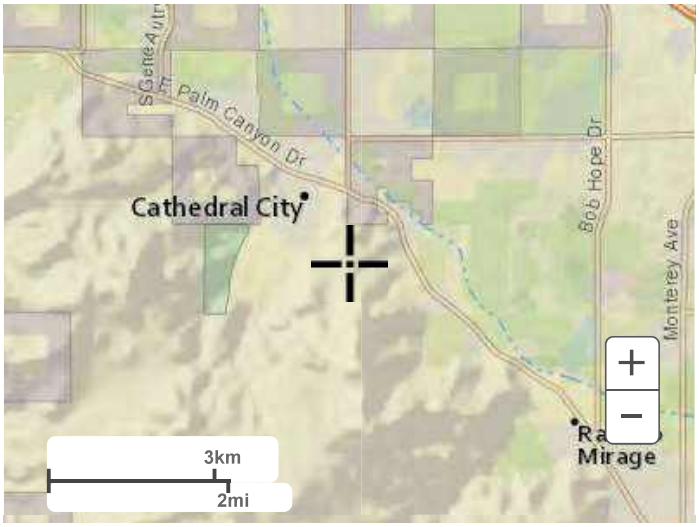
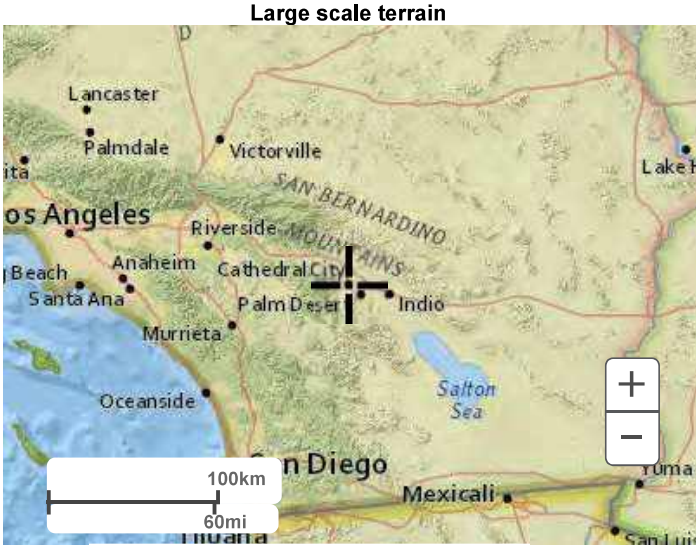
## Maps & aerials

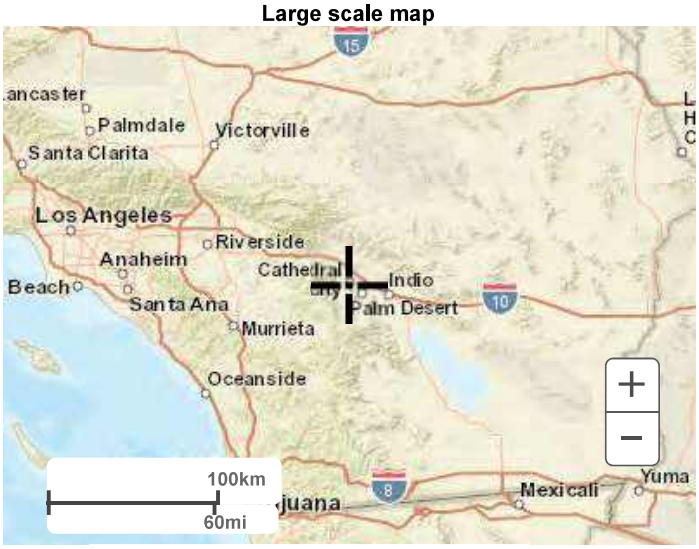
**Small scale terrain**




**Large scale terrain**




**Large scale map**




**Large scale aerial**

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

# APPENDIX 3

## Rational Method Hydrology Calculations

RATIONAL METHOD HYDROLOGY DATA SHEET

Proj: Ritz Carlton
Date:
Description: Existing Condition (CEQA Drainage Study)
Drawing Path:

Job#: 562-01

| U/S NODE | D/S NODE | AES CODE | U/S ELEV | D/S ELEV | LENGTH (feet) | Imperv. Area (sf) | %Imperv | AREA (acres) | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| 100.0 | 101.0 | 2 | 669.0 | 657.0 | 96 | 0 | 0.0% | 0.09 | |
| 101.0 | 102.0 | 5 | 657.0 | 635.0 | 388 | 0 | 0.0% | 0.89 | |
| 103.0 | 102.0 | 8 | | | | 0 | 0.0% | 0.90 | |
| 102.0 | 104.0 | 6 | 635.0 | 619.0 | 230 | 11180 | 44.0% | 0.58 | |
| 105.0 | 104.0 | 8 | | | | 15963 | 37.0% | 0.99 | |
| | | | | | | | TOTAL | 3.45 | |
| | | | | | | | | | |
| 200.0 | 201.0 | 2 | 669.0 | 654.0 | 57 | 0 | 0.0% | 0.10 | |
| 201.0 | 202.0 | 5 | 654.0 | 635.0 | 397 | 0 | 0.0% | 3.21 | |
| 202.0 | 203.0 | 5 | 635.0 | 626.0 | 471 | 9114 | 17.9% | 1.17 | |
| 203.0 | 204.0 | 5 | 626.0 | 584.0 | 358 | 6700 | 8.4% | 1.83 | |
| 205.0 | 204.0 | 8 | | | | 263 | 0.5% | 1.32 | |
| 204.0 | 206.0 | 5 | 584.0 | 534.0 | 253 | 2840 | 9.8% | 0.67 | |
| | | | | | | | TOTAL | 8.29 | |
| | | | | | | | | | |
| 300.0 | 301.0 | 2 | 676.0 | 666.0 | 84 | 0 | 0.0% | 0.13 | |
| 301.0 | 302.0 | 5 | 666.0 | 640.0 | 589 | 0 | 0.0% | 1.76 | |
| | | | | | | | TOTAL | 1.89 | |

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
        (c) Copyright 1982-2007 Advanced Engineering Software (aes)
                    (Rational Tabling Version 7.0D)
                Release Date: 06/01/2007  License ID 1532

                         Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* 562-01                                                                *
* EXISTING CONDITION 100-YR (DISCHARGE POINT 1)                         *
*                                                                       *
 ************************************************************************

  FILE NAME: RCEX1.DAT
  TIME/DATE OF STUDY: 11:56 07/16/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.360
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.060
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  5.630
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  2.530
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4467076
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4464271
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.530
  SLOPE OF INTENSITY DURATION CURVE = 0.4464
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.00
  UPSTREAM ELEVATION(FEET) =    669.00
  DOWNSTREAM ELEVATION(FEET) =    657.00
  ELEVATION DIFFERENCE(FEET) =     12.00
  TC = 0.533*[(   96.00**3)/(    12.00)]**.2 =    5.011
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.664
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7918
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    657.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   388.00   CHANNEL SLOPE =  0.0567
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  25.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.275
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7712
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.28
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   2.83
  Tc(MIN.) =    7.84
  SUBAREA AREA(ACRES) =     0.89       SUBAREA RUNOFF(CFS) =    4.31
  TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       4.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   2.67
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     484.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.275
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7712
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    4.36
  TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       9.21
  TC(MIN.) =    7.84

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  635.00  DOWNSTREAM ELEVATION(FEET) =  619.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
```

```
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.54
  STREET FLOW TRAVEL TIME(MIN.) =   0.59   Tc(MIN.) =    8.43
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.076
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8206
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    2.89
  TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =      12.10

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.40
  FLOW VELOCITY(FEET/SEC.) =  6.73   DEPTH*VELOCITY(FT*FT/SEC.) =   2.71
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.076
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8206
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.99   SUBAREA RUNOFF(CFS) =    4.94
  TOTAL AREA(ACRES) =        3.5   TOTAL RUNOFF(CFS) =      17.04
  TC(MIN.) =    8.43
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.5  TC(MIN.) =      8.43
  PEAK FLOW RATE(CFS)   =      17.04
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                     (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2007 Advanced Engineering Software (aes)
                     (Rational Tabling Version 7.0D)
                  Release Date: 06/01/2007  License ID 1532

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* 562-01                                                                 *
* EXISTING CONDITION 100-YR (DISCHARGE POINT 2)                          *
*                                                                        *
 **************************************************************************

  FILE NAME: RCEX2.DAT
  TIME/DATE OF STUDY: 14:14 07/16/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.360
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.060
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  5.630
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  2.530
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4467076
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4464271
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.530
  SLOPE OF INTENSITY DURATION CURVE = 0.4464
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    57.00
  UPSTREAM ELEVATION(FEET) =    669.00
  DOWNSTREAM ELEVATION(FEET) =    654.00
  ELEVATION DIFFERENCE(FEET) =     15.00
  TC = 0.533*[(   57.00**3)/(    15.00)]**.2 =    3.505
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.672
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7919
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.61

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    654.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   397.00   CHANNEL SLOPE =  0.0479
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  40.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.386
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7732
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.60
  AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   2.54
  Tc(MIN.) =    7.54
  SUBAREA AREA(ACRES) =     3.21       SUBAREA RUNOFF(CFS) =   15.85
  TOTAL AREA(ACRES) =       3.3         PEAK FLOW RATE(CFS) =      16.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   3.02
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     454.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    626.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   471.00   CHANNEL SLOPE =  0.0191
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.630
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7870
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.05
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.20
  AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   2.46
  Tc(MIN.) =   10.00
  SUBAREA AREA(ACRES) =     1.17       SUBAREA RUNOFF(CFS) =    5.18
  TOTAL AREA(ACRES) =       4.5         PEAK FLOW RATE(CFS) =      21.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   3.30
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    626.00  DOWNSTREAM(FEET) =    584.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   358.00   CHANNEL SLOPE =  0.1173
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   8.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.520
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7564
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.19
  AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   0.45
  Tc(MIN.) =   10.45
  SUBAREA AREA(ACRES) =     1.83       SUBAREA RUNOFF(CFS) =    7.64
  TOTAL AREA(ACRES) =        6.3         PEAK FLOW RATE(CFS) =      29.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =  13.75
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =    1283.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.520
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7564
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    1.32   SUBAREA RUNOFF(CFS) =    5.51
  TOTAL AREA(ACRES) =        7.6   TOTAL RUNOFF(CFS) =      34.79
  TC(MIN.) =   10.45

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    584.00  DOWNSTREAM(FEET) =    534.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   253.00   CHANNEL SLOPE =  0.1976
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.050   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.406
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7539
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.16
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.39
  AVERAGE FLOW DEPTH(FEET) =   0.92   TRAVEL TIME(MIN.) =   0.50
  Tc(MIN.) =   10.95
  SUBAREA AREA(ACRES) =     0.67       SUBAREA RUNOFF(CFS) =    2.73
  TOTAL AREA(ACRES) =        8.3         PEAK FLOW RATE(CFS) =      37.52

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   8.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    1536.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.3  TC(MIN.) =     10.95
  PEAK FLOW RATE(CFS)   =      37.52
============================================================================
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2007 Advanced Engineering Software (aes)
                    (Rational Tabling Version 7.0D)
                  Release Date: 06/01/2007  License ID 1532

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* 562-01                                                                 *
* EXISTING CONDITION 100-YR (DISCHARGE POINT 3)                          *
*                                                                        *
 **************************************************************************

  FILE NAME: RCEX3.DAT
  TIME/DATE OF STUDY: 15:10 07/16/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.360
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.060
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  5.630
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  2.530
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4467076
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4464271
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.530
  SLOPE OF INTENSITY DURATION CURVE = 0.4464
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    84.00
  UPSTREAM ELEVATION(FEET) =    676.00
  DOWNSTREAM ELEVATION(FEET) =    666.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  TC = 0.533*[(   84.00**3)/(    10.00)]**.2 =    4.797
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.672
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7919
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.79
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.79

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    666.00  DOWNSTREAM(FEET) =    640.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   589.00   CHANNEL SLOPE =  0.0441
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   8.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.214
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7702
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.26
  AVERAGE FLOW DEPTH(FEET) =   0.44   TRAVEL TIME(MIN.) =   3.02
  Tc(MIN.) =    8.02
  SUBAREA AREA(ACRES) =     1.76       SUBAREA RUNOFF(CFS) =    8.42
  TOTAL AREA(ACRES) =        1.9         PEAK FLOW RATE(CFS) =       9.21

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   3.78
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     673.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.9  TC(MIN.) =      8.02
  PEAK FLOW RATE(CFS)   =       9.21
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

RATIONAL METHOD HYDROLOGY DATA SHEET

Proj: Ritz Carlton - Sky Mesa
Date:
Description: Existing Condition (CEQA Drainage Study)
Drawing Path:

Job#: 562-01

| U/S NODE | D/S NODE | AES CODE | U/S ELEV | D/S ELEV | LENGTH (feet) | Imperv. Area (sf) | %Imperv | AREA (acres) | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| 400.0 | 401.0 | 2 | 670.0 | 656.0 | 71 | 0 | 0.0% | 0.04 | |
| 401.0 | 402.0 | 5 | 656.0 | 640.0 | 144 | 1150 | 5.8% | 0.46 | |
| | | | | | | | TOTAL | 0.50 | |
| | | | | | | | | | |
| 500.0 | 501.0 | 2 | 663.0 | 656.0 | 38 | 0 | 0.0% | 0.02 | |
| 501.0 | 502.0 | 5 | 656.0 | 642.0 | 255 | 0 | 0.0% | 0.78 | |
| 502.0 | 503.0 | 5 | 642.0 | 556.0 | 321 | 0 | 0.0% | 1.25 | |
| | | | | | | | TOTAL | 2.04 | |

```
******************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2007 Advanced Engineering Software (aes)
                    (Rational Tabling Version 7.0D)
                 Release Date: 06/01/2007  License ID 1532

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY ************************
* 562-01                                                              *
* EXISTING CONDITION 100-YR (DISCHARGE POINT 4 - SKY MESA)            *
*                                                                     *
 *********************************************************************

  FILE NAME: RCEX4.DAT
  TIME/DATE OF STUDY: 17:15 08/30/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.360
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.060
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  5.630
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  2.530
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4467076
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4464271
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.530
  SLOPE OF INTENSITY DURATION CURVE = 0.4464
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    71.00
  UPSTREAM ELEVATION(FEET) =    670.00
  DOWNSTREAM ELEVATION(FEET) =    656.00
  ELEVATION DIFFERENCE(FEET) =     14.00
  TC = 0.533*[(   71.00**3)/(    14.00)]**.2 =    4.054
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.672
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7919
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    656.00  DOWNSTREAM(FEET) =    640.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   144.00   CHANNEL SLOPE =  0.1111
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.352
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7877
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.79
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   0.50
  Tc(MIN.) =    5.50
  SUBAREA AREA(ACRES) =     0.46       SUBAREA RUNOFF(CFS) =    2.66
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   5.58
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     215.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.50
  PEAK FLOW RATE(CFS)   =       2.91
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
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                    (Rational Tabling Version 7.0D)
                 Release Date: 06/01/2007  License ID 1532

                         Analysis prepared by:




 ************************ DESCRIPTION OF STUDY ************************
* 562-01                                                              *
* EXISTING CONDITION 100-YR (DISCHARGE POINT 5 - SKY MESA)            *
*                                                                     *
 **********************************************************************

  FILE NAME: RCEX5.DAT
  TIME/DATE OF STUDY: 08:31 09/03/2019
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.360
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.060
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  5.630
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  2.530
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4467076
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4464271
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.530
  SLOPE OF INTENSITY DURATION CURVE = 0.4464
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    38.00
  UPSTREAM ELEVATION(FEET) =    663.00
  DOWNSTREAM ELEVATION(FEET) =    656.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  TC = 0.533*[(   38.00**3)/(     7.00)]**.2 =    3.201
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.672
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7919
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.12

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    656.00  DOWNSTREAM(FEET) =    642.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   255.00   CHANNEL SLOPE =  0.0549
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.876
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7810
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.06
  AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   1.39
  Tc(MIN.) =    6.39
  SUBAREA AREA(ACRES) =     0.78       SUBAREA RUNOFF(CFS) =    4.19
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       4.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.35   FLOW VELOCITY(FEET/SEC.) =   3.60
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    502.00 =     293.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    642.00  DOWNSTREAM(FEET) =    556.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   321.00   CHANNEL SLOPE =  0.2679
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.557
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7760
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.47
  AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   0.72
  Tc(MIN.) =    7.11
  SUBAREA AREA(ACRES) =     1.25       SUBAREA RUNOFF(CFS) =    6.36
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =      10.67

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.57   FLOW VELOCITY(FEET/SEC.) =   8.23
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    503.00 =     614.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      7.11
```

```
  PEAK FLOW RATE(CFS)   =      10.67
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

# RATIONAL METHOD HYDROLOGY DATA SHEET

Proj: Ritz Carlton
Date:
Description: Proposed Condition (CEQA Drainage Study)
Drawing Path:

Job#: 562-01

| U/S NODE | D/S NODE | AES CODE | U/S ELEV | D/S ELEV | LENGTH (feet) | Imperv. Area (sf) | %Imperv | AREA (acres) | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| 100.0 | 101.0 | 2 | 660.0 | 657.5 | 30 | 1866 | 76.5% | 0.06 | |
| 101.0 | 102.0 | 6 | 657.5 | 643.0 | 510 | 40340 | 73.6% | 1.26 | |
| 103.0 | 102.0 | 8 | | | | 25455 | 55.6% | 1.05 | |
| 102.0 | 105.0 | 6 | 643.0 | 636.0 | 102 | 4954 | 61.3% | 0.19 | |
| 105.0 | 106.0 | 6 | 636.0 | 619.0 | 234 | 11409 | 45.8% | 0.57 | |
| 107.0 | 106.0 | 8 | | | | 38501 | 65.2% | 1.36 | |
| | | | | | | | TOTAL | 4.48 | |
| | | | | | | | | | |
| 200.0 | 201.0 | 2 | 660.0 | 659.6 | 33 | 570 | 27.1% | 0.05 | |
| 201.0 | 202.0 | 6 | 659.6 | 639.5 | 305 | 24871 | 89.4% | 0.64 | |
| 203.0 | 202.0 | 8 | | | | 25889 | 77.8% | 0.76 | |
| 202.0 | 204.0 | 6 | 639.5 | 621.0 | 259 | 9694 | 22.5% | 0.99 | |
| 206.0 | 204.0 | 8 | | | | 33742 | 73.3% | 1.06 | |
| 205.0 | 204.0 | 8 | | | | 47200 | 79.8% | 1.36 | |
| 204.0 | 206.0 | 5 | 590.0 | 584.0 | 102 | 0 | | | |
| 206.0 | 206.0 | 1 | | | | | | | Confluence stream 1 of 2 |
| 220.0 | 221.0 | 2 | 650.0 | 649.5 | 41 | 2270 | 100.0% | 0.05 | |
| 221.0 | 222.0 | 5 | 636.0 | 634.0 | 544 | 46689 | 63.8% | 1.68 | |
| 222.0 | 206.0 | 5 | 634.0 | 584.0 | 474 | 6963 | 18.7% | 0.85 | |
| 206.0 | 206.0 | 1 | | | | | | | Confluence stream 2 of 2 |
| 206.0 | 207.0 | 5 | 584.0 | 534.0 | 253 | 2840 | 9.8% | 0.67 | |
| | | | | | | | TOTAL | 8.11 | |
| | | | | | | | | | |
| 300.0 | 301.0 | 2 | | | | 2300 | 94.5% | 0.06 | Assume minimum 5 min Tc |
| 301.0 | 302.0 | 6 | 657.0 | 645.0 | 355 | 31014 | 78.7% | 0.91 | |
| 302.0 | 303.0 | 4 | 641.5 | 641.0 | 35 | | | | |
| 303.0 | 304.0 | 5 | 641.0 | 640.0 | 48 | 0 | 0.0% | 0.11 | |
| | | | | | | | TOTAL | 1.07 | |

```
**************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
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                    (Rational Tabling Version 7.0D)
                  Release Date: 06/01/2007  License ID 1532

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* 562-01                                                                 *
* PROPOSED CONDITION 100-YR (DISCHARGE POINT 1)                          *
*                                                                        *
 **************************************************************************

  FILE NAME: RCPR1.DAT
  TIME/DATE OF STUDY: 11:10 07/24/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.360
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.060
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  5.630
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  2.530
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4467076
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4464271
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.530
  SLOPE OF INTENSITY DURATION CURVE = 0.4464
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    62.00
  UPSTREAM ELEVATION(FEET) =    660.00
  DOWNSTREAM ELEVATION(FEET) =    657.50
  ELEVATION DIFFERENCE(FEET) =      2.50
  TC = 0.323*[(   62.00**3)/(     2.50)]**.2 =    3.196
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.672
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8901
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  657.50  DOWNSTREAM ELEVATION(FEET) =  643.00
  STREET LENGTH(FEET) =   510.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   2.77   Tc(MIN.) =    7.77
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.302
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8881
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    7.05
  TOTAL AREA(ACRES) =       1.3        PEAK FLOW RATE(CFS) =       7.46

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.88
  FLOW VELOCITY(FEET/SEC.) =  3.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     572.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.302
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8704
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.05   SUBAREA RUNOFF(CFS) =    5.76
  TOTAL AREA(ACRES) =       2.4   TOTAL RUNOFF(CFS) =      13.22
  TC(MIN.) =    7.77

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    102.00 TO NODE    105.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  643.00  DOWNSTREAM ELEVATION(FEET) =  636.00
 STREET LENGTH(FEET) =   102.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.74
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   10.43
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.90
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.06
 STREET FLOW TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    8.06
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.200
 CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8789
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    1.04
 TOTAL AREA(ACRES) =        2.6        PEAK FLOW RATE(CFS) =      14.26

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.66
 FLOW VELOCITY(FEET/SEC.) =  5.89   DEPTH*VELOCITY(FT*FT/SEC.) =   2.08
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =     674.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  636.00  DOWNSTREAM ELEVATION(FEET) =  619.00
 STREET LENGTH(FEET) =   234.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.75
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.43
   HALFSTREET FLOOD WIDTH(FEET) =   14.88
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.25
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.11
 STREET FLOW TRAVEL TIME(MIN.) =   0.54   Tc(MIN.) =    8.60
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.024
```

```
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8691
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    2.98
  TOTAL AREA(ACRES) =        3.1        PEAK FLOW RATE(CFS) =      17.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.43
  FLOW VELOCITY(FEET/SEC.) =  7.43   DEPTH*VELOCITY(FT*FT/SEC.) =   3.26
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =     908.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.024
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8784
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.36   SUBAREA RUNOFF(CFS) =    7.20
  TOTAL AREA(ACRES) =        4.5   TOTAL RUNOFF(CFS) =      24.44
  TC(MIN.) =    8.60
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.5  TC(MIN.) =      8.60
  PEAK FLOW RATE(CFS)   =      24.44
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2007 Advanced Engineering Software (aes)
                    (Rational Tabling Version 7.0D)
                  Release Date: 06/01/2007  License ID 1532

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* 562-01                                                                 *
* PROPOSED CONDITION 100-YR (DISCHARGE POINT 2)                          *
*                                                                        *
 **************************************************************************

  FILE NAME: RCPR2.DAT
  TIME/DATE OF STUDY: 16:24 07/22/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.360
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.060
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  5.630
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  2.530
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4467076
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4464271
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.530
  SLOPE OF INTENSITY DURATION CURVE = 0.4464
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    33.00
  UPSTREAM ELEVATION(FEET) =    660.00
  DOWNSTREAM ELEVATION(FEET) =    659.60
  ELEVATION DIFFERENCE(FEET) =      0.40
  TC = 0.303*[(   33.00**3)/(     0.40)]**.2 =    2.967
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.672
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8951
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  659.60  DOWNSTREAM ELEVATION(FEET) =  639.50
  STREET LENGTH(FEET) =   305.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    2.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    5.97
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.086
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8947
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.64      SUBAREA RUNOFF(CFS) =    4.06
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       4.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   5.74
  FLOW VELOCITY(FEET/SEC.) =  4.49   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     338.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.086
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8894
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    4.79
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       9.19
  TC(MIN.) =    5.97

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  639.50  DOWNSTREAM ELEVATION(FEET) =  621.00
 STREET LENGTH(FEET) =   259.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.03
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =    9.96
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.54
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
 STREET FLOW TRAVEL TIME(MIN.) =   0.78   Tc(MIN.) =    6.75
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.709
 SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .8553
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    5.68
 TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =      14.87

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.98
 FLOW VELOCITY(FEET/SEC.) =  5.82   DEPTH*VELOCITY(FT*FT/SEC.) =   2.09
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     597.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.709
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8888
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    1.06   SUBAREA RUNOFF(CFS) =    6.32
 TOTAL AREA(ACRES) =        3.5   TOTAL RUNOFF(CFS) =      21.19
 TC(MIN.) =    6.75

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.709
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8888
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    1.36   SUBAREA RUNOFF(CFS) =    8.11
 TOTAL AREA(ACRES) =        4.9   TOTAL RUNOFF(CFS) =      29.30
 TC(MIN.) =    6.75

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    590.00  DOWNSTREAM(FEET) =    584.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   102.00   CHANNEL SLOPE =  0.0588
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      29.30
  FLOW VELOCITY(FEET/SEC.) =   6.89   FLOW DEPTH(FEET) =   0.90
  TRAVEL TIME(MIN.) =   0.25   Tc(MIN.) =    7.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     699.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.00
  RAINFALL INTENSITY(INCH/HR) =   6.60
  TOTAL STREAM AREA(ACRES) =     4.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.30

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.672
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8951
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    636.00  DOWNSTREAM(FEET) =    634.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   544.00   CHANNEL SLOPE =  0.0037
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.884
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .8779
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.74
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.23
  AVERAGE FLOW DEPTH(FEET) =   0.46   TRAVEL TIME(MIN.) =   4.06
  Tc(MIN.) =    9.06
  SUBAREA AREA(ACRES) =     1.68       SUBAREA RUNOFF(CFS) =    8.68
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       9.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   2.64
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     646.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    222.00 TO NODE    206.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    634.00  DOWNSTREAM(FEET) =    584.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   474.00   CHANNEL SLOPE =  0.1055
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   8.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.678
 SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .8477
 SOIL CLASSIFICATION IS "D"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.07
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.48
 AVERAGE FLOW DEPTH(FEET) =   0.36   TRAVEL TIME(MIN.) =   0.75
 Tc(MIN.) =    9.81
 SUBAREA AREA(ACRES) =     0.85       SUBAREA RUNOFF(CFS) =    4.09
 TOTAL AREA(ACRES) =        2.6         PEAK FLOW RATE(CFS) =      13.11

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =  10.67
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    206.00 =    1120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.81
 RAINFALL INTENSITY(INCH/HR) =   5.68
 TOTAL STREAM AREA(ACRES) =     2.58
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.11

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       29.30     7.00        6.602          4.86
     2       13.11     9.81        5.678          2.58

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       38.65     7.00        6.602
     2       38.31     9.81        5.678

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      38.65   Tc(MIN.) =    7.00
 TOTAL AREA(ACRES) =        7.4
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    206.00 =    1120.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    584.00  DOWNSTREAM(FEET) =    534.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   253.00   CHANNEL SLOPE =  0.1976
 CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.050   MAXIMUM DEPTH(FEET) =   5.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.405
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7735
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      40.31
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.58
 AVERAGE FLOW DEPTH(FEET) =   0.97   TRAVEL TIME(MIN.) =   0.49
 Tc(MIN.) =    7.49
 SUBAREA AREA(ACRES) =     0.67       SUBAREA RUNOFF(CFS) =    3.32
 TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      41.97

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.98   FLOW VELOCITY(FEET/SEC.) =   8.68
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    207.00 =    1373.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        8.1  TC(MIN.) =      7.49
 PEAK FLOW RATE(CFS)   =      41.97
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2007 Advanced Engineering Software (aes)
                    (Rational Tabling Version 7.0D)
                 Release Date: 06/01/2007  License ID 1532

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* 562-01                                                                 *
* PROPOSED CONDITION 100-YR (DISCHARGE POINT 3)                          *
*                                                                        *
 **************************************************************************

  FILE NAME: RCPR3.DAT
  TIME/DATE OF STUDY: 09:49 07/24/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.360
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.060
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  5.630
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  2.530
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4467076
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4464271
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.530
  SLOPE OF INTENSITY DURATION CURVE = 0.4464
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  22
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
```

```
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.672
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8951
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  657.00  DOWNSTREAM ELEVATION(FEET) =  645.00
  STREET LENGTH(FEET) =   355.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    5.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =    6.86
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.661
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.91      SUBAREA RUNOFF(CFS) =    5.39
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       5.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.32
  FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     411.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   641.50  DOWNSTREAM(FEET) =   641.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.80
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.95
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =     446.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    641.00  DOWNSTREAM(FEET) =    640.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    48.00   CHANNEL SLOPE =  0.0208
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.502
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7751
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.08
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.71
  AVERAGE FLOW DEPTH(FEET) =   0.38   TRAVEL TIME(MIN.) =   0.30
  Tc(MIN.) =    7.24
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.55
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       6.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   2.72
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =     494.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.1  TC(MIN.) =      7.24
  PEAK FLOW RATE(CFS)   =       6.35
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

# RATIONAL METHOD HYDROLOGY DATA SHEET

Proj: Ritz Carlton - Sky Mesa
Date:
Description: Proposed Condition (CEQA Drainage Study)
Drawing Path:

Job#: 562-01

| U/S NODE | D/S NODE | AES CODE | U/S ELEV | D/S ELEV | LENGTH (feet) | Imperv. Area (sf) | %Imperv | AREA (acres) | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| 400.0 | 401.0 | 2 | 670.0 | 654.0 | 81 | 0 | 0.0% | 0.10 | |
| 401.0 | 402.0 | 5 | 654.0 | 648.0 | 60 | 0 | 0.0% | 0.08 | |
| 402.0 | 403.0 | 5 | 644.0 | 640.0 | 58 | 4919 | 37.4% | 0.30 | |
| | | | | | | | TOTAL | 0.49 | |
| | | | | | | | | | |
| 500.0 | 501.0 | 2 | 670.0 | 669.0 | 45 | 0 | 0.0% | 0.04 | |
| 501.0 | 502.0 | 4 | 654.5 | 649.5 | 128 | | | | |
| 502.0 | 502.0 | 8 | | | | 6272 | 40.5% | 0.36 | |
| 502.0 | 503.0 | 4 | 649.5 | 643.0 | 136 | | | | |
| 503.0 | 503.0 | 8 | | | | 3327 | 17.2% | 0.44 | |
| 503.0 | 504.0 | 4 | 643.0 | 632.0 | 41 | | | | |
| 504.0 | 504.0 | 8 | | | | 437 | 5.9% | 0.17 | |
| 504.0 | 505.0 | 4 | 632.0 | 631.0 | 15 | | | | |
| 505.0 | 506.0 | 5 | 631.0 | 556.0 | 274 | 7340 | 14.8% | 1.14 | |
| | | | | | | | TOTAL | 2.15 | |

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2007 Advanced Engineering Software (aes)
                    (Rational Tabling Version 7.0D)
                 Release Date: 06/01/2007  License ID 1532

                         Analysis prepared by:




 ************************ DESCRIPTION OF STUDY ************************
* 562-01                                                              *
* PROPOSED CONDITION 100-YR (DISCHARGE POINT 4 - SKY MESA)            *
*                                                                     *
 *********************************************************************

  FILE NAME: RCPR4.DAT
  TIME/DATE OF STUDY: 09:24 09/03/2019
-------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.360
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.060
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  5.630
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  2.530
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4467076
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4464271
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.530
  SLOPE OF INTENSITY DURATION CURVE = 0.4464
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
-------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    81.00
  UPSTREAM ELEVATION(FEET) =    670.00
  DOWNSTREAM ELEVATION(FEET) =    654.00
  ELEVATION DIFFERENCE(FEET) =     16.00
  TC = 0.937*[(   81.00**3)/(    16.00)]**.2 =    7.520
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.394
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7733
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    654.00  DOWNSTREAM(FEET) =    648.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.1000
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   8.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.244
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7707
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.43
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   0.41
  Tc(MIN.) =    7.93
  SUBAREA AREA(ACRES) =     0.08       SUBAREA RUNOFF(CFS) =    0.38
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   2.52
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     141.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    644.00  DOWNSTREAM(FEET) =    640.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    58.00   CHANNEL SLOPE =  0.0690
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.138
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8213
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.12
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.31
  Tc(MIN.) =    8.24
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    1.51
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.76
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =     199.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      8.24
  PEAK FLOW RATE(CFS)   =       2.39
```

==========
==========
END OF RATIONAL METHOD ANALYSIS

```
******************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2007 Advanced Engineering Software (aes)
                    (Rational Tabling Version 7.0D)
                 Release Date: 06/01/2007  License ID 1532

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY ************************
* 562-01                                                              *
* PROPOSED CONDITION 100-YR (DISCHARGE POINT 5 - SKY MESA)            *
*                                                                     *
 *********************************************************************

  FILE NAME: RCPR5.DAT
  TIME/DATE OF STUDY: 11:40 09/03/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.360
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.060
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  5.630
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  2.530
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4467076
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4464271
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.530
  SLOPE OF INTENSITY DURATION CURVE = 0.4464
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    45.00
  UPSTREAM ELEVATION(FEET) =    670.00
  DOWNSTREAM ELEVATION(FEET) =    669.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  TC = 0.937*[(   45.00**3)/(     1.00)]**.2 =    9.201
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.843
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7632
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   654.50  DOWNSTREAM(FEET) =   649.50
  FLOW LENGTH(FEET) =   128.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   1.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.13
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.18
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    9.72
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    502.00 =     173.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    502.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.702
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8162
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.36   SUBAREA RUNOFF(CFS) =    1.68
  TOTAL AREA(ACRES) =       0.4   TOTAL RUNOFF(CFS) =       1.85
  TC(MIN.) =    9.72

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   649.50  DOWNSTREAM(FEET) =   643.00
  FLOW LENGTH(FEET) =   136.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.98
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.85
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   10.00
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    503.00 =     309.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.630
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7870
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.44   SUBAREA RUNOFF(CFS) =    1.95
```

```
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.80
  TC(MIN.) =   10.00

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    504.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   643.00  DOWNSTREAM(FEET) =   632.00
  FLOW LENGTH(FEET) =    41.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.18
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.80
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.04
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    504.00 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    504.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.620
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7586
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.72
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       4.53
  TC(MIN.) =   10.04

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    505.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   632.00  DOWNSTREAM(FEET) =   631.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.45
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.53
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.06
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    505.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    505.00 TO NODE    506.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    631.00  DOWNSTREAM(FEET) =    556.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   274.00   CHANNEL SLOPE =  0.2737
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.467
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7842
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.97
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.40
  AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   0.62
  Tc(MIN.) =   10.68
  SUBAREA AREA(ACRES) =     1.14       SUBAREA RUNOFF(CFS) =    4.89
```

```
 TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       9.42

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =   7.94
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    506.00 =     639.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        2.2  TC(MIN.) =     10.68
 PEAK FLOW RATE(CFS)   =       9.42
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

# APPENDIX 4

## Onsite Detention Analysis

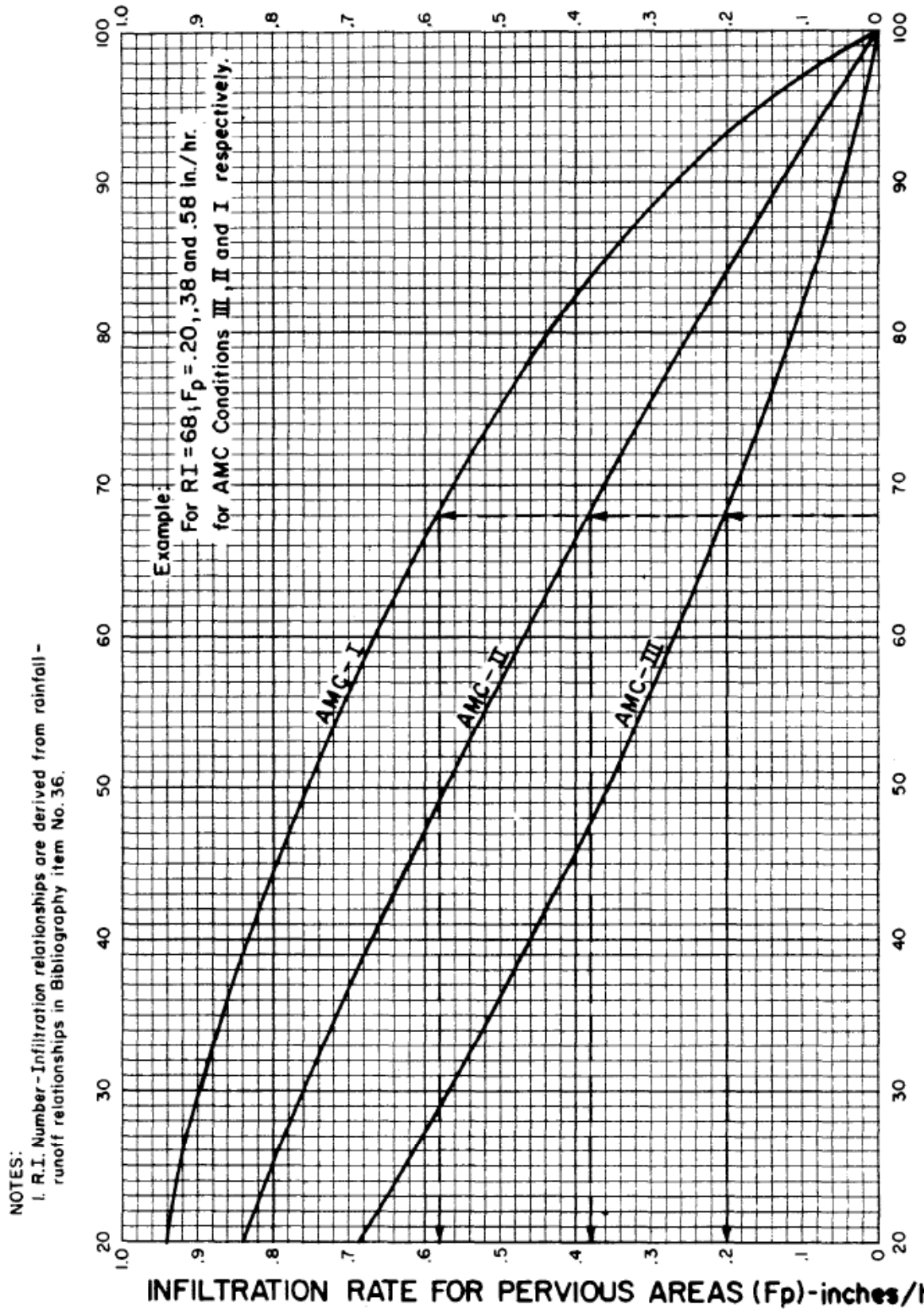
RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

| Cover Type (3) | Quality of Cover (2) | Soil Group A | B | C | D |
|---|---|---|---|---|---|
| NATURAL COVERS - | | | | | |
| Barren (Rockland, eroded and graded land) | | 78 | 86 | 91 | 93 |
| Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak) | Poor | 53 | 70 | 80 | 85 |
| | Fair | 40 | 63 | 75 | 81 |
| | Good | 31 | 57 | 71 | 78 |
| Chaparrel, Narrowleaf (Chamise and redshank) | Poor | 71 | 82 | 88 | 91 |
| | Fair | 55 | 72 | 81 | 86 |
| Grass, Annual or Perennial | Poor | 67 | 78 | 86 | 89 |
| | Fair | 50 | 69 | 79 | 84 |
| | Good | 38 | 61 | 74 | 80 |
| Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass) | Poor | 63 | 77 | 85 | 88 |
| | Fair | 51 | 70 | 80 | 84 |
| | Good | 30 | 58 | 72 | 78 |
| Open Brush (Soft wood shrubs - buckwheat, sage, etc.) | Poor | 62 | 76 | 84 | 88 |
| | Fair | 46 | 66 | 77 | 83 |
| | Good | 41 | 63 | 75 | 81 |
| Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent) | Poor | 45 | 66 | 77 | 83 |
| | Fair | 36 | 60 | 73 | 79 |
| | Good | 28 | 55 | 70 | 77 |
| Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent) | Poor | 57 | 73 | 82 | 86 |
| | Fair | 44 | 65 | 77 | 82 |
| | Good | 33 | 58 | 72 | 79 |
| URBAN COVERS - | | | | | |
| Residential or Commercial Landscaping (Lawn, shrubs, etc.) | Good | 32 | 56 | 69 | 75 |
| Turf (Irrigated and mowed grass) | Poor | 58 | 74 | 83 | 87 |
| | Fair | 44 | 65 | 77 | 82 |
| | Good | 33 | 58 | 72 | 79 |
| AGRICULTURAL COVERS - | | | | | |
| Fallow (Land plowed but not tilled or seeded) | | 76 | 85 | 90 | 92 |

**RCFC & WCD**
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREA

PLATE D-5.5 (1 of 2)



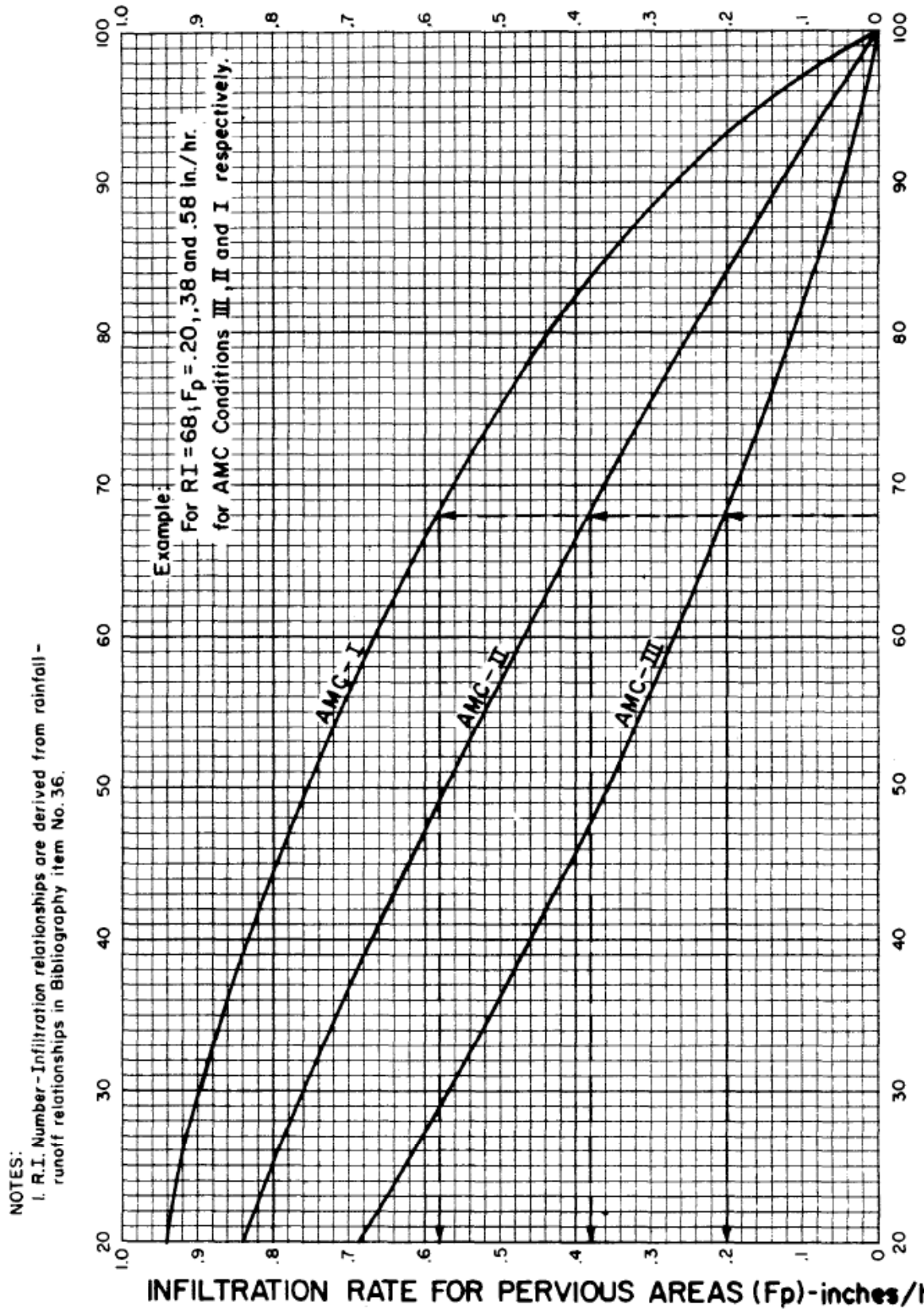

NOTES:
1. R.I. Number-Infiltration relationships are derived from rainfall-runoff relationships in Bibliography item No. 36.

**RCFC & WCD**

HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

PLATE E-6.2




NOTES:
1. R.I. Number-Infiltration relationships are derived from rainfall-runoff relationships in Bibliography item No. 36.

**RCFC & WCD**

HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

PLATE E-6.2

**NOAA Atlas 14, Volume 6, Version 2**
**Location name: Rancho Mirage, California, USA***
**Latitude: 33.766°, Longitude: -116.4573°**
**Elevation: 661.75 ft****
* source: ESRI Maps
** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | 0.075 (0.063-0.091) | 0.123 (0.102-0.149) | 0.199 (0.165-0.242) | 0.274 (0.226-0.336) | 0.398 (0.317-0.505) | 0.515 (0.401-0.667) | 0.655 (0.498-0.870) | 0.850 (0.628-1.16) | 1.36 (0.962-1.94) | 1.94 (1.33-2.87) |
| 10-min | 0.107 (0.090-0.130) | 0.176 (0.146-0.213) | 0.286 (0.237-0.347) | 0.393 (0.323-0.482) | 0.571 (0.454-0.724) | 0.738 (0.575-0.956) | 0.938 (0.713-1.25) | 1.22 (0.899-1.67) | 1.95 (1.38-2.78) | 2.78 (1.90-4.12) |
| 15-min | 0.130 (0.108-0.157) | 0.213 (0.177-0.258) | 0.345 (0.287-0.420) | 0.475 (0.391-0.583) | 0.690 (0.549-0.876) | 0.892 (0.695-1.16) | 1.14 (0.862-1.51) | 1.47 (1.09-2.02) | 2.36 (1.67-3.36) | 3.37 (2.30-4.98) |
| 30-min | 0.210 (0.175-0.255) | 0.344 (0.287-0.417) | 0.559 (0.464-0.680) | 0.769 (0.633-0.943) | 1.12 (0.890-1.42) | 1.44 (1.13-1.87) | 1.84 (1.40-2.44) | 2.39 (1.76-3.26) | 3.82 (2.70-5.45) | 5.45 (3.72-8.06) |
| 60-min | 0.290 (0.242-0.351) | 0.474 (0.395-0.575) | 0.771 (0.640-0.937) | 1.06 (0.873-1.30) | 1.54 (1.23-1.95) | 1.99 (1.55-2.58) | 2.53 (1.93-3.37) | 3.29 (2.43-4.50) | 5.26 (3.72-7.51) | 7.51 (5.13-11.1) |
| 2-hr | 0.387 (0.323-0.469) | 0.636 (0.530-0.771) | 1.01 (0.841-1.23) | 1.36 (1.12-1.67) | 1.90 (1.52-2.42) | 2.38 (1.86-3.09) | 2.93 (2.23-3.90) | 3.57 (2.63-4.88) | 5.31 (3.76-7.58) | 7.59 (5.18-11.2) |
| 3-hr | 0.458 (0.382-0.555) | 0.750 (0.625-0.910) | 1.18 (0.981-1.44) | 1.57 (1.29-1.93) | 2.16 (1.72-2.74) | 2.67 (2.08-3.46) | 3.24 (2.46-4.31) | 3.89 (2.87-5.32) | 5.37 (3.80-7.66) | 7.66 (5.23-11.3) |
| 6-hr | 0.613 (0.511-0.742) | 0.991 (0.826-1.20) | 1.53 (1.27-1.86) | 2.01 (1.66-2.47) | 2.72 (2.16-3.45) | 3.31 (2.58-4.29) | 3.96 (3.01-5.26) | 4.68 (3.46-6.40) | 5.74 (4.06-8.20) | 7.74 (5.29-11.4) |
| 12-hr | 0.763 (0.636-0.924) | 1.22 (1.01-1.47) | 1.85 (1.54-2.25) | 2.40 (1.98-2.95) | 3.22 (2.56-4.08) | 3.89 (3.03-5.04) | 4.61 (3.50-6.13) | 5.41 (3.99-7.40) | 6.57 (4.65-9.38) | 7.82 (5.34-11.6) |
| 24-hr | 0.905 (0.801-1.04) | 1.42 (1.25-1.64) | 2.14 (1.89-2.48) | 2.77 (2.42-3.23) | 3.68 (3.12-4.44) | 4.43 (3.68-5.45) | 5.25 (4.25-6.60) | 6.13 (4.84-7.93) | 7.42 (5.63-9.98) | 8.49 (6.23-11.8) |
| 2-day | 1.05 (0.925-1.21) | 1.62 (1.43-1.87) | 2.42 (2.14-2.80) | 3.13 (2.73-3.65) | 4.16 (3.52-5.01) | 5.01 (4.16-6.16) | 5.93 (4.81-7.47) | 6.95 (5.48-8.98) | 8.43 (6.39-11.3) | 9.67 (7.09-13.5) |
| 3-day | 1.11 (0.985-1.28) | 1.71 (1.51-1.97) | 2.55 (2.25-2.95) | 3.30 (2.88-3.85) | 4.39 (3.72-5.29) | 5.31 (4.41-6.53) | 6.31 (5.12-7.95) | 7.42 (5.86-9.59) | 9.05 (6.86-12.2) | 10.4 (7.65-14.5) |
| 4-day | 1.15 (1.01-1.32) | 1.75 (1.55-2.02) | 2.62 (2.31-3.03) | 3.38 (2.95-3.94) | 4.51 (3.82-5.43) | 5.46 (4.53-6.71) | 6.50 (5.27-8.17) | 7.65 (6.04-9.89) | 9.35 (7.09-12.6) | 10.8 (7.91-15.0) |
| 7-day | 1.26 (1.11-1.45) | 1.91 (1.69-2.21) | 2.85 (2.52-3.30) | 3.68 (3.22-4.30) | 4.92 (4.16-5.92) | 5.95 (4.94-7.31) | 7.08 (5.74-8.91) | 8.34 (6.58-10.8) | 10.2 (7.73-13.7) | 11.8 (8.64-16.4) |
| 10-day | 1.34 (1.18-1.54) | 2.03 (1.80-2.35) | 3.03 (2.67-3.51) | 3.92 (3.42-4.57) | 5.23 (4.43-6.29) | 6.33 (5.25-7.78) | 7.53 (6.11-9.48) | 8.87 (7.00-11.5) | 10.9 (8.23-14.6) | 12.5 (9.19-17.4) |
| 20-day | 1.49 (1.32-1.72) | 2.28 (2.01-2.63) | 3.41 (3.01-3.95) | 4.41 (3.86-5.15) | 5.91 (5.01-7.12) | 7.17 (5.96-8.82) | 8.56 (6.94-10.8) | 10.1 (7.98-13.1) | 12.4 (9.41-16.7) | 14.4 (10.5-20.0) |
| 30-day | 1.69 (1.49-1.94) | 2.59 (2.29-2.99) | 3.90 (3.44-4.52) | 5.07 (4.43-5.91) | 6.81 (5.77-8.20) | 8.29 (6.88-10.2) | 9.92 (8.05-12.5) | 11.7 (9.27-15.2) | 14.5 (11.0-19.5) | 16.8 (12.3-23.4) |
| 45-day | 1.87 (1.66-2.16) | 2.90 (2.57-3.35) | 4.40 (3.88-5.09) | 5.73 (5.01-6.69) | 7.74 (6.55-9.32) | 9.45 (7.84-11.6) | 11.3 (9.20-14.3) | 13.5 (10.6-17.4) | 16.7 (12.6-22.4) | 19.4 (14.2-27.0) |
| 60-day | 2.03 (1.79-2.34) | 3.16 (2.80-3.65) | 4.82 (4.25-5.57) | 6.30 (5.51-7.35) | 8.53 (7.23-10.3) | 10.4 (8.67-12.8) | 12.6 (10.2-15.8) | 15.0 (11.8-19.4) | 18.6 (14.1-25.0) | 21.7 (16.0-30.3) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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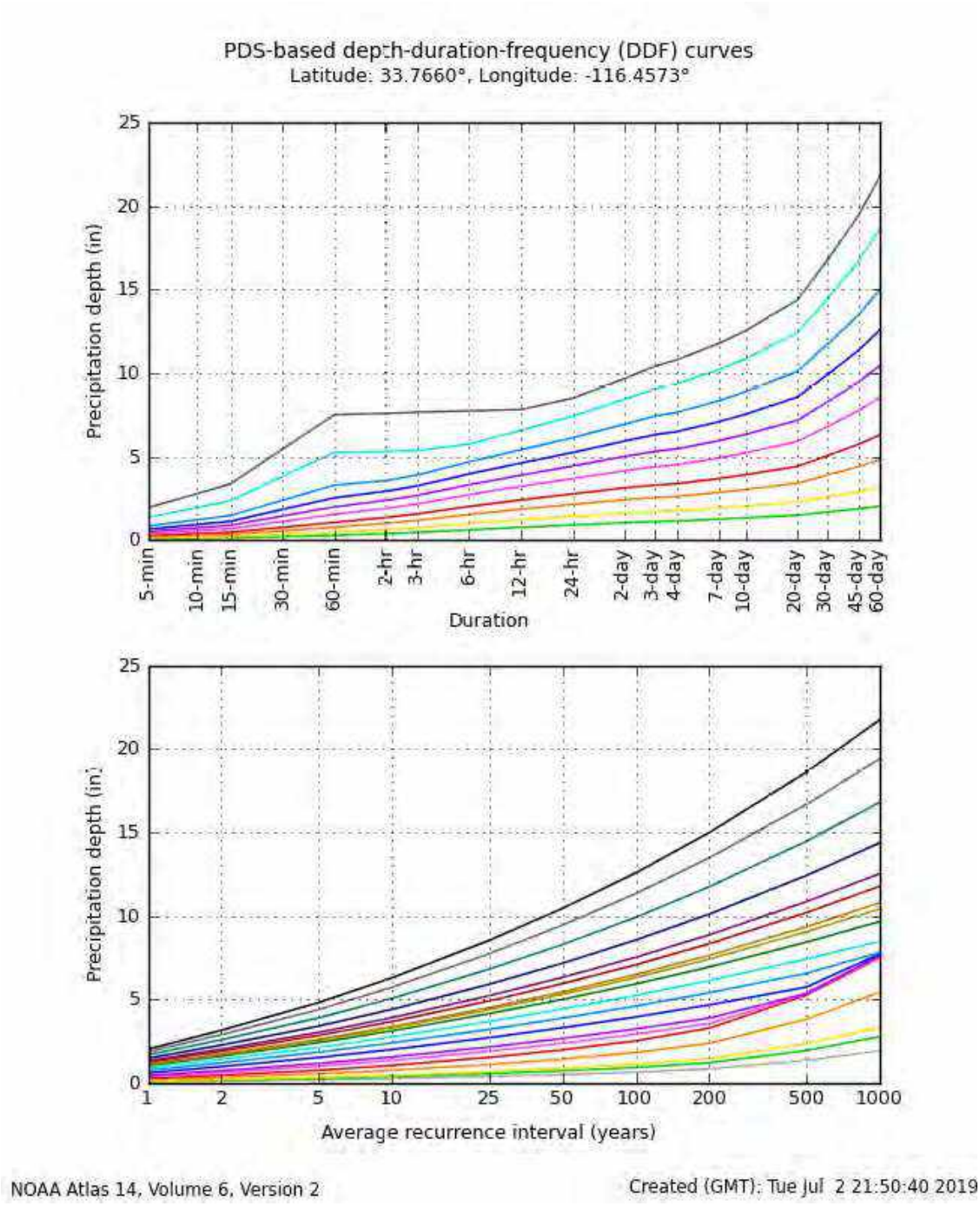
## PF graphical




NOAA Atlas 14, Volume 6, Version 2

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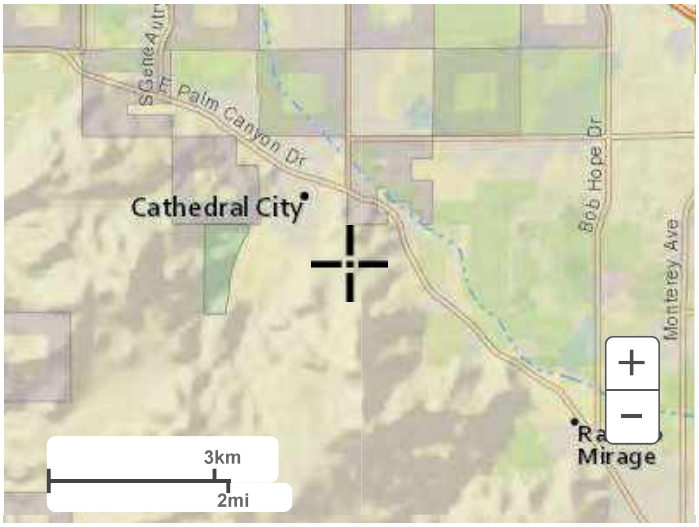
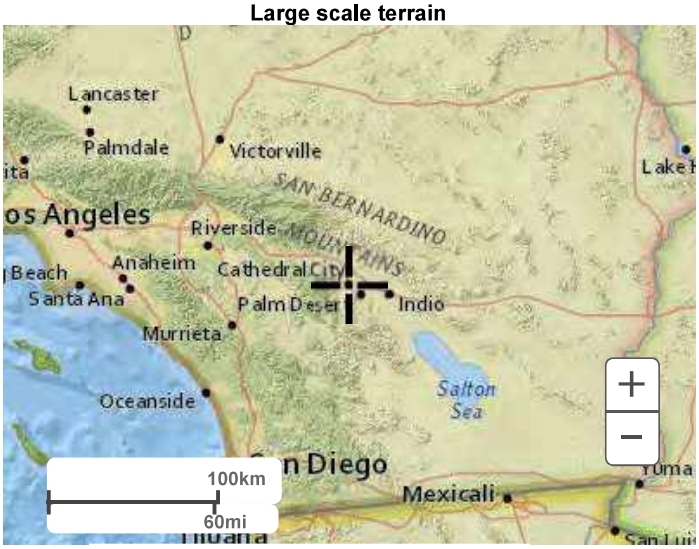
## Maps & aerials

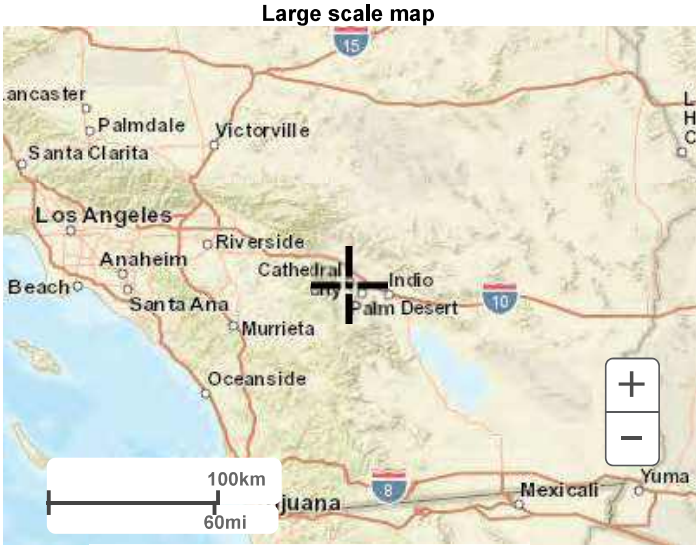
**Small scale terrain**




**Large scale terrain**




**Large scale map**




**Large scale aerial**

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Unit Time for 24-hour storms = 15 minutes (per Plate E-1.2)

| Storm Event | Precipitation (inches) | RCFC&WCD Hydrology Manual Reference |
|---|---|---|
| 100-yr, 24-hour | 5.25 | NOAA Atlas 14 |

# Discharge Point 1 (Existing Condition)

| Storm | Volume (ac-ft) | Volume (cf) | Peak FLow (cfs) |
|---|---|---|---|
| 100-yr, 24-hour | 0.80 | 34801 | 2.03 |

# Loss Parameters (Existing Condition - Discharge Point 1)

| | | | | |
|---|---|---|---|---|
| Drainage Area | 150,401 | sf | | |
| | 3.45 | ac | | |
| $A_i$ | 27,143 | sf | | |
| | 18% | imp | | |
| Runoff Index | 86 | | Note: | Plate E-6.1: Barren (Rockland, eroded and graded); Soil Type B |
| $F_p$ | 0.18 | in/hr | Note: | Plate E-6.2: AMC II |

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.151 in/hr**

For 24-hr storms, $F_T$ is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$

$$C = (F - F_M)/54$$

$$T = \text{Unit Time}/2$$

$$F_M = 0.5F$$

***$F_T$ =*** **0.266**

***C =*** **0.0014**

***T =*** **7.5**

***$F_M$ =*** **0.075**

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Existing Condition - Discharge Point 1) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 3.45 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.151 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.075 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR MAX | [22] LOSS RATE IN/HR LOW | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| 1 | | | | | 0.2 | 0.042 | 0.266 | 0.036 | 0.006 | 0.02 |
| 2 | | | | | 0.3 | 0.063 | 0.263 | 0.054 | 0.009 | 0.03 |
| 3 | | | | | 0.3 | 0.063 | 0.260 | 0.054 | 0.009 | 0.03 |
| 4 | | | | | 0.4 | 0.084 | 0.257 | 0.071 | 0.013 | 0.04 |
| 5 | | | | | 0.3 | 0.063 | 0.254 | 0.054 | 0.009 | 0.03 |
| 6 | | | | | 0.3 | 0.063 | 0.251 | 0.054 | 0.009 | 0.03 |
| 7 | | | | | 0.3 | 0.063 | 0.248 | 0.054 | 0.009 | 0.03 |
| 8 | | | | | 0.4 | 0.084 | 0.245 | 0.071 | 0.013 | 0.04 |
| 9 | | | | | 0.4 | 0.084 | 0.242 | 0.071 | 0.013 | 0.04 |
| 10 | | | | | 0.4 | 0.084 | 0.239 | 0.071 | 0.013 | 0.04 |
| 11 | | | | | 0.5 | 0.105 | 0.236 | 0.089 | 0.016 | 0.05 |
| 12 | | | | | 0.5 | 0.105 | 0.233 | 0.089 | 0.016 | 0.05 |
| 13 | | | | | 0.5 | 0.105 | 0.230 | 0.089 | 0.016 | 0.05 |
| 14 | | | | | 0.5 | 0.105 | 0.228 | 0.089 | 0.016 | 0.05 |
| 15 | | | | | 0.5 | 0.105 | 0.225 | 0.089 | 0.016 | 0.05 |
| 16 | | | | | 0.6 | 0.126 | 0.222 | 0.107 | 0.019 | 0.07 |
| 17 | | | | | 0.6 | 0.126 | 0.219 | 0.107 | 0.019 | 0.07 |
| 18 | | | | | 0.7 | 0.147 | 0.216 | 0.125 | 0.022 | 0.08 |
| 19 | | | | | 0.7 | 0.147 | 0.213 | 0.125 | 0.022 | 0.08 |
| 20 | | | | | 0.8 | 0.168 | 0.211 | 0.143 | 0.025 | 0.09 |
| 21 | | | | | 0.6 | 0.126 | 0.208 | 0.107 | 0.019 | 0.07 |
| 22 | | | | | 0.7 | 0.147 | 0.205 | 0.125 | 0.022 | 0.08 |
| 23 | | | | | 0.8 | 0.168 | 0.203 | 0.143 | 0.025 | 0.09 |
| 24 | | | | | 0.8 | 0.168 | 0.200 | 0.143 | 0.025 | 0.09 |
| 25 | | | | | 0.9 | 0.189 | 0.197 | 0.161 | 0.028 | 0.10 |
| 26 | | | | | 0.9 | 0.189 | 0.195 | 0.161 | 0.028 | 0.10 |
| 27 | | | | | 1.0 | 0.210 | 0.192 | 0.179 | 0.018 | 0.06 |
| 28 | | | | | 1.0 | 0.210 | 0.189 | 0.179 | 0.021 | 0.07 |
| 29 | | | | | 1.0 | 0.210 | 0.187 | 0.179 | 0.023 | 0.08 |
| 30 | | | | | 1.1 | 0.231 | 0.184 | 0.196 | 0.047 | 0.16 |
| 31 | | | | | 1.2 | 0.252 | 0.182 | 0.214 | 0.070 | 0.24 |
| 32 | | | | | 1.3 | 0.273 | 0.179 | 0.232 | 0.094 | 0.33 |
| 33 | | | | | 1.5 | 0.315 | 0.177 | 0.268 | 0.138 | 0.48 |
| 34 | | | | | 1.5 | 0.315 | 0.174 | 0.268 | 0.141 | 0.49 |
| 35 | | | | | 1.6 | 0.336 | 0.172 | 0.286 | 0.164 | 0.57 |
| 36 | | | | | 1.7 | 0.357 | 0.169 | 0.303 | 0.188 | 0.65 |
| 37 | | | | | 1.9 | 0.399 | 0.167 | 0.339 | 0.232 | 0.81 |
| 38 | | | | | 2.0 | 0.420 | 0.165 | 0.357 | 0.255 | 0.89 |
| 39 | | | | | 2.1 | 0.441 | 0.162 | 0.375 | 0.279 | 0.97 |
| 40 | | | | | 2.2 | 0.462 | 0.160 | 0.393 | 0.302 | 1.05 |
| 41 | | | | | 1.5 | 0.315 | 0.158 | 0.268 | 0.157 | 0.55 |
| 42 | | | | | 1.5 | 0.315 | 0.155 | 0.268 | 0.160 | 0.56 |
| 43 | | | | | 2.0 | 0.420 | 0.153 | 0.357 | 0.267 | 0.93 |
| 44 | | | | | 2.0 | 0.420 | 0.151 | 0.357 | 0.269 | 0.94 |
| 45 | | | | | 1.9 | 0.399 | 0.149 | 0.339 | 0.250 | 0.87 |
| 46 | | | | | 1.9 | 0.399 | 0.146 | 0.339 | 0.253 | 0.88 |
| 47 | | | | | 1.7 | 0.357 | 0.144 | 0.303 | 0.213 | 0.74 |
| 48 | | | | | 1.8 | 0.378 | 0.142 | 0.321 | 0.236 | 0.82 |
| 49 | | | | | 2.5 | 0.525 | 0.140 | 0.446 | 0.385 | 1.34 |
| 50 | | | | | 2.6 | 0.546 | 0.138 | 0.464 | 0.408 | 1.42 |
| 51 | | | | | 2.8 | 0.588 | 0.136 | 0.500 | 0.452 | 1.57 |
| 52 | | | | | 2.9 | 0.609 | 0.134 | 0.518 | 0.475 | 1.65 |
| 53 | | | | | 3.4 | 0.714 | 0.132 | 0.607 | 0.582 | 2.03 |
| 54 | | | | | 3.4 | 0.714 | 0.130 | 0.607 | 0.584 | **2.03** |
| 55 | | | | | 2.3 | 0.483 | 0.128 | 0.411 | 0.355 | 1.24 |
| 56 | | | | | 2.3 | 0.483 | 0.126 | 0.411 | 0.357 | 1.24 |
| 57 | | | | | 2.7 | 0.567 | 0.124 | 0.482 | 0.443 | 1.54 |
| 58 | | | | | 2.6 | 0.546 | 0.122 | 0.464 | 0.424 | 1.48 |
| 59 | | | | | 2.6 | 0.546 | 0.120 | 0.464 | 0.426 | 1.48 |
| 60 | | | | | 2.5 | 0.525 | 0.118 | 0.446 | 0.407 | 1.42 |
| 61 | | | | | 2.4 | 0.504 | 0.117 | 0.428 | 0.387 | 1.35 |
| 62 | | | | | 2.3 | 0.483 | 0.115 | 0.411 | 0.368 | 1.28 |
| 63 | | | | | 1.9 | 0.399 | 0.113 | 0.339 | 0.286 | 1.00 |
| 64 | | | | | 1.9 | 0.399 | 0.111 | 0.339 | 0.288 | 1.00 |

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Existing Condition - Discharge Point 1) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 3.45 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.151 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.075 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR MAX | [22] LOSS RATE IN/HR LOW | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| 65 | | | | | 0.4 | 0.084 | 0.110 | 0.071 | 0.013 | 0.04 |
| 66 | | | | | 0.4 | 0.084 | 0.108 | 0.071 | 0.013 | 0.04 |
| 67 | | | | | 0.3 | 0.063 | 0.106 | 0.054 | 0.009 | 0.03 |
| 68 | | | | | 0.3 | 0.063 | 0.105 | 0.054 | 0.009 | 0.03 |
| 69 | | | | | 0.5 | 0.105 | 0.103 | 0.089 | 0.002 | 0.01 |
| 70 | | | | | 0.5 | 0.105 | 0.102 | 0.089 | 0.003 | 0.01 |
| 71 | | | | | 0.5 | 0.105 | 0.100 | 0.089 | 0.005 | 0.02 |
| 72 | | | | | 0.4 | 0.084 | 0.099 | 0.071 | 0.013 | 0.04 |
| 73 | | | | | 0.4 | 0.084 | 0.097 | 0.071 | 0.013 | 0.04 |
| 74 | | | | | 0.4 | 0.084 | 0.096 | 0.071 | 0.013 | 0.04 |
| 75 | | | | | 0.3 | 0.063 | 0.094 | 0.054 | 0.009 | 0.03 |
| 76 | | | | | 0.2 | 0.042 | 0.093 | 0.036 | 0.006 | 0.02 |
| 77 | | | | | 0.3 | 0.063 | 0.092 | 0.054 | 0.009 | 0.03 |
| 78 | | | | | 0.4 | 0.084 | 0.090 | 0.071 | 0.013 | 0.04 |
| 79 | | | | | 0.3 | 0.063 | 0.089 | 0.054 | 0.009 | 0.03 |
| 80 | | | | | 0.2 | 0.042 | 0.088 | 0.036 | 0.006 | 0.02 |
| 81 | | | | | 0.3 | 0.063 | 0.087 | 0.054 | 0.009 | 0.03 |
| 82 | | | | | 0.3 | 0.063 | 0.086 | 0.054 | 0.009 | 0.03 |
| 83 | | | | | 0.3 | 0.063 | 0.085 | 0.054 | 0.009 | 0.03 |
| 84 | | | | | 0.2 | 0.042 | 0.084 | 0.036 | 0.006 | 0.02 |
| 85 | | | | | 0.3 | 0.063 | 0.083 | 0.054 | 0.009 | 0.03 |
| 86 | | | | | 0.2 | 0.042 | 0.082 | 0.036 | 0.006 | 0.02 |
| 87 | | | | | 0.3 | 0.063 | 0.081 | 0.054 | 0.009 | 0.03 |
| 88 | | | | | 0.2 | 0.042 | 0.080 | 0.036 | 0.006 | 0.02 |
| 89 | | | | | 0.3 | 0.063 | 0.079 | 0.054 | 0.009 | 0.03 |
| 90 | | | | | 0.2 | 0.042 | 0.078 | 0.036 | 0.006 | 0.02 |
| 91 | | | | | 0.2 | 0.042 | 0.078 | 0.036 | 0.006 | 0.02 |
| 92 | | | | | 0.2 | 0.042 | 0.077 | 0.036 | 0.006 | 0.02 |
| 93 | | | | | 0.2 | 0.042 | 0.077 | 0.036 | 0.006 | 0.02 |
| 94 | | | | | 0.2 | 0.042 | 0.076 | 0.036 | 0.006 | 0.02 |
| 95 | | | | | 0.2 | 0.042 | 0.076 | 0.036 | 0.006 | 0.02 |
| 96 | | | | | 0.2 | 0.042 | 0.075 | 0.036 | 0.006 | 0.02 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTALS | | | | | 100.0 | | | | 11.11 | 38.67 |

**EFFECTIVE RAIN = 2.78 INCHES**
**TOTAL RUNOFF VOLUME = 0.80 AC-FT**

# Discharge Point 2 (Existing Condition)

| Storm | Volume (ac-ft) | Volume (cf) | Peak FLow (cfs) |
|---|---|---|---|
| 100-yr, 24-hour | 1.81 | 78852 | 4.74 |

# Loss Parameters (Existing Condition - Discharge Point 2)

| | | | | |
|---|---|---|---|---|
| Drainage Area | 361,322 | sf | | |
| | 8.29 | ac | | |
| $A_i$ | 18,916 | sf | | |
| | 5% | imp | | |
| Runoff Index | 86 | | Note: | Plate E-6.1: Barren (Rockland, eroded and graded); Soil Type B |
| $F_p$ | 0.18 | in/hr | Note: | Plate E-6.2: AMC II |

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.172 in/hr**

For 24-hr storms, $F_T$ is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$

$$C = (F - F_M)/54$$

$$T = \text{Unit Time}/2$$

$$F_M = 0.5F$$

***$F_T$ =*** **0.303**

***C =*** **0.0016**

***T =*** **7.5**

***$F_M$ =*** **0.086**

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Existing Condition - Discharge Point 2) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 8.29 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.172 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.086 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR MAX | [22] LOSS RATE IN/HR LOW | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| 1 | | | | | 0.2 | 0.042 | 0.303 | 0.036 | 0.006 | 0.05 |
| 2 | | | | | 0.3 | 0.063 | 0.299 | 0.054 | 0.009 | 0.08 |
| 3 | | | | | 0.3 | 0.063 | 0.296 | 0.054 | 0.009 | 0.08 |
| 4 | | | | | 0.4 | 0.084 | 0.292 | 0.071 | 0.013 | 0.11 |
| 5 | | | | | 0.3 | 0.063 | 0.289 | 0.054 | 0.009 | 0.08 |
| 6 | | | | | 0.3 | 0.063 | 0.286 | 0.054 | 0.009 | 0.08 |
| 7 | | | | | 0.3 | 0.063 | 0.282 | 0.054 | 0.009 | 0.08 |
| 8 | | | | | 0.4 | 0.084 | 0.279 | 0.071 | 0.013 | 0.11 |
| 9 | | | | | 0.4 | 0.084 | 0.275 | 0.071 | 0.013 | 0.11 |
| 10 | | | | | 0.4 | 0.084 | 0.272 | 0.071 | 0.013 | 0.11 |
| 11 | | | | | 0.5 | 0.105 | 0.269 | 0.089 | 0.016 | 0.13 |
| 12 | | | | | 0.5 | 0.105 | 0.265 | 0.089 | 0.016 | 0.13 |
| 13 | | | | | 0.5 | 0.105 | 0.262 | 0.089 | 0.016 | 0.13 |
| 14 | | | | | 0.5 | 0.105 | 0.259 | 0.089 | 0.016 | 0.13 |
| 15 | | | | | 0.5 | 0.105 | 0.256 | 0.089 | 0.016 | 0.13 |
| 16 | | | | | 0.6 | 0.126 | 0.252 | 0.107 | 0.019 | 0.16 |
| 17 | | | | | 0.6 | 0.126 | 0.249 | 0.107 | 0.019 | 0.16 |
| 18 | | | | | 0.7 | 0.147 | 0.246 | 0.125 | 0.022 | 0.18 |
| 19 | | | | | 0.7 | 0.147 | 0.243 | 0.125 | 0.022 | 0.18 |
| 20 | | | | | 0.8 | 0.168 | 0.240 | 0.143 | 0.025 | 0.21 |
| 21 | | | | | 0.6 | 0.126 | 0.237 | 0.107 | 0.019 | 0.16 |
| 22 | | | | | 0.7 | 0.147 | 0.234 | 0.125 | 0.022 | 0.18 |
| 23 | | | | | 0.8 | 0.168 | 0.230 | 0.143 | 0.025 | 0.21 |
| 24 | | | | | 0.8 | 0.168 | 0.227 | 0.143 | 0.025 | 0.21 |
| 25 | | | | | 0.9 | 0.189 | 0.224 | 0.161 | 0.028 | 0.24 |
| 26 | | | | | 0.9 | 0.189 | 0.221 | 0.161 | 0.028 | 0.24 |
| 27 | | | | | 1.0 | 0.210 | 0.218 | 0.179 | 0.032 | 0.26 |
| 28 | | | | | 1.0 | 0.210 | 0.215 | 0.179 | 0.032 | 0.26 |
| 29 | | | | | 1.0 | 0.210 | 0.213 | 0.179 | 0.032 | 0.26 |
| 30 | | | | | 1.1 | 0.231 | 0.210 | 0.196 | 0.021 | 0.18 |
| 31 | | | | | 1.2 | 0.252 | 0.207 | 0.214 | 0.045 | 0.38 |
| 32 | | | | | 1.3 | 0.273 | 0.204 | 0.232 | 0.069 | 0.58 |
| 33 | | | | | 1.5 | 0.315 | 0.201 | 0.268 | 0.114 | 0.95 |
| 34 | | | | | 1.5 | 0.315 | 0.198 | 0.268 | 0.117 | 0.98 |
| 35 | | | | | 1.6 | 0.336 | 0.196 | 0.286 | 0.140 | 1.17 |
| 36 | | | | | 1.7 | 0.357 | 0.193 | 0.303 | 0.164 | 1.37 |
| 37 | | | | | 1.9 | 0.399 | 0.190 | 0.339 | 0.209 | 1.75 |
| 38 | | | | | 2.0 | 0.420 | 0.187 | 0.357 | 0.233 | 1.95 |
| 39 | | | | | 2.1 | 0.441 | 0.185 | 0.375 | 0.256 | 2.14 |
| 40 | | | | | 2.2 | 0.462 | 0.182 | 0.393 | 0.280 | 2.34 |
| 41 | | | | | 1.5 | 0.315 | 0.179 | 0.268 | 0.136 | 1.13 |
| 42 | | | | | 1.5 | 0.315 | 0.177 | 0.268 | 0.138 | 1.16 |
| 43 | | | | | 2.0 | 0.420 | 0.174 | 0.357 | 0.246 | 2.06 |
| 44 | | | | | 2.0 | 0.420 | 0.172 | 0.357 | 0.248 | 2.08 |
| 45 | | | | | 1.9 | 0.399 | 0.169 | 0.339 | 0.230 | 1.92 |
| 46 | | | | | 1.9 | 0.399 | 0.167 | 0.339 | 0.232 | 1.94 |
| 47 | | | | | 1.7 | 0.357 | 0.164 | 0.303 | 0.193 | 1.61 |
| 48 | | | | | 1.8 | 0.378 | 0.162 | 0.321 | 0.216 | 1.81 |
| 49 | | | | | 2.5 | 0.525 | 0.159 | 0.446 | 0.366 | 3.06 |
| 50 | | | | | 2.6 | 0.546 | 0.157 | 0.464 | 0.389 | 3.25 |
| 51 | | | | | 2.8 | 0.588 | 0.155 | 0.500 | 0.433 | 3.63 |
| 52 | | | | | 2.9 | 0.609 | 0.152 | 0.518 | 0.457 | 3.82 |
| 53 | | | | | 3.4 | 0.714 | 0.150 | 0.607 | 0.564 | 4.72 |
| 54 | | | | | 3.4 | 0.714 | 0.148 | 0.607 | 0.566 | **4.74** |
| 55 | | | | | 2.3 | 0.483 | 0.145 | 0.411 | 0.338 | 2.82 |
| 56 | | | | | 2.3 | 0.483 | 0.143 | 0.411 | 0.340 | 2.84 |
| 57 | | | | | 2.7 | 0.567 | 0.141 | 0.482 | 0.426 | 3.56 |
| 58 | | | | | 2.6 | 0.546 | 0.139 | 0.464 | 0.407 | 3.41 |
| 59 | | | | | 2.6 | 0.546 | 0.137 | 0.464 | 0.409 | 3.42 |
| 60 | | | | | 2.5 | 0.525 | 0.135 | 0.446 | 0.390 | 3.26 |
| 61 | | | | | 2.4 | 0.504 | 0.133 | 0.428 | 0.371 | 3.11 |
| 62 | | | | | 2.3 | 0.483 | 0.131 | 0.411 | 0.352 | 2.95 |
| 63 | | | | | 1.9 | 0.399 | 0.129 | 0.339 | 0.270 | 2.26 |
| 64 | | | | | 1.9 | 0.399 | 0.127 | 0.339 | 0.272 | 2.28 |

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Existing Condition - Discharge Point 2) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 8.29 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.172 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.086 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR | | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| | | | | | | | MAX | LOW | | |
| 65 | | | | | 0.4 | 0.084 | 0.125 | 0.071 | 0.013 | 0.11 |
| 66 | | | | | 0.4 | 0.084 | 0.123 | 0.071 | 0.013 | 0.11 |
| 67 | | | | | 0.3 | 0.063 | 0.121 | 0.054 | 0.009 | 0.08 |
| 68 | | | | | 0.3 | 0.063 | 0.119 | 0.054 | 0.009 | 0.08 |
| 69 | | | | | 0.5 | 0.105 | 0.117 | 0.089 | 0.016 | 0.13 |
| 70 | | | | | 0.5 | 0.105 | 0.116 | 0.089 | 0.016 | 0.13 |
| 71 | | | | | 0.5 | 0.105 | 0.114 | 0.089 | 0.016 | 0.13 |
| 72 | | | | | 0.4 | 0.084 | 0.112 | 0.071 | 0.013 | 0.11 |
| 73 | | | | | 0.4 | 0.084 | 0.110 | 0.071 | 0.013 | 0.11 |
| 74 | | | | | 0.4 | 0.084 | 0.109 | 0.071 | 0.013 | 0.11 |
| 75 | | | | | 0.3 | 0.063 | 0.107 | 0.054 | 0.009 | 0.08 |
| 76 | | | | | 0.2 | 0.042 | 0.106 | 0.036 | 0.006 | 0.05 |
| 77 | | | | | 0.3 | 0.063 | 0.104 | 0.054 | 0.009 | 0.08 |
| 78 | | | | | 0.4 | 0.084 | 0.103 | 0.071 | 0.013 | 0.11 |
| 79 | | | | | 0.3 | 0.063 | 0.101 | 0.054 | 0.009 | 0.08 |
| 80 | | | | | 0.2 | 0.042 | 0.100 | 0.036 | 0.006 | 0.05 |
| 81 | | | | | 0.3 | 0.063 | 0.099 | 0.054 | 0.009 | 0.08 |
| 82 | | | | | 0.3 | 0.063 | 0.097 | 0.054 | 0.009 | 0.08 |
| 83 | | | | | 0.3 | 0.063 | 0.096 | 0.054 | 0.009 | 0.08 |
| 84 | | | | | 0.2 | 0.042 | 0.095 | 0.036 | 0.006 | 0.05 |
| 85 | | | | | 0.3 | 0.063 | 0.094 | 0.054 | 0.009 | 0.08 |
| 86 | | | | | 0.2 | 0.042 | 0.093 | 0.036 | 0.006 | 0.05 |
| 87 | | | | | 0.3 | 0.063 | 0.092 | 0.054 | 0.009 | 0.08 |
| 88 | | | | | 0.2 | 0.042 | 0.091 | 0.036 | 0.006 | 0.05 |
| 89 | | | | | 0.3 | 0.063 | 0.090 | 0.054 | 0.009 | 0.08 |
| 90 | | | | | 0.2 | 0.042 | 0.089 | 0.036 | 0.006 | 0.05 |
| 91 | | | | | 0.2 | 0.042 | 0.088 | 0.036 | 0.006 | 0.05 |
| 92 | | | | | 0.2 | 0.042 | 0.088 | 0.036 | 0.006 | 0.05 |
| 93 | | | | | 0.2 | 0.042 | 0.087 | 0.036 | 0.006 | 0.05 |
| 94 | | | | | 0.2 | 0.042 | 0.087 | 0.036 | 0.006 | 0.05 |
| 95 | | | | | 0.2 | 0.042 | 0.086 | 0.036 | 0.006 | 0.05 |
| 96 | | | | | 0.2 | 0.042 | 0.086 | 0.036 | 0.006 | 0.05 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTALS | | | | | 100.0 | | | | 10.48 | 87.61 |

**EFFECTIVE RAIN = 2.62 INCHES**
**TOTAL RUNOFF VOLUME = 1.81 AC-FT**

# Discharge Point 1 (Proposed Condition)

| Storm | Volume (ac-ft) | Volume (cf) | Peak FLow (cfs) |
|---|---|---|---|
| 100-yr, 24-hour | 1.42 | 61935 | 2.97 |

# Loss Parameters (Proposed Condition - Discharge Point 1)

| | | | | |
|---|---|---|---|---|
| Drainage Area | 195,054 | sf | | |
| | 4.48 | ac | | |
| $A_i$ | 122,525 | sf | | |
| | 63% | imp | | |
| Runoff Index | 88 | | Note: | Plate E-6.1: Assume desert landscaping => Open Brush - Poor; Soil Type D |
| $F_p$ | 0.15 | in/hr | Note: | Plate E-6.2: AMC II |

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.065 in/hr**

For 24-hr storms, $F_T$ is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$ ***$F_T$ =*** **0.115**

$$C = (F - F_M)/54$$ ***C =*** **0.0006**

$$T = \text{Unit Time}/2$$ ***T =*** **7.5**

$$F_M = 0.5F$$ ***$F_M$ =*** **0.033**

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Discharge Point 1) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 4.48 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.065 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.033 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR MAX | [22] LOSS RATE IN/HR LOW | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| 1 | | | | | 0.2 | 0.042 | 0.115 | 0.036 | 0.006 | 0.03 |
| 2 | | | | | 0.3 | 0.063 | 0.114 | 0.054 | 0.009 | 0.04 |
| 3 | | | | | 0.3 | 0.063 | 0.112 | 0.054 | 0.009 | 0.04 |
| 4 | | | | | 0.4 | 0.084 | 0.111 | 0.071 | 0.013 | 0.06 |
| 5 | | | | | 0.3 | 0.063 | 0.110 | 0.054 | 0.009 | 0.04 |
| 6 | | | | | 0.3 | 0.063 | 0.109 | 0.054 | 0.009 | 0.04 |
| 7 | | | | | 0.3 | 0.063 | 0.107 | 0.054 | 0.009 | 0.04 |
| 8 | | | | | 0.4 | 0.084 | 0.106 | 0.071 | 0.013 | 0.06 |
| 9 | | | | | 0.4 | 0.084 | 0.105 | 0.071 | 0.013 | 0.06 |
| 10 | | | | | 0.4 | 0.084 | 0.103 | 0.071 | 0.013 | 0.06 |
| 11 | | | | | 0.5 | 0.105 | 0.102 | 0.089 | 0.003 | 0.01 |
| 12 | | | | | 0.5 | 0.105 | 0.101 | 0.089 | 0.004 | 0.02 |
| 13 | | | | | 0.5 | 0.105 | 0.100 | 0.089 | 0.005 | 0.02 |
| 14 | | | | | 0.5 | 0.105 | 0.098 | 0.089 | 0.007 | 0.03 |
| 15 | | | | | 0.5 | 0.105 | 0.097 | 0.089 | 0.008 | 0.04 |
| 16 | | | | | 0.6 | 0.126 | 0.096 | 0.107 | 0.030 | 0.14 |
| 17 | | | | | 0.6 | 0.126 | 0.095 | 0.107 | 0.031 | 0.14 |
| 18 | | | | | 0.7 | 0.147 | 0.094 | 0.125 | 0.053 | 0.24 |
| 19 | | | | | 0.7 | 0.147 | 0.092 | 0.125 | 0.055 | 0.25 |
| 20 | | | | | 0.8 | 0.168 | 0.091 | 0.143 | 0.077 | 0.35 |
| 21 | | | | | 0.6 | 0.126 | 0.090 | 0.107 | 0.036 | 0.16 |
| 22 | | | | | 0.7 | 0.147 | 0.089 | 0.125 | 0.058 | 0.26 |
| 23 | | | | | 0.8 | 0.168 | 0.088 | 0.143 | 0.080 | 0.36 |
| 24 | | | | | 0.8 | 0.168 | 0.086 | 0.143 | 0.082 | 0.37 |
| 25 | | | | | 0.9 | 0.189 | 0.085 | 0.161 | 0.104 | 0.47 |
| 26 | | | | | 0.9 | 0.189 | 0.084 | 0.161 | 0.105 | 0.47 |
| 27 | | | | | 1.0 | 0.210 | 0.083 | 0.179 | 0.127 | 0.57 |
| 28 | | | | | 1.0 | 0.210 | 0.082 | 0.179 | 0.128 | 0.58 |
| 29 | | | | | 1.0 | 0.210 | 0.081 | 0.179 | 0.129 | 0.58 |
| 30 | | | | | 1.1 | 0.231 | 0.080 | 0.196 | 0.151 | 0.68 |
| 31 | | | | | 1.2 | 0.252 | 0.079 | 0.214 | 0.173 | 0.78 |
| 32 | | | | | 1.3 | 0.273 | 0.078 | 0.232 | 0.195 | 0.88 |
| 33 | | | | | 1.5 | 0.315 | 0.076 | 0.268 | 0.239 | 1.08 |
| 34 | | | | | 1.5 | 0.315 | 0.075 | 0.268 | 0.240 | 1.08 |
| 35 | | | | | 1.6 | 0.336 | 0.074 | 0.286 | 0.262 | 1.18 |
| 36 | | | | | 1.7 | 0.357 | 0.073 | 0.303 | 0.284 | 1.28 |
| 37 | | | | | 1.9 | 0.399 | 0.072 | 0.339 | 0.327 | 1.48 |
| 38 | | | | | 2.0 | 0.420 | 0.071 | 0.357 | 0.349 | 1.57 |
| 39 | | | | | 2.1 | 0.441 | 0.070 | 0.375 | 0.371 | 1.67 |
| 40 | | | | | 2.2 | 0.462 | 0.069 | 0.393 | 0.393 | 1.77 |
| 41 | | | | | 1.5 | 0.315 | 0.068 | 0.268 | 0.247 | 1.11 |
| 42 | | | | | 1.5 | 0.315 | 0.067 | 0.268 | 0.248 | 1.12 |
| 43 | | | | | 2.0 | 0.420 | 0.066 | 0.357 | 0.354 | 1.60 |
| 44 | | | | | 2.0 | 0.420 | 0.065 | 0.357 | 0.355 | 1.60 |
| 45 | | | | | 1.9 | 0.399 | 0.064 | 0.339 | 0.335 | 1.51 |
| 46 | | | | | 1.9 | 0.399 | 0.063 | 0.339 | 0.336 | 1.52 |
| 47 | | | | | 1.7 | 0.357 | 0.062 | 0.303 | 0.295 | 1.33 |
| 48 | | | | | 1.8 | 0.378 | 0.061 | 0.321 | 0.317 | 1.43 |
| 49 | | | | | 2.5 | 0.525 | 0.061 | 0.446 | 0.464 | 2.10 |
| 50 | | | | | 2.6 | 0.546 | 0.060 | 0.464 | 0.486 | 2.20 |
| 51 | | | | | 2.8 | 0.588 | 0.059 | 0.500 | 0.529 | 2.39 |
| 52 | | | | | 2.9 | 0.609 | 0.058 | 0.518 | 0.551 | 2.49 |
| 53 | | | | | 3.4 | 0.714 | 0.057 | 0.607 | 0.657 | 2.97 |
| 54 | | | | | 3.4 | 0.714 | 0.056 | 0.607 | 0.658 | **2.97** |
| 55 | | | | | 2.3 | 0.483 | 0.055 | 0.411 | 0.428 | 1.93 |
| 56 | | | | | 2.3 | 0.483 | 0.054 | 0.411 | 0.429 | 1.94 |
| 57 | | | | | 2.7 | 0.567 | 0.054 | 0.482 | 0.513 | 2.32 |
| 58 | | | | | 2.6 | 0.546 | 0.053 | 0.464 | 0.493 | 2.23 |
| 59 | | | | | 2.6 | 0.546 | 0.052 | 0.464 | 0.494 | 2.23 |
| 60 | | | | | 2.5 | 0.525 | 0.051 | 0.446 | 0.474 | 2.14 |
| 61 | | | | | 2.4 | 0.504 | 0.050 | 0.428 | 0.454 | 2.05 |
| 62 | | | | | 2.3 | 0.483 | 0.050 | 0.411 | 0.433 | 1.96 |
| 63 | | | | | 1.9 | 0.399 | 0.049 | 0.339 | 0.350 | 1.58 |
| 64 | | | | | 1.9 | 0.399 | 0.048 | 0.339 | 0.351 | 1.58 |

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Discharge Point 1) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 4.48 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.065 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.033 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR | | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| | | | | | | | MAX | LOW | | |
| 65 | | | | | 0.4 | 0.084 | 0.047 | 0.071 | 0.037 | 0.17 |
| 66 | | | | | 0.4 | 0.084 | 0.047 | 0.071 | 0.037 | 0.17 |
| 67 | | | | | 0.3 | 0.063 | 0.046 | 0.054 | 0.017 | 0.08 |
| 68 | | | | | 0.3 | 0.063 | 0.045 | 0.054 | 0.018 | 0.08 |
| 69 | | | | | 0.5 | 0.105 | 0.045 | 0.089 | 0.060 | 0.27 |
| 70 | | | | | 0.5 | 0.105 | 0.044 | 0.089 | 0.061 | 0.28 |
| 71 | | | | | 0.5 | 0.105 | 0.043 | 0.089 | 0.062 | 0.28 |
| 72 | | | | | 0.4 | 0.084 | 0.043 | 0.071 | 0.041 | 0.19 |
| 73 | | | | | 0.4 | 0.084 | 0.042 | 0.071 | 0.042 | 0.19 |
| 74 | | | | | 0.4 | 0.084 | 0.041 | 0.071 | 0.043 | 0.19 |
| 75 | | | | | 0.3 | 0.063 | 0.041 | 0.054 | 0.022 | 0.10 |
| 76 | | | | | 0.2 | 0.042 | 0.040 | 0.036 | 0.002 | 0.01 |
| 77 | | | | | 0.3 | 0.063 | 0.040 | 0.054 | 0.023 | 0.11 |
| 78 | | | | | 0.4 | 0.084 | 0.039 | 0.071 | 0.045 | 0.20 |
| 79 | | | | | 0.3 | 0.063 | 0.039 | 0.054 | 0.024 | 0.11 |
| 80 | | | | | 0.2 | 0.042 | 0.038 | 0.036 | 0.004 | 0.02 |
| 81 | | | | | 0.3 | 0.063 | 0.038 | 0.054 | 0.025 | 0.12 |
| 82 | | | | | 0.3 | 0.063 | 0.037 | 0.054 | 0.026 | 0.12 |
| 83 | | | | | 0.3 | 0.063 | 0.037 | 0.054 | 0.026 | 0.12 |
| 84 | | | | | 0.2 | 0.042 | 0.036 | 0.036 | 0.006 | 0.03 |
| 85 | | | | | 0.3 | 0.063 | 0.036 | 0.054 | 0.027 | 0.12 |
| 86 | | | | | 0.2 | 0.042 | 0.035 | 0.036 | 0.007 | 0.03 |
| 87 | | | | | 0.3 | 0.063 | 0.035 | 0.054 | 0.028 | 0.13 |
| 88 | | | | | 0.2 | 0.042 | 0.035 | 0.036 | 0.007 | 0.03 |
| 89 | | | | | 0.3 | 0.063 | 0.034 | 0.054 | 0.029 | 0.13 |
| 90 | | | | | 0.2 | 0.042 | 0.034 | 0.036 | 0.008 | 0.04 |
| 91 | | | | | 0.2 | 0.042 | 0.034 | 0.036 | 0.008 | 0.04 |
| 92 | | | | | 0.2 | 0.042 | 0.033 | 0.036 | 0.009 | 0.04 |
| 93 | | | | | 0.2 | 0.042 | 0.033 | 0.036 | 0.009 | 0.04 |
| 94 | | | | | 0.2 | 0.042 | 0.033 | 0.036 | 0.009 | 0.04 |
| 95 | | | | | 0.2 | 0.042 | 0.033 | 0.036 | 0.009 | 0.04 |
| 96 | | | | | 0.2 | 0.042 | 0.033 | 0.036 | 0.009 | 0.04 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTALS | | | | | 100.0 | | | | 15.24 | 68.82 |

**EFFECTIVE RAIN = 3.81 INCHES**
**TOTAL RUNOFF VOLUME = 1.42 AC-FT**

# Runoff Hydrograph to Detention Vault-1 (Proposed Condition)

| Storm | Volume (ac-ft) | Volume (cf) | Peak FLow (cfs) |
|---|---|---|---|
| 100-yr, 24-hour | 0.77 | 33364 | 1.58 |

# Loss Parameters (Proposed Condition - Runoff Hydgraph to Detention Vault-1)

| | | | | |
|---|---|---|---|---|
| Drainage Area | 102,994 | sf | | |
| | 2.36 | ac | | |
| $A_i$ | 67,661 | sf | | |
| | 66% | imp | | |
| Runoff Index | 88 | | Note: | Plate E-6.1: Assume desert landscaping => Open Brush - Poor; Soil Type D |
| $F_p$ | 0.15 | in/hr | Note: | Plate E-6.2: AMC II |

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.061 in/hr**

For 24-hr storms, $F_T$ is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$

$$C = (F - F_M)/54$$

$$T = \text{Unit Time}/2$$

$$F_M = 0.5F$$

***$F_T$ =*** **0.108**
***C =*** **0.0006**
***T =*** **7.5**
***$F_M$ =*** **0.031**

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Runoff HG to Detention Vault-1) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 2.36 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.061 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.031 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR | | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| | | | | | | | MAX | LOW | | |
| 1 | | | | | 0.2 | 0.042 | 0.108 | 0.036 | 0.006 | 0.02 |
| 2 | | | | | 0.3 | 0.063 | 0.107 | 0.054 | 0.009 | 0.02 |
| 3 | | | | | 0.3 | 0.063 | 0.106 | 0.054 | 0.009 | 0.02 |
| 4 | | | | | 0.4 | 0.084 | 0.105 | 0.071 | 0.013 | 0.03 |
| 5 | | | | | 0.3 | 0.063 | 0.103 | 0.054 | 0.009 | 0.02 |
| 6 | | | | | 0.3 | 0.063 | 0.102 | 0.054 | 0.009 | 0.02 |
| 7 | | | | | 0.3 | 0.063 | 0.101 | 0.054 | 0.009 | 0.02 |
| 8 | | | | | 0.4 | 0.084 | 0.100 | 0.071 | 0.013 | 0.03 |
| 9 | | | | | 0.4 | 0.084 | 0.098 | 0.071 | 0.013 | 0.03 |
| 10 | | | | | 0.4 | 0.084 | 0.097 | 0.071 | 0.013 | 0.03 |
| 11 | | | | | 0.5 | 0.105 | 0.096 | 0.089 | 0.009 | 0.02 |
| 12 | | | | | 0.5 | 0.105 | 0.095 | 0.089 | 0.010 | 0.02 |
| 13 | | | | | 0.5 | 0.105 | 0.094 | 0.089 | 0.011 | 0.03 |
| 14 | | | | | 0.5 | 0.105 | 0.093 | 0.089 | 0.012 | 0.03 |
| 15 | | | | | 0.5 | 0.105 | 0.091 | 0.089 | 0.014 | 0.03 |
| 16 | | | | | 0.6 | 0.126 | 0.090 | 0.107 | 0.036 | 0.09 |
| 17 | | | | | 0.6 | 0.126 | 0.089 | 0.107 | 0.037 | 0.09 |
| 18 | | | | | 0.7 | 0.147 | 0.088 | 0.125 | 0.059 | 0.14 |
| 19 | | | | | 0.7 | 0.147 | 0.087 | 0.125 | 0.060 | 0.14 |
| 20 | | | | | 0.8 | 0.168 | 0.086 | 0.143 | 0.082 | 0.20 |
| 21 | | | | | 0.6 | 0.126 | 0.085 | 0.107 | 0.041 | 0.10 |
| 22 | | | | | 0.7 | 0.147 | 0.083 | 0.125 | 0.064 | 0.15 |
| 23 | | | | | 0.8 | 0.168 | 0.082 | 0.143 | 0.086 | 0.20 |
| 24 | | | | | 0.8 | 0.168 | 0.081 | 0.143 | 0.087 | 0.21 |
| 25 | | | | | 0.9 | 0.189 | 0.080 | 0.161 | 0.109 | 0.26 |
| 26 | | | | | 0.9 | 0.189 | 0.079 | 0.161 | 0.110 | 0.26 |
| 27 | | | | | 1.0 | 0.210 | 0.078 | 0.179 | 0.132 | 0.31 |
| 28 | | | | | 1.0 | 0.210 | 0.077 | 0.179 | 0.133 | 0.32 |
| 29 | | | | | 1.0 | 0.210 | 0.076 | 0.179 | 0.134 | 0.32 |
| 30 | | | | | 1.1 | 0.231 | 0.075 | 0.196 | 0.156 | 0.37 |
| 31 | | | | | 1.2 | 0.252 | 0.074 | 0.214 | 0.178 | 0.42 |
| 32 | | | | | 1.3 | 0.273 | 0.073 | 0.232 | 0.200 | 0.48 |
| 33 | | | | | 1.5 | 0.315 | 0.072 | 0.268 | 0.243 | 0.58 |
| 34 | | | | | 1.5 | 0.315 | 0.071 | 0.268 | 0.244 | 0.58 |
| 35 | | | | | 1.6 | 0.336 | 0.070 | 0.286 | 0.266 | 0.63 |
| 36 | | | | | 1.7 | 0.357 | 0.069 | 0.303 | 0.288 | 0.69 |
| 37 | | | | | 1.9 | 0.399 | 0.068 | 0.339 | 0.331 | 0.79 |
| 38 | | | | | 2.0 | 0.420 | 0.067 | 0.357 | 0.353 | 0.84 |
| 39 | | | | | 2.1 | 0.441 | 0.066 | 0.375 | 0.375 | 0.89 |
| 40 | | | | | 2.2 | 0.462 | 0.065 | 0.393 | 0.397 | 0.95 |
| 41 | | | | | 1.5 | 0.315 | 0.064 | 0.268 | 0.251 | 0.60 |
| 42 | | | | | 1.5 | 0.315 | 0.063 | 0.268 | 0.252 | 0.60 |
| 43 | | | | | 2.0 | 0.420 | 0.062 | 0.357 | 0.358 | 0.85 |
| 44 | | | | | 2.0 | 0.420 | 0.061 | 0.357 | 0.359 | 0.86 |
| 45 | | | | | 1.9 | 0.399 | 0.060 | 0.339 | 0.339 | 0.81 |
| 46 | | | | | 1.9 | 0.399 | 0.060 | 0.339 | 0.339 | 0.81 |
| 47 | | | | | 1.7 | 0.357 | 0.059 | 0.303 | 0.298 | 0.71 |
| 48 | | | | | 1.8 | 0.378 | 0.058 | 0.321 | 0.320 | 0.76 |
| 49 | | | | | 2.5 | 0.525 | 0.057 | 0.446 | 0.468 | 1.12 |
| 50 | | | | | 2.6 | 0.546 | 0.056 | 0.464 | 0.490 | 1.17 |
| 51 | | | | | 2.8 | 0.588 | 0.055 | 0.500 | 0.533 | 1.27 |
| 52 | | | | | 2.9 | 0.609 | 0.054 | 0.518 | 0.555 | 1.32 |
| 53 | | | | | 3.4 | 0.714 | 0.054 | 0.607 | 0.660 | 1.57 |
| 54 | | | | | 3.4 | 0.714 | 0.053 | 0.607 | 0.661 | **1.58** |
| 55 | | | | | 2.3 | 0.483 | 0.052 | 0.411 | 0.431 | 1.03 |
| 56 | | | | | 2.3 | 0.483 | 0.051 | 0.411 | 0.432 | 1.03 |
| 57 | | | | | 2.7 | 0.567 | 0.050 | 0.482 | 0.517 | 1.23 |
| 58 | | | | | 2.6 | 0.546 | 0.050 | 0.464 | 0.496 | 1.18 |
| 59 | | | | | 2.6 | 0.546 | 0.049 | 0.464 | 0.497 | 1.19 |
| 60 | | | | | 2.5 | 0.525 | 0.048 | 0.446 | 0.477 | 1.14 |
| 61 | | | | | 2.4 | 0.504 | 0.047 | 0.428 | 0.457 | 1.09 |
| 62 | | | | | 2.3 | 0.483 | 0.047 | 0.411 | 0.436 | 1.04 |
| 63 | | | | | 1.9 | 0.399 | 0.046 | 0.339 | 0.353 | 0.84 |
| 64 | | | | | 1.9 | 0.399 | 0.045 | 0.339 | 0.354 | 0.84 |

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Runoff HG to Detention Vault-1) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 2.36 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.061 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.031 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR | | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| | | | | | | | MAX | LOW | | |
| 65 | | | | | 0.4 | 0.084 | 0.045 | 0.071 | 0.039 | 0.09 |
| 66 | | | | | 0.4 | 0.084 | 0.044 | 0.071 | 0.040 | 0.10 |
| 67 | | | | | 0.3 | 0.063 | 0.043 | 0.054 | 0.020 | 0.05 |
| 68 | | | | | 0.3 | 0.063 | 0.043 | 0.054 | 0.020 | 0.05 |
| 69 | | | | | 0.5 | 0.105 | 0.042 | 0.089 | 0.063 | 0.15 |
| 70 | | | | | 0.5 | 0.105 | 0.041 | 0.089 | 0.064 | 0.15 |
| 71 | | | | | 0.5 | 0.105 | 0.041 | 0.089 | 0.064 | 0.15 |
| 72 | | | | | 0.4 | 0.084 | 0.040 | 0.071 | 0.044 | 0.10 |
| 73 | | | | | 0.4 | 0.084 | 0.039 | 0.071 | 0.045 | 0.11 |
| 74 | | | | | 0.4 | 0.084 | 0.039 | 0.071 | 0.045 | 0.11 |
| 75 | | | | | 0.3 | 0.063 | 0.038 | 0.054 | 0.025 | 0.06 |
| 76 | | | | | 0.2 | 0.042 | 0.038 | 0.036 | 0.004 | 0.01 |
| 77 | | | | | 0.3 | 0.063 | 0.037 | 0.054 | 0.026 | 0.06 |
| 78 | | | | | 0.4 | 0.084 | 0.037 | 0.071 | 0.047 | 0.11 |
| 79 | | | | | 0.3 | 0.063 | 0.036 | 0.054 | 0.027 | 0.06 |
| 80 | | | | | 0.2 | 0.042 | 0.036 | 0.036 | 0.006 | 0.01 |
| 81 | | | | | 0.3 | 0.063 | 0.035 | 0.054 | 0.028 | 0.07 |
| 82 | | | | | 0.3 | 0.063 | 0.035 | 0.054 | 0.028 | 0.07 |
| 83 | | | | | 0.3 | 0.063 | 0.034 | 0.054 | 0.029 | 0.07 |
| 84 | | | | | 0.2 | 0.042 | 0.034 | 0.036 | 0.008 | 0.02 |
| 85 | | | | | 0.3 | 0.063 | 0.034 | 0.054 | 0.029 | 0.07 |
| 86 | | | | | 0.2 | 0.042 | 0.033 | 0.036 | 0.009 | 0.02 |
| 87 | | | | | 0.3 | 0.063 | 0.033 | 0.054 | 0.030 | 0.07 |
| 88 | | | | | 0.2 | 0.042 | 0.032 | 0.036 | 0.010 | 0.02 |
| 89 | | | | | 0.3 | 0.063 | 0.032 | 0.054 | 0.031 | 0.07 |
| 90 | | | | | 0.2 | 0.042 | 0.032 | 0.036 | 0.010 | 0.02 |
| 91 | | | | | 0.2 | 0.042 | 0.032 | 0.036 | 0.010 | 0.02 |
| 92 | | | | | 0.2 | 0.042 | 0.031 | 0.036 | 0.011 | 0.03 |
| 93 | | | | | 0.2 | 0.042 | 0.031 | 0.036 | 0.011 | 0.03 |
| 94 | | | | | 0.2 | 0.042 | 0.031 | 0.036 | 0.011 | 0.03 |
| 95 | | | | | 0.2 | 0.042 | 0.031 | 0.036 | 0.011 | 0.03 |
| 96 | | | | | 0.2 | 0.042 | 0.031 | 0.036 | 0.011 | 0.03 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTALS | | | | | 100.0 | | | | 15.55 | 37.07 |

**EFFECTIVE RAIN = 3.89 INCHES**
**TOTAL RUNOFF VOLUME = 0.77 AC-FT**

# Runoff Hydrograph Bypass to Discharge Point 1 (Proposed Condition)

| Storm | Volume (ac-ft) | Volume (cf) | Peak FLow (cfs) |
|---|---|---|---|
| 100-yr, 24-hour | 0.66 | 28690 | 1.39 |

# Loss Parameters (Proposed Condition - Runoff Hydgraph Bypass to Discharge Point 1)

| | | | | |
|---|---|---|---|---|
| Drainage Area | 92,060 | sf | | |
| | 2.11 | ac | | |
| $A_i$ | 54,864 | sf | | |
| | 60% | imp | | |
| Runoff Index | 88 | | Note: | Plate E-6.1: Assume desert landscaping => Open Brush - Poor; Soil Type D |
| $F_p$ | 0.15 | in/hr | Note: | Plate E-6.2: AMC II |

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.070 in/hr**

For 24-hr storms, $F_T$ is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$ ***$F_T$ =*** **0.123**

$$C = (F - F_M)/54$$ ***C =*** **0.0006**

$$T = \text{Unit Time}/2$$ ***T =*** **7.5**

$$F_M = 0.5F$$ ***$F_M$ =*** **0.035**

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Bypass to Discharge Point 1) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 2.11 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.070 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.035 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR MAX | [22] LOSS RATE IN/HR LOW | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| 1 | | | | | 0.2 | 0.042 | 0.123 | 0.036 | 0.006 | 0.01 |
| 2 | | | | | 0.3 | 0.063 | 0.121 | 0.054 | 0.009 | 0.02 |
| 3 | | | | | 0.3 | 0.063 | 0.120 | 0.054 | 0.009 | 0.02 |
| 4 | | | | | 0.4 | 0.084 | 0.119 | 0.071 | 0.013 | 0.03 |
| 5 | | | | | 0.3 | 0.063 | 0.117 | 0.054 | 0.009 | 0.02 |
| 6 | | | | | 0.3 | 0.063 | 0.116 | 0.054 | 0.009 | 0.02 |
| 7 | | | | | 0.3 | 0.063 | 0.114 | 0.054 | 0.009 | 0.02 |
| 8 | | | | | 0.4 | 0.084 | 0.113 | 0.071 | 0.013 | 0.03 |
| 9 | | | | | 0.4 | 0.084 | 0.112 | 0.071 | 0.013 | 0.03 |
| 10 | | | | | 0.4 | 0.084 | 0.110 | 0.071 | 0.013 | 0.03 |
| 11 | | | | | 0.5 | 0.105 | 0.109 | 0.089 | 0.016 | 0.03 |
| 12 | | | | | 0.5 | 0.105 | 0.108 | 0.089 | 0.016 | 0.03 |
| 13 | | | | | 0.5 | 0.105 | 0.106 | 0.089 | 0.016 | 0.03 |
| 14 | | | | | 0.5 | 0.105 | 0.105 | 0.089 | 0.000 | 0.00 |
| 15 | | | | | 0.5 | 0.105 | 0.104 | 0.089 | 0.001 | 0.00 |
| 16 | | | | | 0.6 | 0.126 | 0.102 | 0.107 | 0.024 | 0.05 |
| 17 | | | | | 0.6 | 0.126 | 0.101 | 0.107 | 0.025 | 0.05 |
| 18 | | | | | 0.7 | 0.147 | 0.100 | 0.125 | 0.047 | 0.10 |
| 19 | | | | | 0.7 | 0.147 | 0.098 | 0.125 | 0.049 | 0.10 |
| 20 | | | | | 0.8 | 0.168 | 0.097 | 0.143 | 0.071 | 0.15 |
| 21 | | | | | 0.6 | 0.126 | 0.096 | 0.107 | 0.030 | 0.06 |
| 22 | | | | | 0.7 | 0.147 | 0.095 | 0.125 | 0.052 | 0.11 |
| 23 | | | | | 0.8 | 0.168 | 0.093 | 0.143 | 0.075 | 0.16 |
| 24 | | | | | 0.8 | 0.168 | 0.092 | 0.143 | 0.076 | 0.16 |
| 25 | | | | | 0.9 | 0.189 | 0.091 | 0.161 | 0.098 | 0.21 |
| 26 | | | | | 0.9 | 0.189 | 0.090 | 0.161 | 0.099 | 0.21 |
| 27 | | | | | 1.0 | 0.210 | 0.089 | 0.179 | 0.121 | 0.26 |
| 28 | | | | | 1.0 | 0.210 | 0.087 | 0.179 | 0.123 | 0.26 |
| 29 | | | | | 1.0 | 0.210 | 0.086 | 0.179 | 0.124 | 0.26 |
| 30 | | | | | 1.1 | 0.231 | 0.085 | 0.196 | 0.146 | 0.31 |
| 31 | | | | | 1.2 | 0.252 | 0.084 | 0.214 | 0.168 | 0.36 |
| 32 | | | | | 1.3 | 0.273 | 0.083 | 0.232 | 0.190 | 0.41 |
| 33 | | | | | 1.5 | 0.315 | 0.082 | 0.268 | 0.233 | 0.50 |
| 34 | | | | | 1.5 | 0.315 | 0.080 | 0.268 | 0.235 | 0.50 |
| 35 | | | | | 1.6 | 0.336 | 0.079 | 0.286 | 0.257 | 0.55 |
| 36 | | | | | 1.7 | 0.357 | 0.078 | 0.303 | 0.279 | 0.59 |
| 37 | | | | | 1.9 | 0.399 | 0.077 | 0.339 | 0.322 | 0.69 |
| 38 | | | | | 2.0 | 0.420 | 0.076 | 0.357 | 0.344 | 0.73 |
| 39 | | | | | 2.1 | 0.441 | 0.075 | 0.375 | 0.366 | 0.78 |
| 40 | | | | | 2.2 | 0.462 | 0.074 | 0.393 | 0.388 | 0.83 |
| 41 | | | | | 1.5 | 0.315 | 0.073 | 0.268 | 0.242 | 0.52 |
| 42 | | | | | 1.5 | 0.315 | 0.072 | 0.268 | 0.243 | 0.52 |
| 43 | | | | | 2.0 | 0.420 | 0.071 | 0.357 | 0.349 | 0.74 |
| 44 | | | | | 2.0 | 0.420 | 0.070 | 0.357 | 0.350 | 0.75 |
| 45 | | | | | 1.9 | 0.399 | 0.069 | 0.339 | 0.330 | 0.70 |
| 46 | | | | | 1.9 | 0.399 | 0.068 | 0.339 | 0.331 | 0.71 |
| 47 | | | | | 1.7 | 0.357 | 0.067 | 0.303 | 0.290 | 0.62 |
| 48 | | | | | 1.8 | 0.378 | 0.066 | 0.321 | 0.312 | 0.67 |
| 49 | | | | | 2.5 | 0.525 | 0.065 | 0.446 | 0.460 | 0.98 |
| 50 | | | | | 2.6 | 0.546 | 0.064 | 0.464 | 0.482 | 1.03 |
| 51 | | | | | 2.8 | 0.588 | 0.063 | 0.500 | 0.525 | 1.12 |
| 52 | | | | | 2.9 | 0.609 | 0.062 | 0.518 | 0.547 | 1.17 |
| 53 | | | | | 3.4 | 0.714 | 0.061 | 0.607 | 0.653 | 1.39 |
| 54 | | | | | 3.4 | 0.714 | 0.060 | 0.607 | 0.654 | **1.39** |
| 55 | | | | | 2.3 | 0.483 | 0.059 | 0.411 | 0.424 | 0.90 |
| 56 | | | | | 2.3 | 0.483 | 0.058 | 0.411 | 0.425 | 0.91 |
| 57 | | | | | 2.7 | 0.567 | 0.057 | 0.482 | 0.510 | 1.09 |
| 58 | | | | | 2.6 | 0.546 | 0.056 | 0.464 | 0.490 | 1.04 |
| 59 | | | | | 2.6 | 0.546 | 0.055 | 0.464 | 0.491 | 1.05 |
| 60 | | | | | 2.5 | 0.525 | 0.055 | 0.446 | 0.470 | 1.00 |
| 61 | | | | | 2.4 | 0.504 | 0.054 | 0.428 | 0.450 | 0.96 |
| 62 | | | | | 2.3 | 0.483 | 0.053 | 0.411 | 0.430 | 0.92 |
| 63 | | | | | 1.9 | 0.399 | 0.052 | 0.339 | 0.347 | 0.74 |
| 64 | | | | | 1.9 | 0.399 | 0.051 | 0.339 | 0.348 | 0.74 |

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Bypass to Discharge Point 1) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 2.11 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.070 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.035 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR | | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| | | | | | | | MAX | LOW | | |
| 65 | | | | | 0.4 | 0.084 | 0.051 | 0.071 | 0.033 | 0.07 |
| 66 | | | | | 0.4 | 0.084 | 0.050 | 0.071 | 0.034 | 0.07 |
| 67 | | | | | 0.3 | 0.063 | 0.049 | 0.054 | 0.014 | 0.03 |
| 68 | | | | | 0.3 | 0.063 | 0.048 | 0.054 | 0.015 | 0.03 |
| 69 | | | | | 0.5 | 0.105 | 0.048 | 0.089 | 0.057 | 0.12 |
| 70 | | | | | 0.5 | 0.105 | 0.047 | 0.089 | 0.058 | 0.12 |
| 71 | | | | | 0.5 | 0.105 | 0.046 | 0.089 | 0.059 | 0.13 |
| 72 | | | | | 0.4 | 0.084 | 0.045 | 0.071 | 0.039 | 0.08 |
| 73 | | | | | 0.4 | 0.084 | 0.045 | 0.071 | 0.039 | 0.08 |
| 74 | | | | | 0.4 | 0.084 | 0.044 | 0.071 | 0.040 | 0.08 |
| 75 | | | | | 0.3 | 0.063 | 0.044 | 0.054 | 0.019 | 0.04 |
| 76 | | | | | 0.2 | 0.042 | 0.043 | 0.036 | 0.006 | 0.01 |
| 77 | | | | | 0.3 | 0.063 | 0.042 | 0.054 | 0.021 | 0.04 |
| 78 | | | | | 0.4 | 0.084 | 0.042 | 0.071 | 0.042 | 0.09 |
| 79 | | | | | 0.3 | 0.063 | 0.041 | 0.054 | 0.022 | 0.05 |
| 80 | | | | | 0.2 | 0.042 | 0.041 | 0.036 | 0.001 | 0.00 |
| 81 | | | | | 0.3 | 0.063 | 0.040 | 0.054 | 0.023 | 0.05 |
| 82 | | | | | 0.3 | 0.063 | 0.040 | 0.054 | 0.023 | 0.05 |
| 83 | | | | | 0.3 | 0.063 | 0.039 | 0.054 | 0.024 | 0.05 |
| 84 | | | | | 0.2 | 0.042 | 0.039 | 0.036 | 0.003 | 0.01 |
| 85 | | | | | 0.3 | 0.063 | 0.038 | 0.054 | 0.025 | 0.05 |
| 86 | | | | | 0.2 | 0.042 | 0.038 | 0.036 | 0.004 | 0.01 |
| 87 | | | | | 0.3 | 0.063 | 0.037 | 0.054 | 0.026 | 0.05 |
| 88 | | | | | 0.2 | 0.042 | 0.037 | 0.036 | 0.005 | 0.01 |
| 89 | | | | | 0.3 | 0.063 | 0.036 | 0.054 | 0.027 | 0.06 |
| 90 | | | | | 0.2 | 0.042 | 0.036 | 0.036 | 0.006 | 0.01 |
| 91 | | | | | 0.2 | 0.042 | 0.036 | 0.036 | 0.006 | 0.01 |
| 92 | | | | | 0.2 | 0.042 | 0.036 | 0.036 | 0.006 | 0.01 |
| 93 | | | | | 0.2 | 0.042 | 0.035 | 0.036 | 0.007 | 0.01 |
| 94 | | | | | 0.2 | 0.042 | 0.035 | 0.036 | 0.007 | 0.01 |
| 95 | | | | | 0.2 | 0.042 | 0.035 | 0.036 | 0.007 | 0.02 |
| 96 | | | | | 0.2 | 0.042 | 0.035 | 0.036 | 0.007 | 0.02 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTALS | | | | | 100.0 | | | | 14.96 | 31.88 |

**EFFECTIVE RAIN = 3.74 INCHES**
**TOTAL RUNOFF VOLUME = 0.66 AC-FT**

# Discharge Point 2 (Proposed Condition)

| Storm | Volume (ac-ft) | Volume (cf) | Peak FLow (cfs) |
|---|---|---|---|
| 100-yr, 24-hour | 2.49 | 108396 | 5.32 |

# Loss Parameters (Proposed Condition - Discharge Point 2)

| | | | | |
|---|---|---|---|---|
| Drainage Area | 353,209 | sf | | |
| | 8.11 | ac | | |
| $A_i$ | 200,729 | sf | | |
| | 57% | imp | | |
| Runoff Index | 88 | | Note: | Plate E-6.1: Assume desert landscaping => Open Brush - Poor; Soil Type D |
| $F_p$ | 0.15 | in/hr | Note: | Plate E-6.2: AMC II |

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.073 in/hr**

For 24-hr storms, $F_T$ is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$

$$C = (F - F_M)/54$$

$$T = \text{Unit Time}/2$$

$$F_M = 0.5F$$

***$F_T$ =*** **0.129**

***C =*** **0.0007**

***T =*** **7.5**

***$F_M$ =*** **0.037**

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Discharge Point 2) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 8.11 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.073 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.037 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR MAX | [22] LOSS RATE IN/HR LOW | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| 1 | | | | | 0.2 | 0.042 | 0.129 | 0.036 | 0.006 | 0.05 |
| 2 | | | | | 0.3 | 0.063 | 0.128 | 0.054 | 0.009 | 0.08 |
| 3 | | | | | 0.3 | 0.063 | 0.126 | 0.054 | 0.009 | 0.08 |
| 4 | | | | | 0.4 | 0.084 | 0.125 | 0.071 | 0.013 | 0.10 |
| 5 | | | | | 0.3 | 0.063 | 0.123 | 0.054 | 0.009 | 0.08 |
| 6 | | | | | 0.3 | 0.063 | 0.122 | 0.054 | 0.009 | 0.08 |
| 7 | | | | | 0.3 | 0.063 | 0.121 | 0.054 | 0.009 | 0.08 |
| 8 | | | | | 0.4 | 0.084 | 0.119 | 0.071 | 0.013 | 0.10 |
| 9 | | | | | 0.4 | 0.084 | 0.118 | 0.071 | 0.013 | 0.10 |
| 10 | | | | | 0.4 | 0.084 | 0.116 | 0.071 | 0.013 | 0.10 |
| 11 | | | | | 0.5 | 0.105 | 0.115 | 0.089 | 0.016 | 0.13 |
| 12 | | | | | 0.5 | 0.105 | 0.113 | 0.089 | 0.016 | 0.13 |
| 13 | | | | | 0.5 | 0.105 | 0.112 | 0.089 | 0.016 | 0.13 |
| 14 | | | | | 0.5 | 0.105 | 0.111 | 0.089 | 0.016 | 0.13 |
| 15 | | | | | 0.5 | 0.105 | 0.109 | 0.089 | 0.016 | 0.13 |
| 16 | | | | | 0.6 | 0.126 | 0.108 | 0.107 | 0.018 | 0.15 |
| 17 | | | | | 0.6 | 0.126 | 0.106 | 0.107 | 0.020 | 0.16 |
| 18 | | | | | 0.7 | 0.147 | 0.105 | 0.125 | 0.042 | 0.34 |
| 19 | | | | | 0.7 | 0.147 | 0.104 | 0.125 | 0.043 | 0.35 |
| 20 | | | | | 0.8 | 0.168 | 0.102 | 0.143 | 0.066 | 0.54 |
| 21 | | | | | 0.6 | 0.126 | 0.101 | 0.107 | 0.025 | 0.20 |
| 22 | | | | | 0.7 | 0.147 | 0.100 | 0.125 | 0.047 | 0.39 |
| 23 | | | | | 0.8 | 0.168 | 0.098 | 0.143 | 0.070 | 0.57 |
| 24 | | | | | 0.8 | 0.168 | 0.097 | 0.143 | 0.071 | 0.58 |
| 25 | | | | | 0.9 | 0.189 | 0.096 | 0.161 | 0.093 | 0.76 |
| 26 | | | | | 0.9 | 0.189 | 0.095 | 0.161 | 0.094 | 0.77 |
| 27 | | | | | 1.0 | 0.210 | 0.093 | 0.179 | 0.117 | 0.95 |
| 28 | | | | | 1.0 | 0.210 | 0.092 | 0.179 | 0.118 | 0.96 |
| 29 | | | | | 1.0 | 0.210 | 0.091 | 0.179 | 0.119 | 0.97 |
| 30 | | | | | 1.1 | 0.231 | 0.090 | 0.196 | 0.141 | 1.16 |
| 31 | | | | | 1.2 | 0.252 | 0.088 | 0.214 | 0.164 | 1.34 |
| 32 | | | | | 1.3 | 0.273 | 0.087 | 0.232 | 0.186 | 1.52 |
| 33 | | | | | 1.5 | 0.315 | 0.086 | 0.268 | 0.229 | 1.87 |
| 34 | | | | | 1.5 | 0.315 | 0.085 | 0.268 | 0.230 | 1.88 |
| 35 | | | | | 1.6 | 0.336 | 0.084 | 0.286 | 0.252 | 2.06 |
| 36 | | | | | 1.7 | 0.357 | 0.082 | 0.303 | 0.275 | 2.25 |
| 37 | | | | | 1.9 | 0.399 | 0.081 | 0.339 | 0.318 | 2.60 |
| 38 | | | | | 2.0 | 0.420 | 0.080 | 0.357 | 0.340 | 2.78 |
| 39 | | | | | 2.1 | 0.441 | 0.079 | 0.375 | 0.362 | 2.96 |
| 40 | | | | | 2.2 | 0.462 | 0.078 | 0.393 | 0.384 | 3.14 |
| 41 | | | | | 1.5 | 0.315 | 0.077 | 0.268 | 0.238 | 1.95 |
| 42 | | | | | 1.5 | 0.315 | 0.076 | 0.268 | 0.239 | 1.96 |
| 43 | | | | | 2.0 | 0.420 | 0.074 | 0.357 | 0.346 | 2.83 |
| 44 | | | | | 2.0 | 0.420 | 0.073 | 0.357 | 0.347 | 2.83 |
| 45 | | | | | 1.9 | 0.399 | 0.072 | 0.339 | 0.327 | 2.67 |
| 46 | | | | | 1.9 | 0.399 | 0.071 | 0.339 | 0.328 | 2.68 |
| 47 | | | | | 1.7 | 0.357 | 0.070 | 0.303 | 0.287 | 2.35 |
| 48 | | | | | 1.8 | 0.378 | 0.069 | 0.321 | 0.309 | 2.53 |
| 49 | | | | | 2.5 | 0.525 | 0.068 | 0.446 | 0.457 | 3.74 |
| 50 | | | | | 2.6 | 0.546 | 0.067 | 0.464 | 0.479 | 3.92 |
| 51 | | | | | 2.8 | 0.588 | 0.066 | 0.500 | 0.522 | 4.27 |
| 52 | | | | | 2.9 | 0.609 | 0.065 | 0.518 | 0.544 | 4.45 |
| 53 | | | | | 3.4 | 0.714 | 0.064 | 0.607 | 0.650 | 5.31 |
| 54 | | | | | 3.4 | 0.714 | 0.063 | 0.607 | 0.651 | **5.32** |
| 55 | | | | | 2.3 | 0.483 | 0.062 | 0.411 | 0.421 | 3.44 |
| 56 | | | | | 2.3 | 0.483 | 0.061 | 0.411 | 0.422 | 3.45 |
| 57 | | | | | 2.7 | 0.567 | 0.060 | 0.482 | 0.507 | 4.14 |
| 58 | | | | | 2.6 | 0.546 | 0.059 | 0.464 | 0.487 | 3.98 |
| 59 | | | | | 2.6 | 0.546 | 0.058 | 0.464 | 0.488 | 3.99 |
| 60 | | | | | 2.5 | 0.525 | 0.058 | 0.446 | 0.467 | 3.82 |
| 61 | | | | | 2.4 | 0.504 | 0.057 | 0.428 | 0.447 | 3.66 |
| 62 | | | | | 2.3 | 0.483 | 0.056 | 0.411 | 0.427 | 3.49 |
| 63 | | | | | 1.9 | 0.399 | 0.055 | 0.339 | 0.344 | 2.81 |
| 64 | | | | | 1.9 | 0.399 | 0.054 | 0.339 | 0.345 | 2.82 |

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Discharge Point 2) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 8.11 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.073 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.037 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR MAX | [22] LOSS RATE IN/HR LOW | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| 65 | | | | | 0.4 | 0.084 | 0.053 | 0.071 | 0.031 | 0.25 |
| 66 | | | | | 0.4 | 0.084 | 0.052 | 0.071 | 0.032 | 0.26 |
| 67 | | | | | 0.3 | 0.063 | 0.052 | 0.054 | 0.011 | 0.09 |
| 68 | | | | | 0.3 | 0.063 | 0.051 | 0.054 | 0.012 | 0.10 |
| 69 | | | | | 0.5 | 0.105 | 0.050 | 0.089 | 0.055 | 0.45 |
| 70 | | | | | 0.5 | 0.105 | 0.049 | 0.089 | 0.056 | 0.45 |
| 71 | | | | | 0.5 | 0.105 | 0.049 | 0.089 | 0.056 | 0.46 |
| 72 | | | | | 0.4 | 0.084 | 0.048 | 0.071 | 0.036 | 0.30 |
| 73 | | | | | 0.4 | 0.084 | 0.047 | 0.071 | 0.037 | 0.30 |
| 74 | | | | | 0.4 | 0.084 | 0.047 | 0.071 | 0.037 | 0.31 |
| 75 | | | | | 0.3 | 0.063 | 0.046 | 0.054 | 0.017 | 0.14 |
| 76 | | | | | 0.2 | 0.042 | 0.045 | 0.036 | 0.006 | 0.05 |
| 77 | | | | | 0.3 | 0.063 | 0.045 | 0.054 | 0.018 | 0.15 |
| 78 | | | | | 0.4 | 0.084 | 0.044 | 0.071 | 0.040 | 0.33 |
| 79 | | | | | 0.3 | 0.063 | 0.043 | 0.054 | 0.020 | 0.16 |
| 80 | | | | | 0.2 | 0.042 | 0.043 | 0.036 | 0.006 | 0.05 |
| 81 | | | | | 0.3 | 0.063 | 0.042 | 0.054 | 0.021 | 0.17 |
| 82 | | | | | 0.3 | 0.063 | 0.042 | 0.054 | 0.021 | 0.17 |
| 83 | | | | | 0.3 | 0.063 | 0.041 | 0.054 | 0.022 | 0.18 |
| 84 | | | | | 0.2 | 0.042 | 0.041 | 0.036 | 0.001 | 0.01 |
| 85 | | | | | 0.3 | 0.063 | 0.040 | 0.054 | 0.023 | 0.19 |
| 86 | | | | | 0.2 | 0.042 | 0.040 | 0.036 | 0.002 | 0.02 |
| 87 | | | | | 0.3 | 0.063 | 0.039 | 0.054 | 0.024 | 0.19 |
| 88 | | | | | 0.2 | 0.042 | 0.039 | 0.036 | 0.003 | 0.03 |
| 89 | | | | | 0.3 | 0.063 | 0.038 | 0.054 | 0.025 | 0.20 |
| 90 | | | | | 0.2 | 0.042 | 0.038 | 0.036 | 0.004 | 0.03 |
| 91 | | | | | 0.2 | 0.042 | 0.038 | 0.036 | 0.004 | 0.03 |
| 92 | | | | | 0.2 | 0.042 | 0.037 | 0.036 | 0.005 | 0.04 |
| 93 | | | | | 0.2 | 0.042 | 0.037 | 0.036 | 0.005 | 0.04 |
| 94 | | | | | 0.2 | 0.042 | 0.037 | 0.036 | 0.005 | 0.04 |
| 95 | | | | | 0.2 | 0.042 | 0.037 | 0.036 | 0.005 | 0.04 |
| 96 | | | | | 0.2 | 0.042 | 0.037 | 0.036 | 0.005 | 0.04 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTALS | | | | | 100.0 | | | | 14.73 | 120.44 |

**EFFECTIVE RAIN = 3.68 INCHES**
**TOTAL RUNOFF VOLUME = 2.49 AC-FT**

# Runoff Hydrograph to Detention Vault-2 (Proposed Condition)

| Storm | Volume (ac-ft) | Volume (cf) | Peak FLow (cfs) |
|---|---|---|---|
| 100-yr, 24-hour | 1.59 | 69189 | 3.25 |

# Loss Parameters (Proposed Condition - Runoff Hydgraph to Detention Vault-2)

| | | | | |
|---|---|---|---|---|
| Drainage Area | 211,502 | sf | | |
| | 4.86 | ac | | |
| $A_i$ | 141,966 | sf | | |
| | 67% | imp | | |
| Runoff Index | 88 | | Note: | Plate E-6.1: Assume desert landscaping => Open Brush - Poor; Soil Type D |
| $F_p$ | 0.15 | in/hr | Note: | Plate E-6.2: AMC II |

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.059 in/hr**

For 24-hr storms, $F_T$ is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$

$$C = (F - F_M)/54$$

$$T = \text{Unit Time}/2$$

$$F_M = 0.5F$$

***$F_T$ =*** **0.105**

***C =*** **0.0005**

***T =*** **7.5**

***$F_M$ =*** **0.030**

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Runoff HG to Detention Vault-2) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 4.86 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.059 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.030 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR | | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| | | | | | | | MAX | LOW | | |
| 1 | | | | | 0.2 | 0.042 | 0.105 | 0.036 | 0.006 | 0.03 |
| 2 | | | | | 0.3 | 0.063 | 0.104 | 0.054 | 0.009 | 0.05 |
| 3 | | | | | 0.3 | 0.063 | 0.102 | 0.054 | 0.009 | 0.05 |
| 4 | | | | | 0.4 | 0.084 | 0.101 | 0.071 | 0.013 | 0.06 |
| 5 | | | | | 0.3 | 0.063 | 0.100 | 0.054 | 0.009 | 0.05 |
| 6 | | | | | 0.3 | 0.063 | 0.099 | 0.054 | 0.009 | 0.05 |
| 7 | | | | | 0.3 | 0.063 | 0.098 | 0.054 | 0.009 | 0.05 |
| 8 | | | | | 0.4 | 0.084 | 0.096 | 0.071 | 0.013 | 0.06 |
| 9 | | | | | 0.4 | 0.084 | 0.095 | 0.071 | 0.013 | 0.06 |
| 10 | | | | | 0.4 | 0.084 | 0.094 | 0.071 | 0.013 | 0.06 |
| 11 | | | | | 0.5 | 0.105 | 0.093 | 0.089 | 0.012 | 0.06 |
| 12 | | | | | 0.5 | 0.105 | 0.092 | 0.089 | 0.013 | 0.06 |
| 13 | | | | | 0.5 | 0.105 | 0.091 | 0.089 | 0.014 | 0.07 |
| 14 | | | | | 0.5 | 0.105 | 0.090 | 0.089 | 0.015 | 0.08 |
| 15 | | | | | 0.5 | 0.105 | 0.088 | 0.089 | 0.017 | 0.08 |
| 16 | | | | | 0.6 | 0.126 | 0.087 | 0.107 | 0.039 | 0.19 |
| 17 | | | | | 0.6 | 0.126 | 0.086 | 0.107 | 0.040 | 0.19 |
| 18 | | | | | 0.7 | 0.147 | 0.085 | 0.125 | 0.062 | 0.30 |
| 19 | | | | | 0.7 | 0.147 | 0.084 | 0.125 | 0.063 | 0.31 |
| 20 | | | | | 0.8 | 0.168 | 0.083 | 0.143 | 0.085 | 0.42 |
| 21 | | | | | 0.6 | 0.126 | 0.082 | 0.107 | 0.044 | 0.22 |
| 22 | | | | | 0.7 | 0.147 | 0.081 | 0.125 | 0.066 | 0.32 |
| 23 | | | | | 0.8 | 0.168 | 0.080 | 0.143 | 0.088 | 0.43 |
| 24 | | | | | 0.8 | 0.168 | 0.079 | 0.143 | 0.089 | 0.44 |
| 25 | | | | | 0.9 | 0.189 | 0.078 | 0.161 | 0.111 | 0.54 |
| 26 | | | | | 0.9 | 0.189 | 0.077 | 0.161 | 0.112 | 0.55 |
| 27 | | | | | 1.0 | 0.210 | 0.076 | 0.179 | 0.134 | 0.66 |
| 28 | | | | | 1.0 | 0.210 | 0.075 | 0.179 | 0.135 | 0.66 |
| 29 | | | | | 1.0 | 0.210 | 0.074 | 0.179 | 0.136 | 0.67 |
| 30 | | | | | 1.1 | 0.231 | 0.073 | 0.196 | 0.158 | 0.78 |
| 31 | | | | | 1.2 | 0.252 | 0.072 | 0.214 | 0.180 | 0.88 |
| 32 | | | | | 1.3 | 0.273 | 0.071 | 0.232 | 0.202 | 0.99 |
| 33 | | | | | 1.5 | 0.315 | 0.070 | 0.268 | 0.245 | 1.20 |
| 34 | | | | | 1.5 | 0.315 | 0.069 | 0.268 | 0.246 | 1.21 |
| 35 | | | | | 1.6 | 0.336 | 0.068 | 0.286 | 0.268 | 1.31 |
| 36 | | | | | 1.7 | 0.357 | 0.067 | 0.303 | 0.290 | 1.42 |
| 37 | | | | | 1.9 | 0.399 | 0.066 | 0.339 | 0.333 | 1.63 |
| 38 | | | | | 2.0 | 0.420 | 0.065 | 0.357 | 0.355 | 1.74 |
| 39 | | | | | 2.1 | 0.441 | 0.064 | 0.375 | 0.377 | 1.85 |
| 40 | | | | | 2.2 | 0.462 | 0.063 | 0.393 | 0.399 | 1.95 |
| 41 | | | | | 1.5 | 0.315 | 0.062 | 0.268 | 0.253 | 1.24 |
| 42 | | | | | 1.5 | 0.315 | 0.061 | 0.268 | 0.254 | 1.24 |
| 43 | | | | | 2.0 | 0.420 | 0.060 | 0.357 | 0.360 | 1.76 |
| 44 | | | | | 2.0 | 0.420 | 0.059 | 0.357 | 0.361 | 1.77 |
| 45 | | | | | 1.9 | 0.399 | 0.059 | 0.339 | 0.340 | 1.67 |
| 46 | | | | | 1.9 | 0.399 | 0.058 | 0.339 | 0.341 | 1.67 |
| 47 | | | | | 1.7 | 0.357 | 0.057 | 0.303 | 0.300 | 1.47 |
| 48 | | | | | 1.8 | 0.378 | 0.056 | 0.321 | 0.322 | 1.58 |
| 49 | | | | | 2.5 | 0.525 | 0.055 | 0.446 | 0.470 | 2.30 |
| 50 | | | | | 2.6 | 0.546 | 0.054 | 0.464 | 0.492 | 2.41 |
| 51 | | | | | 2.8 | 0.588 | 0.054 | 0.500 | 0.534 | 2.62 |
| 52 | | | | | 2.9 | 0.609 | 0.053 | 0.518 | 0.556 | 2.72 |
| 53 | | | | | 3.4 | 0.714 | 0.052 | 0.607 | 0.662 | 3.24 |
| 54 | | | | | 3.4 | 0.714 | 0.051 | 0.607 | 0.663 | **3.25** |
| 55 | | | | | 2.3 | 0.483 | 0.050 | 0.411 | 0.433 | 2.12 |
| 56 | | | | | 2.3 | 0.483 | 0.050 | 0.411 | 0.433 | 2.12 |
| 57 | | | | | 2.7 | 0.567 | 0.049 | 0.482 | 0.518 | 2.54 |
| 58 | | | | | 2.6 | 0.546 | 0.048 | 0.464 | 0.498 | 2.44 |
| 59 | | | | | 2.6 | 0.546 | 0.047 | 0.464 | 0.499 | 2.44 |
| 60 | | | | | 2.5 | 0.525 | 0.047 | 0.446 | 0.478 | 2.34 |
| 61 | | | | | 2.4 | 0.504 | 0.046 | 0.428 | 0.458 | 2.24 |
| 62 | | | | | 2.3 | 0.483 | 0.045 | 0.411 | 0.438 | 2.14 |
| 63 | | | | | 1.9 | 0.399 | 0.045 | 0.339 | 0.354 | 1.74 |
| 64 | | | | | 1.9 | 0.399 | 0.044 | 0.339 | 0.355 | 1.74 |

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Runoff HG to Detention Vault-2) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 4.86 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.059 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.030 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR MAX | [22] LOSS RATE IN/HR LOW | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| 65 | | | | | 0.4 | 0.084 | 0.043 | 0.071 | 0.041 | 0.20 |
| 66 | | | | | 0.4 | 0.084 | 0.043 | 0.071 | 0.041 | 0.20 |
| 67 | | | | | 0.3 | 0.063 | 0.042 | 0.054 | 0.021 | 0.10 |
| 68 | | | | | 0.3 | 0.063 | 0.041 | 0.054 | 0.022 | 0.11 |
| 69 | | | | | 0.5 | 0.105 | 0.041 | 0.089 | 0.064 | 0.32 |
| 70 | | | | | 0.5 | 0.105 | 0.040 | 0.089 | 0.065 | 0.32 |
| 71 | | | | | 0.5 | 0.105 | 0.039 | 0.089 | 0.066 | 0.32 |
| 72 | | | | | 0.4 | 0.084 | 0.039 | 0.071 | 0.045 | 0.22 |
| 73 | | | | | 0.4 | 0.084 | 0.038 | 0.071 | 0.046 | 0.22 |
| 74 | | | | | 0.4 | 0.084 | 0.038 | 0.071 | 0.046 | 0.23 |
| 75 | | | | | 0.3 | 0.063 | 0.037 | 0.054 | 0.026 | 0.13 |
| 76 | | | | | 0.2 | 0.042 | 0.037 | 0.036 | 0.005 | 0.03 |
| 77 | | | | | 0.3 | 0.063 | 0.036 | 0.054 | 0.027 | 0.13 |
| 78 | | | | | 0.4 | 0.084 | 0.036 | 0.071 | 0.048 | 0.24 |
| 79 | | | | | 0.3 | 0.063 | 0.035 | 0.054 | 0.028 | 0.14 |
| 80 | | | | | 0.2 | 0.042 | 0.035 | 0.036 | 0.007 | 0.04 |
| 81 | | | | | 0.3 | 0.063 | 0.034 | 0.054 | 0.029 | 0.14 |
| 82 | | | | | 0.3 | 0.063 | 0.034 | 0.054 | 0.029 | 0.14 |
| 83 | | | | | 0.3 | 0.063 | 0.033 | 0.054 | 0.030 | 0.15 |
| 84 | | | | | 0.2 | 0.042 | 0.033 | 0.036 | 0.009 | 0.04 |
| 85 | | | | | 0.3 | 0.063 | 0.033 | 0.054 | 0.030 | 0.15 |
| 86 | | | | | 0.2 | 0.042 | 0.032 | 0.036 | 0.010 | 0.05 |
| 87 | | | | | 0.3 | 0.063 | 0.032 | 0.054 | 0.031 | 0.15 |
| 88 | | | | | 0.2 | 0.042 | 0.031 | 0.036 | 0.011 | 0.05 |
| 89 | | | | | 0.3 | 0.063 | 0.031 | 0.054 | 0.032 | 0.16 |
| 90 | | | | | 0.2 | 0.042 | 0.031 | 0.036 | 0.011 | 0.05 |
| 91 | | | | | 0.2 | 0.042 | 0.031 | 0.036 | 0.011 | 0.06 |
| 92 | | | | | 0.2 | 0.042 | 0.030 | 0.036 | 0.012 | 0.06 |
| 93 | | | | | 0.2 | 0.042 | 0.030 | 0.036 | 0.012 | 0.06 |
| 94 | | | | | 0.2 | 0.042 | 0.030 | 0.036 | 0.012 | 0.06 |
| 95 | | | | | 0.2 | 0.042 | 0.030 | 0.036 | 0.012 | 0.06 |
| 96 | | | | | 0.2 | 0.042 | 0.030 | 0.036 | 0.012 | 0.06 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTALS | | | | | 100.0 | | | | 15.70 | 76.88 |

**EFFECTIVE RAIN = 3.93 INCHES**
**TOTAL RUNOFF VOLUME = 1.59 AC-FT**

# Runoff Hydrograph Bypass to Discharge Point 2 (Proposed Condition)

| Storm | Volume (ac-ft) | Volume (cf) | Peak FLow (cfs) |
|---|---|---|---|
| 100-yr, 24-hour | 0.92 | 39878 | 2.08 |

# Loss Parameters (Proposed Condition - Runoff Hydgraph Bypass to Discharge Point 2)

| | | | | |
|---|---|---|---|---|
| Drainage Area | 141,706 | sf | | |
| | 3.25 | ac | | |
| $A_i$ | 58,762 | sf | | |
| | 41% | imp | | |
| Runoff Index | 88 | | Note: | Plate E-6.1: Assume desert landscaping => Open Brush - Poor; Soil Type D |
| $F_p$ | 0.15 | in/hr | Note: | Plate E-6.2: AMC II |

$$F = F_p(1 - 0.9A_i)$$ **F = 0.094 in/hr**

For 24-hr storms, $F_T$ is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$

$$C = (F - F_M)/54$$

$$T = \text{Unit Time}/2$$

$$F_M = 0.5F$$

**$F_T$ = 0.166**
**C = 0.0009**
**T = 7.5**
**$F_M$ = 0.047**

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Bypass to Discharge Point 2) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 3.25 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.094 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.047 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR MAX | [22] LOSS RATE IN/HR LOW | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| 1 | | | | | 0.2 | 0.042 | 0.166 | 0.036 | 0.006 | 0.02 |
| 2 | | | | | 0.3 | 0.063 | 0.164 | 0.054 | 0.009 | 0.03 |
| 3 | | | | | 0.3 | 0.063 | 0.162 | 0.054 | 0.009 | 0.03 |
| 4 | | | | | 0.4 | 0.084 | 0.160 | 0.071 | 0.013 | 0.04 |
| 5 | | | | | 0.3 | 0.063 | 0.158 | 0.054 | 0.009 | 0.03 |
| 6 | | | | | 0.3 | 0.063 | 0.157 | 0.054 | 0.009 | 0.03 |
| 7 | | | | | 0.3 | 0.063 | 0.155 | 0.054 | 0.009 | 0.03 |
| 8 | | | | | 0.4 | 0.084 | 0.153 | 0.071 | 0.013 | 0.04 |
| 9 | | | | | 0.4 | 0.084 | 0.151 | 0.071 | 0.013 | 0.04 |
| 10 | | | | | 0.4 | 0.084 | 0.149 | 0.071 | 0.013 | 0.04 |
| 11 | | | | | 0.5 | 0.105 | 0.147 | 0.089 | 0.016 | 0.05 |
| 12 | | | | | 0.5 | 0.105 | 0.145 | 0.089 | 0.016 | 0.05 |
| 13 | | | | | 0.5 | 0.105 | 0.144 | 0.089 | 0.016 | 0.05 |
| 14 | | | | | 0.5 | 0.105 | 0.142 | 0.089 | 0.016 | 0.05 |
| 15 | | | | | 0.5 | 0.105 | 0.140 | 0.089 | 0.016 | 0.05 |
| 16 | | | | | 0.6 | 0.126 | 0.138 | 0.107 | 0.019 | 0.06 |
| 17 | | | | | 0.6 | 0.126 | 0.137 | 0.107 | 0.019 | 0.06 |
| 18 | | | | | 0.7 | 0.147 | 0.135 | 0.125 | 0.012 | 0.04 |
| 19 | | | | | 0.7 | 0.147 | 0.133 | 0.125 | 0.014 | 0.05 |
| 20 | | | | | 0.8 | 0.168 | 0.131 | 0.143 | 0.037 | 0.12 |
| 21 | | | | | 0.6 | 0.126 | 0.130 | 0.107 | 0.019 | 0.06 |
| 22 | | | | | 0.7 | 0.147 | 0.128 | 0.125 | 0.019 | 0.06 |
| 23 | | | | | 0.8 | 0.168 | 0.126 | 0.143 | 0.042 | 0.14 |
| 24 | | | | | 0.8 | 0.168 | 0.125 | 0.143 | 0.043 | 0.14 |
| 25 | | | | | 0.9 | 0.189 | 0.123 | 0.161 | 0.066 | 0.22 |
| 26 | | | | | 0.9 | 0.189 | 0.121 | 0.161 | 0.068 | 0.22 |
| 27 | | | | | 1.0 | 0.210 | 0.120 | 0.179 | 0.090 | 0.30 |
| 28 | | | | | 1.0 | 0.210 | 0.118 | 0.179 | 0.092 | 0.30 |
| 29 | | | | | 1.0 | 0.210 | 0.117 | 0.179 | 0.093 | 0.31 |
| 30 | | | | | 1.1 | 0.231 | 0.115 | 0.196 | 0.116 | 0.38 |
| 31 | | | | | 1.2 | 0.252 | 0.113 | 0.214 | 0.139 | 0.45 |
| 32 | | | | | 1.3 | 0.273 | 0.112 | 0.232 | 0.161 | 0.53 |
| 33 | | | | | 1.5 | 0.315 | 0.110 | 0.268 | 0.205 | 0.67 |
| 34 | | | | | 1.5 | 0.315 | 0.109 | 0.268 | 0.206 | 0.68 |
| 35 | | | | | 1.6 | 0.336 | 0.107 | 0.286 | 0.229 | 0.75 |
| 36 | | | | | 1.7 | 0.357 | 0.106 | 0.303 | 0.251 | 0.82 |
| 37 | | | | | 1.9 | 0.399 | 0.104 | 0.339 | 0.295 | 0.97 |
| 38 | | | | | 2.0 | 0.420 | 0.103 | 0.357 | 0.317 | 1.04 |
| 39 | | | | | 2.1 | 0.441 | 0.101 | 0.375 | 0.340 | 1.11 |
| 40 | | | | | 2.2 | 0.462 | 0.100 | 0.393 | 0.362 | 1.19 |
| 41 | | | | | 1.5 | 0.315 | 0.098 | 0.268 | 0.217 | 0.71 |
| 42 | | | | | 1.5 | 0.315 | 0.097 | 0.268 | 0.218 | 0.72 |
| 43 | | | | | 2.0 | 0.420 | 0.095 | 0.357 | 0.325 | 1.06 |
| 44 | | | | | 2.0 | 0.420 | 0.094 | 0.357 | 0.326 | 1.07 |
| 45 | | | | | 1.9 | 0.399 | 0.093 | 0.339 | 0.306 | 1.00 |
| 46 | | | | | 1.9 | 0.399 | 0.091 | 0.339 | 0.308 | 1.01 |
| 47 | | | | | 1.7 | 0.357 | 0.090 | 0.303 | 0.267 | 0.88 |
| 48 | | | | | 1.8 | 0.378 | 0.089 | 0.321 | 0.289 | 0.95 |
| 49 | | | | | 2.5 | 0.525 | 0.087 | 0.446 | 0.438 | 1.44 |
| 50 | | | | | 2.6 | 0.546 | 0.086 | 0.464 | 0.460 | 1.51 |
| 51 | | | | | 2.8 | 0.588 | 0.085 | 0.500 | 0.503 | 1.65 |
| 52 | | | | | 2.9 | 0.609 | 0.083 | 0.518 | 0.526 | 1.72 |
| 53 | | | | | 3.4 | 0.714 | 0.082 | 0.607 | 0.632 | 2.07 |
| 54 | | | | | 3.4 | 0.714 | 0.081 | 0.607 | 0.633 | **2.08** |
| 55 | | | | | 2.3 | 0.483 | 0.080 | 0.411 | 0.403 | 1.32 |
| 56 | | | | | 2.3 | 0.483 | 0.078 | 0.411 | 0.405 | 1.33 |
| 57 | | | | | 2.7 | 0.567 | 0.077 | 0.482 | 0.490 | 1.61 |
| 58 | | | | | 2.6 | 0.546 | 0.076 | 0.464 | 0.470 | 1.54 |
| 59 | | | | | 2.6 | 0.546 | 0.075 | 0.464 | 0.471 | 1.55 |
| 60 | | | | | 2.5 | 0.525 | 0.074 | 0.446 | 0.451 | 1.48 |
| 61 | | | | | 2.4 | 0.504 | 0.073 | 0.428 | 0.431 | 1.41 |
| 62 | | | | | 2.3 | 0.483 | 0.072 | 0.411 | 0.411 | 1.35 |
| 63 | | | | | 1.9 | 0.399 | 0.070 | 0.339 | 0.329 | 1.08 |
| 64 | | | | | 1.9 | 0.399 | 0.069 | 0.339 | 0.330 | 1.08 |

| R C F C & W C D HYDROLOGY MANUAL | "SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form | Project: 562-01 (Prop Condition - Bypass to Discharge Point 2) By_____ Date_____ Checked_____ Date_____ | Sheet 1 / 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| [1] CONCENTRATION POINT | --- | [2] AREA DESIGNATION | --- |
| [3] DRAINAGE AREA-ACRES | 3.25 | [4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3]) | N/A |
| [5] UNIT TIME-MINUTES | 15 | [6] LAG TIME-MINUTES | --- |
| [7] UNIT TIME-PERCENT OF LAG (100*[5]/[6]) | --- | [8] S-CURVE | N/A |
| [9] STORM FREQUENCY & DURATION | 100-YR, 24-HR | [10] TOTAL ADJUSTED STORM RAIN-INCHES | 5.25 |
| [11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR | 0.094 | [12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR | 0.047 |
| [13] CONSTANT LOSS RATE-INCHES/HOUR | --- | [14] LOW LOSS RATE-PERCENT | 85 |

| | UNIT HYDROGRAPH | | | | EFFECTIVE RAIN | | | | | FLOOD HYDROGRAPH |
|---|---|---|---|---|---|---|---|---|---|---|
| [15] UNIT TIME PERIOD m | [16] TIME PERCENT OF LAG [7]*[15] | [17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH) | [16] DISTRIB GRAPH PERCENT [17]m-[17]m-1 | [17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000 | [20] PATTERN PERCENT (PL E-5.9) | [21] STORM RAIN IN/HR 60[10][20] 100[5] | [22] LOSS RATE IN/HR | | [23] EFFECTIVE RAIN IN/HR [21]-[22] | [24] FLOW CFS |
| | | | | | | | MAX | LOW | | |
| 65 | | | | | 0.4 | 0.084 | 0.068 | 0.071 | 0.016 | 0.05 |
| 66 | | | | | 0.4 | 0.084 | 0.067 | 0.071 | 0.017 | 0.05 |
| 67 | | | | | 0.3 | 0.063 | 0.066 | 0.054 | 0.009 | 0.03 |
| 68 | | | | | 0.3 | 0.063 | 0.065 | 0.054 | 0.009 | 0.03 |
| 69 | | | | | 0.5 | 0.105 | 0.064 | 0.089 | 0.041 | 0.13 |
| 70 | | | | | 0.5 | 0.105 | 0.063 | 0.089 | 0.042 | 0.14 |
| 71 | | | | | 0.5 | 0.105 | 0.062 | 0.089 | 0.043 | 0.14 |
| 72 | | | | | 0.4 | 0.084 | 0.061 | 0.071 | 0.023 | 0.07 |
| 73 | | | | | 0.4 | 0.084 | 0.061 | 0.071 | 0.023 | 0.08 |
| 74 | | | | | 0.4 | 0.084 | 0.060 | 0.071 | 0.024 | 0.08 |
| 75 | | | | | 0.3 | 0.063 | 0.059 | 0.054 | 0.004 | 0.01 |
| 76 | | | | | 0.2 | 0.042 | 0.058 | 0.036 | 0.006 | 0.02 |
| 77 | | | | | 0.3 | 0.063 | 0.057 | 0.054 | 0.006 | 0.02 |
| 78 | | | | | 0.4 | 0.084 | 0.056 | 0.071 | 0.028 | 0.09 |
| 79 | | | | | 0.3 | 0.063 | 0.056 | 0.054 | 0.007 | 0.02 |
| 80 | | | | | 0.2 | 0.042 | 0.055 | 0.036 | 0.006 | 0.02 |
| 81 | | | | | 0.3 | 0.063 | 0.054 | 0.054 | 0.009 | 0.03 |
| 82 | | | | | 0.3 | 0.063 | 0.053 | 0.054 | 0.010 | 0.03 |
| 83 | | | | | 0.3 | 0.063 | 0.053 | 0.054 | 0.010 | 0.03 |
| 84 | | | | | 0.2 | 0.042 | 0.052 | 0.036 | 0.006 | 0.02 |
| 85 | | | | | 0.3 | 0.063 | 0.051 | 0.054 | 0.012 | 0.04 |
| 86 | | | | | 0.2 | 0.042 | 0.051 | 0.036 | 0.006 | 0.02 |
| 87 | | | | | 0.3 | 0.063 | 0.050 | 0.054 | 0.013 | 0.04 |
| 88 | | | | | 0.2 | 0.042 | 0.050 | 0.036 | 0.006 | 0.02 |
| 89 | | | | | 0.3 | 0.063 | 0.049 | 0.054 | 0.014 | 0.04 |
| 90 | | | | | 0.2 | 0.042 | 0.049 | 0.036 | 0.006 | 0.02 |
| 91 | | | | | 0.2 | 0.042 | 0.048 | 0.036 | 0.006 | 0.02 |
| 92 | | | | | 0.2 | 0.042 | 0.048 | 0.036 | 0.006 | 0.02 |
| 93 | | | | | 0.2 | 0.042 | 0.048 | 0.036 | 0.006 | 0.02 |
| 94 | | | | | 0.2 | 0.042 | 0.047 | 0.036 | 0.006 | 0.02 |
| 95 | | | | | 0.2 | 0.042 | 0.047 | 0.036 | 0.006 | 0.02 |
| 96 | | | | | 0.2 | 0.042 | 0.047 | 0.036 | 0.006 | 0.02 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTALS | | | | | 100.0 | | | | 13.51 | 44.31 |

**EFFECTIVE RAIN = 3.38 INCHES**
**TOTAL RUNOFF VOLUME = 0.92 AC-FT**

| Stage-Storage for Vault-1 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Depth (ft)** | **Footprint Area ($ft^2$)** | **Porosity** | **Effective Area ($ft^2$)** | **Effective Area (ac)** | | **Total Volume ($ft^3$)** | |
| 0 | 2600 | 0.95 | 2470 | 0.056703 | | 14820 | |
| 6 | 2600 | 0.95 | 2470 | 0.056703 | | | |

| Stage-Storage for Vault-2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Depth (ft)** | **Footprint Area ($ft^2$)** | **Porosity** | **Effective Area ($ft^2$)** | **Effective Area (ac)** | | **Total Volume ($ft^3$)** | |
| 0 | 1000 | 0.95 | 950 | 0.021809 | | 5700 | |
| 6 | 1000 | 0.95 | 950 | 0.021809 | | | |

## Stage-Discharge for Vault-1

*Lowest Orifice*

Diameter: 3.375 inches
Quantity: 1
Invert Elevation: 0.000 ft

*Lower Slot*

Quantity: 0
Invert Elevation: 0.00 ft
Width: 0.00 ft
Height: 0.00 in / 0.000 ft
$H_w$: 0.00 ft

*Lower Weir*

Quantity: 0
Invert Elevation: 0.00 ft
Length: 0.00 ft
$H_w$: 0.00 ft

*Upper Orifice*

Diameter: 0.000 inches
Quantity: 0
Invert Elevation: 0.000 ft

*Upper Slot*

Quantity: 0
Invert Elevation: 0.00 ft
Width: 0.00 ft
Height: 0.00 in / 0.000 ft
$H_w$: 0.00 ft

*Emergency Weir*

Invert Elevation: 6.00 ft
Length: 6.00 ft
$H_w$: 6.00 ft

($H_w$ = height of slot/weir invert above basin bottom)

*Absolute Invert Elevation of Lowest Discharge Opening*

Invert Elevation: 0.00 ft

**Head taken as total depth above the invert of the lowest discharge opening.*

| h* (ft) | h/D | h/D | $Q_{LOWEST\ ORIFICE}$ (cfs) | | | | $Q_{UPPER\ ORIFICE}$ (cfs) | | | | $Q_{LOWER\ SLOT}$ (cfs) | $Q_{UPPER\ SLOT}$ (cfs) | $Q_{LOWER\ WEIR}$ (cfs) | $Q_{EMERGENCY}$ (cfs) | $Q_{TOTAL}$ (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lowest Orifice | Upper Orifice | Discharge Coefficient | Orifice Flow | Weir Flow | $Q_{control}$ | Discharge Coefficient | Orifice Flow | Weir Flow | $Q_{control}$ | | | | | |
| 0.000 | 0.000 | N/A | N/A | N/A | 0.000 | 0.000 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.000 |
| 0.100 | 0.356 | N/A | N/A | N/A | 0.017 | 0.017 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.017 |
| 0.200 | 0.711 | N/A | N/A | N/A | 0.061 | 0.061 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.061 |
| 0.300 | 1.067 | N/A | N/A | N/A | 0.121 | 0.121 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.121 |
| 0.400 | 1.422 | N/A | 0.598 | 0.152 | 0.183 | 0.152 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.152 |
| 0.500 | 1.778 | N/A | 0.598 | 0.179 | 0.237 | 0.179 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.179 |
| 0.600 | 2.133 | N/A | 0.598 | 0.202 | 0.274 | 0.202 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.202 |
| 0.700 | 2.489 | N/A | 0.598 | 0.223 | 0.291 | 0.223 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.223 |
| 0.800 | 2.844 | N/A | 0.599 | 0.242 | 0.295 | 0.242 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.242 |
| 0.900 | 3.200 | N/A | 0.599 | 0.260 | 0.301 | 0.260 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.260 |
| 1.000 | 3.556 | N/A | 0.599 | 0.277 | 0.338 | 0.277 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.277 |
| 1.100 | 3.911 | N/A | 0.600 | 0.293 | 0.449 | 0.293 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.293 |
| 1.200 | 4.267 | N/A | 0.599 | 0.307 | 0.695 | 0.307 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.307 |
| 1.300 | 4.622 | N/A | 0.599 | 0.322 | 1.157 | 0.322 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.322 |
| 1.400 | 4.978 | N/A | 0.599 | 0.335 | 1.935 | 0.335 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.335 |
| 1.500 | 5.333 | N/A | 0.599 | 0.348 | 3.157 | 0.348 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.348 |
| 1.600 | 5.689 | N/A | 0.600 | 0.361 | 3.611 | 0.361 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.361 |
| 1.700 | 6.044 | N/A | 0.600 | 0.373 | 3.733 | 0.373 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.373 |
| 1.800 | 6.400 | N/A | 0.600 | 0.385 | 3.851 | 0.385 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.385 |
| 1.900 | 6.756 | N/A | 0.599 | 0.396 | 3.963 | 0.396 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.396 |
| 2.000 | 7.111 | N/A | 0.599 | 0.407 | 4.072 | 0.407 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.407 |
| 2.100 | 7.467 | N/A | 0.599 | 0.418 | 4.180 | 0.418 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.418 |
| 2.200 | 7.822 | N/A | 0.599 | 0.429 | 4.286 | 0.429 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.429 |
| 2.300 | 8.178 | N/A | 0.599 | 0.439 | 4.388 | 0.439 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.439 |
| 2.400 | 8.533 | N/A | 0.599 | 0.449 | 4.489 | 0.449 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.449 |
| 2.500 | 8.889 | N/A | 0.599 | 0.459 | 4.587 | 0.459 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.459 |
| 2.600 | 9.244 | N/A | 0.599 | 0.468 | 4.683 | 0.468 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.468 |

## Stage-Discharge for Vault-1

*Lowest Orifice*

| | | |
|---|---|---|
| Diameter: | 3.375 | inches |
| Quantity: | 1 | |
| Invert Elevation: | 0.000 | ft |

*Lower Slot*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Width: | 0.00 | ft |
| Height: | 0.00 | in |
| | 0.000 | ft |
| $H_w$: | 0.00 | ft |

*Lower Weir*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Length: | 0.00 | ft |
| $H_w$: | 0.00 | ft |

*Upper Orifice*

| | | |
|---|---|---|
| Diameter: | 0.000 | inches |
| Quantity: | 0 | |
| Invert Elevation: | 0.000 | ft |

*Upper Slot*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Width: | 0.00 | ft |
| Height: | 0.00 | in |
| | 0.000 | ft |
| $H_w$: | 0.00 | ft |

*Emergency Weir*

| | | |
|---|---|---|
| Invert Elevation: | 6.00 | ft |
| Length: | 6.00 | ft |
| $H_w$: | 6.00 | ft |

($H_w$ = height of slot/weir invert above basin bottom)

*Absolute Invert Elevation of Lowest Discharge Opening*

Invert Elevation: 0.00 ft

**Head taken as total depth above the invert of the lowest discharge opening.*

| h* (ft) | h/D | h/D | $Q_{LOWEST\ ORIFICE}$ (cfs) | | | | $Q_{UPPER\ ORIFICE}$ (cfs) | | | | $Q_{LOWER\ SLOT}$ (cfs) | $Q_{UPPER\ SLOT}$ (cfs) | $Q_{LOWER\ WEIR}$ (cfs) | $Q_{EMERGENCY}$ (cfs) | $Q_{TOTAL}$ (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lowest Orifice | Upper Orifice | Discharge Coefficient | Orifice Flow | Weir Flow | $Q_{control}$ | Discharge Coefficient | Orifice Flow | Weir Flow | $Q_{control}$ | | | | | |
| 2.700 | 9.600 | N/A | 0.599 | 0.478 | 4.778 | 0.478 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.478 |
| 2.800 | 9.956 | N/A | 0.599 | 0.487 | 4.870 | 0.487 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.487 |
| 2.900 | 10.311 | N/A | 0.599 | 0.496 | 4.961 | 0.496 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.496 |
| 3.000 | 10.667 | N/A | 0.599 | 0.505 | 5.050 | 0.505 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.505 |
| 3.100 | 11.022 | N/A | 0.599 | 0.514 | 5.137 | 0.514 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.514 |
| 3.200 | 11.378 | N/A | 0.599 | 0.522 | 5.223 | 0.522 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.522 |
| 3.300 | 11.733 | N/A | 0.599 | 0.531 | 5.308 | 0.531 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.531 |
| 3.400 | 12.089 | N/A | 0.599 | 0.539 | 5.392 | 0.539 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.539 |
| 3.500 | 12.444 | N/A | 0.599 | 0.547 | 5.474 | 0.547 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.547 |
| 3.600 | 12.800 | N/A | 0.599 | 0.555 | 5.554 | 0.555 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.555 |
| 3.700 | 13.156 | N/A | 0.599 | 0.563 | 5.634 | 0.563 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.563 |
| 3.800 | 13.511 | N/A | 0.599 | 0.571 | 5.712 | 0.571 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.571 |
| 3.900 | 13.867 | N/A | 0.599 | 0.579 | 5.789 | 0.579 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.579 |
| 4.000 | 14.222 | N/A | 0.599 | 0.586 | 5.864 | 0.586 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.586 |
| 4.100 | 14.578 | N/A | 0.599 | 0.594 | 5.939 | 0.594 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.594 |
| 4.200 | 14.933 | N/A | 0.599 | 0.601 | 6.013 | 0.601 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.601 |
| 4.300 | 15.289 | N/A | 0.599 | 0.609 | 6.086 | 0.609 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.609 |
| 4.400 | 15.644 | N/A | 0.598 | 0.616 | 6.158 | 0.616 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.616 |
| 4.500 | 16.000 | N/A | 0.598 | 0.623 | 6.229 | 0.623 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.623 |
| 4.600 | 16.356 | N/A | 0.598 | 0.630 | 6.300 | 0.630 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.630 |
| 4.700 | 16.711 | N/A | 0.598 | 0.637 | 6.369 | 0.637 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.637 |
| 4.800 | 17.067 | N/A | 0.598 | 0.644 | 6.438 | 0.644 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.644 |
| 4.900 | 17.422 | N/A | 0.598 | 0.651 | 6.506 | 0.651 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.651 |
| 5.000 | 17.778 | N/A | 0.598 | 0.657 | 6.573 | 0.657 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.657 |
| 5.100 | 18.133 | N/A | 0.598 | 0.664 | 6.640 | 0.664 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.664 |
| 5.200 | 18.489 | N/A | 0.598 | 0.671 | 6.706 | 0.671 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.671 |
| 5.300 | 18.844 | N/A | 0.598 | 0.677 | 6.772 | 0.677 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.677 |

## Stage-Discharge for Vault-1

*Lowest Orifice*

| | | |
|---|---|---|
| Diameter: | 3.375 | inches |
| Quantity: | 1 | |
| Invert Elevation: | 0.000 | ft |

*Lower Slot*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Width: | 0.00 | ft |
| Height: | 0.00 | in |
| | 0.000 | ft |
| $H_w$: | 0.00 | ft |

*Lower Weir*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Length: | 0.00 | ft |
| $H_w$: | 0.00 | ft |

*Upper Orifice*

| | | |
|---|---|---|
| Diameter: | 0.000 | inches |
| Quantity: | 0 | |
| Invert Elevation: | 0.000 | ft |

*Upper Slot*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Width: | 0.00 | ft |
| Height: | 0.00 | in |
| | 0.000 | ft |
| $H_w$: | 0.00 | ft |

*Emergency Weir*

| | | |
|---|---|---|
| Invert Elevation: | 6.00 | ft |
| Length: | 6.00 | ft |
| $H_w$: | 6.00 | ft |

($H_w$ = height of slot/weir invert above basin bottom)

*Absolute Invert Elevation of Lowest Discharge Opening*

Invert Elevation: 0.00 ft

**Head taken as total depth above the invert of the lowest discharge opening.*

| ***h**** **(ft)** | ***h/D*** | ***h/D*** | ***Q LOWEST ORIFICE* (cfs)** | | | | ***Q UPPER ORIFICE* (cfs)** | | | | ***Q LOWER SLOT*** **(cfs)** | ***Q UPPER SLOT*** **(cfs)** | ***Q LOWER WEIR*** **(cfs)** | ***Q EMERGENCY*** **(cfs)** | ***Q TOTAL*** **(cfs)** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Lowest Orifice* | *Upper Orifice* | *Discharge Coefficient* | *Orifice Flow* | *Weir Flow* | $Q_{control}$ | *Discharge Coefficient* | *Orifice Flow* | *Weir Flow* | $Q_{control}$ | | | | | |
| 5.400 | 19.200 | N/A | 0.598 | 0.684 | 6.837 | 0.684 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.684 |
| 5.500 | 19.556 | N/A | 0.598 | 0.690 | 6.902 | 0.690 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.690 |
| 5.600 | 19.911 | N/A | 0.598 | 0.697 | 6.966 | 0.697 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.697 |
| 5.700 | 20.267 | N/A | 0.598 | 0.703 | 7.030 | 0.703 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.703 |
| 5.800 | 20.622 | N/A | 0.598 | 0.709 | 7.093 | 0.709 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.709 |
| 5.900 | 20.978 | N/A | 0.598 | 0.715 | 7.155 | 0.715 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.715 |
| 6.000 | 21.333 | N/A | 0.598 | 0.722 | 7.217 | 0.722 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.722 |

## Stage-Discharge for Vault-2

*Lowest Orifice*

| | | |
|---|---|---|
| Diameter: | 6.500 | inches |
| Quantity: | 1 | |
| Invert Elevation: | 0.000 | ft |

*Lower Slot*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Width: | 0.00 | ft |
| Height: | 0.00 | in |
| | 0.000 | ft |
| $H_w$: | 0.00 | ft |

*Lower Weir*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Length: | 0.00 | ft |
| $H_w$: | 0.00 | ft |

*Upper Orifice*

| | | |
|---|---|---|
| Diameter: | 0.000 | inches |
| Quantity: | 0 | |
| Invert Elevation: | 0.000 | ft |

*Upper Slot*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Width: | 0.00 | ft |
| Height: | 0.00 | in |
| | 0.000 | ft |
| $H_w$: | 0.00 | ft |

*Emergency Weir*

| | | |
|---|---|---|
| Invert Elevation: | 6.00 | ft |
| Length: | 9.00 | ft |
| $H_w$: | 6.00 | ft |

($H_w$ = height of slot/weir invert above basin bottom)

*Absolute Invert Elevation of Lowest Discharge Opening*

Invert Elevation: 0.00 ft

**Head taken as total depth above the invert of the lowest discharge opening.*

| h* (ft) | h/D | h/D | $Q_{LOWEST\ ORIFICE}$ (cfs) | | | | $Q_{UPPER\ ORIFICE}$ (cfs) | | | | $Q_{LOWER\ SLOT}$ (cfs) | $Q_{UPPER\ SLOT}$ (cfs) | $Q_{LOWER\ WEIR}$ (cfs) | $Q_{EMERGENCY}$ (cfs) | $Q_{TOTAL}$ (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lowest Orifice | Upper Orifice | Discharge Coefficient | Orifice Flow | Weir Flow | $Q_{control}$ | Discharge Coefficient | Orifice Flow | Weir Flow | $Q_{control}$ | | | | | |
| 0.000 | 0.000 | N/A | N/A | N/A | 0.000 | 0.000 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.000 |
| 0.100 | 0.185 | N/A | N/A | N/A | 0.025 | 0.025 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.025 |
| 0.200 | 0.369 | N/A | N/A | N/A | 0.094 | 0.094 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.094 |
| 0.300 | 0.554 | N/A | N/A | N/A | 0.200 | 0.200 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.200 |
| 0.400 | 0.738 | N/A | N/A | N/A | 0.336 | 0.336 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.336 |
| 0.500 | 0.923 | N/A | N/A | N/A | 0.492 | 0.492 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.492 |
| 0.600 | 1.108 | N/A | 0.593 | 0.629 | 0.659 | 0.629 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.629 |
| 0.700 | 1.292 | N/A | 0.593 | 0.719 | 0.828 | 0.719 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.719 |
| 0.800 | 1.477 | N/A | 0.593 | 0.798 | 0.990 | 0.798 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.798 |
| 0.900 | 1.662 | N/A | 0.594 | 0.871 | 1.138 | 0.871 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.871 |
| 1.000 | 1.846 | N/A | 0.595 | 0.939 | 1.264 | 0.939 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 0.939 |
| 1.100 | 2.031 | N/A | 0.595 | 1.002 | 1.365 | 1.002 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.002 |
| 1.200 | 2.215 | N/A | 0.596 | 1.062 | 1.439 | 1.062 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.062 |
| 1.300 | 2.400 | N/A | 0.596 | 1.118 | 1.486 | 1.118 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.118 |
| 1.400 | 2.585 | N/A | 0.596 | 1.172 | 1.510 | 1.172 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.172 |
| 1.500 | 2.769 | N/A | 0.597 | 1.223 | 1.518 | 1.223 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.223 |
| 1.600 | 2.954 | N/A | 0.597 | 1.272 | 1.522 | 1.272 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.272 |
| 1.700 | 3.138 | N/A | 0.597 | 1.320 | 1.539 | 1.320 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.320 |
| 1.800 | 3.323 | N/A | 0.597 | 1.366 | 1.588 | 1.366 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.366 |
| 1.900 | 3.508 | N/A | 0.598 | 1.411 | 1.698 | 1.411 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.411 |
| 2.000 | 3.692 | N/A | 0.598 | 1.453 | 1.900 | 1.453 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.453 |
| 2.100 | 3.877 | N/A | 0.598 | 1.495 | 2.233 | 1.495 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.495 |
| 2.200 | 4.062 | N/A | 0.598 | 1.535 | 2.742 | 1.535 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.535 |
| 2.300 | 4.246 | N/A | 0.598 | 1.574 | 3.481 | 1.574 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.574 |
| 2.400 | 4.431 | N/A | 0.598 | 1.613 | 4.509 | 1.613 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.613 |
| 2.500 | 4.615 | N/A | 0.598 | 1.651 | 5.895 | 1.651 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.651 |
| 2.600 | 4.800 | N/A | 0.598 | 1.688 | 7.716 | 1.688 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.688 |

## Stage-Discharge for Vault-2

*Lowest Orifice*

Diameter: 6.500 inches
Quantity: 1
Invert Elevation: 0.000 ft

*Lower Slot*

Quantity: 0
Invert Elevation: 0.00 ft
Width: 0.00 ft
Height: 0.00 in
0.000 ft
$H_w$: 0.00 ft

*Lower Weir*

Quantity: 0
Invert Elevation: 0.00 ft
Length: 0.00 ft
$H_w$: 0.00 ft

*Upper Orifice*

Diameter: 0.000 inches
Quantity: 0
Invert Elevation: 0.000 ft

*Upper Slot*

Quantity: 0
Invert Elevation: 0.00 ft
Width: 0.00 ft
Height: 0.00 in
0.000 ft
$H_w$: 0.00 ft

*Emergency Weir*

Invert Elevation: 6.00 ft
Length: 9.00 ft
$H_w$: 6.00 ft

($H_w$ = height of slot/weir invert above basin bottom)

*Absolute Invert Elevation of Lowest Discharge Opening*

Invert Elevation: 0.00 ft

**Head taken as total depth above the invert of the lowest discharge opening.*

| h* (ft) | h/D | h/D | $Q_{LOWEST\ ORIFICE}$ (cfs) | | | | $Q_{UPPER\ ORIFICE}$ (cfs) | | | | $Q_{LOWER\ SLOT}$ (cfs) | $Q_{UPPER\ SLOT}$ (cfs) | $Q_{LOWER\ WEIR}$ (cfs) | $Q_{EMERGENCY}$ (cfs) | $Q_{TOTAL}$ (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lowest Orifice | Upper Orifice | Discharge Coefficient | Orifice Flow | Weir Flow | $Q_{control}$ | Discharge Coefficient | Orifice Flow | Weir Flow | $Q_{control}$ | | | | | |
| 2.700 | 4.985 | N/A | 0.598 | 1.724 | 10.058 | 1.724 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.724 |
| 2.800 | 5.169 | N/A | 0.598 | 1.760 | 13.016 | 1.760 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.760 |
| 2.900 | 5.354 | N/A | 0.598 | 1.794 | 16.697 | 1.794 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.794 |
| 3.000 | 5.538 | N/A | 0.598 | 1.828 | 18.278 | 1.828 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.828 |
| 3.100 | 5.723 | N/A | 0.598 | 1.861 | 18.610 | 1.861 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.861 |
| 3.200 | 5.908 | N/A | 0.598 | 1.894 | 18.936 | 1.894 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.894 |
| 3.300 | 6.092 | N/A | 0.598 | 1.926 | 19.256 | 1.926 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.926 |
| 3.400 | 6.277 | N/A | 0.598 | 1.957 | 19.572 | 1.957 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.957 |
| 3.500 | 6.462 | N/A | 0.598 | 1.988 | 19.882 | 1.988 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 1.988 |
| 3.600 | 6.646 | N/A | 0.598 | 2.019 | 20.187 | 2.019 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.019 |
| 3.700 | 6.831 | N/A | 0.598 | 2.049 | 20.488 | 2.049 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.049 |
| 3.800 | 7.015 | N/A | 0.598 | 2.078 | 20.785 | 2.078 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.078 |
| 3.900 | 7.200 | N/A | 0.598 | 2.107 | 21.070 | 2.107 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.107 |
| 4.000 | 7.385 | N/A | 0.598 | 2.135 | 21.351 | 2.135 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.135 |
| 4.100 | 7.569 | N/A | 0.598 | 2.163 | 21.628 | 2.163 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.163 |
| 4.200 | 7.754 | N/A | 0.597 | 2.190 | 21.902 | 2.190 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.190 |
| 4.300 | 7.938 | N/A | 0.597 | 2.217 | 22.171 | 2.217 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.217 |
| 4.400 | 8.123 | N/A | 0.597 | 2.244 | 22.445 | 2.244 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.244 |
| 4.500 | 8.308 | N/A | 0.597 | 2.271 | 22.715 | 2.271 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.271 |
| 4.600 | 8.492 | N/A | 0.597 | 2.298 | 22.982 | 2.298 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.298 |
| 4.700 | 8.677 | N/A | 0.597 | 2.325 | 23.246 | 2.325 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.325 |
| 4.800 | 8.862 | N/A | 0.597 | 2.351 | 23.507 | 2.351 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.351 |
| 4.900 | 9.046 | N/A | 0.597 | 2.376 | 23.765 | 2.376 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.376 |
| 5.000 | 9.231 | N/A | 0.597 | 2.402 | 24.020 | 2.402 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.402 |
| 5.100 | 9.415 | N/A | 0.597 | 2.427 | 24.273 | 2.427 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.427 |
| 5.200 | 9.600 | N/A | 0.597 | 2.452 | 24.523 | 2.452 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.452 |
| 5.300 | 9.785 | N/A | 0.597 | 2.477 | 24.770 | 2.477 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.477 |

## Stage-Discharge for Vault-2

*Lowest Orifice*

| | | |
|---|---|---|
| Diameter: | 6.500 | inches |
| Quantity: | 1 | |
| Invert Elevation: | 0.000 | ft |

*Lower Slot*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Width: | 0.00 | ft |
| Height: | 0.00 | in |
| | 0.000 | ft |
| $H_w$: | 0.00 | ft |

*Lower Weir*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Length: | 0.00 | ft |
| $H_w$: | 0.00 | ft |

*Upper Orifice*

| | | |
|---|---|---|
| Diameter: | 0.000 | inches |
| Quantity: | 0 | |
| Invert Elevation: | 0.000 | ft |

*Upper Slot*

| | | |
|---|---|---|
| Quantity: | 0 | |
| Invert Elevation: | 0.00 | ft |
| Width: | 0.00 | ft |
| Height: | 0.00 | in |
| | 0.000 | ft |
| $H_w$: | 0.00 | ft |

*Emergency Weir*

| | | |
|---|---|---|
| Invert Elevation: | 6.00 | ft |
| Length: | 9.00 | ft |
| $H_w$: | 6.00 | ft |

($H_w$ = height of slot/weir invert above basin bottom)

*Absolute Invert Elevation of Lowest Discharge Opening*

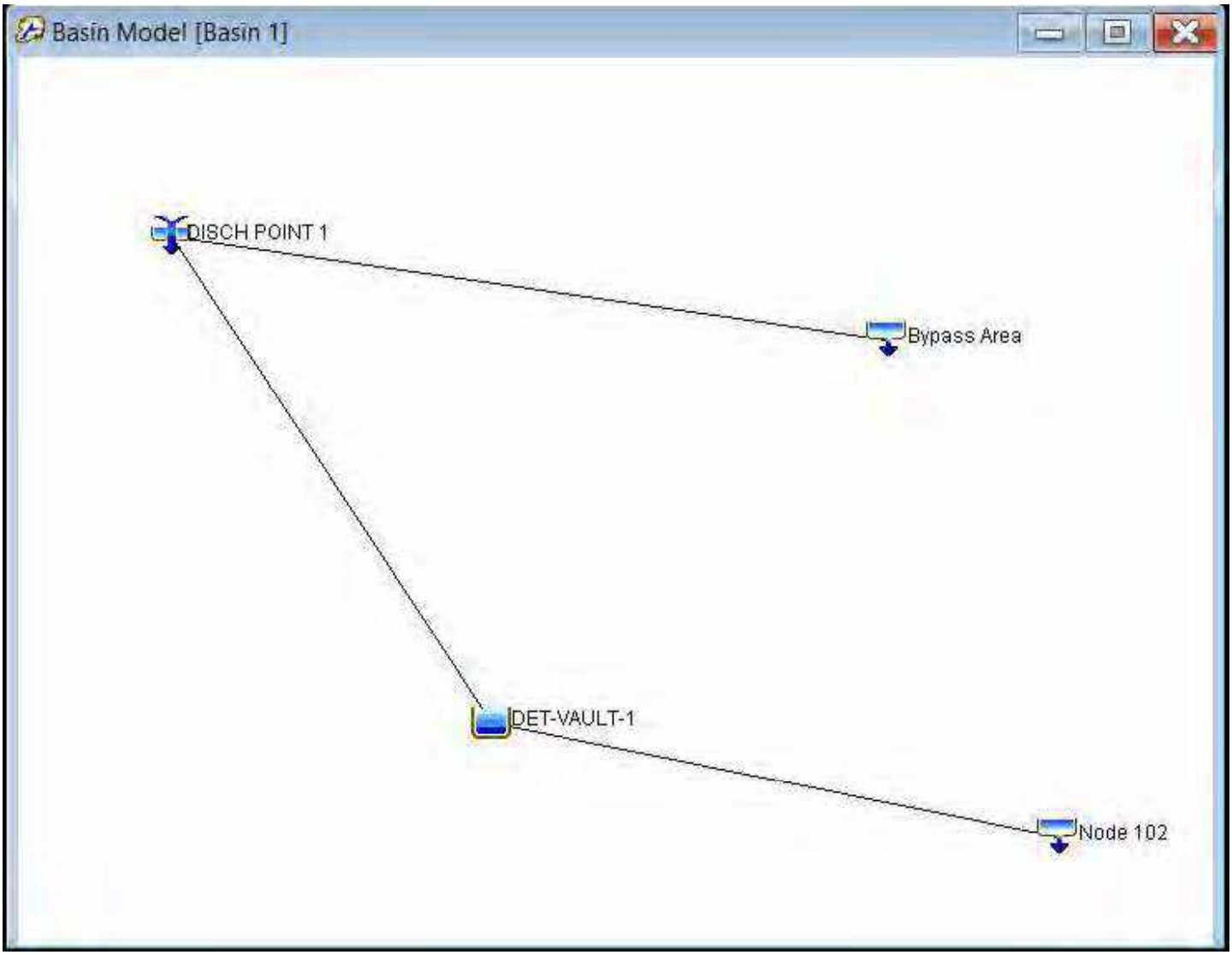
Invert Elevation: 0.00 ft

**Head taken as total depth above the invert of the lowest discharge opening.*

| ***h**** **(ft)** | ***h/D*** | ***h/D*** | ***Q LOWEST ORIFICE* (cfs)** | | | | ***Q UPPER ORIFICE* (cfs)** | | | | ***Q LOWER SLOT*** **(cfs)** | ***Q UPPER SLOT*** **(cfs)** | ***Q LOWER WEIR*** **(cfs)** | ***Q EMERGENCY*** **(cfs)** | ***Q TOTAL*** **(cfs)** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Lowest Orifice* | *Upper Orifice* | *Discharge Coefficient* | *Orifice Flow* | *Weir Flow* | $Q_{control}$ | *Discharge Coefficient* | *Orifice Flow* | *Weir Flow* | $Q_{control}$ | | | | | |
| 5.400 | 9.969 | N/A | 0.597 | 2.502 | 25.015 | 2.502 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.502 |
| 5.500 | 10.154 | N/A | 0.597 | 2.526 | 25.258 | 2.526 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.526 |
| 5.600 | 10.338 | N/A | 0.597 | 2.550 | 25.498 | 2.550 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.550 |
| 5.700 | 10.523 | N/A | 0.597 | 2.574 | 25.737 | 2.574 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.574 |
| 5.800 | 10.708 | N/A | 0.597 | 2.597 | 25.972 | 2.597 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.597 |
| 5.900 | 10.892 | N/A | 0.597 | 2.621 | 26.206 | 2.621 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.621 |
| 6.000 | 11.077 | N/A | 0.597 | 2.644 | 26.438 | 2.644 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.000 | 2.644 |

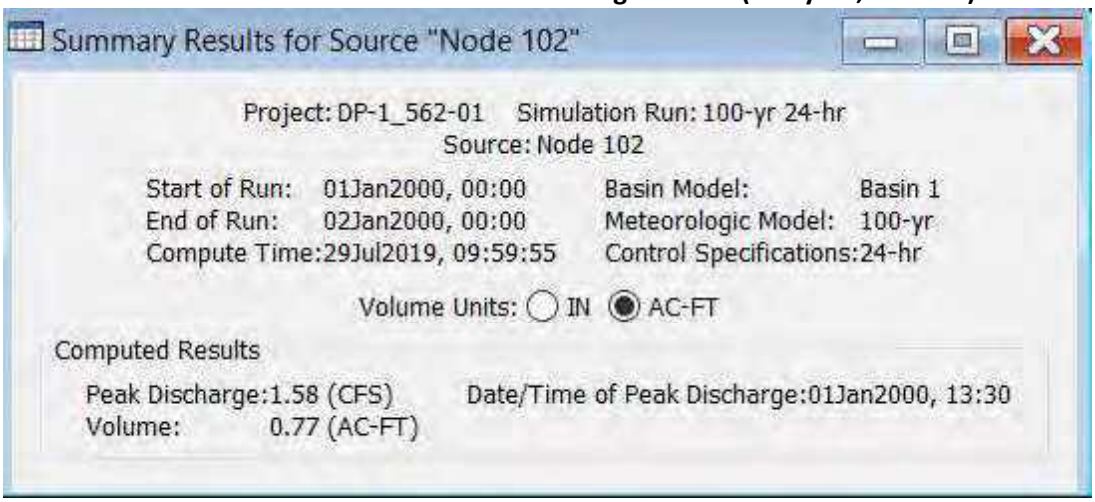
# HEC-HMS Detention Routing

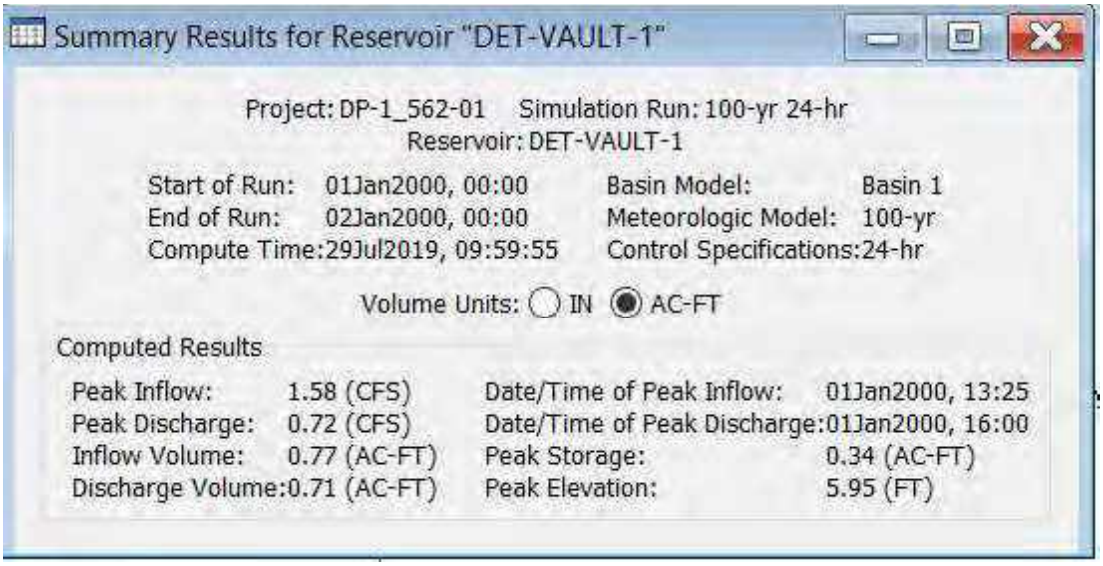
**Discharge Point 1 (100-year, 24-hour)**

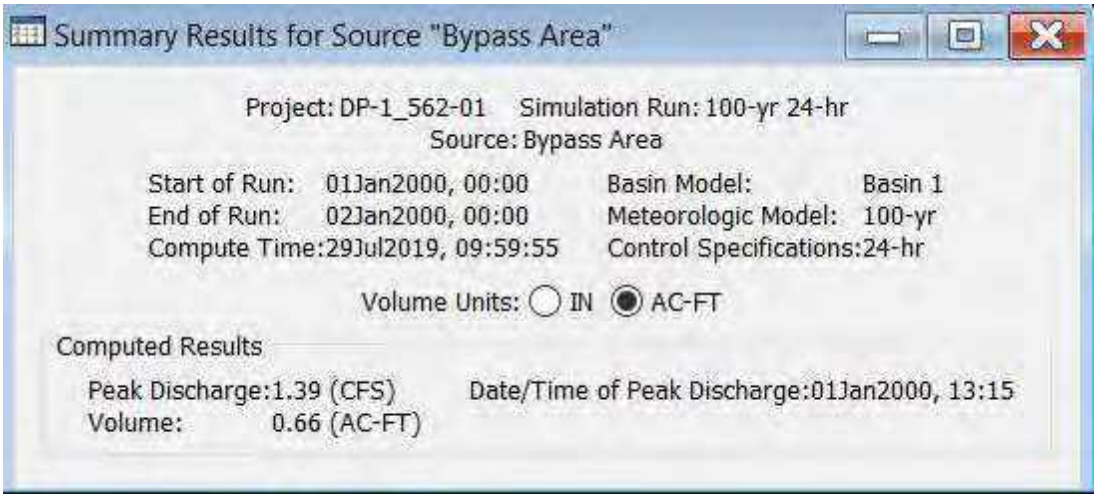


# HEC-HMS Detention Routing

**Discharge Point 1 (100-year, 24-hour)**



# HEC-HMS Detention Routing

**Discharge Point 1 (100-year, 24-hour)**

Summary Results for Junction "DISCH POINT 1"

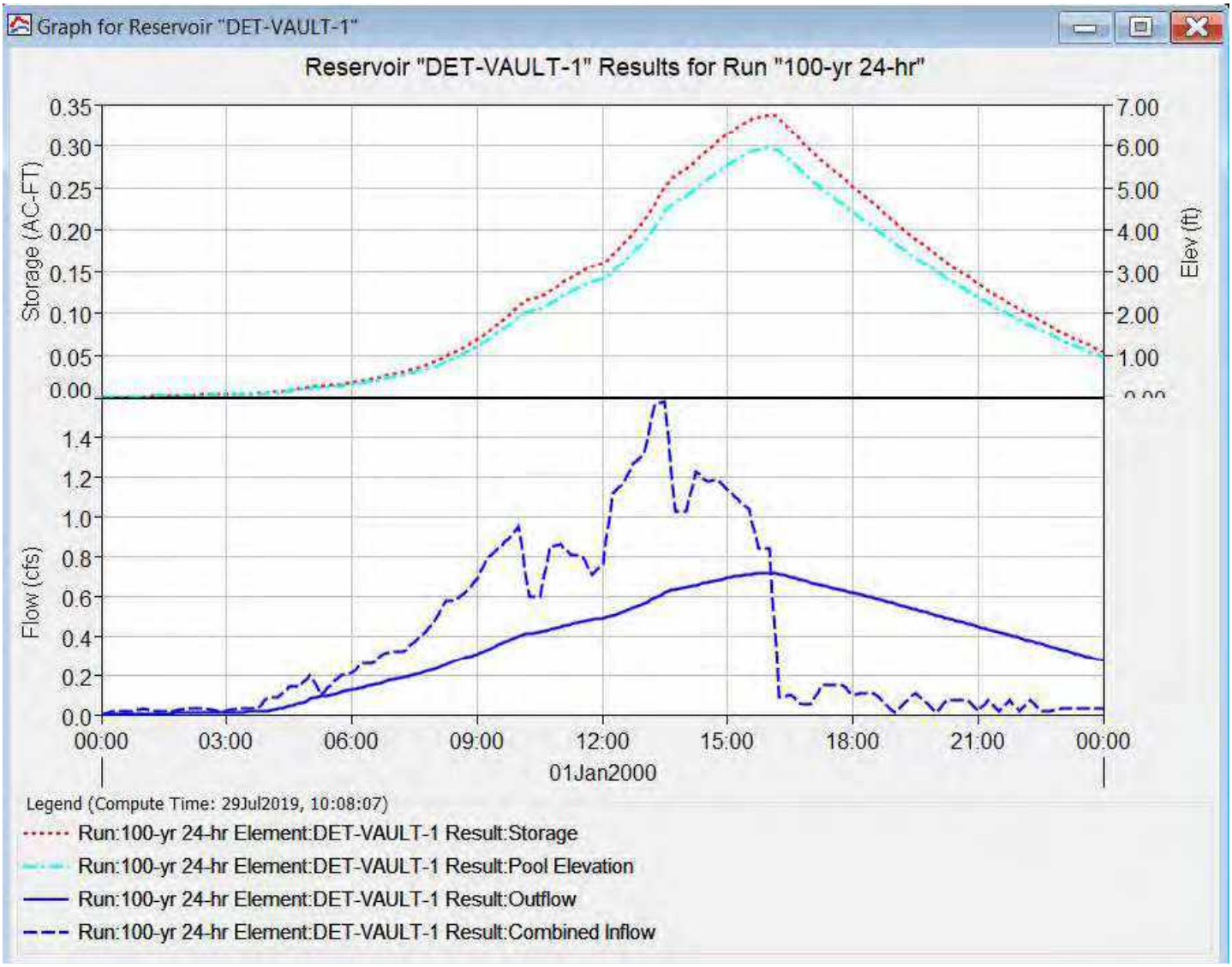
Project: DP-1_562-01 Simulation Run: 100-yr 24-hr
Junction: DISCH POINT 1

| | | | |
|---|---|---|---|
| Start of Run: | 01Jan2000, 00:00 | Basin Model: | Basin 1 |
| End of Run: | 02Jan2000, 00:00 | Meteorologic Model: | 100-yr |
| Compute Time: | 29Jul2019, 10:08:07 | Control Specifications: | 24-hr |

Volume Units: ○ IN ◉ AC-FT

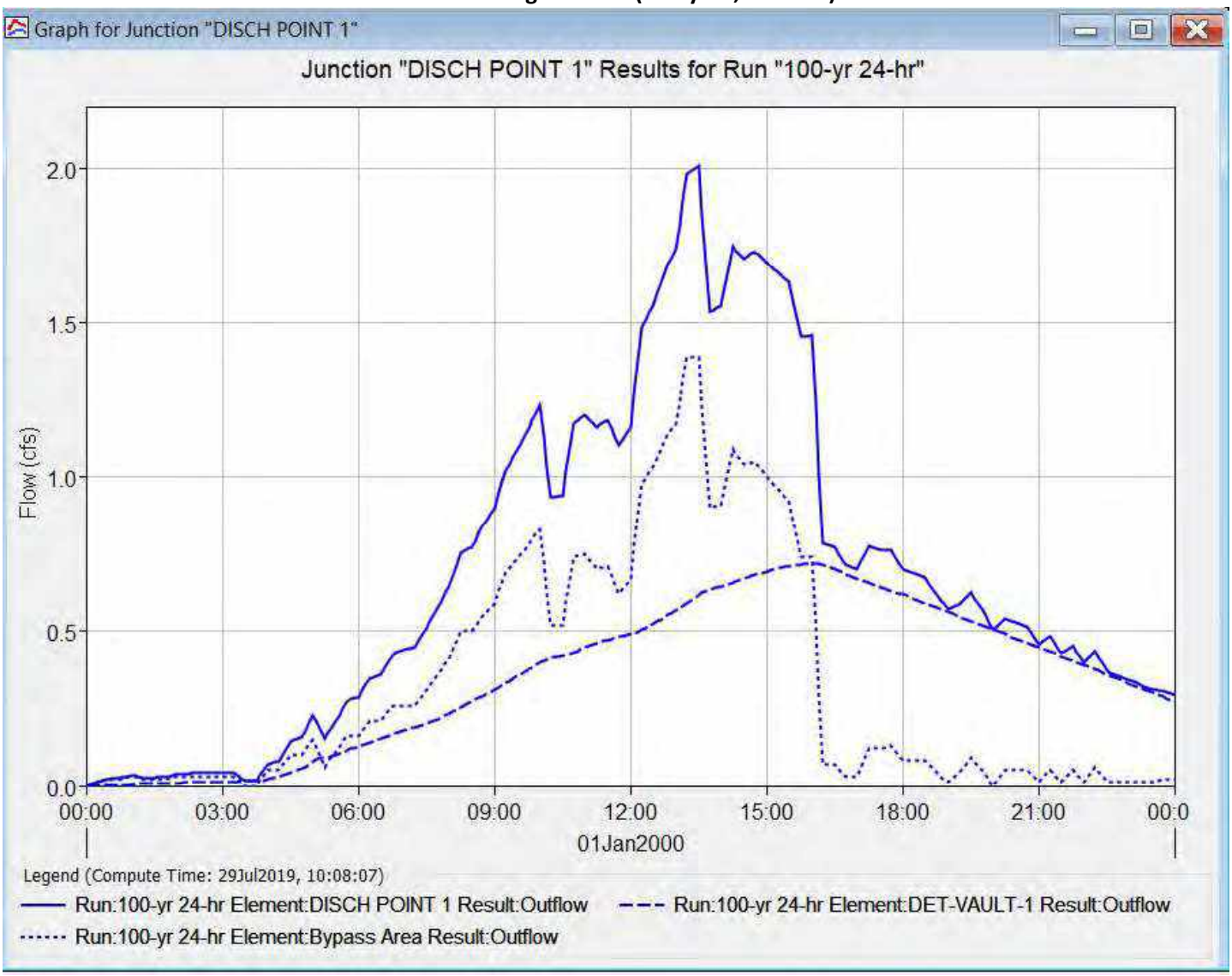
Computed Results

| | | | |
|---|---|---|---|
| Peak Discharge: | 2.01 (CFS) | Date/Time of Peak Discharge: | 01Jan2000, 13:30 |
| Volume: | 1.37 (AC-FT) | | |



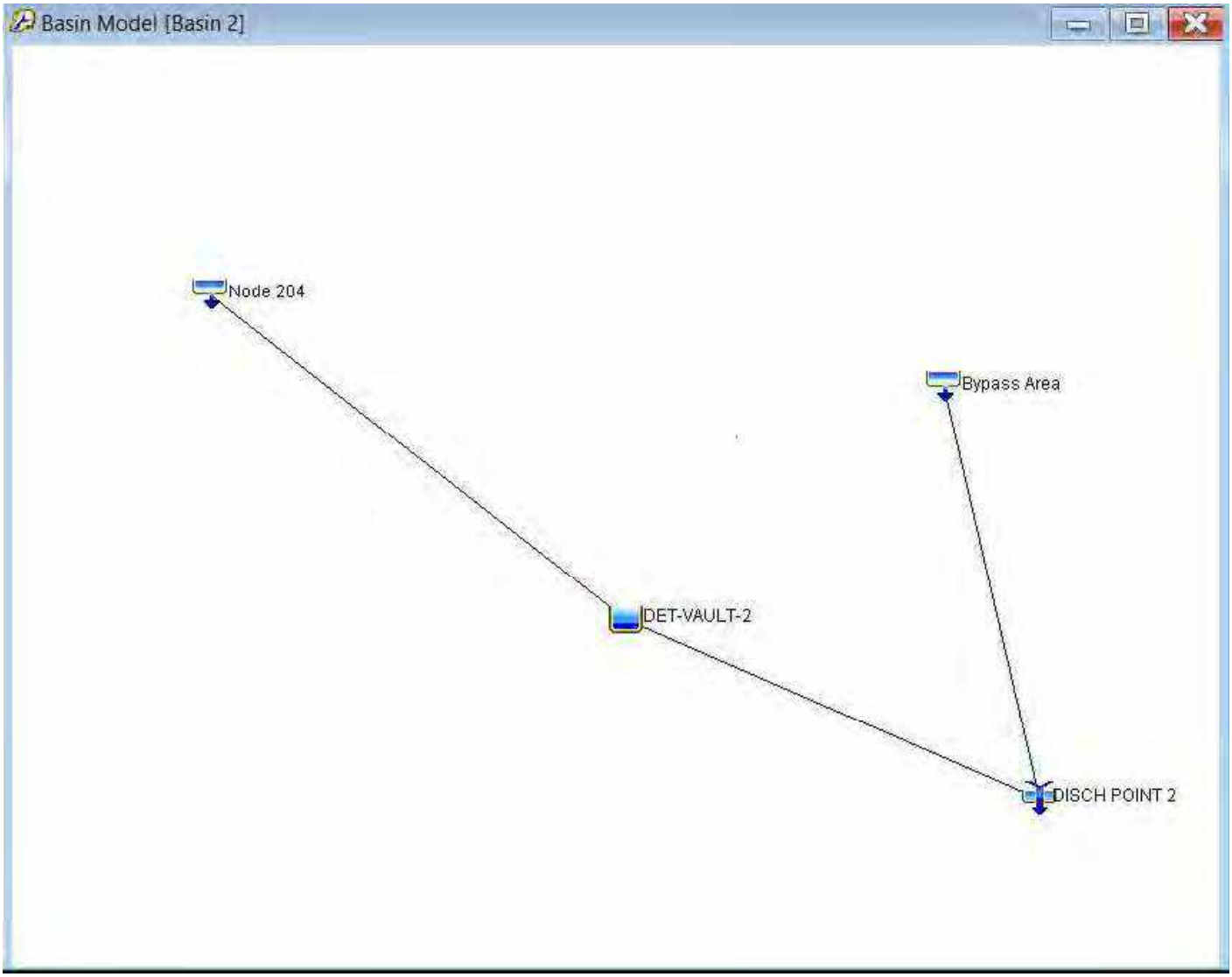
# HEC-HMS Detention Routing

**Discharge Point 1 (100-year, 24-hour)**



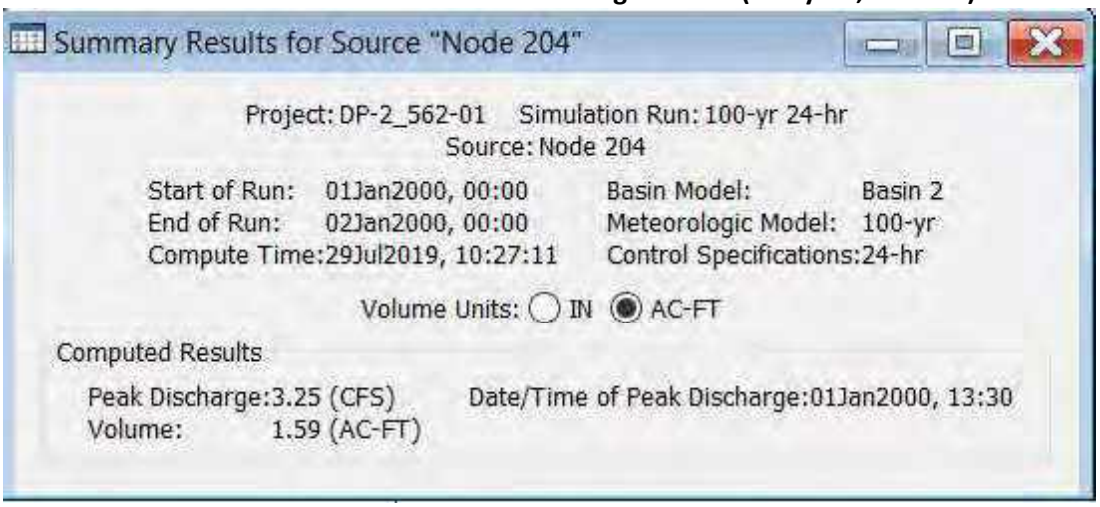
# HEC-HMS Detention Routing

**Discharge Point 2 (100-year, 24-hour)**



# HEC-HMS Detention Routing

**Discharge Point 2 (100-year, 24-hour)**



Summary Results for Source "Node 204"

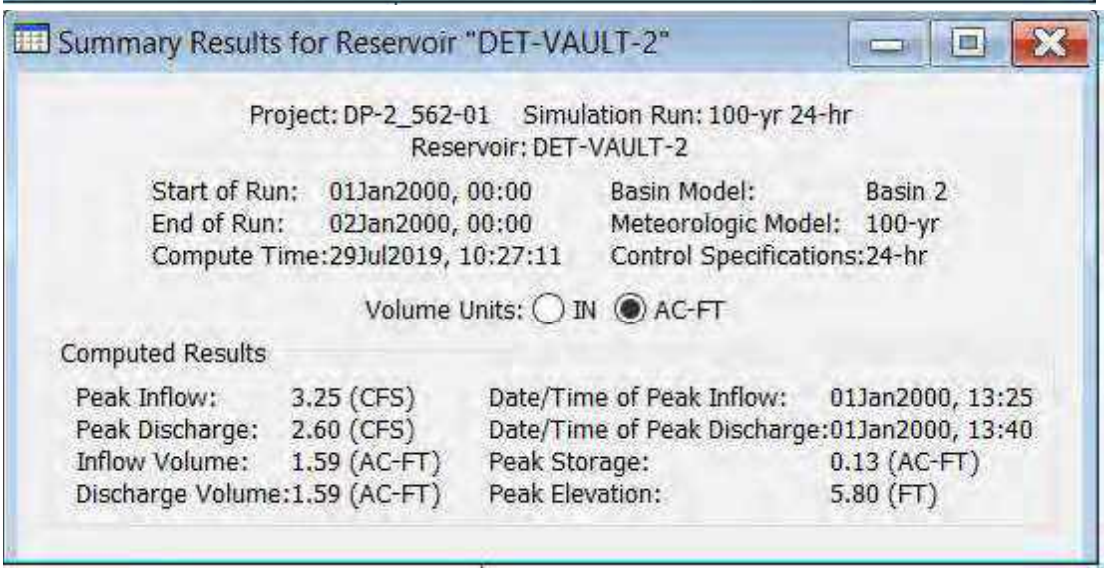
Project: DP-2_562-01 Simulation Run: 100-yr 24-hr
Source: Node 204

| | | | |
|---|---|---|---|
| Start of Run: | 01Jan2000, 00:00 | Basin Model: | Basin 2 |
| End of Run: | 02Jan2000, 00:00 | Meteorologic Model: | 100-yr |
| Compute Time: | 29Jul2019, 10:27:11 | Control Specifications: | 24-hr |

Volume Units: ○ IN ◉ AC-FT

Computed Results

| | | | |
|---|---|---|---|
| Peak Discharge: | 3.25 (CFS) | Date/Time of Peak Discharge: | 01Jan2000, 13:30 |
| Volume: | 1.59 (AC-FT) | | |



Summary Results for Reservoir "DET-VAULT-2"

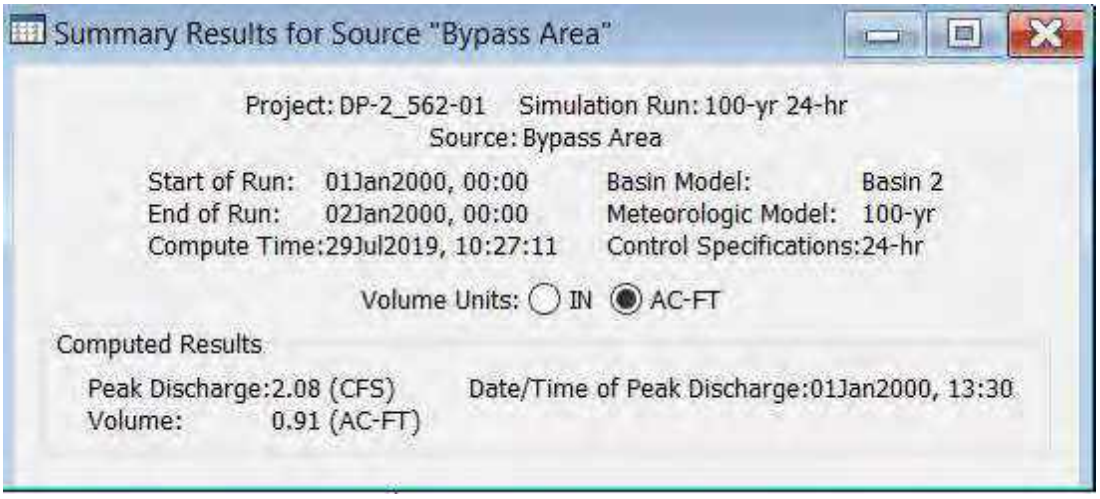
Project: DP-2_562-01 Simulation Run: 100-yr 24-hr
Reservoir: DET-VAULT-2

| | | | |
|---|---|---|---|
| Start of Run: | 01Jan2000, 00:00 | Basin Model: | Basin 2 |
| End of Run: | 02Jan2000, 00:00 | Meteorologic Model: | 100-yr |
| Compute Time: | 29Jul2019, 10:27:11 | Control Specifications: | 24-hr |

Volume Units: ○ IN ◉ AC-FT

Computed Results

| | | | |
|---|---|---|---|
| Peak Inflow: | 3.25 (CFS) | Date/Time of Peak Inflow: | 01Jan2000, 13:25 |
| Peak Discharge: | 2.60 (CFS) | Date/Time of Peak Discharge: | 01Jan2000, 13:40 |
| Inflow Volume: | 1.59 (AC-FT) | Peak Storage: | 0.13 (AC-FT) |
| Discharge Volume: | 1.59 (AC-FT) | Peak Elevation: | 5.80 (FT) |



Summary Results for Source "Bypass Area"

Project: DP-2_562-01 Simulation Run: 100-yr 24-hr
Source: Bypass Area

| | | | |
|---|---|---|---|
| Start of Run: | 01Jan2000, 00:00 | Basin Model: | Basin 2 |
| End of Run: | 02Jan2000, 00:00 | Meteorologic Model: | 100-yr |
| Compute Time: | 29Jul2019, 10:27:11 | Control Specifications: | 24-hr |

Volume Units: ○ IN ◉ AC-FT

Computed Results

| | | | |
|---|---|---|---|
| Peak Discharge: | 2.08 (CFS) | Date/Time of Peak Discharge: | 01Jan2000, 13:30 |
| Volume: | 0.91 (AC-FT) | | |

# HEC-HMS Detention Routing

**Discharge Point 2 (100-year, 24-hour)**

Summary Results for Junction "DISCH POINT 2"

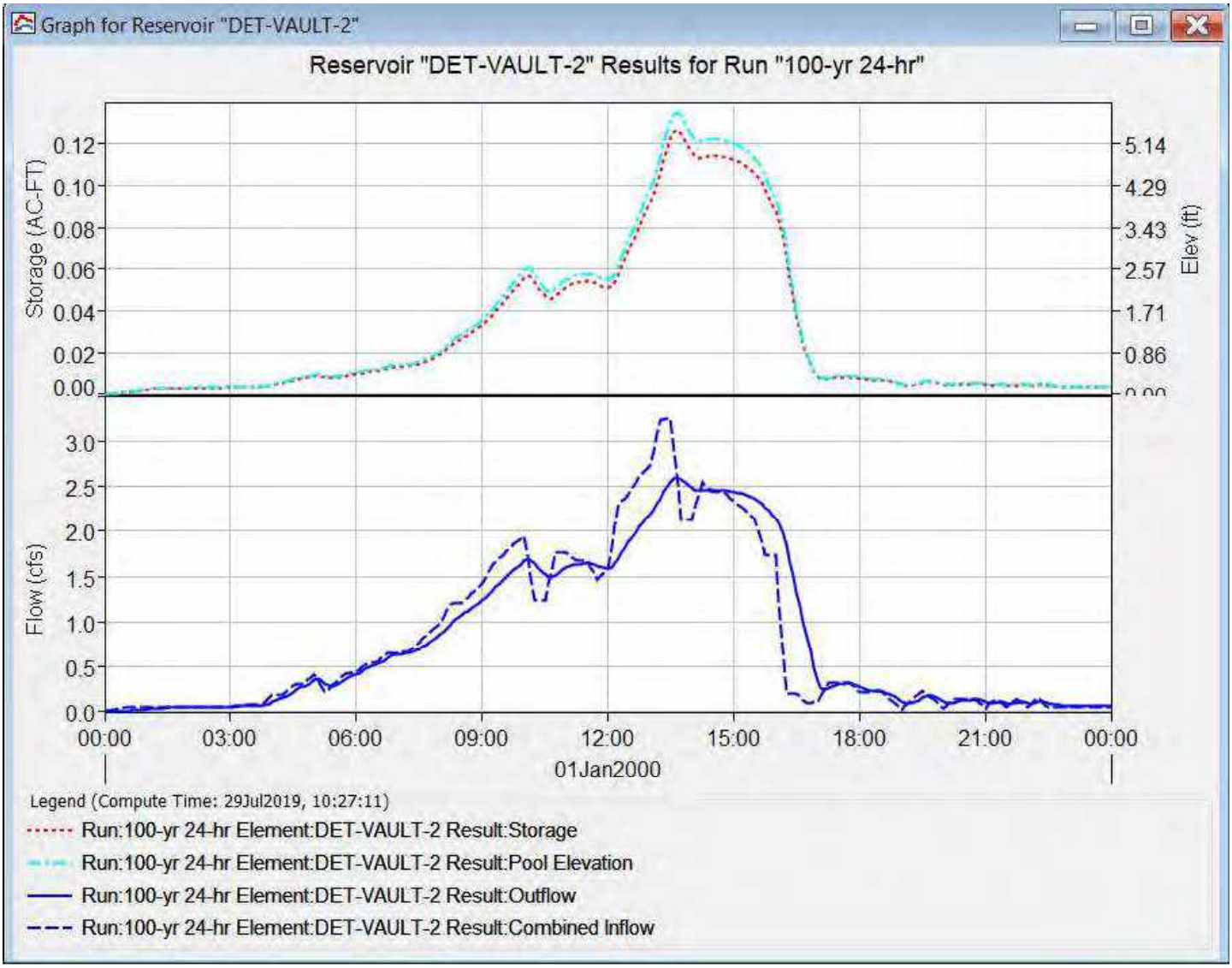
Project: DP-2_562-01 Simulation Run: 100-yr 24-hr
Junction: DISCH POINT 2

| | | | |
|---|---|---|---|
| Start of Run: | 01Jan2000, 00:00 | Basin Model: | Basin 2 |
| End of Run: | 02Jan2000, 00:00 | Meteorologic Model: | 100-yr |
| Compute Time: | 29Jul2019, 10:27:11 | Control Specifications: | 24-hr |

Volume Units: ○ IN ◉ AC-FT

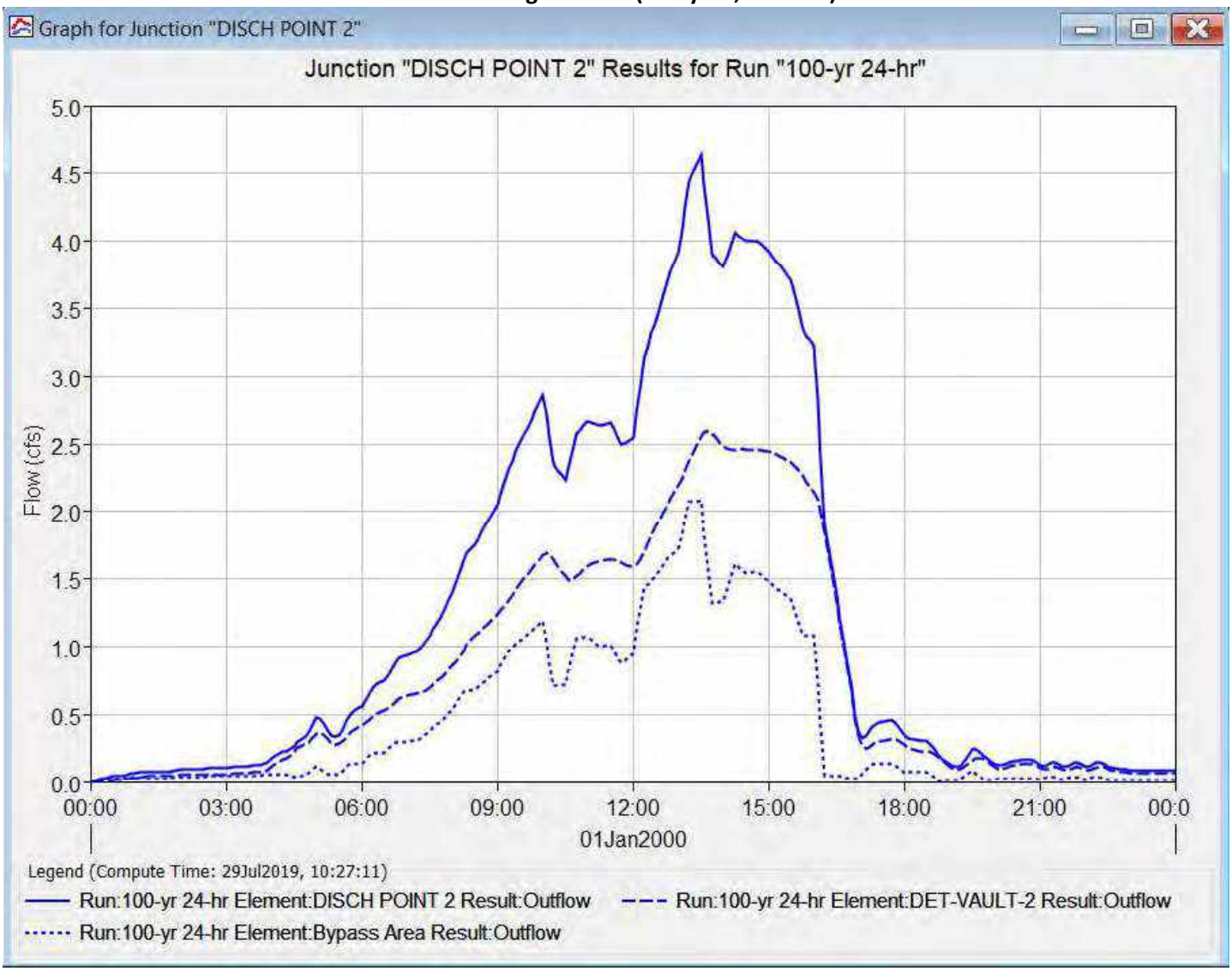
Computed Results

Peak Discharge: 4.63 (CFS) Date/Time of Peak Discharge: 01Jan2000, 13:30
Volume: 2.50 (AC-FT)



# HEC-HMS Detention Routing

**Discharge Point 2 (100-year, 24-hour)**



# Appendix E-1

Noise Study

# Ritz-Carlton Residences

## NOISE IMPACT ANALYSIS

### CITY OF RANCHO MIRAGE

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FEBRUARY 18, 2020

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# LIST OF ABBREVIATED TERMS

| | |
|---|---|
| (1) | Reference |
| ADT | Average Daily Traffic |
| ANSI | American National Standards Institute |
| Calveno | California Vehicle Noise |
| CEQA | California Environmental Quality Act |
| CNEL | Community Noise Equivalent Level |
| dBA | A-weighted decibels |
| FHWA | Federal Highway Administration |
| FTA | Federal Transit Administration |
| INCE | Institute of Noise Control Engineering |
| $L_{eq}$ | Equivalent continuous (average) sound level |
| $L_{max}$ | Maximum level measured over the time interval |
| $L_{min}$ | Minimum level measured over the time interval |
| mph | Miles per hour |
| PPV | Peak Particle Velocity |
| Project | Ritz-Carlton Residences |
| REMEL | Reference Energy Mean Emission Level |
| RMS | Root-mean-square |
| VdB | Vibration Decibels |

# EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and any necessary noise mitigation measures for the proposed Ritz-Carlton Residences development ("Project"). The Project site is located north of Mirada Circle and east of Frank Sinatra Drive in the City of Rancho Mirage. The Project proposes to expand the existing Ritz-Carlton hotel by 106 residential dwelling units, a 6,966 square foot restaurant, and a 23,843 square foot venue. For the purposes of this analysis, it is assumed that the Project will be constructed within a single phase of development with a projected Opening Year of 2023. This study has been prepared consistent with applicable City of Rancho Mirage noise standards, and significance criteria based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

## OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the Project will influence the traffic noise levels in surrounding off-site areas. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on four roadway segments were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in *Ritz-Carlton Residences Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (2) To assess the off-site noise level impacts associated with the proposed Project, noise level contours were developed for Existing 2019, Existing plus Ambient (EA), Existing plus Ambient plus Cumulative (EAC), and Horizon Year 2040 traffic conditions. The off-site traffic noise analysis shows that the Project-related traffic noise level increases at receiving land uses under all traffic scenarios will be *less than significant*.

## OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the potential noise sources within Ritz-Carlton Residences site, this analysis estimates the Project-related operational (stationary-source) noise levels at the nearby receiver locations. The Project-related operational noise sources are expected to include air conditioning units, pool activity and outdoor courtyard activity. The analysis shows that the operational noise levels associated with Ritz-Carlton Residences Project will satisfy the City of Rancho Mirage 55 dBA $L_{eq}$ daytime, 50 dBA $L_{eq}$ evening and 45 dBA $L_{eq}$ nighttime exterior noise level standards at all nearby receiver locations. Therefore, the operational noise impacts are considered *less than significant* at the nearby noise-sensitive receiver locations

## CONSTRUCTION NOISE ANALYSIS

Construction-related noise impacts are expected to create short-term and intermittent high-level noise conditions at receivers surrounding the Project site. Using sample reference noise levels to represent the planned construction activities of the Ritz-Carlton Residences site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. Since the City of Rancho Mirage General Plan and Municipal Codes do not identify specific construction noise level thresholds, a construction noise level threshold is identified based on the National Institute for Occupational Safety and Health (NIOSH) limits. The Project-related short-term construction noise levels are expected to range from 42.1 to 70.6 dBA $L_{eq}$ and will satisfy the 85 dBA $L_{eq}$ NIOSH construction noise level threshold at all receiver locations. Therefore, based on the results of this analysis, all nearby sensitive receiver locations will experience *less than significant* impacts due to Project construction noise levels.

### CONSTRUCTION NOISE ABATEMENT MEASURES

Though construction noise is intermittent and of short duration, and will not present any long-term impacts, the following practices, while not required, would reduce noise level increases produced by the construction equipment to the nearby noise-sensitive residential land uses:

- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction (i.e., to the center).
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 7:00 a.m. to 6:00 p.m. Monday to Saturdays, with no activity allowed on Sundays or holidays). The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

## CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. At distances ranging from 21 to 591 feet from Project construction activity, construction vibration velocity levels are expected to range from 45.8 to 89.3 VdB and will exceed the FTA 80 VdB threshold for human annoyance at receiver locations R3 and R4. The construction vibration analysis shows that the unmitigated Project-related vibration impacts will be *potentially significant* during the construction activities at the Project site and mitigation is required.

Therefore, a 50-foot vibration buffer zone mitigation measure is required restricting the use of large loaded trucks and dozers (greater than 80,000 pounds) within 50-feet of occupied sensitive receiver locations R3 and R4. With the mitigation measures identified in this report, the mitigated vibration levels with the 50-foot buffer zone will be reduced to 78.0 VdB and will satisfy the FTA 80 VdB threshold for human annoyance. Therefore, impacts with the construction vibration mitigation measure identified in this study will be *less than significant*.

### CONSTRUCTION VIBRATION MITIGATION

To reduce the construction vibration impacts to *less than significant* levels, the following vibration mitigation measure is required for Project-related construction activities:

- Large loaded trucks and dozers (greater than 80,000 pounds) shall not be used within 50 feet of occupied noise-sensitive residential homes, as shown on Exhibit ES-A, represented by receiver locations R3 and R4, during Project construction activities. Instead, small rubber-tired or alternative equipment shall be used within this area during Project construction to reduce vibration effects. If all mobile equipment used during Project construction are less than 80,000 pounds, then the 50-foot buffer vibration mitigation is not required.

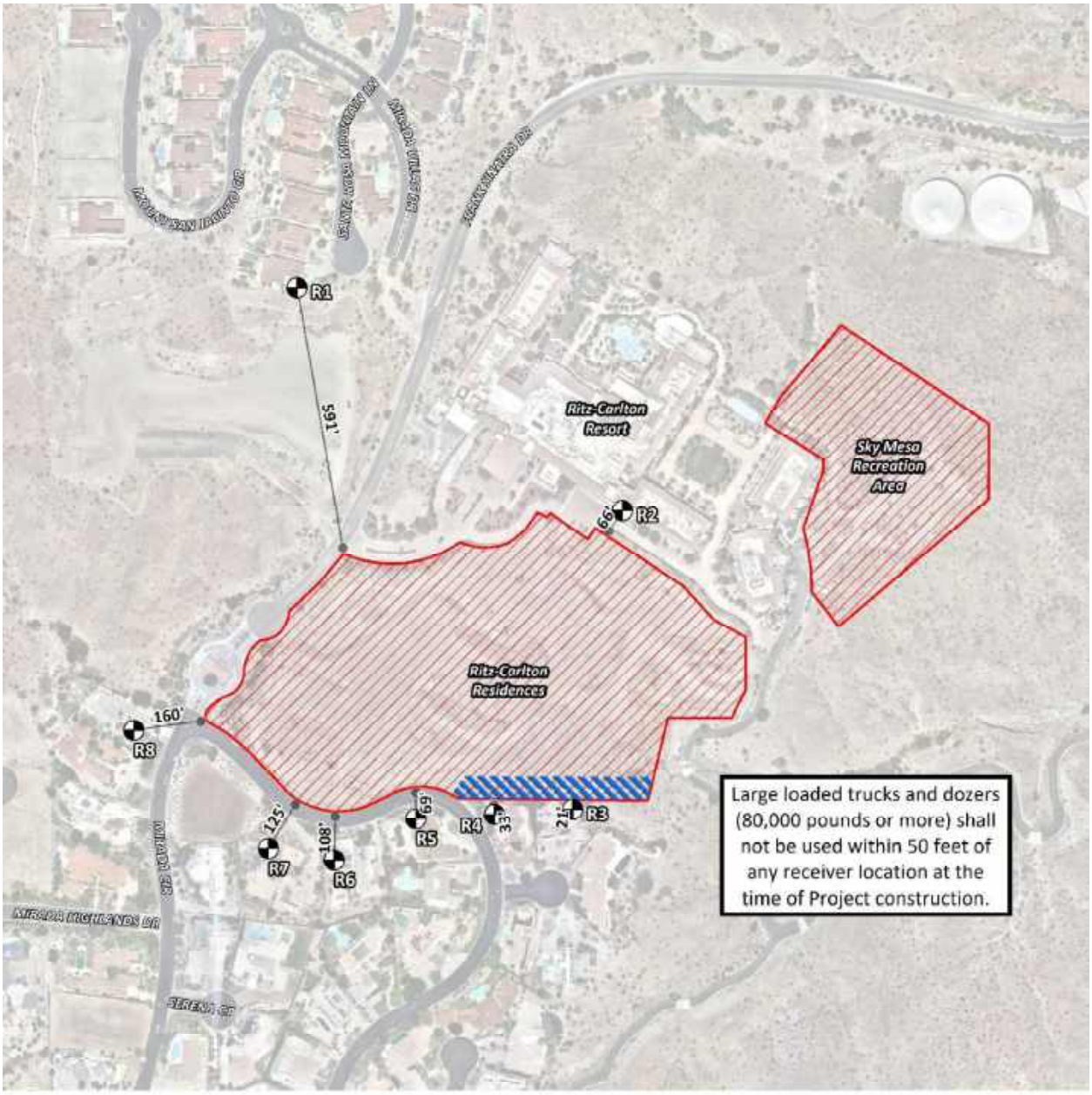
### SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this Ritz-Carlton Residences Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1). Table ES-1 shows the findings of significance for each potential noise and/or vibration impact under CEQA before and after any required mitigation measures described below.

**TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS**

| Analysis | Report Section | Significance Findings | |
|---|---|---|---|
| | | Unmitigated | Mitigated |
| Off-Site Traffic Noise | 7 | *Less Than Significant* | - |
| Operational Noise | 9 | *Less Than Significant* | - |
| Construction Noise | 10 | *Less Than Significant* | - |
| Construction Vibration | | *Potentially Significant* | *Less Than Significant* |

## EXHIBIT ES-A: SUMMARY OF RECOMMENDATIONS



# 1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Ritz-Carlton Residences ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, provides the study methods and procedures for transportation noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential short-term construction noise and vibration impacts.

## 1.1 SITE LOCATION

The Project site is located north of Mirada Circle and east of Frank Sinatra Drive, in the City of Rancho Mirage as shown on Exhibit 1-A. The Project site is located adjacent to the existing Ritz-Carlton Rancho Mirage, north of the Mirada Estates and east of the Villas of Mirada. The Project site is currently vacant and undeveloped.

## 1.2 PROJECT DESCRIPTION

It is our understanding that the Project is to expand the existing Ritz-Carlton hotel by 106 residential dwelling units, a 6,966 square foot restaurant, and a 23,843 square foot venue. For the purposes of this analysis, it is assumed that the Project will be constructed within a single phase of development with a projected Opening Year of 2023.

The Ritz-Carlton Residences at Rancho Mirage is an expansion and enhancement to the existing Ritz-Carlton Resort. The project consists of renovation of the existing motor court which will provide a connection to the new proposed building across from the existing hotel. This new building will provide a new 23,843 square feet of indoor event space and expansive exterior entertaining and garden spaces. The building will also house 48 Residential Suites over underground parking for the both the suites and the event space along with additional parking for the existing hotel. In addition, 58 new residential villas with their own private garages will be built around naturally landscaped areas. A community clubroom with access to a central pool terrace as well as smaller amenity areas will enhance the new community. The new Sky Mesa Recreation Area will enhance the land southeast of the existing hotel by providing additional event space and amenities such as a pool terrace and view opportunities onto the valley. A new restaurant will be tucked away into the site to provide a new dining experience as well as services to the pool deck.

Per the *Ritz-Carlton Residences Traffic Impact Analysis* prepared by Urban Crossroads, Inc., the Project is expected to generate a net total of 1,068 trip-ends per day, 51 AM peak hour trips and 86 PM peak hour trips. (3)

## EXHIBIT 1-A: LOCATION MAP

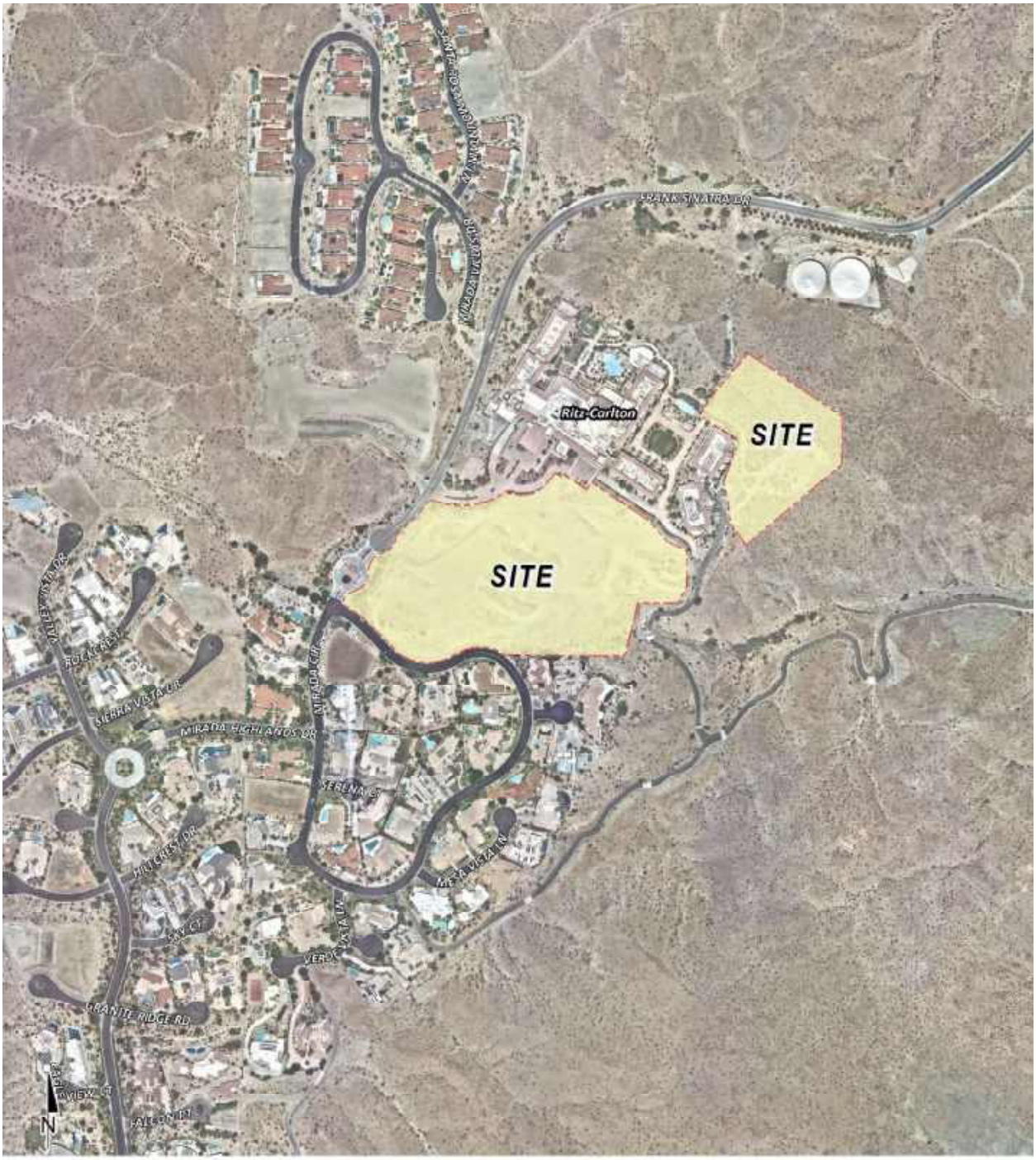


**EXHIBIT 1-B: SITE PLAN**



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# 2 FUNDAMENTALS

Noise has been simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

**EXHIBIT 2-A: TYPICAL NOISE LEVELS**

| COMMON OUTDOOR ACTIVITIES | COMMON INDOOR ACTIVITIES | A - WEIGHTED SOUND LEVEL dBA | SUBJECTIVE LOUDNESS | EFFECTS OF NOISE |
|---|---|---|---|---|
| THRESHOLD OF PAIN | | 140 | INTOLERABLE OR DEAFENING | HEARING LOSS |
| NEAR JET ENGINE | | 130 | | |
| | | 120 | | |
| JET FLY-OVER AT 300m (1000 ft) | ROCK BAND | 110 | | |
| LOUD AUTO HORN | | 100 | VERY NOISY | |
| GAS LAWN MOWER AT 1m (3 ft) | | 90 | | |
| DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph) | FOOD BLENDER AT 1m (3 ft) | 80 | | SPEECH INTERFERENCE |
| NOISY URBAN AREA, DAYTIME | VACUUM CLEANER AT 3m (10 ft) | 70 | LOUD | |
| HEAVY TRAFFIC AT 90m (300 ft) | NORMAL SPEECH AT 1m (3 ft) | 60 | | |
| QUIET URBAN DAYTIME | LARGE BUSINESS OFFICE | 50 | MODERATE | SLEEP DISTURBANCE |
| QUIET URBAN NIGHTTIME | THEATER, LARGE CONFERENCE ROOM (BACKGROUND) | 40 | | |
| QUIET SUBURBAN NIGHTTIME | LIBRARY | 30 | FAINT | NO EFFECT |
| QUIET RURAL NIGHTTIME | BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND) | 20 | | |
| | BROADCAST/RECORDING STUDIO | 10 | VERY FAINT | |
| LOWEST THRESHOLD OF HUMAN HEARING | LOWEST THRESHOLD OF HUMAN HEARING | 0 | | |

## 2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (3) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA at approximately 100 feet, which can cause serious discomfort. (4) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

## 2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level ($L_{eq}$). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level ($L_{eq}$) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 5 decibels to dBA $L_{eq}$ sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA $L_{eq}$ sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Rancho Mirage relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

## 2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The way noise reduces with distance depends on the following factors.

### 2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (3)

### 2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those

sites with an absorptive ground surface between the source and the receiver such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (5)

### 2.3.3 Atmospheric Effects

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (3)

### 2.3.4 Shielding

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby residents. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure. (5)

## 2.4 Noise Control

Noise control is the process of obtaining an acceptable noise environment for an observation point or receiver by controlling the noise source, transmission path, receiver, or all three. This concept is known as the source-path-receiver concept. In general, noise control measures can be applied to these three elements.

## 2.5 Noise Barrier Attenuation

Effective noise barriers can reduce noise levels by up to 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (5)

## 2.6 Land Use Compatibility With Noise

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic

health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (6)

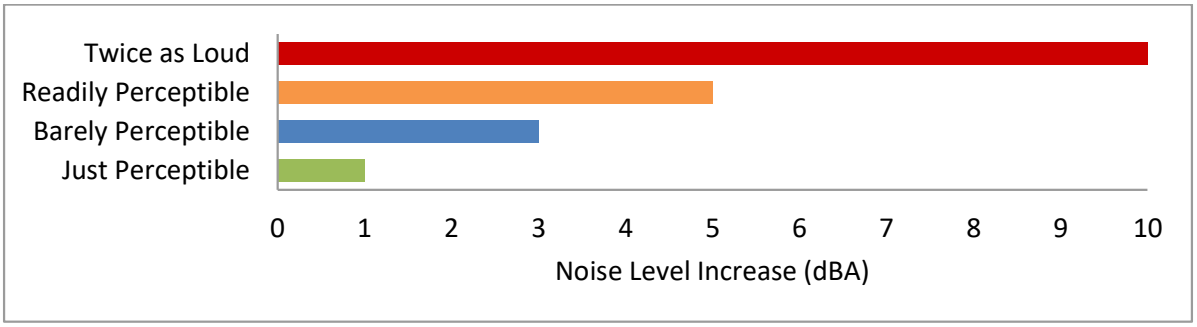
## 2.7 COMMUNITY RESPONSE TO NOISE

Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (7) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (7) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA are considered barely perceptible, and changes of 5 dBA are considered readily perceptible. (5)

**EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION**



## 2.8 EXPOSURE TO HIGH NOISE LEVELS

The Occupational Safety and Health Administration (OSHA) sets legal limits on noise exposure in the workplace. The permissible exposure limit (PEL) for a worker over an eight-hour day is 90 dBA. The OSHA standard uses a 5-dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half. The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise induced hearing loss. NIOSH also recommends a 3 dBA exchange rate so that every increase by 3 dBA doubles the amount of the noise and halves the recommended amount of exposure time. (8)

OSHA has implemented requirements to protect all workers in general industry (e.g. the manufacturing and the service sectors) for employers to implement a Hearing Conservation Program where workers are exposed to a time weighted average noise level of 85 dBA or higher over an eight-hour work shift. Hearing Conservation Programs require employers to measure noise levels, provide free annual hearing exams and free hearing protection, provide training, and conduct evaluations of the adequacy of the hearing protectors in use unless changes to tools, equipment and schedules are made so that they are less noisy and worker exposure to noise is less than the 85 dBA. This noise study does not evaluate the noise exposure of workers within a project or construction site based on CEQA requirements, and instead, evaluates Project-related construction noise levels at the nearby sensitive receiver locations in the Project study area.

## 2.9 VIBRATION

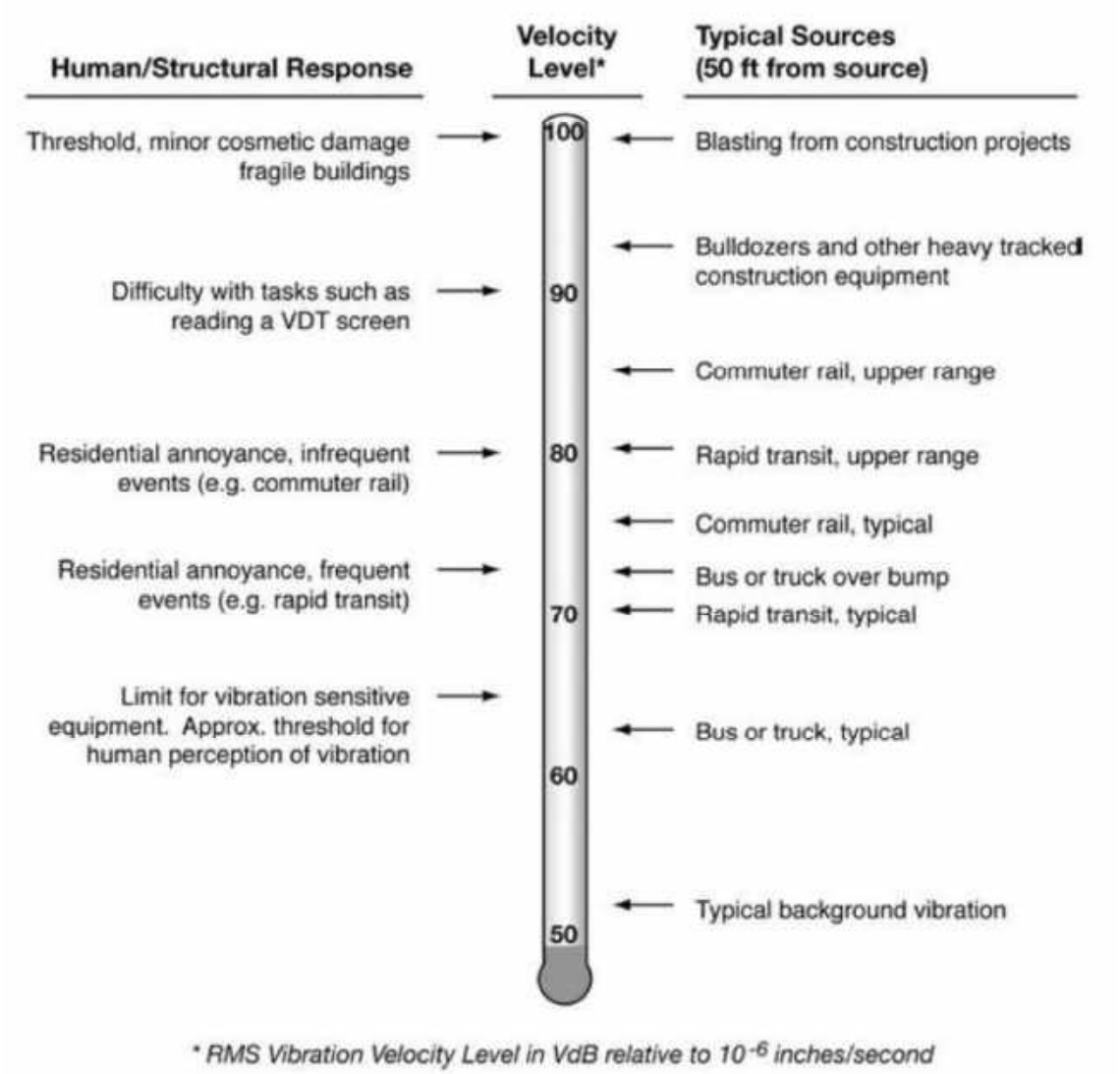
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (9), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures

(especially older masonry structures), people (especially residents, the elderly, and sick), vibration-sensitive equipment and/or activities

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-C illustrates common vibration sources and the human and structural response to ground-borne vibration.

**EXHIBIT 2-C: TYPICAL LEVELS OF GROUND-BORNE VIBRATION**




*Source: Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment*.

# 3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

## 3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research. (10) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

## 3.2 STATE OF CALIFORNIA BUILDING CODE

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, and the California Building Code. These noise standards are applied to new construction in California for the purpose of controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are developed near major transportation noise sources, and where such noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans for noise-sensitive land uses must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

## 3.3 CITY OF RANCHO MIRAGE GENERAL PLAN NOISE ELEMENT

The City of Rancho Mirage has adopted a Noise Element of the General Plan (12) to control and abate environmental noise, and to protect the citizens of the City of Rancho Mirage from excessive exposure to noise. The Noise Element is intended to help align the community's various land uses with the existing and future noise environment and thus ensure that any negative effects of noise are minimized or completely avoided.

The noise criteria identified in the City of Rancho Mirage Noise Element are guidelines to evaluate the land use compatibility of transportation related noise. To assist the City in the planning compatible uses, a range of exterior noise thresholds for various land uses have been developed. Particularly sensitive land uses include residences, schools, libraries, churches, hospitals and nursing homes, and destination resort areas. In addition, parks, golf courses, and other outdoor activity areas can be sensitive to noise disturbances. Less sensitive land uses include commercial uses, conventional hotels and motels, and playgrounds. east sensitive to noise are heavy commercial uses, transportation, communication, and utility land uses.

The Noise Level and Land Use Compatibility matrix in the Noise Element shown on Exhibit 3-A provides guidelines to evaluate the acceptability of the transportation related noise level impacts. Single-family residential land uses are considered *normally acceptable* with exterior noise levels below 60 dBA CNEL and *conditionally acceptable* with noise levels below 70 dBA CNEL. Hospitals land uses are considered *normally acceptable* with exterior noise levels below 70 dBA CNEL. For *conditionally acceptable* land use, *new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed*

## 3.4 OPERATIONAL NOISE STANDARDS

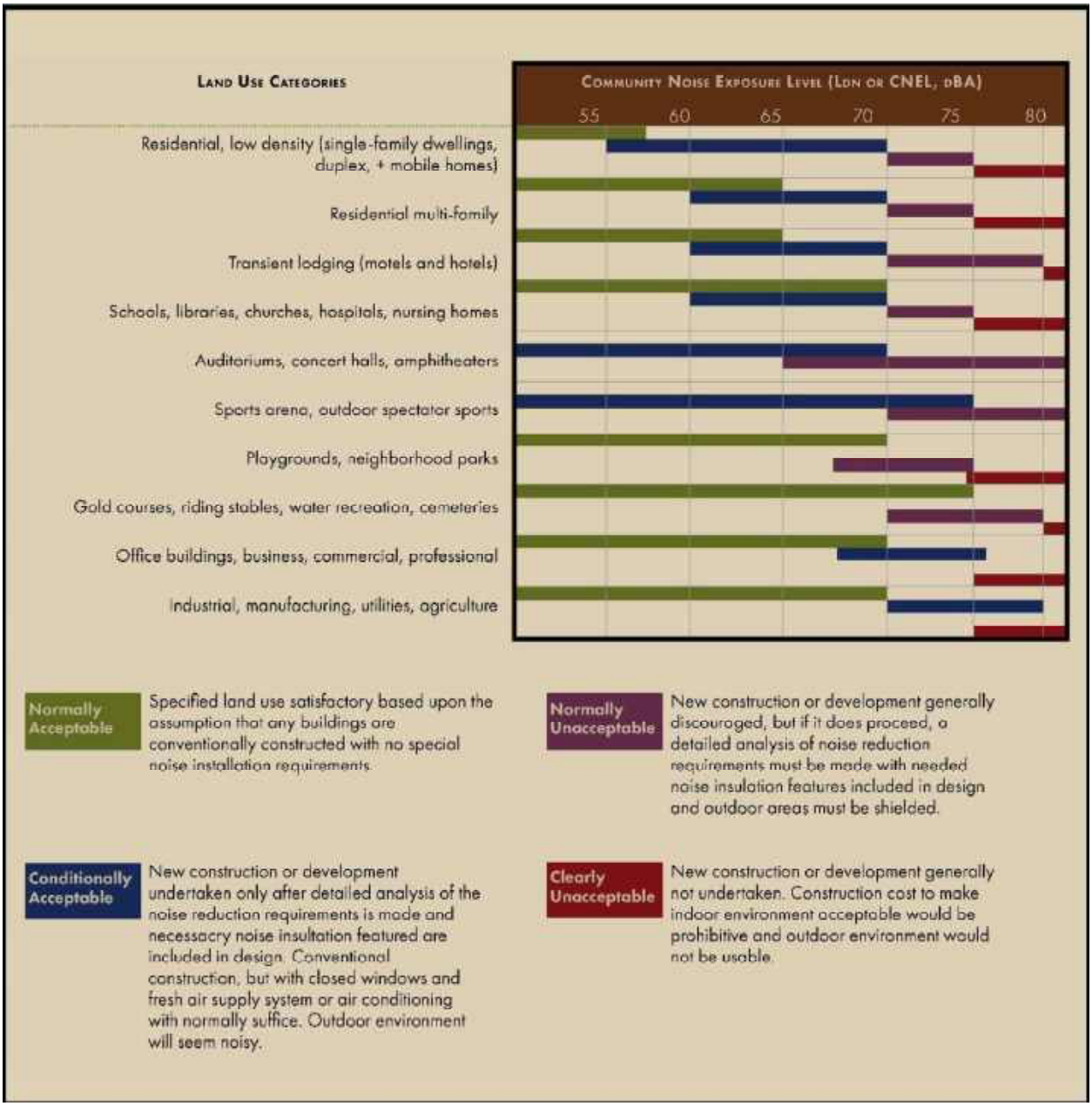
To analyze noise impacts originating from a designated fixed location or private property such as the Ritz-Carlton Residences Project, stationary-source (operational) noise such as the expected air conditioning units, pool activity and outdoor courtyard activity are typically evaluated against standards established under a jurisdiction's Municipal Code. The City of Rancho Mirage Municipal Code noise standards are provided in Appendix 3.1. The City of Rancho Mirage Municipal Code, Chapter 8.45 establishes the noise level standards for stationary noise sources. The Project's land use will potentially impact nearby noise-sensitive uses in the Project study area. For nearby noise-sensitive residential land uses in the Project study area, Section 8.45.030 identifies the base exterior noise level standard of 55 dBA $L_{eq}$ during the daytime hours (7:00 a.m. to 6:00 p.m.), 50 dBA $L_{eq}$ during the evening hours (6:00 p.m. to 10:00 p.m.) and 45 dBA $L_{eq}$ during the nighttime hours (10:00 p.m. to 7:00 a.m.). (11) Table 3-1 provides a summary of the City of Rancho Mirage operational exterior noise level standards.

**TABLE 3-1: OPERATIONAL NOISE STANDARDS**

| Land Use[1] | Time Period | Exterior Noise Level Standards (dBA $L_{eq}$)[2] |
|---|---|---|
| Residential | Daytime (7:00 a.m. to 6:00 p.m.) | 55 |
| | Evening (6:00 p.m. to 10:00 p.m.) | 50 |
| | Nighttime (10:00 p.m. to 7:00 a.m.) | 45 |

[1] Source: City of Rancho Mirage Municipal Code, Section 8.45.030 Exterior noise level limits (Appendix 3.1).
[2] $L_{eq}$ represents a steady state sound level containing the same total energy as a time varying signal over a given sample period.

## EXHIBIT 3-A: NOISE LEVEL AND LAND USE COMPATIBILITY



## 3.5 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of Ritz-Carlton Residences, noise from construction activities are typically evaluated against standards established under a City's Municipal Code. The Municipal Code noise standards for construction are described below for the City of Rancho Mirage to determine the potential noise impacts at nearby receiver locations.

To control noise impacts associated with the construction of the proposed Project, the City has established limits to the hours of operation. The City of Rancho Mirage Municipal Code, Section 15.04.030 indicates that construction, shall be limited to the hours of 7:00 a.m. to 7:00 p.m. weekdays. Construction activity is not permitted on Sundays or major holidays. (12) However, the City's General Plan and Municipal Code do not establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes as the *generation of noise levels in excess of standards* or as a *substantial temporary or periodic noise increase*, therefore, the following construction noise level thresholds are used in this noise study.

To evaluate whether the Project will generate potentially significant temporary construction noise levels at off-site sensitive receiver locations, a construction-related noise level threshold is adopted from the *Criteria for Recommended Standard: Occupational Noise Exposure* prepared by the National Institute for Occupational Safety and Health (NIOSH). (13) A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The construction related noise level threshold starts at 85 dBA for more than eight hours per day, and for every 3-dBA increase, the exposure time is cut in half. This results in noise level thresholds of 88 dBA for more than four hours per day, 92 dBA for more than one hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day. (13) For the purposes of this analysis, the lowest, more conservative construction noise level threshold of 85 dBA $L_{eq}$ is used as an acceptable threshold for construction noise at the nearby sensitive receiver locations. Since this construction-related noise level threshold represents the energy average of the noise source over a given time, they are expressed as $L_{eq}$ noise levels. Therefore, the noise level threshold of 85 dBA $L_{eq}$ over a period of eight hours or more is used to evaluate the potential Project-related construction noise level impacts at the nearby sensitive receiver locations.

## 3.6 VIBRATION STANDARDS

The City of Rancho Mirage has not identified or adopted specific, quantified vibration level standards. However, the United States Department of Transportation Federal Transit Administration (FTA) provides guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 80 VdB for residential uses and buildings where people normally sleep, and 83 VdB for institutional land uses typically occupied during the daytime hours. (9) Construction activities can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. The FTA guidelines provide a substantiated basis for determining the relative significance of potential Project vibration impacts due to on-site construction activities.

# 4 SIGNIFICANCE CRITERIA

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

A. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

B. Generation of excessive ground-borne vibration or ground-borne noise levels?

C. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

While the City of Rancho Mirage General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at which increases are considered substantial for use under Guideline A. CEQA Appendix G Guideline C applies to nearby public and private airports, if any, and the Project's land use compatibility.

## 4.1 CEQA GUIDELINES NOT FURTHER ANALYZED

The Palm Springs Airport (PSP) is located roughly 4 miles north west of the Project site Since the Project is located more than two miles away from the nearest airport, the potential impacts are considered *less than significant,* and no further noise analysis is provided under Guideline C.

## 4.2 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (15) Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment.

In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (16) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft

noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level ($L_{eq}$).

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders the noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (15) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance.

## 4.3 NON-NOISE-SENSITIVE RECEIVERS

The City of Rancho Mirage General Plan Noise Element (Figure 8-2), *Land Use Compatibility for Community Noise Exposure* was used to establish the satisfactory noise levels of significance for non-noise-sensitive land uses in the Project study area. As previously shown on Exhibit 3-A, the *normally acceptable* exterior noise levels for non-noise-sensitive land uses is 70 dBA CNEL. Noise levels greater than 70 dBA CNEL are considered *conditionally acceptable* per the *Land Use Compatibility for Community Noise Exposure*.

To determine if Project-related traffic noise level increases are significant at off-site non-noise-sensitive land uses, a *readily perceptible* 5 dBA and *barely perceptible* 3 dBA criteria were used. When the without Project noise levels at the non-noise-sensitive land uses are below the *normally acceptable* 70 dBA CNEL compatibility criteria, a *readily perceptible* 5 dBA or greater noise level increase is considered a significant impact. When the without Project noise levels are greater than the *normally acceptable* 70 dBA CNEL land use compatibility criteria, a *barely perceptible* 3 dBA or greater noise level increase is considered a significant impact since the noise level criteria is already exceeded. The noise level increases used to determine significant impacts for non-noise-sensitive land uses is generally consistent with the FICON noise level increase thresholds for noise-sensitive land uses but instead rely on the City of Rancho Mirage General Plan Noise Element (Figure 8-2) *Land Use Compatibility for Community Noise Exposure normally acceptable* 70 dBA CNEL exterior noise level criteria.

## 4.4 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-1 shows the significance criteria summary matrix.

### OFF-SITE TRAFFIC NOISE

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
    - are less than 60 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project-related noise level increase; or
    - range from 60 to 65 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project-related noise level increase; or
    - already exceed 65 dBA CNEL, and the Project creates a community noise level increase of greater than 1.5 dBA CNEL (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g., office, commercial, industrial):
    - are less than the City of Rancho Mirage General Plan Noise Element (Figure 8-2), *normally acceptable* 70 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project related noise level increase and the resulting noise level would exceed acceptable exterior noise standards; or
    - are greater than the City of Rancho Mirage General Plan Noise Element (Figure 8-2), *normally acceptable* 70 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project noise level increase.

### OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels exceed the base exterior noise level standard of 55 dBA $L_{eq}$ during the daytime hours (7:00 a.m. to 6:00 p.m.), 50 dBA $L_{eq}$ during the evening hours (6:00 p.m. to 10:00 p.m.) and 45 dBA $L_{eq}$ during the nighttime hours (10:00 p.m. to 7:00 a.m.) for noise-sensitive residential and institutional uses in the Project study area. (11)
- When the noise levels at existing and future noise-sensitive land uses (e.g., residential, etc.):
    - are less than 60 dBA $L_{eq}$ and the Project creates a readily perceptible 5 dBA $L_{eq}$ or greater Project-related noise level increase; or
    - range from 60 to 65 dBA $L_{eq}$ and the Project creates a barely perceptible 3 dBA $L_{eq}$ or greater Project-related noise level increase; or
    - already exceed 65 dBA $L_{eq}$, and the Project creates a community noise level impact of greater than 1.5 dBA $L_{eq}$ (FICON, 1992).

### CONSTRUCTION NOISE & VIBRATION

- If Project-related construction activities create noise levels which exceed the 85 dBA $L_{eq}$ acceptable noise level threshold at the nearby sensitive receiver locations (NIOSH, Criteria for Recommended Standard: Occupational Noise Exposure).
- If short-term Project generated construction vibration levels exceed the FTA vibration standards of 80 VdB at residential uses (Federal Transit Administration, Transit Noise and Vibration Impact Assessment).

**TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY**

| Analysis | Receiving Land Use | Condition(s) | Significance Criteria | |
|---|---|---|---|---|
| | | | Daytime | Nighttime |
| Off-Site Traffic[1] | Noise-Sensitive[1,2] | If ambient is < 60 dBA CNEL | ≥ 5 dBA CNEL Project increase | |
| | | If ambient is 60 - 65 dBA CNEL | ≥ 3 dBA CNEL Project increase | |
| | | If ambient is > 65 dBA CNEL | ≥ 1.5 dBA CNEL Project increase | |
| | Non-Noise-Sensitive[1,2] | If ambient is < 70 dBA CNEL | ≥ 5 dBA CNEL Project increase | |
| | | If ambient is > 70 dBA CNEL | ≥ 3 dBA CNEL Project increase | |
| Operational | Residential[3] | Exterior Noise Level Standards | See Table 3-1 | |
| | | If ambient is < 60 dBA $L_{eq}$[1] | ≥ 5 dBA $L_{eq}$ Project increase | |
| | | If ambient is 60 - 65 dBA $L_{eq}$[1] | ≥ 3 dBA $L_{eq}$ Project increase | |
| | | If ambient is > 65 dBA $L_{eq}$[1] | ≥ 1.5 dBA $L_{eq}$ Project increase | |
| Construction | Noise-Sensitive | Permitted between 7:00 a.m. to 6:00 p.m. Monday to Saturdays; with no activity allowed on Sundays or holidays.[4] | | |
| | | Noise Level Threshold[5] | 85 dBA $L_{eq}$ | n/a |
| | | Vibration Level Threshold[6] | 80 VdB | n/a |

[1] Source: FICON, 1992.
[2] Source: City of Rancho Mirage General Plan Noise Element.
[3] Source: City of Rancho Mirage General Plan Municipal Code, Section 8.45.030
[4] Source: City of Rancho Mirage General Plan Municipal Code, Section15.04.030
[5] Acceptable threshold for construction noise based on the Criteria for Recommended Standard: Occupational Noise Exposure prepared by the National Institute for Occupational Safety and Health.
[6] Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

# 5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at five locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Thursday, December 5th, 2019. Appendix 5.1 includes study area photos.

## 5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (17)

## 5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (3) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (9)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (9) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels

and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

## 5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels ($L_{eq}$). The equivalent sound level ($L_{eq}$) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels north of the Project site near existing Villas of Mirada single-family homes and dirt parking lot. The noise levels at this location consist primarily of parking lot vehicle movements from dirt lot to the south. The energy (logarithmic) average daytime noise level was calculated at 49.7 dBA $L_{eq}$ with an average evening noise level of 46.7 dBA $L_{eq}$ and an average nighttime noise level of 44.1 dBA $L_{eq}$.
- Location L2 represents the noise levels near the eastern boundary of the Project site near the existing Ritz-Carlton hotel and vacant land. The energy (logarithmic) average daytime noise level was calculated at 53.4 dBA $L_{eq}$ with an average evening noise level of 48.0 dBA $L_{eq}$ and an average nighttime noise level of 48.1 dBA $L_{eq}$. The noise levels at this location consist primarily of walkway activity around the Ritz-Carlton Rancho Mirage
- Location L3 represents the noise levels by the western boundary of the Project site near to the gated entrance of the Mirada Estates. The energy (logarithmic) average daytime noise level was calculated at 50.4 dBA $L_{eq}$ with an average evening noise level of 46.6 dBA $L_{eq}$ and an average nighttime noise level of 41.7 dBA $L_{eq}$. Traffic on Frank Sinatra Drive represents the primary source of noise at this location.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, $L_1$, $L_2$, $L_5$, $L_8$, $L_{25}$, $L_{50}$, $L_{90}$, $L_{95}$, and $L_{99}$ percentile noise levels observed during the daytime and nighttime periods.

The background ambient noise levels in the Project study area are dominated by surface street and parking lot activity. This includes the auto and heavy truck activities on study area roadway segments near the noise level measurement locations. The 24-hour existing noise level measurement results are shown on Table 5-1.

**TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS**

| Location[1] | Description | Energy Average Noise Level (dBA $L_{eq}$)[2] | | |
|---|---|---|---|---|
| | | Daytime | Evening | Nighttime |
| L1 | Located north of the Project site near the existing Villas of Mirada single-family homes and an open dirt parking lot. | 49.7 | 46.7 | 44.1 |
| L2 | Located near the eastern boundary of the Project site near the existing Ritz-Carlton hotel and vacant land. | 53.4 | 48.0 | 48.1 |
| L3 | Located by the western boundary of the Project site near to the gated entrance of the Mirada Estates. | 50.4 | 46.6 | 41.7 |

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average levels. The long-term 24-hour measurement worksheets are included in Appendix 5.2.
"Day" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.

## EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS



# 6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future traffic noise environment.

## 6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (18) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (19) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (5)

### 6.1.1 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the four study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Rancho Mirage General Plan Circulation Element, and the posted vehicle speeds. Consistent with *Ritz-Carlton Residences Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (3) the off-site traffic noise analysis maintains a peak hour to average daily traffic (peak-to-daily) relationship of approximately 16.06% and includes the following traffic scenarios.

- Existing (2019) Without Project
- Existing (2019) With Project
- Existing Plus Ambient Growth (EAP) (2023) Without Project
- Existing Plus Ambient Growth (EAP) (2023) With Project
- Existing Plus Ambient Growth Plus Cumulative Projects (EAC) (2023) Without Project
- Existing Plus Ambient Growth Plus Cumulative Projects (EAC) (2023) With Project
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

The average daily traffic (ADT) volumes used for this study are presented on Table 6-2. Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits and Table 6-4 presents the traffic flow distributions (vehicle mix) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks, and heavy trucks for input into the FHWA noise prediction model.

**TABLE 6-1: OFF-SITE ROADWAY PARAMETERS**

| ID | Roadway | Segment | Receiving Land Use[1] | Classification[2] | Distance from Centerline to Receiving Land Use (Feet)[2] | Vehicle Speed (mph) |
|---|---|---|---|---|---|---|
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | Major Arterial | 60' | 50 |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | Major Arterial | 60' | 50 |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | Local | 30' | 30 |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | Minor Arterial | 55' | 35 |

[1] Source: City of Rancho Mirage General Plan, Chapter 2, Exhibit 1, Land Use Map
[2] Source: City of Rancho Mirage General Plan, Chapter 3, Exhibit 8, Circulation Roadway Plan.
[3] Distance to receiving land use is based upon the right-of-way distances for each roadway classification provided in the Circulation Element. "C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES**

| ID | Roadway | Segment | Average Daily Traffic Volumes[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Existing | | Existing + Ambient (EA) | | Existing + Ambient + Cumulative (EAC) | | Horizon Year 2040 | |
| | | | Without Project | With Project | Without Project | With Project | Without Project | With Project | Without Project | With Project |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | 41,685 | 41,953 | 45,122 | 45,390 | 46,714 | 46,982 | 51,385 | 51,653 |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | 37,066 | 37,494 | 40,121 | 40,549 | 40,917 | 41,345 | 45,009 | 45,437 |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | 2,553 | 3,623 | 2,763 | 3,833 | 2,945 | 4,015 | 3,240 | 4,310 |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | 14,494 | 14,868 | 15,689 | 16,063 | 16,025 | 16,399 | 17,627 | 18,001 |

[1] Source: Ritz-Carlton Residences Traffic Impact Analysis.

**TABLE 6-3: TIME OF DAY VEHICLE SPLITS**

| Vehicle Type | Time of Day Splits[1] | | | Total of Time of Day Splits |
|---|---|---|---|---|
| | Daytime | Evening | Nighttime | |
| Autos | 75.55% | 13.96% | 10.49% | 100.00% |
| Medium Trucks | 48.91% | 2.17% | 48.91% | 100.00% |
| Heavy Trucks | 47.30% | 5.41% | 47.30% | 100.00% |

[1] Source: Typical Southern California vehicle mix.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

**TABLE 6-4: DISTRIBUTION OF TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)**

| Classification | Total % Traffic Flow | | | Total |
|---|---|---|---|---|
| | Autos | Medium Trucks | Heavy Trucks | |
| All Roadways[1] | 97.42% | 1.84% | 0.74% | 100.00% |

[1] Source: Typical Southern California vehicle mix.

## 6.2 VIBRATION ASSESSMENT

Construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-5. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\text{ ft}) - 30\log(D/25)$

**TABLE 6-5: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT**

| Equipment | Vibration Decibels (VdB) at 25 feet[1] |
|---|---|
| Small bulldozer | 58 |
| Jackhammer | 79 |
| Loaded Trucks | 86 |
| Large bulldozer | 87 |

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment

# 7 OFF-SITE TRANSPORTATION NOISE ANALYSIS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on *Ritz-Carlton Residences Traffic Impact Analysis*. (3) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Without / With Project: This scenario refers to the existing present-day 2019 noise conditions, without and with the development of the full Project. The existing with Project scenario will not actually occur since the Project would not be fully constructed and operational until 2023 conditions.
- Existing plus Ambient (EA) 2023 Without / With Project: This scenario refers to the existing noise conditions plus the estimated 4 years of background growth in ambient traffic conditions without and with the development of the full Project.
- Existing plus Ambient plus Cumulative (EAC) 2023 Without / With Project: This scenario refers to the existing plus ambient plus cumulative noise conditions at 2023 without and with the proposed Project.
- Horizon Year 2040 Without / With Project: This scenario refers to the future Horizon Year conditions at Year 2040 without and with the proposed Project. This scenario represents buildout of the General Plan land use and includes all cumulative projects identified in the Traffic Impact Analysis.

## 7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 and 7-8 present a summary of the exterior traffic noise levels for each traffic condition. Appendix 7.1 includes the traffic noise level contours worksheets for each traffic condition.

**TABLE 7-1: EXISTING 2019 WITHOUT PROJECT NOISE CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | 76.9 | 172 | 370 | 798 |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | 76.3 | 159 | 342 | 738 |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | 62.0 | RW | RW | 41 |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | 68.0 | RW | 88 | 189 |

[1] Source: City of Rancho Mirage General Plan, Chapter 2, Exhibit 1, Land Use Map
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 7-2: EXISTING 2019 WITH PROJECT NOISE CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | 76.9 | 173 | 372 | 801 |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | 76.4 | 160 | 345 | 743 |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | 63.6 | RW | RW | 52 |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | 68.2 | RW | 89 | 192 |

[1] Source: City of Rancho Mirage General Plan, Chapter 2, Exhibit 1, Land Use Map
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 7-3: EA 2023 WITHOUT PROJECT NOISE CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | 77.2 | 181 | 390 | 841 |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | 76.7 | 168 | 361 | 778 |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | 62.4 | RW | RW | 43 |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | 68.4 | RW | 93 | 199 |

[1] Source: City of Rancho Mirage General Plan, Chapter 2, Exhibit 1, Land Use Map
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 7-4: EA 2023 WITH PROJECT NOISE CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | 77.2 | 182 | 392 | 844 |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | 76.7 | 169 | 364 | 783 |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | 63.8 | RW | RW | 54 |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | 68.5 | RW | 94 | 202 |

[1] Source: City of Rancho Mirage General Plan, Chapter 2, Exhibit 1, Land Use Map
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 7-5: EAC 2023 WITHOUT PROJECT NOISE CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | 77.4 | 185 | 400 | 861 |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | 76.8 | 170 | 366 | 788 |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | 62.7 | RW | RW | 45 |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | 68.5 | RW | 94 | 202 |

[1] Source: City of Rancho Mirage General Plan, Chapter 2, Exhibit 1, Land Use Map
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 7-6: EAC 2023 WITH PROJECT NOISE CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | 77.4 | 186 | 401 | 864 |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | 76.8 | 171 | 368 | 793 |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | 64.0 | RW | RW | 55 |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | 68.6 | RW | 95 | 205 |

[1] Source: City of Rancho Mirage General Plan, Chapter 2, Exhibit 1, Land Use Map
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 7-7: HORIZON YEAR 2040 WITHOUT PROJECT NOISE CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | 77.8 | 198 | 426 | 917 |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | 77.2 | 181 | 390 | 840 |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | 63.1 | RW | RW | 48 |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | 68.9 | RW | 100 | 215 |

[1] Source: City of Rancho Mirage General Plan, Chapter 2, Exhibit 1, Land Use Map
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 7-8: HORIZON YEAR 2040 WITH PROJECT NOISE CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | 77.8 | 198 | 427 | 920 |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | 77.2 | 182 | 392 | 845 |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | 64.3 | RW | RW | 58 |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | 69.0 | RW | 101 | 218 |

[1] Source: City of Rancho Mirage General Plan, Chapter 2, Exhibit 1, Land Use Map
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

## 7.2 EXISTING 2019 PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report for informational purposes and to fully analyze all the existing traffic scenarios identified in the *Ritz-Carlton Residences Traffic Impact Analysis* prepared by Urban Crossroads, Inc. However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until future year 2023 plus cumulative conditions. Therefore, no mitigation measures are considered to reduce the Existing Plus Project traffic noise level increases. The EAC 2023 and Horizon Year 2040 traffic noise conditions that include all

cumulative projects are used to determine the significance of the Project off-site traffic noise level increases on the study area roadway segments.

Table 7-1 shows the Existing 2019 without Project conditions CNEL noise levels. The Existing 2019 without Project exterior noise levels are expected to range from 62.0 to 76.9 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing 2019 with Project conditions range from 63.6 to 76.9 dBA CNEL. Table 7-9 shows that the Project off-site traffic noise level increases range from 0.0 to 1.6 dBA CNEL on the study area roadway segments.

## 7.3 EA 2023 PROJECT TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the EA 2023 without Project conditions CNEL noise levels. The EA 2023 without Project exterior noise levels are expected to range from 62.4 to 77.2 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows the EA 2023 with Project conditions range from 63.8 to 77.2 dBA CNEL. Table 7-10 shows that the Project off-site traffic noise level increases range from 0.0 to 1.4 dBA CNEL.

## 7.4 EAC 2023 PROJECT TRAFFIC NOISE LEVEL INCREASES

Table 7-5 presents the EAC 2023 without Project conditions CNEL noise levels. The EAC 2023 without Project exterior noise levels are expected to range from 62.7 to 77.4 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-6 shows the EAC 2023 with Project conditions range from 64.0 to 77.4 dBA CNEL. Table 7-11 shows that the Project off-site traffic noise level increases range from 0.0 to 1.3 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

## 7.5 HORIZON YEAR 2040 PROJECT TRAFFIC NOISE LEVEL INCREASES

Table 7-7 presents the Horizon Year 2040 without Project conditions CNEL noise levels. The Horizon Year 2040 without Project exterior noise levels are expected to range from 63.1 to 77.8 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-8 shows the Horizon Year 2040 with Project conditions range from 64.3 to 77.8 dBA CNEL. Table 7-12 shows that the Project off-site traffic noise level increases range from 0.0 to 1.2 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

**TABLE 7-9: EXISTING 2019 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES**

| ID | Road | Segment | Receiving Land Use[1] | Noise-Sensitive Land Use? | CNEL at Receiving Land Use (dBA)[1] | | | Noise Level Increase Significance Criteria[2] | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | No Project | With Project | Project Increase | Criteria | Exceeded? |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | No | 76.9 | 76.9 | 0.0 | 3.0 | No |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | No | 76.3 | 76.4 | 0.1 | 3.0 | No |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | Yes | 62.0 | 63.6 | 1.6 | 3.0 | No |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | Yes | 68.0 | 68.2 | 0.2 | 1.5 | No |

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an off-site transportation related noise level increase exceeding the significance criteria (Table 4-1)?
"C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 7-10: EA 2023 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES**

| ID | Road | Segment | Receiving Land Use[1] | Noise-Sensitive Land Use? | CNEL at Receiving Land Use (dBA)[1] | | | Noise Level Increase Significance Criteria[2] | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | No Project | With Project | Project Increase | Criteria | Exceeded? |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | No | 77.2 | 77.2 | 0.0 | 3.0 | No |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | No | 76.7 | 76.7 | 0.0 | 3.0 | No |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | Yes | 62.4 | 63.8 | 1.4 | 3.0 | No |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | Yes | 68.4 | 68.5 | 0.1 | 1.5 | No |

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an off-site transportation related noise level increase exceeding the significance criteria (Table 4-1)?
"C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 7-11: EAC 2023 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES**

| ID | Road | Segment | Receiving Land Use[1] | Noise-Sensitive Land Use? | CNEL at Receiving Land Use (dBA)[1] | | | Noise Level Increase Significance Criteria[2] | | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | No Project | With Project | Project Increase | Criteria | Exceeded? | |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | No | 77.4 | 77.4 | 0.0 | 3.0 | No | No |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | No | 76.8 | 76.8 | 0.0 | 3.0 | No | No |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | Yes | 62.7 | 64.0 | 1.3 | 3.0 | No | No |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | Yes | 68.5 | 68.6 | 0.1 | 1.5 | No | No |

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an off-site transportation related noise level increase exceeding the significance criteria (Table 4-1)?
"C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

**TABLE 7-12: HORIZON YEAR 2040 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES**

| ID | Road | Segment | Receiving Land Use[1] | Noise-Sensitive Land Use? | CNEL at Receiving Land Use (dBA)[1] | | | Noise Level Increase Significance Criteria[2] | | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | No Project | With Project | Project Increase | Criteria | Exceeded? | |
| 1 | State Route 111 | n/o Frank Sinatra Dr. | C-G/MR | No | 77.8 | 77.8 | 0.0 | 3.0 | No | No |
| 2 | State Route 111 | s/o Frank Sinatra Dr. | C-G/MR/O | No | 77.2 | 77.2 | 0.0 | 3.0 | No | No |
| 3 | Frank Sinatra Dr. | w/o State Route 111 | R-M/R-L/Rs-H | Yes | 63.1 | 64.3 | 1.2 | 3.0 | No | No |
| 4 | Frank Sinatra Dr. | e/o State Route 111 | C-G/O/MHP | Yes | 68.9 | 69.0 | 0.1 | 1.5 | No | No |

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an off-site transportation related noise level increase exceeding the significance criteria (Table 4-1)?
"C-G" = General Commercial; "MR" = Mountain Reserve Open Space; "O" = Office; "R-M" = Medium Density Residential; "R-L" = Low Density Residential; "Rs-H" = Resort Hotel; "MHP" = Mobile Home Park.

# 8 SENSITIVE RECEIVER LOCATIONS

To assess the potential for long-term short-term construction noise impacts, the following sensitive receiver locations, as shown on Exhibit 8-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Receiver locations are located in outdoor living areas (e.g., backyards) at 10 feet from any existing or proposed barriers or at the building façade, whichever is closer to the Project site, based on FHWA guidance, and consistent with additional guidance provided by Caltrans and the FTA, as previously described in Section 5.2. Sensitive receiver locations in the Project study area include the nearby residential uses, as described below. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

R1: Located approximately 591 feet north of the Project site, R1 represents existing residential homes (1 Santa Rosa Mountain Lane) west of Frank Sinatra Drive. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the Ritz-Carlton Rancho Mirage located northeast of the Project site at roughly 66 feet. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing residential homes (29 Grande View Court) on the south side of Mirada Circle at approximately 21 feet from the Project site.

R4: Location R4 represents the existing residential home located at 30 Grande View Court approximately 33 feet from the Project site boundary.

R5: Location R5 represents the existing residential home located at 31 Mirada Circle approximately 69 feet from the Project site boundary.

R6: Location R6 represents the existing residential home located at 46 Mirada Circle approximately 108 feet from the Project site boundary.

R7: Location R7 represents the existing residential home located 45 Mirada Circle approximately 125 feet from the Project site boundary.

R8: Location R8 represents the existing residential home located at 1 Mirada Circle approximately 160 feet from the Project site boundary.

## EXHIBIT 8-A: RECEIVER LOCATIONS



# 9 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Section 8, resulting from the operation of the proposed Ritz-Carlton Residences Project. Exhibit 9-A identifies the noise source locations used to assess the operational noise levels.

## 9.1 OPERATIONAL NOISE SOURCES

It is expected the on-site Project-related noise sources will include: air conditioning units, pool activity and outdoor courtyard activity. This noise analysis is intended to describe noise level impacts associated with the typical operational activities at the Project site.

## 9.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 9-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the air conditioning units, pool activity and outdoor courtyard activity all operating at the same time. These noise level impacts will likely vary throughout the day.

### 9.2.1 MEASUREMENT PROCEDURES

The reference noise level measurements presented in this section were collected using Larson Davis Lxt Type 1 and Piccolo Type 2 integrating sound level meters and dataloggers. All sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 200, was programmed in "slow" mode to record noise levels in "A" weighted form and was located at approximately five feet above the ground elevation for each measurement. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (17)

## EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS



**TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS**

| Noise Source | Duration (hh:mm:ss) | Ref. Distance (Feet) | Noise Source Height (Feet) | Min./Hour[4] | | | Reference Noise Level (dBA $L_{eq}$) | | Sound Power Level (dBA)[5] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Day | Eve. | Night | @ Ref. Dist. | @ 50 Feet | |
| Air Conditioning Units[1] | 96:00:00 | 5' | 5' | 39 | 39 | 28 | 77.2 | 57.2 | 88.9 |
| Pool Activity[2] | 00:10:00 | 5' | 4' | 60 | 60 | 0 | 68.7 | 48.7 | 80.4 |
| Courtyard Activity[3] | 00:08:00 | 10' | 5' | 60 | 60 | 0 | 73.8 | 59.8 | 91.5 |

[1] As measured by Urban Crossroads, Inc. at the Santee Walmart located at 170 Town Center Parkway.
[2] As measured by Urban Crossroads, Inc. at the Covenant Hill Clubhouse pool in Ladera Ranch.
[3] As measured by Urban Crossroads, Inc. on the Patio at Louie's by the Bay in the City of Newport Beach.
[4] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site. "Day" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.
[5] Sound power level represents the total amount of acoustical energy (noise level) produced by a sound source independent of distance or surroundings. Sound power levels calculated using the CadnaA noise model at the reference distance to the noise source. Numbers may vary due to size differences between point and area noise sources.

### 9.2.2 AIR CONDITIONING UNITS

To assess the impacts created by the roof-top air conditioning units at the Project buildings, reference noise levels measurements were taken over a four-day total duration at the Santee Walmart. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe mechanical roof-top air conditioning units on the roof of an existing Walmart store, with additional roof-top units operating in the background. The reference noise level represents Lennox SCA120 series 10-ton model packaged air conditioning units. At 5 feet from the closest roof-top air conditioning unit, the highest exterior noise level from all four days of the measurement period was measured at 77.2 dBA $L_{eq}$. Using the uniform reference distance of 50 feet, the noise level is 57.2 dBA $L_{eq}$. The operating conditions of the reference noise level measurement reflect peak summer cooling requirements. The air conditioning units were observed to operate 39 minutes during the daytime and evening hours and 28 minutes per hour during the nighttime hours.

### 9.2.3 POOL ACTIVITY

To represent the noise levels associated with pool activities, Urban Crossroads collected a reference noise level measurement at the Covenant Hill Clubhouse Pool in the unincorporated community of Ladera Ranch in the County of Orange. The measured reference noise level at the uniform 50-foot reference distance is 48.7 dBA $L_{eq}$ for pool activity. The pool activity noise levels include kids playing, running, screaming, splashing, playing with a ball, and parents talking. Noise associated with pool activities is expected to occur for the entire hour (60 minutes).

### 9.2.4 COURTYARD ACTIVITY

To describe the outdoor common area courtyards activity areas, a reference noise level measurement was taken at the Louie's by the Bay in Newport Beach. At 50 feet, the reference noise level is 59.8 dBA $L_{eq}$ at a noise source height of 5 feet. The reference noise level measurement includes outdoor eating, drinking, with patrons laughing and talking. Courtyard activities are limited to the daytime and evening hours.

## 9.3 CADNAA NOISE PREDICTION MODEL

To fully describe the exterior operational noise levels from the Project, Urban Crossroads, Inc. developed a noise prediction model using the CadnaA (Computer Aided Noise Abatement) computer program. CadnaA can analyze the noise level of multiple types of noise sources and calculates the noise levels at any location using the spatially accurate Project site plan and includes the effects of topography, buildings, and multiple barriers in its calculations using the latest standards to predict outdoor noise impacts. Appendix 9.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section. Using the spatially accurate Project site plan and flown aerial imagery from Nearmap, a CadnaA noise prediction model of the Project study area was developed. The noise model provides a three-dimensional representation of the Project study area using the following key data inputs:

- Ground absorption;
- Multiple reflections at buildings and barriers;
- Reference noise level sources by type (area, point, etc.) and noise source height;
- Multiple noise receiver locations and heights;
- Topography and earthen berms;
- Barrier and building heights.

Using the ISO 9613 protocol, the CadnaA noise prediction model will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level calculations at each receiver location and the partial noise level contributions by noise source. The reference sound power level (PWL) for the highest noise source expected at the Project site was input into the CadnaA noise prediction model. While sound pressure levels (e.g. $L_{eq}$) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (PWL) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish as a result of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment. The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A default ground attenuation factor of 0.5 was used in the noise analysis to account for mixed ground representing a combination of hard and soft surfaces.

## 9.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Tables 9-2 shows the calculated Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m., evening hours of 7:00 p.m. to 10:00 p.m. and the nighttime hours of 10:00 p.m. to 7:00 a.m. Table 9-2 shows that the Project operational noise levels will range from 26.7 to 47.2 dBA $L_{eq}$.

**TABLE 9-2: PROJECT OPERATIONAL NOISE LEVELS**

| Receiver Location[1] | Project Operational Noise Levels (dBA Leq)[2] | | | Noise Level Standards (dBA Leq)[3] | | | Threshold Exceeded?[4] | | |
|---|---|---|---|---|---|---|---|---|---|
| | Day | Eve. | Night | Day | Eve. | Night | Day | Eve. | Night |
| R1 | 29.6 | 30.3 | 26.7 | 55 | 50 | 45 | No | No | No |
| R2 | 41.9 | 42.9 | 37.3 | 55 | 50 | 45 | No | No | No |
| R3 | 46.8 | 47.2 | 44.6 | 55 | 50 | 45 | No | No | No |
| R4 | 43.7 | 43.7 | 42.2 | 55 | 50 | 45 | No | No | No |
| R5 | 43.5 | 43.6 | 42.0 | 55 | 50 | 45 | No | No | No |
| R6 | 43.1 | 43.5 | 40.8 | 55 | 50 | 45 | No | No | No |
| R7 | 42.3 | 42.3 | 40.7 | 55 | 50 | 45 | No | No | No |
| R8 | 35.3 | 35.4 | 33.7 | 55 | 50 | 45 | No | No | No |

[1] See Exhibit 8-A for the noise source and receiver locations.
[2] Proposed Project operational noise level calculations included in Appendix 9.1.
[3] City of Rancho Mirage exterior noise level standards for residential land use, as shown on Table 3-1.
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Day" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Rancho Mirage exterior noise level standards at nearby noise-sensitive receiver locations. Table 9-2 shows that the operational noise levels associated with Ritz-Carlton Residences Project will satisfy the City of Rancho Mirage 55 dBA $L_{eq}$ daytime, 50 dBA $L_{eq}$ evening and 45 dBA $L_{eq}$ nighttime exterior noise level standards at all nearby receiver locations. Therefore, the operational noise impacts are considered *less than significant* at the nearby noise-sensitive receiver locations.

## 9.5 PROJECT OPERATIONAL NOISE LEVEL CONTRIBUTIONS

To describe the Project operational noise level contributions, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (3) Instead, they must be logarithmically added using the following base equation:

$$SPL_{Total} = 10\log_{10}[10^{SPL1/10} + 10^{SPL2/10} + \ldots 10^{SPLn/10}]$$

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describe the Project noise level contributions to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime, evening and nighttime ambient conditions are presented on Tables 9-3, 9-4 and 9-5, respectively. As indicated on Tables 9-3, 9-4 and 9-5, the Project will generate an unmitigated operational noise level increases ranging from 0.0 to 4.7 dBA $L_{eq}$ at the nearby receiver locations.

Tables 9-3, 9-4 and 9-5 show that the Project operational noise level contributions satisfy the operational noise level increase significance criteria presented in Table 4-1. Therefore, the Project related operational noise level increases at all sensitive receiver locations will be *less than significant.*

**TABLE 9-3: DAYTIME PROJECT OPERATIONAL NOISE LEVEL CONTRIBUTIONS**

| Receiver Location[1] | Total Project Operational Noise Level[2] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria[7] | Increase Criteria Exceeded?[7] |
|---|---|---|---|---|---|---|---|
| R1 | 29.6 | L1 | 49.7 | 49.7 | 0.0 | 5.0 | No |
| R2 | 41.9 | L2 | 53.4 | 53.7 | 0.3 | 5.0 | No |
| R3 | 46.8 | L3 | 50.4 | 52.0 | 1.6 | 5.0 | No |
| R4 | 43.7 | L3 | 50.4 | 51.2 | 0.8 | 5.0 | No |
| R5 | 43.5 | L3 | 50.4 | 51.2 | 0.8 | 5.0 | No |
| R6 | 43.1 | L3 | 50.4 | 51.1 | 0.7 | 5.0 | No |
| R7 | 42.3 | L3 | 50.4 | 51.0 | 0.6 | 5.0 | No |
| R8 | 35.3 | L3 | 50.4 | 50.5 | 0.1 | 5.0 | No |

[1] See Exhibit 8-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

**TABLE 9-4: EVENING OPERATIONAL NOISE LEVEL CONTRIBUTIONS**

| Receiver Location[1] | Total Project Operational Noise Level[2] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria[7] | Increase Criteria Exceeded?[7] |
|---|---|---|---|---|---|---|---|
| R1 | 30.3 | L1 | 46.7 | 46.8 | 0.1 | 5.0 | No |
| R2 | 42.9 | L2 | 48.0 | 49.2 | 1.2 | 5.0 | No |
| R3 | 47.2 | L3 | 46.6 | 49.9 | 3.3 | 5.0 | No |
| R4 | 43.7 | L3 | 46.6 | 48.4 | 1.8 | 5.0 | No |
| R5 | 43.6 | L3 | 46.6 | 48.4 | 1.8 | 5.0 | No |
| R6 | 43.5 | L3 | 46.6 | 48.3 | 1.7 | 5.0 | No |
| R7 | 42.3 | L3 | 46.6 | 48.0 | 1.4 | 5.0 | No |
| R8 | 35.4 | L3 | 46.6 | 46.9 | 0.3 | 5.0 | No |

[1] See Exhibit 8-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed evening ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

**TABLE 9-5: NIGHTTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS**

| Receiver Location[1] | Total Project Operational Noise Level[2] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria[7] | Increase Criteria Exceeded?[7] |
|---|---|---|---|---|---|---|---|
| R1 | 26.7 | L1 | 44.1 | 44.2 | 0.1 | 5.0 | No |
| R2 | 37.3 | L2 | 48.1 | 48.4 | 0.3 | 5.0 | No |
| R3 | 44.6 | L3 | 41.7 | 46.4 | 4.7 | 5.0 | No |
| R4 | 42.2 | L3 | 41.7 | 45.0 | 3.3 | 5.0 | No |
| R5 | 42.0 | L3 | 41.7 | 44.9 | 3.2 | 5.0 | No |
| R6 | 40.8 | L3 | 41.7 | 44.3 | 2.6 | 5.0 | No |
| R7 | 40.7 | L3 | 41.7 | 44.2 | 2.5 | 5.0 | No |
| R8 | 33.7 | L3 | 41.7 | 42.3 | 0.6 | 5.0 | No |

[1] See Exhibit 8-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

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# 10 CONSTRUCTION ANALYSIS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction activity boundaries in relation to the nearby sensitive receiver locations.

## 10.1 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment are expected to occur in the following stages:

- Demolition
- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e. construction equipment). For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver.

## 10.2 CONSTRUCTION REFERENCE NOISE LEVELS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of construction activity area for each stage of construction to the nearest receiver location. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

## EXHIBIT 10-A: CONSTRUCTION NOISE SOURCE LOCATIONS

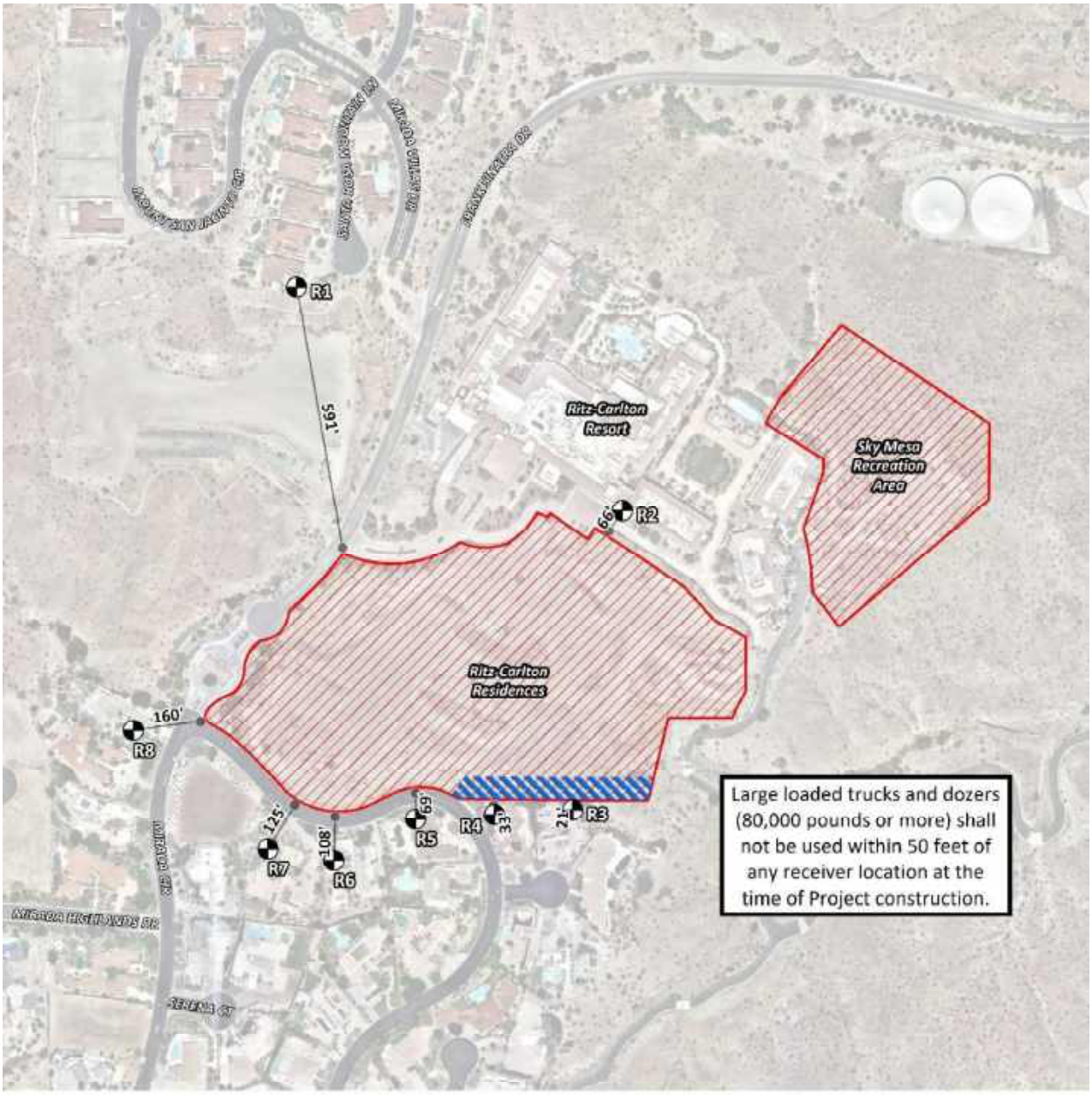

**TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS**

| Construction Stage | Reference Construction Activity[1] | Reference Noise Level @ 50 Feet (dBA $L_{eq}$) | Highest Reference Noise Level (dBA $L_{eq}$) |
|---|---|---|---|
| Demolition | Demolition Activity | 67.9 | 71.9 |
| | Backhoe | 64.2 | |
| | Water Truck Pass-By & Backup Alarm | 71.9 | |
| Site Preparation | Scraper, Water Truck, & Dozer Activity | 75.3 | 75.3 |
| | Backhoe | 64.2 | |
| | Water Truck Pass-By & Backup Alarm | 71.9 | |
| Grading | Rough Grading Activities | 73.5 | 73.5 |
| | Water Truck Pass-By & Backup Alarm | 71.9 | |
| | Construction Vehicle Maintenance Activities | 67.5 | |
| Building Construction | Foundation Trenching | 68.2 | 71.6 |
| | Framing | 62.3 | |
| | Concrete Mixer Backup Alarms & Air Brakes | 71.6 | |
| Paving | Concrete Mixer Truck Movements | 71.2 | 71.2 |
| | Concrete Paver Activities | 65.6 | |
| | Concrete Mixer Pour & Paving Activities | 65.9 | |
| Architectural Coating | Air Compressors | 65.2 | 65.2 |
| | Generator | 64.9 | |
| | Crane | 62.3 | |

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.

## 10.3 CONSTRUCTION NOISE LEVEL COMPLIANCE

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the closest point from the edge of the construction activity areas to each of the nearby receiver locations. As shown on Table 10-2, the unmitigated construction noise levels are expected to range from 42.1 to 70.6 dBA $L_{eq}$ at the nearby receiver locations. Project construction noise levels are considered exempt if activities occur within the hours specified in the City of Rancho Mirage Municipal Code Section 15.04.030 of 7:00 a.m. to 7:00 p.m. on weekdays.

To evaluate whether the Project will generate potentially significant short-term noise levels at nearby receiver locations a construction-related the NIOSH noise level threshold of 85 dBA $L_{eq}$ is used as acceptable thresholds for construction noise at the nearby sensitive receiver locations. The construction noise analysis shows that the noise sensitive residential receiver locations will satisfy the 85 dBA $L_{eq}$ significance threshold during Project construction activities as shown on Table 10-3. Therefore, the noise impacts due to Project construction noise is considered *less than significant* at all noise sensitive receiver locations

**TABLE 10-2: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY**

| Receiver Location[1] | Construction Noise Levels (dBA $L_{eq}$) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Demolition | Site Preparation | Grading | Building Construction | Paving | Architectural Coating | Highest Levels[2] |
| R1 | 48.8 | 52.2 | 50.4 | 48.5 | 48.1 | 42.1 | 52.2 |
| R2 | 66.2 | 69.6 | 67.8 | 65.9 | 65.5 | 59.5 | 69.6 |
| R3 | 66.9 | 70.3 | 68.5 | 66.6 | 66.2 | 60.2 | 70.3 |
| R4 | 67.2 | 70.6 | 68.8 | 66.9 | 66.5 | 60.5 | 70.6 |
| R5 | 66.8 | 70.2 | 68.4 | 66.5 | 66.1 | 60.1 | 70.2 |
| R6 | 61.8 | 65.2 | 63.4 | 61.5 | 61.1 | 55.1 | 65.2 |
| R7 | 63.1 | 66.5 | 64.7 | 62.8 | 62.4 | 56.4 | 66.5 |
| R8 | 52.7 | 56.1 | 54.3 | 52.4 | 52.0 | 46.0 | 56.1 |

[1] Construction noise source and receiver locations are shown on Exhibit 10-A.
[2] Construction noise level calculations based on distance from the construction noise source activity to nearby receiver locations. CadnaA construction noise model inputs are included in Appendix 10.1.

**TABLE 10-3: CONSTRUCTION NOISE LEVEL COMPLIANCE**

| Receiver Location[1] | Construction Noise Levels (dBA $L_{eq}$) | | |
|---|---|---|---|
| | Highest Construction Noise Levels[2] | Threshold[3] | Threshold Exceeded?[4] |
| R1 | 52.2 | 85 | No |
| R2 | 69.6 | 85 | No |
| R3 | 70.3 | 85 | No |
| R4 | 70.6 | 85 | No |
| R5 | 70.2 | 85 | No |
| R6 | 65.2 | 85 | No |
| R7 | 66.5 | 85 | No |
| R8 | 56.1 | 85 | No |

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Highest construction noise level calculations based on distance from the construction noise source activity to nearby receiver locations as shown on Table 10-2.
[3] Construction noise level thresholds as shown on Table 4-1.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

## 10.4 CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site during various stages of construction. Using the vibration source level of construction equipment provided on Table 6-5 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 10-4 presents the expected Project related vibration levels at the nearby receiver locations.

**TABLE 10-4: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS**

| Receiver[1] | Distance to Const. Activity (Feet)[2] | Receiver Vibration Levels (VdB)[3] | | | | | Threshold (VdB)[4] | Threshold Exceeded?[5] |
|---|---|---|---|---|---|---|---|---|
| | | Small Bulldozer | Jack-hammer | Loaded Trucks | Large Bulldozer | Highest Vibration Levels | | |
| R1 | 591' | 16.8 | 37.8 | 44.8 | 45.8 | 45.8 | 80 | No |
| R2 | 66' | 45.4 | 66.4 | 73.4 | 74.4 | 74.4 | 80 | No |
| R3 | 21' | 60.3 | 81.3 | 88.3 | 89.3 | 89.3 | 80 | Yes |
| R4 | 33' | 54.4 | 75.4 | 82.4 | 83.4 | 83.4 | 80 | Yes |
| R5 | 69' | 44.8 | 65.8 | 72.8 | 73.8 | 73.8 | 80 | No |
| R6 | 108' | 38.9 | 59.9 | 66.9 | 67.9 | 67.9 | 80 | No |
| R7 | 125' | 37.0 | 58.0 | 65.0 | 66.0 | 66.0 | 80 | No |
| R8 | 160' | 33.8 | 54.8 | 61.8 | 62.8 | 62.8 | 80 | No |

[1] Receiver locations are shown on Exhibit 10-A.
[2] Distance from receiver locations to the source of the nearest construction activity.
[3] Based on the Vibration Source Levels of Construction Equipment included on Table 6-5.
[4] Does the peak vibration exceed the vibration thresholds?
[5] Does the vibration level exceed the FTA acceptable vibration level?

At distances ranging from 21 to 591 feet from Project construction activity, construction vibration velocity levels are expected to range from 45.8 to 89.3 VdB and will exceed the FTA 80 VdB threshold for human annoyance at receiver locations R3 and R4. The construction vibration analysis shows that the unmitigated Project-related vibration impacts will be *potentially significant* during the construction activities at the Project site and mitigation is required.

Therefore, a 50-foot vibration buffer zone mitigation measure is required restricting the use of large loaded trucks and dozers (greater than 80,000 pounds) within 50-feet of occupied sensitive receiver locations R3 and R4. With the mitigation measures identified in this report, and shown on Exhibit 10-A, the mitigated vibration levels with the 50-foot buffer zone will be reduced to 78.0 VdB and will satisfy the FTA 80 VdB threshold for human annoyance as shown on Table 10-

5. Therefore, impacts with the construction vibration mitigation measure identified in this study will be *less than significant*.

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the Project site perimeter. Moreover, construction at the Project site will be restricted to the daytime hours between 7:00 a.m. and 6:00 p.m. Monday to Saturday consistent with City of Rancho Mirage requirements thereby eliminating potential vibration impacts during the sensitive evening and nighttime hours.

**TABLE 10-5: MITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS**

| Receiver[1] | Distance to Const. Activity (Feet)[2] | Receiver Vibration Levels (VdB)[3] | | | | | Threshold (VdB)[4] | Threshold Exceeded?[5] |
|---|---|---|---|---|---|---|---|---|
| | | Small Bulldozer | Jack-hammer | Loaded Trucks | Large Bulldozer | Highest Vibration Levels | | |
| R3 | 50' | 49.0 | 70.0 | 77.0 | 78.0 | 78.0 | 80 | No |
| R4 | 50' | 49.0 | 70.0 | 77.0 | 78.0 | 78.0 | 80 | No |

[1] Receiver locations are shown on Exhibit 10-A.
[2] Distance from receiver locations to the source of the nearest construction activity.
[3] Based on the Vibration Source Levels of Construction Equipment included on Table 6-5.
[4] Does the peak vibration exceed the vibration thresholds?
[5] Does the vibration level exceed the FTA acceptable vibration level?

# 11 REFERENCES


1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **Urban Crossroads, Inc.** *Ritz-Carlton Residences Traffic Impact Analysis.* January 2020.
3. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
4. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
5. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
6. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
7. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
8. **Occupational Safety and Health Administration.** *Standard 29 CRF, Part 1910.*
9. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* September 2018.
10. **Office of Planning and Research.** *State of California General Plan Guidelines.* 2018.
11. **City of Rancho Mirage.** *Municipal Code, Chapter 8.45 Noise.*
12. —. *Municipal Code, Sections 15.04.030.*
13. **National Institute for Occupational Safety and Health.** *Criteria for Recommended Standard: Occupational Noise Exposure.* June 1998.
14. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
15. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
16. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
17. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
18. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.

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# 12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Ritz-Carlton Residences Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

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## EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

## PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

## PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

## PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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# APPENDIX 3.1:

# CITY OF RANCHO MIRAGE MUNICIPAL CODE

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## Chapter 8.45 NOISE

### 8.45.010 Purpose.

The city has established a quality of life and environment in which peace and quiet is highly valued by its residents, visitors and businesses. The existence of excessive noise within the city is a condition which is detrimental to the health, safety, comfort, welfare and quality of life of the citizenry and shall be regulated in the public interest. This chapter has been created to implement the goals and policies of the noise element of the city's general plan and to prohibit undesirable noises in the community. This chapter shall be referred to and cited as the Rancho Mirage noise ordinance. (Ord. 633 § 1(Exh. A), 1995)

### 8.45.020 Definitions.

Ambient noise level means the all encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

Cumulative period means an additive period of time consisting of individual time segments which may be continuous or interrupted.

Decibel (dBA) means a unit of sound level measured on a sound level meter using the A-weighting network.

Emergency means any occurrence or set of circumstances involving actual or imminent physical danger, crisis, trauma or property damage which demands immediate action.

Noise level means the same as sound level the terms are interchangeable.

Person means any individual, association, partnership, corporation, organization, or public agency, including associated officer(s), employee(s) or department(s).

Sound level means the quantity of decibels measured using the frequency weighting of A of a sound level meter.

Sound level meter means an instrument meeting the American National Standards Institute's standard S1.4-1983 or later revision, for Type 1 or Type 2 specifications; or an instrument and the associated recording and analyzing equipment which will provide equivalent data. (Ord. 633 § 1(Exh. A), 1995)

### 8.45.030 Exterior noise level limits.

No person shall operate or cause to be operated any source of sound or allow the creation of sound or noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level, as measured on any other property, to exceed:

A. The noise level for the applicable zone specified in Table A-1 for a cumulative period of more than thirty minutes in any hour of the applicable time period.

**Table A-1**

| Land Use/Zone | Time of Day | Noise Level (dBA) |
|---|---|---|
| Residential, Low Density (R-E, H-R, R-L-2, R-L-3) | 7:00 a.m. to 6:00 p.m. | 55 |
| | 6:00 p.m. to 10:00 p.m. | 50 |
| | 10:00 p.m. to 7:00 a.m. | 45 |
| Residential, Medium and High Density, Hospital, Open Space (OS, R-M, R-H, MHP) | 7:00 a.m. to 6:00 p.m. | 60 |
| | 6:00 p.m. to 10:00 p.m. | 55 |

| | | |
|---|---|---|
| | 10:00 p.m. to 7:00 a.m. | 50 |
| Commercial Office, Resort Commercial, Mixed Use, Institutional (O, P, Rs-H, M-U) | 7:00 a.m. to 6:00 p.m.<br>6:00 p.m. to 10:00 p.m.<br>10:00 p.m. to 7:00 a.m. | 65<br>60<br>55 |
| Commercial Neighborhood, General Commercial, Commercial Recreation, Light Industrial (C-N, C-G, I-L) | 7:00 a.m. to 6:00 p.m.<br>6:00 p.m. to 10:00 p.m.<br>10:00 p.m. to 7:00 a.m. | 70<br>65<br>60 |

B. For cumulative periods of time less than thirty minutes in an hour, all the noise standards in Table A-1 are increased according to Table B-1.

**Table B-1**

| Duration of Sound | dBA Adjustment |
|---|---|
| 15—30 minutes per hour | + 3 |
| 10—15 minutes per hour | + 5 |
| 5—10 minutes per hour | + 10 |
| 1—5 minutes per hour | + 15 |
| Any period of time less than 1 minute per hour | + 20 |

C. If the measured ambient noise level exceeds the dBA limits in Table A-1, the noise limits and their adjustments for the first three categories in Table B-1 shall be increased in five dBA increments as needed to encompass or reflect said ambient noise level. The maximum noise level under the last two categories in Table B-1 shall be increased, if necessary, only to equal the ambient noise level. (Ord. 1015 § 2, 2011; Ord. 633 § 1(Exh. A), 1995)

## 8.45.040 Noise level measurement.

A. The location selected for measuring exterior noise levels shall be at the point of the property line of the affected property nearest the alleged offending noise source. If possible, the ambient noise shall be measured at the same location along the property line.

B. If the measurement location is on a boundary between two different locations, the noise level limit applicable to the lower noise zone shall apply.

C. Upon receipt of a complaint or a request to investigate, the code compliance officer, equipped with an American National Standards Institute Type 2 or better sound level meter, may investigate the complaint. The investigation shall consist of measurements and the gathering of data to adequately define the noise problem and shall include the following:

1. Type and measurement of noise source;
2. Location of noise source relative to complainant's or affected property;
3. Time period during which noise source is considered to be intrusive;
4. Total duration of noise levels measured;
5. Date(s) and time(s) of noise measurement survey. (Ord. 633 § 1(Exh. A), 1995)

## 8.45.050 Special provisions and exemptions.

The following activities and noise sources shall be exempted from the provisions of this chapter:

A. School bands, school athletic and other activities occurring on a school campus;

B. Outdoor gatherings, dance, shows, entertainment for events authorized through the city's special events process;

C. Activities conducted in public parks and public playgrounds that are dependent upon such facilities for their operation;

D. Any emission of sound for purposes of alerting persons to an emergency or the general emission of sound during performance of emergency work;

E. Construction, alteration, repair, grading or improvement of any building, structure, road or improvement to real property for which a permit has been issued by the city if said construction occurs within the allowable hours set forth in Section 15.04.030(A)(10);

F. The operation of any equipment and machinery at any time within any zone by the city, its employees, or any agent or franchisee of the city in the course of performing maintenance, construction or trash collection. (Ord. 633 § 1(Exh. A), 1995)

## 8.45.060 Additional prohibition.

It is unlawful and a nuisance for any person to keep, maintain or permit upon any lot or parcel of land within the city under his or her control any animal, including any fowl, which by any sound or cry shall habitually disturb the peace and comfort of any person in the reasonable and comfortable enjoyment of life or property. (Ord. 633 § 1(Exh. A), 1995)

## 8.45.065 Landscape maintenance.

A. It is unlawful and a public nuisance for any person to permit or perform for-hire landscape and non- emergency exterior hardscape maintenance activities such as, but not limited to, tree trimming, re-seeding, lawn mowing, leaf blowing, dust and debris clearing and any other landscaping or nonemergency exterior hardscape maintenance activities which utilize any motorized saw, sander, drill, grinder, leaf-blower, lawnmower, hedge trimmer, edger, or any other similar tool or device any time on Saturday and Sunday and between the hours of six p.m. and seven a.m. the next day during weekdays, unless otherwise provided in this section.

B. The regular mowing or grooming of golf courses, grass tennis courts, grass croquet courts, and lawn bowling areas shall be exempt from the restrictions set forth in this section. The allowed work hours for mowing or green preparation for golf courses, grass tennis courts, grass croquet courts, and lawn bowling areas shall be between five thirty a.m. and seven p.m., seven days per week and during all seasons of the year.

C. Nothing set forth in this section shall permit any person from engaging in any activities that exceed the exterior noise level limits set forth in Section 8.45.030 or otherwise constitute a public nuisance as set forth in Section 14.60.325 of the Municipal Code. (Ord. 979, § 1, 2009; Ord. 936, § 3, 2006)

## 8.45.070 Administration.

The noise control program established by this chapter shall be administered by and is the responsibility of the code compliance division as directed by the director of the community development department. (Ord. 633 § 1(Exh. A), 1995)

## 8.45.080 Violations and enforcement procedures.

Violations of this chapter are declared to be a nuisance and subject to the procedures, remedies and penalties set forth in Title 14. (Ord. 916 §4, 2006; Ord. 633 § 1(Exh. A), 1995)

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# APPENDIX 5.1:

# STUDY AREA PHOTOS

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# JN: 12610 Study Area Photos



L1_E
33, 46' 4.790000", 116, 27' 30.260000"



L1_N
33, 46' 4.830000", 116, 27' 27.870000"



L1_S
33, 46' 4.720000", 116, 27' 30.310000"



L1_W
33, 46' 4.790000", 116, 27' 30.260000"




L2_E
33, 45' 59.190000", 116, 27' 19.110000"



L2_N
33, 45' 59.040000", 116, 27' 19.080000"

# JN: 12610 Study Area Photos



L2_S
33, 45' 58.860000", 116, 27' 19.050000"



L2_W
33, 45' 59.790000", 116, 27' 19.160000"



L3_E
33, 45' 58.040000", 116, 27' 30.810000"



L3_N
33, 45' 58.020000", 116, 27' 30.750000"



L3_S
33, 45' 58.020000", 116, 27' 30.720000"



L3_W
33, 45' 58.010000", 116, 27' 30.780000"

# APPENDIX 5.2:

# NOISE LEVEL MEASUREMENT WORKSHEETS

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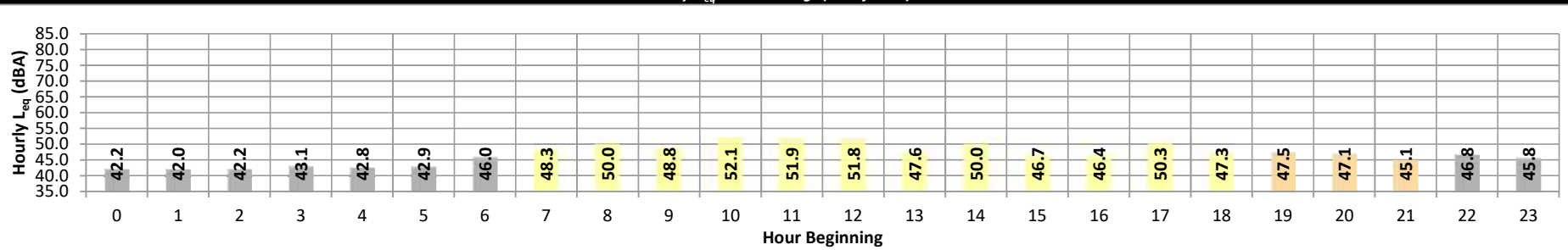
## 24-Hour Noise Level Measurement Summary

*Date:* Thursday, December 5, 2019 *Location:* L1 - Located north of the Project site near the existing Villas of Mirada single-family homes and an open dirt parking lot. *Meter:* Piccolo I *JN:* 12610

*Project:* Ritz-Carlton Residences *Analyst:* P. Mara

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 42.2 | 52.0 | 40.6 | 46.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 | 40.0 | 40.0 | 40.0 | 42.2 | 10.0 | 52.2 |
| | 1 | 42.0 | 46.5 | 40.7 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 41.0 | 41.0 | 40.0 | 42.0 | 10.0 | 52.0 |
| | 2 | 42.2 | 45.1 | 40.7 | 43.0 | 43.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 41.0 | 41.0 | 42.2 | 10.0 | 52.2 |
| | 3 | 43.1 | 54.5 | 40.7 | 49.0 | 44.0 | 43.0 | 43.0 | 43.0 | 43.0 | 41.0 | 41.0 | 40.0 | 43.1 | 10.0 | 53.1 |
| | 4 | 42.8 | 52.3 | 40.7 | 46.0 | 45.0 | 44.0 | 43.0 | 43.0 | 42.0 | 41.0 | 41.0 | 40.0 | 42.8 | 10.0 | 52.8 |
| | 5 | 42.9 | 54.7 | 40.7 | 48.0 | 46.0 | 45.0 | 44.0 | 43.0 | 42.0 | 41.0 | 40.0 | 40.0 | 42.9 | 10.0 | 52.9 |
| | 6 | 46.0 | 62.3 | 42.9 | 52.0 | 49.0 | 48.0 | 47.0 | 45.0 | 45.0 | 43.0 | 43.0 | 43.0 | 46.0 | 10.0 | 56.0 |
| Day | 7 | 48.3 | 62.1 | 43.4 | 56.0 | 54.0 | 51.0 | 50.0 | 48.0 | 47.0 | 45.0 | 44.0 | 44.0 | 48.3 | 0.0 | 48.3 |
| | 8 | 50.0 | 68.2 | 44.0 | 61.0 | 56.0 | 52.0 | 50.0 | 48.0 | 47.0 | 45.0 | 45.0 | 44.0 | 50.0 | 0.0 | 50.0 |
| | 9 | 48.8 | 66.0 | 43.6 | 59.0 | 56.0 | 53.0 | 51.0 | 47.0 | 45.0 | 44.0 | 44.0 | 44.0 | 48.8 | 0.0 | 48.8 |
| | 10 | 52.1 | 71.5 | 42.8 | 65.0 | 62.0 | 56.0 | 54.0 | 47.0 | 45.0 | 43.0 | 43.0 | 43.0 | 52.1 | 0.0 | 52.1 |
| | 11 | 51.9 | 70.7 | 42.8 | 63.0 | 60.0 | 56.0 | 54.0 | 50.0 | 47.0 | 44.0 | 44.0 | 43.0 | 51.9 | 0.0 | 51.9 |
| | 12 | 51.8 | 74.2 | 42.0 | 65.0 | 60.0 | 55.0 | 51.0 | 46.0 | 44.0 | 43.0 | 43.0 | 42.0 | 51.8 | 0.0 | 51.8 |
| | 13 | 47.6 | 67.9 | 42.0 | 58.0 | 55.0 | 51.0 | 48.0 | 46.0 | 44.0 | 43.0 | 43.0 | 42.0 | 47.6 | 0.0 | 47.6 |
| | 14 | 50.0 | 70.0 | 42.5 | 60.0 | 58.0 | 54.0 | 52.0 | 48.0 | 45.0 | 43.0 | 43.0 | 43.0 | 50.0 | 0.0 | 50.0 |
| | 15 | 46.7 | 60.3 | 42.6 | 56.0 | 53.0 | 50.0 | 49.0 | 46.0 | 44.0 | 43.0 | 43.0 | 43.0 | 46.7 | 0.0 | 46.7 |
| | 16 | 46.4 | 62.8 | 42.9 | 56.0 | 54.0 | 50.0 | 48.0 | 45.0 | 44.0 | 43.0 | 43.0 | 43.0 | 46.4 | 0.0 | 46.4 |
| | 17 | 50.3 | 70.3 | 41.9 | 63.0 | 58.0 | 53.0 | 50.0 | 44.0 | 43.0 | 43.0 | 42.0 | 42.0 | 50.3 | 0.0 | 50.3 |
| | 18 | 47.3 | 66.4 | 41.9 | 57.0 | 54.0 | 50.0 | 47.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 | 47.3 | 0.0 | 47.3 |
| Evening | 19 | 47.5 | 67.0 | 41.8 | 59.0 | 54.0 | 49.0 | 46.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 47.5 | 5.0 | 52.5 |
| | 20 | 47.1 | 68.8 | 41.8 | 56.0 | 53.0 | 46.0 | 45.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 47.1 | 5.0 | 52.1 |
| | 21 | 45.1 | 62.9 | 41.8 | 54.0 | 51.0 | 45.0 | 44.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 45.1 | 5.0 | 50.1 |
| Night | 22 | 46.8 | 68.7 | 41.9 | 54.0 | 51.0 | 46.0 | 45.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 46.8 | 10.0 | 56.8 |
| | 23 | 45.8 | 65.8 | 40.7 | 54.0 | 48.0 | 44.0 | 44.0 | 43.0 | 43.0 | 42.0 | 42.0 | 41.0 | 45.8 | 10.0 | 55.8 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 46.4 | 60.3 | 41.9 | 56.0 | 53.0 | 50.0 | 47.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 |
| | Max | 52.1 | 74.2 | 44.0 | 65.0 | 62.0 | 56.0 | 54.0 | 50.0 | 47.0 | 45.0 | 45.0 | 44.0 |
| Energy Average | | 49.7 | Average: | | 59.9 | 56.7 | 52.6 | 50.3 | 46.6 | 44.8 | 43.4 | 43.3 | 42.9 |
| Evening | Min | 45.1 | 62.9 | 41.8 | 54.0 | 51.0 | 45.0 | 44.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 |
| | Max | 47.5 | 68.8 | 41.8 | 59.0 | 54.0 | 49.0 | 46.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 |
| Energy Average | | 46.7 | Average: | | 56.3 | 52.7 | 46.7 | 45.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 |
| Night | Min | 42.0 | 45.1 | 40.6 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 40.0 | 40.0 | 40.0 |
| | Max | 46.8 | 68.7 | 42.9 | 54.0 | 51.0 | 48.0 | 47.0 | 45.0 | 45.0 | 43.0 | 43.0 | 43.0 |
| Energy Average | | 44.1 | Average: | | 48.3 | 45.8 | 44.2 | 43.7 | 42.9 | 42.7 | 41.4 | 41.2 | 40.8 |

| $L_{eq}$ (dBA) | | |
|---|---|---|
| 24-Hour | Daytime | Nighttime |
| 47.9 | 49.2 | 44.1 |

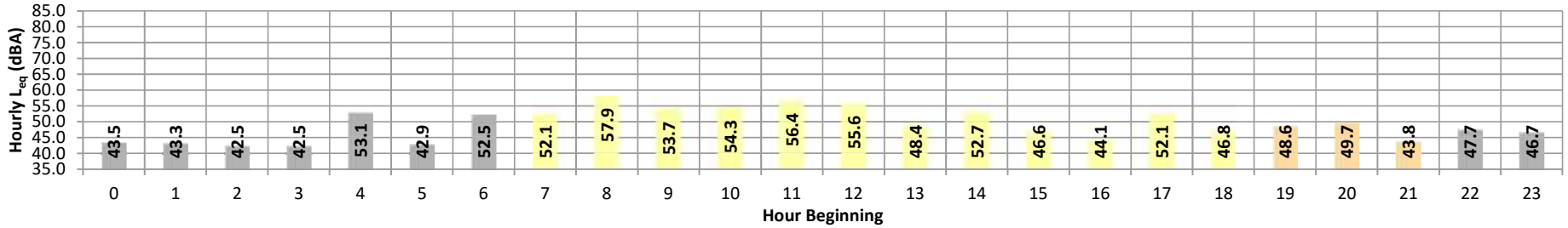
| 24-Hour CNEL (dBA) |
|---|
| 52.1 |

## 24-Hour Noise Level Measurement Summary

*Date:* Thursday, December 5, 2019 *Location:* L2 - Located near the eastern boundary of the Project site near the existing Ritz-Carlton hotel and vacant land. *Meter:* Piccolo I *JN:* 12610

*Project:* Ritz-Carlton Residences *Analyst:* P. Mara

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 43.5 | 49.2 | 42.6 | 46.0 | 44.0 | 43.0 | 43.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 43.5 | 10.0 | 53.5 |
| | 1 | 43.3 | 47.7 | 42.5 | 44.0 | 44.0 | 44.0 | 43.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 43.3 | 10.0 | 53.3 |
| | 2 | 42.5 | 46.1 | 41.4 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 41.0 | 41.0 | 42.5 | 10.0 | 52.5 |
| | 3 | 42.5 | 47.2 | 41.4 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 41.0 | 41.0 | 42.5 | 10.0 | 52.5 |
| | 4 | 53.1 | 82.7 | 41.4 | 50.0 | 46.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 41.0 | 53.1 | 10.0 | 63.1 |
| | 5 | 42.9 | 49.8 | 42.5 | 45.0 | 44.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.9 | 10.0 | 52.9 |
| | 6 | 52.5 | 80.3 | 41.7 | 60.0 | 54.0 | 48.0 | 45.0 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 52.5 | 10.0 | 62.5 |
| Day | 7 | 52.1 | 75.4 | 42.5 | 65.0 | 58.0 | 50.0 | 48.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 | 52.1 | 0.0 | 52.1 |
| | 8 | 57.9 | 77.3 | 42.7 | 70.0 | 67.0 | 63.0 | 62.0 | 51.0 | 47.0 | 43.0 | 43.0 | 42.0 | 57.9 | 0.0 | 57.9 |
| | 9 | 53.7 | 79.0 | 42.6 | 64.0 | 61.0 | 54.0 | 50.0 | 45.0 | 43.0 | 42.0 | 42.0 | 42.0 | 53.7 | 0.0 | 53.7 |
| | 10 | 54.3 | 78.0 | 42.3 | 67.0 | 64.0 | 59.0 | 54.0 | 46.0 | 43.0 | 42.0 | 42.0 | 42.0 | 54.3 | 0.0 | 54.3 |
| | 11 | 56.4 | 81.2 | 42.6 | 66.0 | 64.0 | 61.0 | 60.0 | 52.0 | 46.0 | 43.0 | 42.0 | 42.0 | 56.4 | 0.0 | 56.4 |
| | 12 | 55.6 | 77.9 | 41.4 | 70.0 | 66.0 | 57.0 | 52.0 | 45.0 | 43.0 | 42.0 | 42.0 | 42.0 | 55.6 | 0.0 | 55.6 |
| | 13 | 48.4 | 70.6 | 41.5 | 59.0 | 56.0 | 49.0 | 47.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 | 48.4 | 0.0 | 48.4 |
| | 14 | 52.7 | 73.0 | 41.5 | 66.0 | 61.0 | 55.0 | 51.0 | 44.0 | 42.0 | 42.0 | 42.0 | 42.0 | 52.7 | 0.0 | 52.7 |
| | 15 | 46.6 | 74.1 | 41.4 | 53.0 | 50.0 | 46.0 | 45.0 | 43.0 | 42.0 | 42.0 | 42.0 | 41.0 | 46.6 | 0.0 | 46.6 |
| | 16 | 44.1 | 55.8 | 42.5 | 50.0 | 49.0 | 46.0 | 45.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 | 44.1 | 0.0 | 44.1 |
| | 17 | 52.1 | 73.5 | 42.6 | 66.0 | 54.0 | 47.0 | 45.0 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 52.1 | 0.0 | 52.1 |
| | 18 | 46.8 | 68.1 | 42.5 | 56.0 | 51.0 | 46.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 46.8 | 0.0 | 46.8 |
| Evening | 19 | 48.6 | 69.2 | 42.6 | 62.0 | 53.0 | 46.0 | 44.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 48.6 | 5.0 | 53.6 |
| | 20 | 49.7 | 73.1 | 42.7 | 55.0 | 48.0 | 44.0 | 44.0 | 43.0 | 43.0 | 43.0 | 43.0 | 42.0 | 49.7 | 5.0 | 54.7 |
| | 21 | 43.8 | 55.6 | 42.6 | 50.0 | 46.0 | 44.0 | 43.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 | 43.8 | 5.0 | 48.8 |
| Night | 22 | 47.7 | 70.0 | 42.6 | 57.0 | 51.0 | 44.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 47.7 | 10.0 | 57.7 |
| | 23 | 46.7 | 68.2 | 41.4 | 53.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 41.0 | 41.0 | 46.7 | 10.0 | 56.7 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 44.1 | 55.8 | 41.4 | 50.0 | 49.0 | 46.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 | 41.0 |
| | Max | 57.9 | 81.2 | 42.7 | 70.0 | 67.0 | 63.0 | 62.0 | 52.0 | 47.0 | 43.0 | 43.0 | 42.0 |
| Energy Average | | 53.4 | Average: | | 62.7 | 58.4 | 52.8 | 50.3 | 45.3 | 43.3 | 42.2 | 42.1 | 41.9 |
| Evening | Min | 43.8 | 55.6 | 42.6 | 50.0 | 46.0 | 44.0 | 43.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 |
| | Max | 49.7 | 73.1 | 42.7 | 62.0 | 53.0 | 46.0 | 44.0 | 43.0 | 43.0 | 43.0 | 43.0 | 42.0 |
| Energy Average | | 48.0 | Average: | | 55.7 | 49.0 | 44.7 | 43.7 | 43.0 | 43.0 | 42.3 | 42.3 | 42.0 |
| Night | Min | 42.5 | 46.1 | 41.4 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 41.0 | 41.0 |
| | Max | 53.1 | 82.7 | 42.6 | 60.0 | 54.0 | 48.0 | 45.0 | 43.0 | 43.0 | 42.0 | 42.0 | 42.0 |
| Energy Average | | 48.1 | Average: | | 48.9 | 45.7 | 43.6 | 43.0 | 42.4 | 42.2 | 42.0 | 41.7 | 41.6 |

***$L_{eq}$ (dBA)***

| 24-Hour | Daytime | Nighttime |
|---|---|---|
| 51.5 | 52.7 | 48.1 |

***24-Hour CNEL (dBA)***

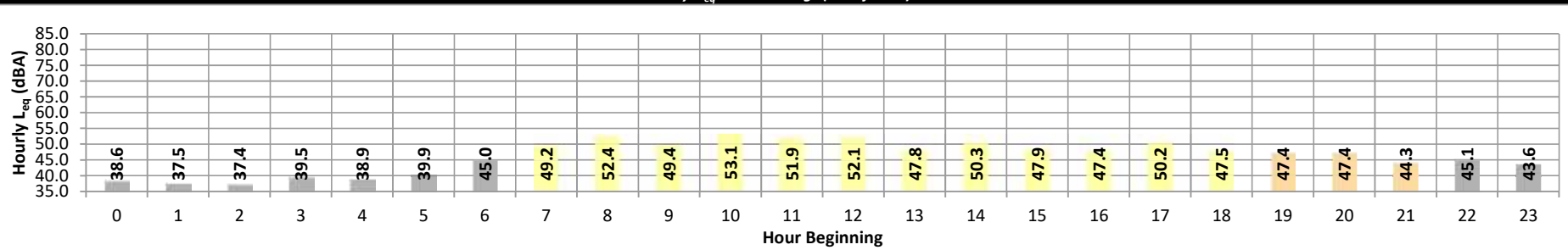
**55.8**

## 24-Hour Noise Level Measurement Summary

*Date:* Thursday, December 5, 2019 *Location:* L3 - Located by the western boundary of the Project site near to the gated entrance of the Mirada Estates. *Meter:* Piccolo I *JN:* 12610

*Project:* Ritz-Carlton Residences *Analyst:* P. Mara

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 38.6 | 56.1 | 35.8 | 44.0 | 42.0 | 40.0 | 39.0 | 38.0 | 37.0 | 37.0 | 36.0 | 36.0 | 38.6 | 10.0 | 48.6 |
| | 1 | 37.5 | 51.3 | 35.2 | 41.0 | 40.0 | 39.0 | 38.0 | 37.0 | 37.0 | 36.0 | 36.0 | 35.0 | 37.5 | 10.0 | 47.5 |
| | 2 | 37.4 | 61.0 | 35.1 | 40.0 | 38.0 | 37.0 | 37.0 | 37.0 | 36.0 | 36.0 | 35.0 | 35.0 | 37.4 | 10.0 | 47.4 |
| | 3 | 39.5 | 58.3 | 35.4 | 48.0 | 45.0 | 40.0 | 39.0 | 39.0 | 38.0 | 36.0 | 36.0 | 36.0 | 39.5 | 10.0 | 49.5 |
| | 4 | 38.9 | 59.9 | 35.5 | 46.0 | 43.0 | 40.0 | 39.0 | 38.0 | 37.0 | 36.0 | 36.0 | 36.0 | 38.9 | 10.0 | 48.9 |
| | 5 | 39.9 | 60.1 | 35.8 | 46.0 | 44.0 | 41.0 | 40.0 | 39.0 | 38.0 | 37.0 | 37.0 | 36.0 | 39.9 | 10.0 | 49.9 |
| | 6 | 45.0 | 60.5 | 38.2 | 54.0 | 51.0 | 48.0 | 47.0 | 45.0 | 43.0 | 40.0 | 39.0 | 39.0 | 45.0 | 10.0 | 55.0 |
| Day | 7 | 49.2 | 71.5 | 41.8 | 58.0 | 55.0 | 53.0 | 51.0 | 48.0 | 46.0 | 43.0 | 43.0 | 42.0 | 49.2 | 0.0 | 49.2 |
| | 8 | 52.4 | 76.3 | 42.1 | 64.0 | 61.0 | 56.0 | 54.0 | 48.0 | 46.0 | 43.0 | 43.0 | 43.0 | 52.4 | 0.0 | 52.4 |
| | 9 | 49.4 | 67.0 | 40.3 | 59.0 | 58.0 | 56.0 | 54.0 | 47.0 | 44.0 | 42.0 | 41.0 | 41.0 | 49.4 | 0.0 | 49.4 |
| | 10 | 53.1 | 76.3 | 40.2 | 65.0 | 62.0 | 58.0 | 56.0 | 47.0 | 44.0 | 41.0 | 41.0 | 41.0 | 53.1 | 0.0 | 53.1 |
| | 11 | 51.9 | 74.7 | 40.4 | 63.0 | 61.0 | 55.0 | 53.0 | 48.0 | 45.0 | 42.0 | 42.0 | 41.0 | 51.9 | 0.0 | 51.9 |
| | 12 | 52.1 | 73.7 | 39.9 | 65.0 | 62.0 | 57.0 | 54.0 | 46.0 | 43.0 | 41.0 | 41.0 | 40.0 | 52.1 | 0.0 | 52.1 |
| | 13 | 47.8 | 65.4 | 40.2 | 59.0 | 57.0 | 53.0 | 51.0 | 45.0 | 43.0 | 41.0 | 41.0 | 41.0 | 47.8 | 0.0 | 47.8 |
| | 14 | 50.3 | 71.5 | 40.3 | 62.0 | 59.0 | 55.0 | 53.0 | 47.0 | 43.0 | 41.0 | 41.0 | 41.0 | 50.3 | 0.0 | 50.3 |
| | 15 | 47.9 | 68.0 | 40.8 | 58.0 | 56.0 | 53.0 | 51.0 | 45.0 | 43.0 | 42.0 | 41.0 | 41.0 | 47.9 | 0.0 | 47.9 |
| | 16 | 47.4 | 66.3 | 41.1 | 57.0 | 56.0 | 53.0 | 50.0 | 45.0 | 43.0 | 42.0 | 42.0 | 41.0 | 47.4 | 0.0 | 47.4 |
| | 17 | 50.2 | 70.0 | 41.1 | 63.0 | 59.0 | 54.0 | 51.0 | 44.0 | 43.0 | 42.0 | 42.0 | 41.0 | 50.2 | 0.0 | 50.2 |
| | 18 | 47.5 | 67.0 | 41.0 | 58.0 | 55.0 | 52.0 | 49.0 | 44.0 | 43.0 | 42.0 | 42.0 | 42.0 | 47.5 | 0.0 | 47.5 |
| Evening | 19 | 47.4 | 67.7 | 41.0 | 60.0 | 56.0 | 50.0 | 47.0 | 43.0 | 42.0 | 42.0 | 41.0 | 41.0 | 47.4 | 5.0 | 52.4 |
| | 20 | 47.4 | 68.5 | 41.3 | 58.0 | 54.0 | 49.0 | 46.0 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 | 47.4 | 5.0 | 52.4 |
| | 21 | 44.3 | 63.1 | 36.7 | 55.0 | 53.0 | 47.0 | 44.0 | 42.0 | 42.0 | 38.0 | 38.0 | 37.0 | 44.3 | 5.0 | 49.3 |
| Night | 22 | 45.1 | 68.1 | 36.2 | 55.0 | 52.0 | 47.0 | 44.0 | 40.0 | 39.0 | 38.0 | 37.0 | 37.0 | 45.1 | 10.0 | 55.1 |
| | 23 | 43.6 | 66.5 | 36.4 | 54.0 | 45.0 | 41.0 | 41.0 | 40.0 | 39.0 | 38.0 | 37.0 | 37.0 | 43.6 | 10.0 | 53.6 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 47.4 | 65.4 | 39.9 | 57.0 | 55.0 | 52.0 | 49.0 | 44.0 | 43.0 | 41.0 | 41.0 | 40.0 |
| | Max | 53.1 | 76.3 | 42.1 | 65.0 | 62.0 | 58.0 | 56.0 | 48.0 | 46.0 | 43.0 | 43.0 | 43.0 |
| Energy Average | | 50.4 | Average: | | 60.9 | 58.4 | 54.6 | 52.3 | 46.2 | 43.8 | 41.8 | 41.7 | 41.3 |
| Evening | Min | 44.3 | 63.1 | 36.7 | 55.0 | 53.0 | 47.0 | 44.0 | 42.0 | 42.0 | 38.0 | 38.0 | 37.0 |
| | Max | 47.4 | 68.5 | 41.3 | 60.0 | 56.0 | 50.0 | 47.0 | 43.0 | 42.0 | 42.0 | 42.0 | 42.0 |
| Energy Average | | 46.6 | Average: | | 57.7 | 54.3 | 48.7 | 45.7 | 42.7 | 42.0 | 40.7 | 40.3 | 40.0 |
| Night | Min | 37.4 | 51.3 | 35.1 | 40.0 | 38.0 | 37.0 | 37.0 | 37.0 | 36.0 | 36.0 | 35.0 | 35.0 |
| | Max | 45.1 | 68.1 | 38.2 | 55.0 | 52.0 | 48.0 | 47.0 | 45.0 | 43.0 | 40.0 | 39.0 | 39.0 |
| Energy Average | | 41.7 | Average: | | 47.6 | 44.4 | 41.4 | 40.4 | 39.2 | 38.2 | 37.1 | 36.6 | 36.3 |

$L_{eq}$ (dBA)

| 24-Hour | Daytime | Nighttime |
|---|---|---|
| 48.2 | 49.8 | 41.7 |

24-Hour CNEL (dBA)

51.1

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# APPENDIX 7.1:

# OFF-SITE TRAFFIC NOISE LEVEL CONTOURS

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: State Route 111
Road Segment: n/o Frank Sinatra Dr.

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 41,685 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 6,695 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 5.85 | 1.01 | -1.20 | *-4.69* | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.39 | 1.04 | -1.20 | *-4.88* | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -15.35 | 1.04 | -1.20 | *-5.34* | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 75.9 | 71.8 | 70.5 | 64.5 | 72.9 | 73.5 |
| Medium Trucks: | 69.5 | 63.5 | 56.0 | 64.7 | 70.9 | 71.0 |
| Heavy Trucks: | 69.9 | 63.8 | 60.4 | 65.0 | 71.2 | 71.3 |
| Vehicle Noise: | 77.6 | 73.0 | 71.0 | 69.5 | 76.5 | 76.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 164 | 353 | 760 | 1,637 |
| CNEL: | 172 | 370 | 798 | 1,719 |

Wednesday, February 5, 2020

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: State Route 111
Road Segment: s/o Frank Sinatra Dr.

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 37,066 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 5,953 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 5.34 | 1.01 | -1.20 | *-4.69* | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.90 | 1.04 | -1.20 | *-4.88* | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -15.86 | 1.04 | -1.20 | *-5.34* | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 75.4 | 71.3 | 70.0 | 64.0 | 72.4 | 73.0 |
| Medium Trucks: | 68.9 | 63.0 | 55.5 | 64.2 | 70.4 | 70.4 |
| Heavy Trucks: | 69.4 | 63.3 | 59.9 | 64.5 | 70.7 | 70.8 |
| Vehicle Noise: | 77.1 | 72.4 | 70.5 | 69.0 | 76.0 | 76.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 151 | 326 | 703 | 1,514 |
| CNEL: | 159 | 342 | 738 | 1,589 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Frank Sinatra Dr.
Road Segment: w/o State Route 111

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 2,553 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 410 vehicles |
| Vehicle Speed: | 30 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 30.0 feet |
| Centerline Dist. to Observer: | 30.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 29.816 |
| Medium Trucks: | 29.518 |
| Heavy Trucks: | 29.547 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 61.75 | -4.06 | 3.26 | -1.20 | *-4.49* | 0.000 | 0.000 |
| Medium Trucks: | 73.48 | -21.30 | 3.33 | -1.20 | *-4.86* | 0.000 | 0.000 |
| Heavy Trucks: | 79.92 | -25.26 | 3.32 | -1.20 | *-5.77* | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 59.8 | 55.7 | 54.4 | 48.4 | 56.8 | 57.4 |
| Medium Trucks: | 54.3 | 48.4 | 40.9 | 49.6 | 55.8 | 55.8 |
| Heavy Trucks: | 56.8 | 50.7 | 47.3 | 51.9 | 58.1 | 58.2 |
| Vehicle Noise: | 62.3 | 57.5 | 55.3 | 55.0 | 61.8 | 62.0 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 8 | 18 | 39 | 85 |
| CNEL: | 9 | 19 | 41 | 88 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Frank Sinatra Dr.
Road Segment: e/o State Route 111

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 14,494 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 2,328 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 58 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 55.0 feet |
| Centerline Dist. to Observer: | 55.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 47.000 |
| Medium Trucks: | 46.811 |
| Heavy Trucks: | 46.830 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | 2.81 | 0.30 | -1.20 | *-4.67* | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -14.43 | 0.33 | -1.20 | *-4.87* | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -18.38 | 0.32 | -1.20 | *-5.38* | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.2 | 62.1 | 60.8 | 54.8 | 63.2 | 63.9 |
| Medium Trucks: | 60.4 | 54.5 | 47.0 | 55.7 | 61.9 | 62.0 |
| Heavy Trucks: | 62.3 | 56.2 | 52.8 | 57.5 | 63.7 | 63.8 |
| Vehicle Noise: | 68.4 | 63.7 | 61.6 | 60.9 | 67.8 | 68.0 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 39 | 84 | 181 | 390 |
| CNEL: | 41 | 88 | 189 | 407 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: State Route 111
Road Segment: n/o Frank Sinatra Dr.
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 41,953 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 6,738 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 5.88 | 1.01 | -1.20 | *-4.69* | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.36 | 1.04 | -1.20 | *-4.88* | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -15.32 | 1.04 | -1.20 | *-5.34* | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 75.9 | 71.8 | 70.5 | 64.5 | 72.9 | 73.5 |
| Medium Trucks: | 69.5 | 63.5 | 56.0 | 64.8 | 70.9 | 71.0 |
| Heavy Trucks: | 69.9 | 63.8 | 60.4 | 65.0 | 71.2 | 71.3 |
| Vehicle Noise: | 77.6 | 73.0 | 71.1 | 69.6 | 76.6 | 76.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 164 | 354 | 763 | 1,644 |
| CNEL: | 173 | 372 | 801 | 1,726 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: State Route 111
Road Segment: s/o Frank Sinatra Dr.
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 37,494 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 6,022 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 5.39 | 1.01 | -1.20 | *-4.69* | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.85 | 1.04 | -1.20 | *-4.88* | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -15.81 | 1.04 | -1.20 | *-5.34* | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 75.4 | 71.3 | 70.0 | 64.0 | 72.4 | 73.1 |
| Medium Trucks: | 69.0 | 63.0 | 55.5 | 64.3 | 70.5 | 70.5 |
| Heavy Trucks: | 69.4 | 63.3 | 59.9 | 64.6 | 70.8 | 70.9 |
| Vehicle Noise: | 77.1 | 72.5 | 70.6 | 69.1 | 76.1 | 76.4 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 153 | 329 | 708 | 1,525 |
| CNEL: | 160 | 345 | 743 | 1,602 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: Frank Sinatra Dr.
Road Segment: w/o State Route 111
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 3,623 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 582 vehicles |
| Vehicle Speed: | 30 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 30.0 feet |
| Centerline Dist. to Observer: | 30.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 29.816 |
| Medium Trucks: | 29.518 |
| Heavy Trucks: | 29.547 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 61.75 | -2.54 | 3.26 | -1.20 | *-4.49* | 0.000 | 0.000 |
| Medium Trucks: | 73.48 | -19.78 | 3.33 | -1.20 | *-4.86* | 0.000 | 0.000 |
| Heavy Trucks: | 79.92 | -23.74 | 3.32 | -1.20 | *-5.77* | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 61.3 | 57.2 | 55.9 | 49.9 | 58.3 | 58.9 |
| Medium Trucks: | 55.8 | 49.9 | 42.4 | 51.1 | 57.3 | 57.3 |
| Heavy Trucks: | 58.3 | 52.2 | 48.8 | 53.5 | 59.7 | 59.8 |
| Vehicle Noise: | 63.8 | 59.0 | 56.8 | 56.5 | 63.3 | 63.6 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 11 | 23 | 50 | 107 |
| CNEL: | 11 | 24 | 52 | 112 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: Frank Sinatra Dr.
Road Segment: e/o State Route 111
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 14,868 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 2,388 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 58 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 55.0 feet |
| Centerline Dist. to Observer: | 55.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 47.000 |
| Medium Trucks: | 46.811 |
| Heavy Trucks: | 46.830 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | 2.92 | 0.30 | -1.20 | *-4.67* | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -14.32 | 0.33 | -1.20 | *-4.87* | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -18.27 | 0.32 | -1.20 | *-5.38* | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.3 | 62.3 | 60.9 | 54.9 | 63.3 | 64.0 |
| Medium Trucks: | 60.6 | 54.6 | 47.1 | 55.9 | 62.0 | 62.1 |
| Heavy Trucks: | 62.4 | 56.3 | 52.9 | 57.6 | 63.8 | 63.9 |
| Vehicle Noise: | 68.6 | 63.8 | 61.7 | 61.0 | 67.9 | 68.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 40 | 86 | 184 | 397 |
| CNEL: | 41 | 89 | 192 | 414 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: State Route 111
Road Segment: n/o Frank Sinatra Dr.

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 45,122 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 7,247 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 6.19 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.05 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -15.00 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 76.2 | 72.1 | 70.8 | 64.8 | 73.2 | 73.9 |
| Medium Trucks: | 69.8 | 63.8 | 56.3 | 65.1 | 71.3 | 71.3 |
| Heavy Trucks: | 70.2 | 64.1 | 60.7 | 65.4 | 71.6 | 71.7 |
| Vehicle Noise: | 77.9 | 73.3 | 71.4 | 69.9 | 76.9 | 77.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 173 | 372 | 801 | 1,726 |
| CNEL: | 181 | 390 | 841 | 1,812 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: State Route 111
Road Segment: s/o Frank Sinatra Dr.

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 40,121 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 6,443 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 5.68 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.56 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -15.51 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 75.7 | 71.6 | 70.3 | 64.3 | 72.7 | 73.4 |
| Medium Trucks: | 69.3 | 63.3 | 55.8 | 64.6 | 70.8 | 70.8 |
| Heavy Trucks: | 69.7 | 63.6 | 60.2 | 64.9 | 71.1 | 71.1 |
| Vehicle Noise: | 77.4 | 72.8 | 70.9 | 69.4 | 76.4 | 76.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 160 | 344 | 741 | 1,596 |
| CNEL: | 168 | 361 | 778 | 1,675 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Frank Sinatra Dr.
Road Segment: w/o State Route 111

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 2,763 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 444 vehicles |
| Vehicle Speed: | 30 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 30.0 feet |
| Centerline Dist. to Observer: | 30.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 29.816 |
| Medium Trucks: | 29.518 |
| Heavy Trucks: | 29.547 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 61.75 | -3.72 | 3.26 | -1.20 | -4.49 | 0.000 | 0.000 |
| Medium Trucks: | 73.48 | -20.96 | 3.33 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 79.92 | -24.91 | 3.32 | -1.20 | -5.77 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 60.1 | 56.0 | 54.7 | 48.7 | 57.1 | 57.8 |
| Medium Trucks: | 54.7 | 48.7 | 41.2 | 49.9 | 56.1 | 56.2 |
| Heavy Trucks: | 57.1 | 51.0 | 47.6 | 52.3 | 58.5 | 58.6 |
| Vehicle Noise: | 62.6 | 57.8 | 55.7 | 55.3 | 62.1 | 62.4 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 9 | 19 | 42 | 90 |
| CNEL: | 9 | 20 | 43 | 93 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Frank Sinatra Dr.
Road Segment: e/o State Route 111

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 15,689 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 2,520 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 58 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 55.0 feet |
| Centerline Dist. to Observer: | 55.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 47.000 |
| Medium Trucks: | 46.811 |
| Heavy Trucks: | 46.830 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | 3.15 | 0.30 | -1.20 | -4.67 | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -14.08 | 0.33 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -18.04 | 0.32 | -1.20 | -5.38 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.6 | 62.5 | 61.2 | 55.2 | 63.6 | 64.2 |
| Medium Trucks: | 60.8 | 54.8 | 47.3 | 56.1 | 62.3 | 62.3 |
| Heavy Trucks: | 62.7 | 56.5 | 53.2 | 57.8 | 64.0 | 64.1 |
| Vehicle Noise: | 68.8 | 64.0 | 62.0 | 61.3 | 68.1 | 68.4 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 41 | 89 | 191 | 412 |
| CNEL: | 43 | 93 | 199 | 429 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA+P
Road Name: State Route 111
Road Segment: n/o Frank Sinatra Dr.

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 45,390 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 7,290 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 6.22 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.02 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -14.98 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 76.2 | 72.2 | 70.9 | 64.8 | 73.3 | 73.9 |
| Medium Trucks: | 69.8 | 63.9 | 56.4 | 65.1 | 71.3 | 71.3 |
| Heavy Trucks: | 70.2 | 64.1 | 60.7 | 65.4 | 71.6 | 71.7 |
| Vehicle Noise: | 77.9 | 73.3 | 71.4 | 69.9 | 76.9 | 77.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 173 | 373 | 804 | 1,732 |
| CNEL: | 182 | 392 | 844 | 1,819 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA+P
Road Name: State Route 111
Road Segment: s/o Frank Sinatra Dr.

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 40,549 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 6,512 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 5.73 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.51 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -15.47 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 75.7 | 71.7 | 70.4 | 64.4 | 72.8 | 73.4 |
| Medium Trucks: | 69.3 | 63.4 | 55.9 | 64.6 | 70.8 | 70.8 |
| Heavy Trucks: | 69.8 | 63.7 | 60.3 | 64.9 | 71.1 | 71.2 |
| Vehicle Noise: | 77.4 | 72.8 | 70.9 | 69.4 | 76.4 | 76.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 161 | 346 | 746 | 1,607 |
| CNEL: | 169 | 364 | 783 | 1,687 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA+P
Road Name: Frank Sinatra Dr.
Road Segment: w/o State Route 111

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 3,833 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 616 vehicles |
| Vehicle Speed: | 30 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 30.0 feet |
| Centerline Dist. to Observer: | 30.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 29.816 |
| Medium Trucks: | 29.518 |
| Heavy Trucks: | 29.547 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 61.75 | -2.30 | 3.26 | -1.20 | -4.49 | 0.000 | 0.000 |
| Medium Trucks: | 73.48 | -19.54 | 3.33 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 79.92 | -23.49 | 3.32 | -1.20 | -5.77 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 61.5 | 57.5 | 56.1 | 50.1 | 58.5 | 59.2 |
| Medium Trucks: | 56.1 | 50.1 | 42.6 | 51.4 | 57.5 | 57.6 |
| Heavy Trucks: | 58.6 | 52.5 | 49.1 | 53.7 | 59.9 | 60.0 |
| Vehicle Noise: | 64.0 | 59.2 | 57.1 | 56.8 | 63.5 | 63.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 11 | 24 | 52 | 111 |
| CNEL: | 12 | 25 | 54 | 116 |

Wednesday, February 5, 2020

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA+P
Road Name: Frank Sinatra Dr.
Road Segment: e/o State Route 111

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 16,063 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 2,580 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 58 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 55.0 feet |
| Centerline Dist. to Observer: | 55.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 47.000 |
| Medium Trucks: | 46.811 |
| Heavy Trucks: | 46.830 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | 3.26 | 0.30 | -1.20 | -4.67 | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -13.98 | 0.33 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -17.94 | 0.32 | -1.20 | -5.38 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.7 | 62.6 | 61.3 | 55.3 | 63.7 | 64.3 |
| Medium Trucks: | 60.9 | 54.9 | 47.4 | 56.2 | 62.4 | 62.4 |
| Heavy Trucks: | 62.8 | 56.7 | 53.3 | 57.9 | 64.1 | 64.2 |
| Vehicle Noise: | 68.9 | 64.1 | 62.1 | 61.4 | 68.2 | 68.5 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 90 | 194 | 418 |
| CNEL: | 44 | 94 | 202 | 436 |

Wednesday, February 5, 2020

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC
Road Name: State Route 111
Road Segment: n/o Frank Sinatra Dr.

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 46,714 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 7,502 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 6.34 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -10.89 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -14.85 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 76.4 | 72.3 | 71.0 | 65.0 | 73.4 | 74.0 |
| Medium Trucks: | 69.9 | 64.0 | 56.5 | 65.2 | 71.4 | 71.5 |
| Heavy Trucks: | 70.4 | 64.3 | 60.9 | 65.5 | 71.7 | 71.8 |
| Vehicle Noise: | 78.1 | 73.4 | 71.5 | 70.0 | 77.0 | 77.4 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 177 | 380 | 820 | 1,766 |
| CNEL: | 185 | 400 | 861 | 1,854 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC
Road Name: State Route 111
Road Segment: s/o Frank Sinatra Dr.

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 40,917 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 6,571 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 5.77 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.47 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -15.43 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 75.8 | 71.7 | 70.4 | 64.4 | 72.8 | 73.4 |
| Medium Trucks: | 69.4 | 63.4 | 55.9 | 64.7 | 70.8 | 70.9 |
| Heavy Trucks: | 69.8 | 63.7 | 60.3 | 64.9 | 71.1 | 71.2 |
| Vehicle Noise: | 77.5 | 72.9 | 70.9 | 69.4 | 76.5 | 76.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 162 | 348 | 750 | 1,617 |
| CNEL: | 170 | 366 | 788 | 1,698 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC
Road Name: Frank Sinatra Dr.
Road Segment: w/o State Route 111

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 2,945 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 473 vehicles |
| Vehicle Speed: | 30 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 30.0 feet |
| Centerline Dist. to Observer: | 30.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 29.816 |
| Medium Trucks: | 29.518 |
| Heavy Trucks: | 29.547 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 61.75 | -3.44 | 3.26 | -1.20 | -4.49 | 0.000 | 0.000 |
| Medium Trucks: | 73.48 | -20.68 | 3.33 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 79.92 | -24.64 | 3.32 | -1.20 | -5.77 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 60.4 | 56.3 | 55.0 | 49.0 | 57.4 | 58.0 |
| Medium Trucks: | 54.9 | 49.0 | 41.5 | 50.2 | 56.4 | 56.4 |
| Heavy Trucks: | 57.4 | 51.3 | 47.9 | 52.6 | 58.8 | 58.9 |
| Vehicle Noise: | 62.9 | 58.1 | 55.9 | 55.6 | 62.4 | 62.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 9 | 20 | 43 | 93 |
| CNEL: | 10 | 21 | 45 | 97 |

Wednesday, February 5, 2020

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC
Road Name: Frank Sinatra Dr.
Road Segment: e/o State Route 111

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 16,025 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 2,574 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 58 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 55.0 feet |
| Centerline Dist. to Observer: | 55.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 47.000 |
| Medium Trucks: | 46.811 |
| Heavy Trucks: | 46.830 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | 3.25 | 0.30 | -1.20 | -4.67 | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -13.99 | 0.33 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -17.95 | 0.32 | -1.20 | -5.38 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.6 | 62.6 | 61.3 | 55.3 | 63.7 | 64.3 |
| Medium Trucks: | 60.9 | 54.9 | 47.4 | 56.2 | 62.3 | 62.4 |
| Heavy Trucks: | 62.7 | 56.6 | 53.2 | 57.9 | 64.1 | 64.2 |
| Vehicle Noise: | 68.9 | 64.1 | 62.1 | 61.4 | 68.2 | 68.5 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 90 | 194 | 417 |
| CNEL: | 44 | 94 | 202 | 436 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC+P
Road Name: State Route 111
Road Segment: n/o Frank Sinatra Dr.
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 46,982 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 7,545 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 6.37 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -10.87 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -14.83 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 76.4 | 72.3 | 71.0 | 65.0 | 73.4 | 74.0 |
| Medium Trucks: | 70.0 | 64.0 | 56.5 | 65.3 | 71.4 | 71.5 |
| Heavy Trucks: | 70.4 | 64.3 | 60.9 | 65.5 | 71.7 | 71.8 |
| Vehicle Noise: | 78.1 | 73.5 | 71.5 | 70.0 | 77.1 | 77.4 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 177 | 382 | 823 | 1,773 |
| CNEL: | 186 | 401 | 864 | 1,861 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC+P
Road Name: State Route 111
Road Segment: s/o Frank Sinatra Dr.
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 41,345 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 6,640 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 5.81 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.43 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -15.38 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 75.8 | 71.8 | 70.4 | 64.4 | 72.9 | 73.5 |
| Medium Trucks: | 69.4 | 63.5 | 56.0 | 64.7 | 70.9 | 70.9 |
| Heavy Trucks: | 69.8 | 63.7 | 60.3 | 65.0 | 71.2 | 71.3 |
| Vehicle Noise: | 77.5 | 72.9 | 71.0 | 69.5 | 76.5 | 76.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 163 | 351 | 756 | 1,628 |
| CNEL: | 171 | 368 | 793 | 1,709 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC+P
Road Name: Frank Sinatra Dr.
Road Segment: w/o State Route 111
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 4,015 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 645 vehicles |
| Vehicle Speed: | 30 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 30.0 feet |
| Centerline Dist. to Observer: | 30.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 29.816 |
| Medium Trucks: | 29.518 |
| Heavy Trucks: | 29.547 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 61.75 | -2.10 | 3.26 | -1.20 | -4.49 | 0.000 | 0.000 |
| Medium Trucks: | 73.48 | -19.33 | 3.33 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 79.92 | -23.29 | 3.32 | -1.20 | -5.77 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 61.7 | 57.7 | 56.3 | 50.3 | 58.7 | 59.4 |
| Medium Trucks: | 56.3 | 50.3 | 42.8 | 51.6 | 57.7 | 57.8 |
| Heavy Trucks: | 58.8 | 52.7 | 49.3 | 53.9 | 60.1 | 60.2 |
| Vehicle Noise: | 64.3 | 59.4 | 57.3 | 57.0 | 63.7 | 64.0 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 11 | 25 | 53 | 115 |
| CNEL: | 12 | 26 | 55 | 119 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC+P
Road Name: Frank Sinatra Dr.
Road Segment: e/o State Route 111
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 16,399 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 2,634 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 58 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 55.0 feet |
| Centerline Dist. to Observer: | 55.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 47.000 |
| Medium Trucks: | 46.811 |
| Heavy Trucks: | 46.830 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | 3.35 | 0.30 | -1.20 | -4.67 | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -13.89 | 0.33 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -17.85 | 0.32 | -1.20 | -5.38 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.7 | 62.7 | 61.4 | 55.4 | 63.8 | 64.4 |
| Medium Trucks: | 61.0 | 55.0 | 47.5 | 56.3 | 62.4 | 62.5 |
| Heavy Trucks: | 62.8 | 56.7 | 53.3 | 58.0 | 64.2 | 64.3 |
| Vehicle Noise: | 69.0 | 64.2 | 62.2 | 61.5 | 68.3 | 68.6 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 91 | 197 | 424 |
| CNEL: | 44 | 95 | 205 | 442 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY
Road Name: State Route 111
Road Segment: n/o Frank Sinatra Dr.

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 51,385 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 8,252 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 6.76 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -10.48 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -14.44 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 76.8 | 72.7 | 71.4 | 65.4 | 73.8 | 74.4 |
| Medium Trucks: | 70.4 | 64.4 | 56.9 | 65.7 | 71.8 | 71.9 |
| Heavy Trucks: | 70.8 | 64.7 | 61.3 | 65.9 | 72.1 | 72.2 |
| Vehicle Noise: | 78.5 | 73.9 | 71.9 | 70.4 | 77.4 | 77.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 188 | 405 | 873 | 1,882 |
| CNEL: | 198 | 426 | 917 | 1,976 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY
Road Name: State Route 111
Road Segment: s/o Frank Sinatra Dr.

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 45,009 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 7,228 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 6.18 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.06 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -15.01 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 76.2 | 72.1 | 70.8 | 64.8 | 73.2 | 73.9 |
| Medium Trucks: | 69.8 | 63.8 | 56.3 | 65.1 | 71.3 | 71.3 |
| Heavy Trucks: | 70.2 | 64.1 | 60.7 | 65.4 | 71.6 | 71.6 |
| Vehicle Noise: | 77.9 | 73.3 | 71.4 | 69.9 | 76.9 | 77.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 172 | 371 | 800 | 1,723 |
| CNEL: | 181 | 390 | 840 | 1,809 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY
Road Name: Frank Sinatra Dr.
Road Segment: w/o State Route 111

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 3,240 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 520 vehicles |
| Vehicle Speed: | 30 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 30.0 feet |
| Centerline Dist. to Observer: | 30.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 29.816 |
| Medium Trucks: | 29.518 |
| Heavy Trucks: | 29.547 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 61.75 | -3.03 | 3.26 | -1.20 | -4.49 | 0.000 | 0.000 |
| Medium Trucks: | 73.48 | -20.27 | 3.33 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 79.92 | -24.22 | 3.32 | -1.20 | -5.77 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 60.8 | 56.7 | 55.4 | 49.4 | 57.8 | 58.4 |
| Medium Trucks: | 55.3 | 49.4 | 41.9 | 50.6 | 56.8 | 56.8 |
| Heavy Trucks: | 57.8 | 51.7 | 48.3 | 53.0 | 59.2 | 59.3 |
| Vehicle Noise: | 63.3 | 58.5 | 56.3 | 56.0 | 62.8 | 63.1 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 10 | 21 | 46 | 100 |
| CNEL: | 10 | 22 | 48 | 104 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY
Road Name: Frank Sinatra Dr.
Road Segment: e/o State Route 111

Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 17,627 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 2,831 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 58 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 55.0 feet |
| Centerline Dist. to Observer: | 55.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 47.000 |
| Medium Trucks: | 46.811 |
| Heavy Trucks: | 46.830 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | 3.66 | 0.30 | -1.20 | -4.67 | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -13.58 | 0.33 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -17.53 | 0.32 | -1.20 | -5.38 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.1 | 63.0 | 61.7 | 55.7 | 64.1 | 64.7 |
| Medium Trucks: | 61.3 | 55.3 | 47.8 | 56.6 | 62.8 | 62.8 |
| Heavy Trucks: | 63.2 | 57.1 | 53.7 | 58.3 | 64.5 | 64.6 |
| Vehicle Noise: | 69.3 | 64.5 | 62.5 | 61.8 | 68.6 | 68.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 44 | 96 | 206 | 445 |
| CNEL: | 46 | 100 | 215 | 464 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY+P
Road Name: State Route 111
Road Segment: n/o Frank Sinatra Dr.
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 51,653 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 8,295 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 6.78 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -10.46 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -14.41 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 76.8 | 72.7 | 71.4 | 65.4 | 73.8 | 74.4 |
| Medium Trucks: | 70.4 | 64.4 | 56.9 | 65.7 | 71.9 | 71.9 |
| Heavy Trucks: | 70.8 | 64.7 | 61.3 | 66.0 | 72.2 | 72.2 |
| Vehicle Noise: | 78.5 | 73.9 | 72.0 | 70.5 | 77.5 | 77.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 189 | 407 | 876 | 1,888 |
| CNEL: | 198 | 427 | 920 | 1,983 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY+P
Road Name: State Route 111
Road Segment: s/o Frank Sinatra Dr.
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 45,437 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 7,297 vehicles |
| Vehicle Speed: | 50 mph |
| Near/Far Lane Distance: | 86 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 60.0 feet |
| Centerline Dist. to Observer: | 60.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 42.143 |
| Medium Trucks: | 41.932 |
| Heavy Trucks: | 41.953 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 70.20 | 6.22 | 1.01 | -1.20 | -4.69 | 0.000 | 0.000 |
| Medium Trucks: | 81.00 | -11.02 | 1.04 | -1.20 | -4.88 | 0.000 | 0.000 |
| Heavy Trucks: | 85.38 | -14.97 | 1.04 | -1.20 | -5.34 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 76.2 | 72.2 | 70.9 | 64.8 | 73.3 | 73.9 |
| Medium Trucks: | 69.8 | 63.9 | 56.4 | 65.1 | 71.3 | 71.3 |
| Heavy Trucks: | 70.2 | 64.1 | 60.8 | 65.4 | 71.6 | 71.7 |
| Vehicle Noise: | 77.9 | 73.3 | 71.4 | 69.9 | 76.9 | 77.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 173 | 374 | 805 | 1,734 |
| CNEL: | 182 | 392 | 845 | 1,820 |

Wednesday, February 5, 2020

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY+P
Road Name: Frank Sinatra Dr.
Road Segment: w/o State Route 111
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 4,310 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 692 vehicles |
| Vehicle Speed: | 30 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 30.0 feet |
| Centerline Dist. to Observer: | 30.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 29.816 |
| Medium Trucks: | 29.518 |
| Heavy Trucks: | 29.547 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 61.75 | -1.79 | 3.26 | -1.20 | -4.49 | 0.000 | 0.000 |
| Medium Trucks: | 73.48 | -19.03 | 3.33 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 79.92 | -22.98 | 3.32 | -1.20 | -5.77 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 62.0 | 58.0 | 56.6 | 50.6 | 59.1 | 59.7 |
| Medium Trucks: | 56.6 | 50.6 | 43.1 | 51.9 | 58.0 | 58.1 |
| Heavy Trucks: | 59.1 | 53.0 | 49.6 | 54.2 | 60.4 | 60.5 |
| Vehicle Noise: | 64.6 | 59.7 | 57.6 | 57.3 | 64.1 | 64.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 12 | 26 | 56 | 120 |
| CNEL: | 13 | 27 | 58 | 125 |

Wednesday, February 5, 2020

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY+P
Road Name: Frank Sinatra Dr.
Road Segment: e/o State Route 111
Project Name: Ritz-Carlton Residences
Job Number: 12610

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 18,001 vehicles |
| Peak Hour Percentage: | 16.06% |
| Peak Hour Volume: | 2,891 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 58 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 55.0 feet |
| Centerline Dist. to Observer: | 55.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 75.5% | 14.0% | 10.5% | 97.42% |
| Medium Trucks: | 48.9% | 2.2% | 48.9% | 1.84% |
| Heavy Trucks: | 47.3% | 5.4% | 47.3% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 47.000 |
| Medium Trucks: | 46.811 |
| Heavy Trucks: | 46.830 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | 3.75 | 0.30 | -1.20 | -4.67 | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -13.49 | 0.33 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -17.44 | 0.32 | -1.20 | -5.38 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.2 | 63.1 | 61.8 | 55.8 | 64.2 | 64.8 |
| Medium Trucks: | 61.4 | 55.4 | 47.9 | 56.7 | 62.9 | 62.9 |
| Heavy Trucks: | 63.2 | 57.1 | 53.8 | 58.4 | 64.6 | 64.7 |
| Vehicle Noise: | 69.4 | 64.6 | 62.6 | 61.9 | 68.7 | 69.0 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 45 | 97 | 209 | 451 |
| CNEL: | 47 | 101 | 218 | 471 |

Wednesday, February 5, 2020

# APPENDIX 9.1:

# CADNAA OPERATIONAL NOISE LEVEL CALCULATIONS

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# 12610

**CadnaA Noise Prediction Model**

12610_03.cna

**Date:**

18.02.20

**Analyst:**

B. Lawson

## Receiver Noise Levels

| Name | M. | ID | Level Lr | | | Limit. Value | | | Land Use | | | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Eve | Night | Day | Eve | Night | Type | Auto | Noise Type | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | | (ft) | | (ft) | (ft) | (ft) |
| R1 | | R1 | 29.6 | 30.2 | 26.7 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498278.71 | 2223255.93 | 612.92 |
| R2 | | R2 | 41.8 | 42.9 | 37.3 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498990.95 | 2222767.65 | 647.26 |
| R3 | | R3 | 46.8 | 47.2 | 44.6 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498881.84 | 2222114.07 | 677.54 |
| R4 | | R4 | 43.7 | 43.7 | 42.1 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498710.78 | 2222103.28 | 685.09 |
| R5 | | R5 | 43.5 | 43.5 | 42.0 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498539.14 | 2222093.84 | 677.54 |
| R6 | | R6 | 43.0 | 43.5 | 40.7 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498360.19 | 2222003.12 | 674.50 |
| R7 | | R7 | 42.2 | 42.3 | 40.7 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498216.10 | 2222028.54 | 671.45 |
| R8 | | R8 | 35.2 | 35.3 | 33.6 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6497921.76 | 2222287.44 | 640.91 |

## Point Source(s)

| Name | M. | ID | Result. PWL | | | Lw / Li | | | Correction | | | Sound Reduction | | Attenuation | Operating Time | | | K0 | Freq. | Direct. | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Type | Value | norm. | Day | Evening | Night | R | Area | | Day | Special | Night | | | | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | | | dB(A) | dB(A) | dB(A) | dB(A) | | ($ft^2$) | | (min) | (min) | (min) | (dB) | (Hz) | | (ft) | | (ft) | (ft) | (ft) |
| POINTSOURCE | | AC01 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498231.12 | 2222368.84 | 680.50 |
| POINTSOURCE | | AC02 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498321.58 | 2222218.93 | 681.50 |
| POINTSOURCE | | AC03 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498330.63 | 2222338.68 | 680.00 |
| POINTSOURCE | | AC04 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498518.87 | 2222243.92 | 693.00 |
| POINTSOURCE | | AC05 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498677.82 | 2222259.86 | 695.00 |
| POINTSOURCE | | AC06 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498776.46 | 2222259.42 | 681.70 |
| POINTSOURCE | | AC07 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498863.38 | 2222268.39 | 680.04 |
| POINTSOURCE | | AC08 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498988.39 | 2222355.48 | 665.50 |
| POINTSOURCE | | AC09 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498589.08 | 2222389.51 | 694.50 |
| POINTSOURCE | | AC10 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498466.31 | 2222381.33 | 687.00 |
| POINTSOURCE | | AC11 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6499080.14 | 2222441.63 | 666.50 |
| POINTSOURCE | | AC12 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6499193.86 | 2222389.94 | 663.50 |
| POINTSOURCE | | AC13 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498439.99 | 2222485.60 | 682.00 |
| POINTSOURCE | | AC14 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498456.97 | 2222579.92 | 681.50 |
| POINTSOURCE | | AC15 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498683.34 | 2222513.90 | 675.00 |
| POINTSOURCE | | AC16 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6498934.23 | 2222515.78 | 675.00 |
| POINTSOURCE | | AC17 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 117.00 | 252.00 | 0.0 | 500 | (none) | 5.00 | g | 6499564.30 | 2222674.24 | 635.39 |
| POINTSOURCE | | COURT01 | 91.5 | 91.5 | 91.5 | Lw | 91.5 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 659.00 | a | 6498470.67 | 2222309.28 | 659.00 |
| POINTSOURCE | | COURT02 | 91.5 | 91.5 | 91.5 | Lw | 91.5 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 659.00 | a | 6498435.87 | 2222274.11 | 659.00 |
| POINTSOURCE | | COURT03 | 91.5 | 91.5 | 91.5 | Lw | 91.5 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 639.00 | a | 6498930.90 | 2222330.61 | 639.00 |
| POINTSOURCE | | COURT04 | 91.5 | 91.5 | 91.5 | Lw | 91.5 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 636.50 | a | 6498984.40 | 2222429.77 | 636.50 |
| POINTSOURCE | | COURT05 | 91.5 | 91.5 | 91.5 | Lw | 91.5 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 654.00 | a | 6498782.40 | 2222542.01 | 654.00 |
| POINTSOURCE | | POOL01 | 80.4 | 80.4 | 80.4 | Lw | 80.4 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 637.00 | a | 6498942.12 | 2222196.28 | 637.00 |
| POINTSOURCE | | POOL02 | 80.4 | 80.4 | 80.4 | Lw | 80.4 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 637.00 | a | 6498970.56 | 2222184.69 | 637.00 |
| POINTSOURCE | | POOL03 | 80.4 | 80.4 | 80.4 | Lw | 80.4 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 649.00 | a | 6498387.97 | 2222425.65 | 649.00 |
| POINTSOURCE | | POOL04 | 80.4 | 80.4 | 80.4 | Lw | 80.4 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 635.50 | a | 6498906.95 | 2222372.52 | 635.50 |
| POINTSOURCE | | POOL05 | 80.4 | 80.4 | 80.4 | Lw | 80.4 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 654.00 | r | 6499573.22 | 2222751.82 | 1281.71 |
| POINTSOURCE | | POOL06 | 80.4 | 80.4 | 80.4 | Lw | 80.4 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 654.00 | r | 6499651.37 | 2222695.18 | 1200.41 |
| POINTSOURCE | | POOL07 | 80.4 | 80.4 | 80.4 | Lw | 80.4 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 654.00 | r | 6499643.47 | 2222755.33 | 1238.37 |
| POINTSOURCE | | POOL08 | 80.4 | 80.4 | 80.4 | Lw | 80.4 | | 0.0 | 0.0 | 0.0 | | | | 468.00 | 180.00 | 0.00 | 0.0 | 500 | (none) | 631.50 | a | 6498918.80 | 2222629.73 | 631.50 |

## Building(s)

| Name | M. | ID | RB | Residents | Absorption | Height | |
|---|---|---|---|---|---|---|---|
| | | | | | | Begin | |
| | | | | | | (ft) | |
| BUILDING | | BUILDING00001 | x | 0 | | 675.50 | a |
| BUILDING | | BUILDING00002 | x | 0 | | 675.00 | a |
| BUILDING | | BUILDING00003 | x | 0 | | 676.50 | a |
| BUILDING | | BUILDING00004 | x | 0 | | 682.00 | a |
| BUILDING | | BUILDING00005 | x | 0 | | 688.00 | a |
| BUILDING | | BUILDING00006 | x | 0 | | 690.00 | a |
| BUILDING | | BUILDING00007 | x | 0 | | 675.50 | a |
| BUILDING | | BUILDING00008 | x | 0 | | 673.50 | a |
| BUILDING | | BUILDING00009 | x | 0 | | 660.50 | a |
| BUILDING | | BUILDING00010 | x | 0 | | 661.50 | a |
| BUILDING | | BUILDING00011 | x | 0 | | 658.50 | a |
| BUILDING | | BUILDING00012 | x | 0 | | 632.00 | a |
| BUILDING | | BUILDING00013 | x | 0 | | 677.00 | a |
| BUILDING | | BUILDING00014 | x | 0 | | 689.50 | a |
| BUILDING | | BUILDING00015 | x | 0 | | 676.50 | a |
| BUILDING | | BUILDING00016 | x | 0 | | 670.00 | a |

# APPENDIX 10.1:

# CADNAA CONSTRUCTION NOISE LEVEL CALCULATIONS

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# 12610

**CadnaA Noise Prediction Model**
12610_03_Construction.cna
**Date:**
18.02.20
**Analyst:**
B. Lawson

## Receiver Noise Levels

| Name | M. | ID | Level Lr | | | Limit. Value | | | Land Use | | | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Eve | Night | Day | Eve | Night | Type | Auto | Noise Type | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | | (ft) | | (ft) | (ft) | (ft) |
| R1 | | R1 | 52.2 | 52.2 | 52.2 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498278.71 | 2223255.93 | 612.92 |
| R2 | | R2 | 69.5 | 69.5 | 69.5 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498990.95 | 2222767.65 | 647.26 |
| R3 | | R3 | 70.2 | 70.2 | 70.2 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498881.84 | 2222114.07 | 677.54 |
| R4 | | R4 | 70.5 | 70.5 | 70.5 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498710.78 | 2222103.28 | 685.09 |
| R5 | | R5 | 70.1 | 70.1 | 70.1 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498539.14 | 2222093.84 | 677.54 |
| R6 | | R6 | 65.1 | 65.1 | 65.1 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498360.19 | 2222003.12 | 674.50 |
| R7 | | R7 | 66.4 | 66.4 | 66.4 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6498216.10 | 2222028.54 | 671.45 |
| R8 | | R8 | 56.0 | 56.0 | 56.0 | 55.0 | 50.0 | 45.0 | | | | 5.00 | r | 6497921.76 | 2222287.44 | 640.91 |

## Area Source(s)

| Name | M. | ID | Result. PWL | | | Result. PWL'' | | | Lw / Li | | | Correction | | | Sound Reduction | | Attenuation | Operating Time | | | K0 | Freq. | Direct. | Moving Pt. Src | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Day | Evening | Night | Type | Value | norm. | Day | Evening | Night | R | Area | | Day | Special | Night | | | | Number | | |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | dB(A) | dB(A) | dB(A) | dB(A) | | ($ft^2$) | | (min) | (min) | (min) | (dB) | (Hz) | | Day | Evening | Night |
| SITEBOUNDARY | | SITEBOUNDARY00001 | 122.3 | 122.3 | 122.3 | 75.3 | 75.3 | 75.3 | Lw'' | 75.3 | | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 500 | (none) | | | |
| SITEBOUNDARY | | SITEBOUNDARY00002 | 119.9 | 119.9 | 119.9 | 75.3 | 75.3 | 75.3 | Lw'' | 75.3 | | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 500 | (none) | | | |

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# **Appendix E-2**
Noise Memo

MEMORANDUM

URBAN | CROSSROADS

**DATE:** November 26, 2024

**TO:** Ms. Joanne Chan, Kam Sang Company Inc.

**FROM:** William Maddux

**JOB NO:** 12610-07 Noise Memo.docx

**RITZ-CARLTON RESIDENCES NOISE ASSESSMENT**

The Project site is located north of Mirada Circle and east of Frank Sinatra Drive, in the City of Rancho Mirage as shown in Exhibit A. The Project site is located adjacent to the existing Ritz-Carlton Rancho Mirage, north of the Mirada Estates and east of the Villas of Mirada. The Project site is currently vacant and undeveloped. The Purpose of this memorandum is to respond to comments on the previous Ritz-Carlton Residences Noise Impact Analysis, prepared by Urban Crossroads in February 2020. Specifically, this memorandum updates the construction noise and vibration analysis.

**PROJECT OVERVIEW**

It is our understanding that the Project is to expand the existing Ritz-Carlton hotel by 106 residential dwelling units, a 6,966 square foot restaurant, and a 23,843 square foot venue. For the purposes of this analysis, it is assumed that the Project will be constructed within a single phase of development with a projected Opening Year of 2027.

The Ritz-Carlton Residences at Rancho Mirage is an expansion and enhancement to the existing Ritz-Carlton Resort. The project consists of renovation of the existing motor court which will provide a connection to the new proposed building across from the existing hotel. This new building will provide a new 23,843 square feet of indoor event space and expansive exterior entertaining and garden spaces. The building will also house 48 Residential Suites over underground parking for the both the suites and the event space along with additional parking for the existing hotel. In addition, 58 new residential villas with their own private garages will be built around naturally landscaped areas. A community clubroom with access to a central pool terrace as well as smaller amenity areas will enhance the new community. The new Sky Mesa Recreation Area will enhance the land southeast of the existing hotel by providing additional event space and amenities such as a pool terrace and view opportunities onto the valley. A new restaurant will be tucked away into the site to provide a new dining experience as well as services to the pool deck.

**EXHIBIT A: LOCATION MAP**

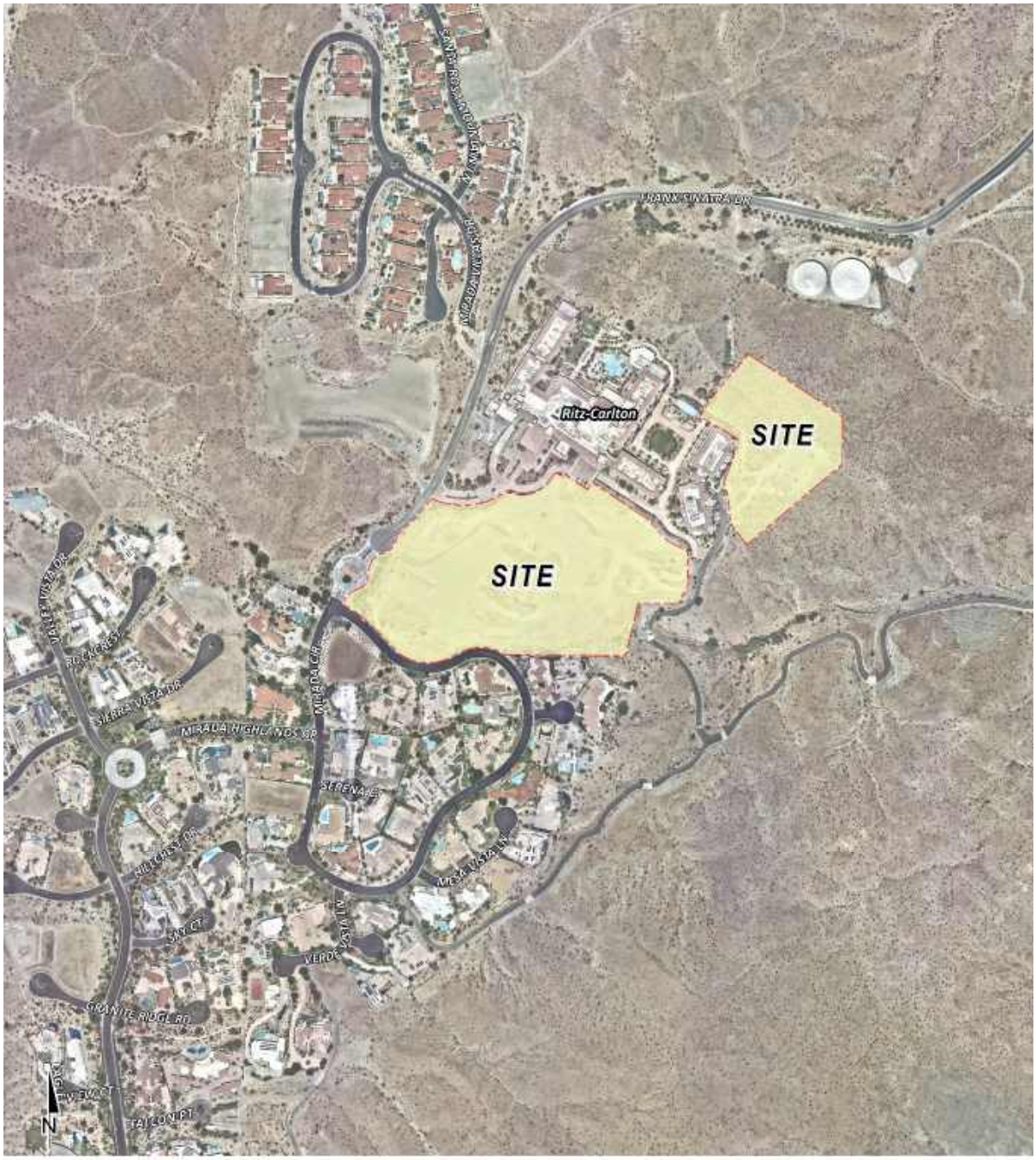


**EXHIBIT B: SITE PLAN**



**CONSTRUCTION NOISE STANDARDS**

To analyze noise impacts originating from the construction of Ritz-Carlton Residences, noise from construction activities are typically evaluated against standards established under a City's Municipal Code. The Municipal Code noise standards for construction are described below for the City of Rancho Mirage to determine the potential noise impacts at nearby receiver locations.

To control noise impacts associated with the construction of the proposed Project, the City has established limits to the hours of operation. The City of Rancho Mirage Municipal Code, Section 15.04.030 indicates that construction, shall be limited to the hours of 7:00 a.m. to 7:00 p.m. weekdays. Construction activity is not permitted on Sundays or major holidays. (1) However, neither the City of Rancho Mirage General Plan or Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*.

According to the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual*, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. The FTA provides noise level criterion of 80 dBA $L_{eq}$ at residential land uses that indicates when noise control measures should be evaluated. The FTA states, "While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the … Guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction." (2)

In addition to absolute noise limits, the temporary noise level increases over the existing ambient conditions must be considered under CEQA Significance Threshold A. Recent court cases have also placed an emphasis on the increase as opposed to the noise level limit. However, limits and acceptable increases are not unrelated since, often, the noise level limits can subtly include the increase limit.

While specific noise ordinances can vary widely, many jurisdictions across California set construction noise level limits around 75 to 80 dBA $L_{eq}$ and only allow construction during daytime hours (e.g., City and County of Los Angeles, City and County of San Diego, City and County of San Francisco, etc.) In contrast, everyday noise limits are stricter because they apply to continuous, long-term activities where excessive noise can greatly affect the quality of life over time. Thus, for everyday noise limits, many jurisdictions across California set residential daytime noise level limits around 55 dBA $L_{eq}$ during daytime hours. This implies that during daytime hours, many California communities consider an increase of 20 dBA over the daytime limit an acceptable temporary increase for construction activities. This is also illustrated in the adoption of many CEQA documents statewide that use an 80 dBA $L_{eq}$ limit for assessing construction impacts while using everyday noise level limits of local noise ordinances in assessing on-site operational impacts.

However, since an increase of 20 dBA could result in noise levels over 85 dBA $L_{eq}$, which the California Occupational Safety and Health Administration (CalOSHA) identifies as a potentially hazardous noise level, the increase should not be allowed to result in an absolute noise level greater than 80 dBA $L_{eq}$ at any residence, which is consistent with the FTA recommendations.

Therefore, if the Project-related construction noise levels generate a temporary noise level increase above the existing daytime ambient noise levels of up to 20 dBA $L_{eq}$, not to exceed 80 dBA $L_{eq}$, or an increase of 5 dBA $L_{eq}$ above the existing nighttime ambient noise levels, then the Project construction noise level increases will not be considered a potentially significant impact.

**SENSITIVE RECEIVER LOCATIONS**

To assess the potential for short-term construction noise impacts, the following sensitive receiver locations, as shown in Exhibit C, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, outpatient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

To describe the potential off-site Project noise levels, 8 receiver locations in the vicinity of the Project site were identified. All distances are measured from the Project site boundary to the outdoor living areas (e.g., private backyards) or at the building façade, whichever is closer to the Project site. The selection of receiver locations is based on FHWA guidelines and is consistent with additional guidance provided by Caltrans and the FTA. (3) (2) Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise analysis will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures. Distance is measured in a straight line from the Project boundary to each receiver location.

R1: Located approximately 591 feet north of the Project site, R1 represents existing residential homes (1 Santa Rosa Mountain Lane) west of Frank Sinatra Drive. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the Ritz-Carlton Rancho Mirage located northeast of the Project site at roughly 66 feet. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing residential homes (29 Grande View Court) on the south side of Mirada Circle at approximately 21 feet from the Project site.

R4: Location R4 represents the existing residential home located at 30 Grande View Court approximately 33 feet from the Project site boundary.

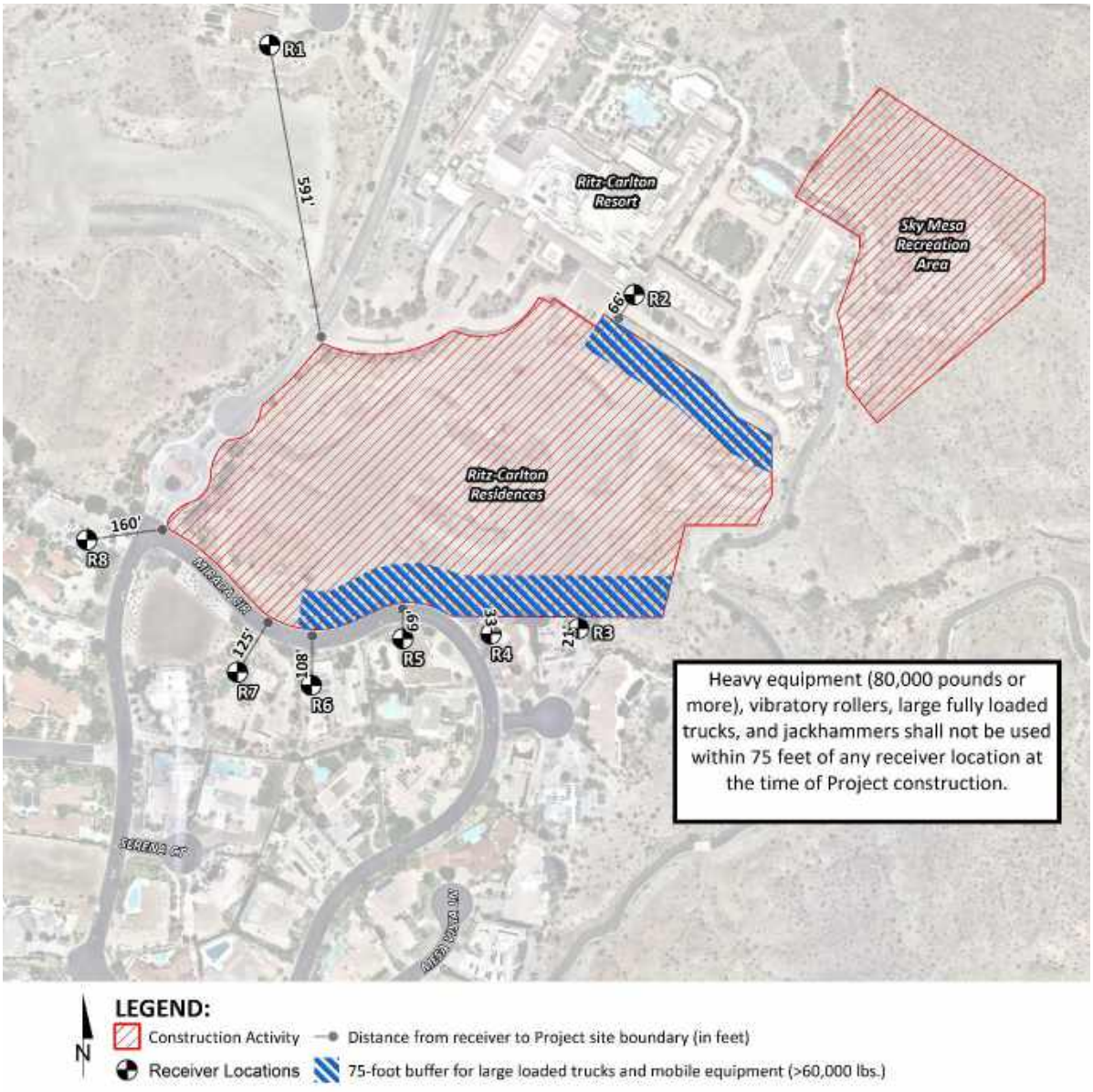
R5: Location R5 represents the existing residential home located at 31 Mirada Circle approximately 69 feet from the Project site boundary.

R6: Location R6 represents the existing residential home located at 46 Mirada Circle approximately 108 feet from the Project site boundary.

R7: Location R7 represents the existing residential home located 45 Mirada Circle approximately 125 feet from the Project site boundary.

R8: Location R8 represents the existing residential home located at 1 Mirada Circle approximately 160 feet from the Project site boundary.

**EXHIBIT C: RECEIVER AND CONSTRUCTION NOISE SOURCE LOCATIONS**




**CADNAA NOISE PREDICTION MODEL**

To fully describe the exterior construction noise levels from the Project, Urban Crossroads, Inc. developed a noise prediction model using the CadnaA (Computer Aided Noise Abatement)

computer program. CadnaA can analyze multiple types of noise sources using the spatially accurate Project site plan georeferenced Nearmap aerial imagery, topography, buildings, and barriers in its calculations to predict outdoor noise levels. Using the ISO 9613 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of the noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613 protocol (4), the CadnaA noise prediction model relies on the reference sound power level ($L_w$) to describe individual noise sources. While sound pressure levels (e.g., $L_{eq}$) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels ($L_w$) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment.

The construction noise level calculations provided in this noise analysis account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A default ground absorption factor of 0.5 was used in the noise analysis to account for mixed ground representing a combination of hard and soft surfaces.

**CONSTRUCTION NOISE ASSESSMENT**

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit C shows the construction activity boundaries in relation to the nearby sensitive receiver locations.

**CONSTRUCTION NOISE LEVELS**

The FTA *Transit Noise and Vibration Impact Assessment Manual* recognizes that construction projects are accomplished in several different stages and outlines the procedures for assessing noise impacts during construction. Each stage has a specific equipment mix, depending on the work to be completed during that stage. As a result of the equipment mix, each stage has its own noise characteristics; some stages have higher continuous noise levels than others, and some have higher impact noise levels than others. The Project construction activities are expected to occur in the following stages:

- Demolition
- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

**CONSTRUCTION REFERENCE NOISE LEVELS**

To describe construction noise activities, this construction noise analysis was prepared using reference construction equipment noise levels from the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model (RCNM), which includes a national database of construction equipment reference noise emission levels. (9) The RCNM equipment database provides a comprehensive list of the noise-generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation. Consistent with FTA guidance for detailed construction noise assessment, Table 1 presents the combined noise levels for the loudest construction activities expected for each stage, assuming all equipment operates at the same time.

**TABLE 1: CONSTRUCTION REFERENCE NOISE LEVELS**

| Construction Stage | Reference Construction Equipmnet[1] | Reference Noise Level @ 50 Feet (dBA $L_{eq}$) | Composite Reference Noise Level (dBA $L_{eq}$) |
|---|---|---|---|
| Demolition | Concrete Saw | 83.0 | 84.4 |
| | Excavator | 77.0 | |
| | Backhoe | 74.0 | |
| Site Preparation | Tractor | 80.0 | 82.9 |
| | Front End Loader | 75.0 | |
| | Dozer | 78.0 | |
| Grading | Tractor | 80.0 | 84.2 |
| | Grader | 81.0 | |
| | Compactor (ground) | 76.0 | |
| Building Construction | Crane | 73.0 | 82.1 |
| | Generator | 78.0 | |
| | Gradall | 79.0 | |
| Paving | Paver | 74.0 | 77.8 |
| | Dump Truck | 72.0 | |
| | Roller | 73.0 | |
| Architectural Coating | Man Lift | 68.0 | 76.2 |
| | Compressor (air) | 74.0 | |
| | Generator (<25kVA) | 70.0 | |

[1] FHWA Road Construction Noise Model.

**CONSTRUCTION NOISE ANALYSIS**

Construction activities are best evaluated as mobile sources since these activities tend to vary considerably, not only as the speed and power of the equipment varies, but also as the

equipment constantly changes in terms of its distance from the receivers and its relative location. (5) Construction projects involve various stages, and activities frequently shift from one location to another. For example, during the initial stages, noise-generating activities might concentrate in one area, and then move to another section as construction progresses.

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts by phase at the nearby sensitive receiver locations were completed. To account for the dynamic nature of construction activities, the CadnaA construction noise analysis evaluates the noise source activities as multiple moving point sources or work crews within the limits of construction for the loudest phase of construction activity. Construction impacts are based on the highest noise level calculated at each receiver location and the relative difference between construction phases. As shown in Table 2, the construction noise levels by phase are expected to range from 43.3 to 70.3 dBA $L_{eq}$ at the nearby receiver locations. Appendix B includes the detailed CadnaA construction noise model inputs.

**TABLE 2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY**

| Receiver Location[1] | Construction Noise Levels (dBA $L_{eq}$) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Demolition | Site Preparation | Grading | Building Construction | Paving | Architectural Coating | Highest Levels[2] |
| R1 | 51.5 | 50.0 | 51.4 | 49.2 | 45.0 | 43.3 | 51.5 |
| R2 | 69.2 | 67.7 | 69.1 | 66.9 | 62.7 | 61.0 | 69.2 |
| R3 | 69.9 | 68.4 | 69.8 | 67.6 | 63.4 | 61.7 | 69.9 |
| R4 | 70.3 | 68.8 | 70.2 | 68.0 | 63.8 | 62.1 | 70.3 |
| R5 | 69.9 | 68.4 | 69.8 | 67.6 | 63.4 | 61.7 | 69.9 |
| R6 | 64.8 | 63.3 | 64.7 | 62.5 | 58.3 | 56.6 | 64.8 |
| R7 | 66.2 | 64.7 | 66.1 | 63.9 | 59.7 | 58.0 | 66.2 |
| R8 | 55.7 | 54.2 | 55.6 | 53.4 | 49.2 | 47.5 | 55.7 |

[1] Construction noise source and receiver locations are shown in Exhibit C.
[2] Construction noise level calculations based on distance from the construction noise source activity to nearby receiver locations. CadnaA construction noise model inputs are included in Appendix B.

**TABLE 3: DAYTIME CONSTRUCTION NOISE LEVEL INCREASES**

| Receiver Location[1] | Highest Construction Noise Level[2] | Maximum Limit (dBA $L_{eq}$) | Threshold Exceeded?[4] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|---|---|
| R1 | 51.5 | 80.0 | No | L1 | 49.7 | 53.7 | 4.0 | 20.0 | No |
| R2 | 69.2 | 80.0 | No | L2 | 53.4 | 69.3 | 15.9 | 20.0 | No |
| R3 | 69.9 | 80.0 | No | L3 | 50.4 | 69.9 | 19.5 | 20.0 | No |
| R4 | 70.3 | 80.0 | No | L3 | 50.4 | 70.3 | 19.9 | 20.0 | No |
| R5 | 69.9 | 80.0 | No | L3 | 50.4 | 69.9 | 19.5 | 20.0 | No |
| R6 | 64.8 | 80.0 | No | L3 | 50.4 | 65.0 | 14.6 | 20.0 | No |
| R7 | 66.2 | 80.0 | No | L3 | 50.4 | 66.3 | 15.9 | 20.0 | No |
| R8 | 55.7 | 80.0 | No | L3 | 50.4 | 56.8 | 6.4 | 20.0 | No |

[1] Construction noise source and receiver locations are shown on Exhibit C.
[2] Total Project daytime construction noise levels as shown in Table 2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A, Ritz Carlton Residences Noise Study..
[4] Observed daytime ambient noise levels as shown in Table 5-1, Ritz Carlton Residences Noise Study.
[5] Represents the combined ambient conditions plus the Project construction activities.
[6] The noise level increase expected with the addition of the proposed Project construction activities.

## TEMPORARY CONSTRUCTION NOISE LEVEL INCREASES

To describe the temporary Project construction noise level contributions to the existing ambient noise environment, the Project construction noise levels were combined with the existing ambient noise level measurements at the nearest off-site receiver locations. The difference between the combined Project-construction and ambient noise levels is used to describe the construction noise level contributions. Temporary noise level increases that would be experienced at sensitive receiver locations when Project construction-source noise is added to the ambient daytime conditions are presented in Table 3. A temporary noise level increase of 20 dBA is considered a potentially significant impact.

As indicated in Table 3, the Project will contribute to construction noise level increases ranging from 4.0 to 19.9 dBA $L_{eq}$ during the daytime hours at the nearest receiver locations. The unmitigated construction noise analysis shows that the nearest receiver locations will not exceed the substantial temporary noise level increase threshold of 20 dBA $L_{eq}$ or 80 dBA $L_{eq}$ threshold during Project construction activities. The temporary construction noise level increase analysis shows that the noise impacts due to Project construction noise are considered less than significant.

### CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. The operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Construction vibration is generally associated with pile driving and rock blasting. However, no pile-driving or rock-blasting activities are planned for the Project.

Unlike noise, which is measured from the center of activity and experienced over time, vibration refers to a single, instantaneous event affecting a building structure, typically caused by a specific piece of equipment. Ground-borne vibration is almost never a problem outdoors. (5 p. 118) Ground vibration levels associated with various types of construction equipment are summarized in Table 4. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential for building damage using the following vibration assessment methods defined by the FTA. To describe the vibration impacts the FTA provides the following equation: $VdB_{distance} = VdB_{ref} \times 30Log (D/25)$

**TABLE 4: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT**

| Equipment | Vibration Decibels (VdB) at 25 feet[1] |
|---|---|
| Small bulldozer | 58 |
| Jackhammer | 79 |
| Loaded Trucks | 86 |
| Large bulldozer | 87 |
| Vibratory Roller | 94 |

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment

Table 5 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 21 to 591 feet from Project construction activity, construction vibration velocity levels are expected to range from 45.8 to 89.3 VdB and will exceed the FTA 80 VdB threshold for human annoyance at receiver locations R2 through R5. The construction vibration analysis shows that the unmitigated Project-related vibration impacts will be potentially significant during the construction activities at the Project site, and mitigation is required.

**TABLE 5: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS**

| Receiver[1] | Distance to Const. Activity (Feet)[2] | Receiver Vibration Levels (VdB)[3] | | | | | | Threshold (VdB) | Threshold Exceeded?[4] |
|---|---|---|---|---|---|---|---|---|---|
| | | Small Bulldozer | Jack-hammer | Loaded Trucks | Large Bulldozer | Vibratory Roller | Highest Vibration Levels | | |
| R1 | 591' | 16.8 | 37.8 | 44.8 | 45.8 | 52.8 | 52.8 | 80 | No |
| R2 | 66' | 45.4 | 66.4 | 73.4 | 74.4 | 81.4 | 81.4 | 80 | Yes |
| R3 | 21' | 60.3 | 81.3 | 88.3 | 89.3 | 96.3 | 96.3 | 80 | Yes |
| R4 | 33' | 54.4 | 75.4 | 82.4 | 83.4 | 90.4 | 90.4 | 80 | Yes |
| R5 | 69' | 44.8 | 65.8 | 72.8 | 73.8 | 80.8 | 80.8 | 80 | Yes |
| R6 | 108' | 38.9 | 59.9 | 66.9 | 67.9 | 74.9 | 74.9 | 80 | No |
| R7 | 125' | 37.0 | 58.0 | 65.0 | 66.0 | 73.0 | 73.0 | 80 | No |
| R8 | 160' | 33.8 | 54.8 | 61.8 | 62.8 | 69.8 | 69.8 | 80 | No |

[1] Receiver locations are shown on Exhibit C.
[2] Distance from receiver locations to the source of the nearest construction activity.
[3] Based on the Vibration Source Levels of Construction Equipment included on Table 4.
[54]Does the vibration level exceed the FTA acceptable vibration level?

Therefore, a 75-foot vibration buffer zone mitigation measure is required to restrict the use of heavy construction equipment (greater than 80,000 pounds), vibratory rollers, large loaded trucks, vibratory rollers, and jackhammers within 75 feet of occupied sensitive receiver locations R2 through R5. With the mitigation measures identified in this analysis and shown in Exhibit C, the mitigated vibration levels with the 75-foot buffer zone will be reduced to 79.7 VdB and will satisfy the FTA 80.0 VdB threshold for human annoyance, as shown in Table 6. Therefore, impacts with the construction vibration mitigation measure identified in this study will be less than significant.

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter. Moreover, construction at the Project site will be restricted to the daytime hours between 7:00 a.m. and 6:00 p.m. Monday to Saturday, consistent with City of Rancho Mirage requirements thereby, eliminating potential vibration impacts during the sensitive evening and nighttime hours.

**TABLE 6: MITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS**

| Receiver[1] | Distance to Const. Activity (Feet)[2] | Receiver Vibration Levels (VdB)[3] | | | | | | Threshold (VdB) | Threshold Exceeded?[4] |
|---|---|---|---|---|---|---|---|---|---|
| | | Small Bulldozer | Jack-hammer | Loaded Trucks | Large Bulldozer | Vibratory Roller | Highest Vibration Levels | | |
| R2 | 75' | 43.7 | 64.7 | 71.7 | 72.7 | 79.7 | 79.7 | 80 | No |
| R3 | 75' | 43.7 | 64.7 | 71.7 | 72.7 | 79.7 | 79.7 | 80 | No |
| R4 | 75' | 43.7 | 64.7 | 71.7 | 72.7 | 79.7 | 79.7 | 80 | No |
| R5 | 75' | 43.7 | 64.7 | 71.7 | 72.7 | 79.7 | 79.7 | 80 | No |

[1] Receiver locations are shown on Exhibit C.
[2] Distance from receiver locations to the source of the nearest construction activity.
[3] Based on the Vibration Source Levels of Construction Equipment included on Table 4.

[4] Does the vibration level exceed the FTA acceptable vibration level?

**REFERENCES**

1. **City of Rancho Mirage.** *Municipal Code, Sections 15.04.030.*

2. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123.* September 2018.

3. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.

4. **International Organization for Standardization.** *Acoustics — Attenuation of sound during propagation outdoors — Part 2.* s.l. : International Organization for Standardization, 2024. ISO 9613-2:2024.

5. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123.* September 2018.

# APPENDIX A

# CITY OF RANCHO MIRAGE MUNICIPAL CODE NOISE STANDARDS

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## Chapter 8.45 NOISE

### 8.45.010 Purpose.

The city has established a quality of life and environment in which peace and quiet is highly valued by its residents, visitors and businesses. The existence of excessive noise within the city is a condition which is detrimental to the health, safety, comfort, welfare and quality of life of the citizenry and shall be regulated in the public interest. This chapter has been created to implement the goals and policies of the noise element of the city's general plan and to prohibit undesirable noises in the community. This chapter shall be referred to and cited as the Rancho Mirage noise ordinance. (Ord. 633 § 1(Exh. A), 1995)

### 8.45.020 Definitions.

Ambient noise level means the all encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

Cumulative period means an additive period of time consisting of individual time segments which may be continuous or interrupted.

Decibel (dBA) means a unit of sound level measured on a sound level meter using the A-weighting network.

Emergency means any occurrence or set of circumstances involving actual or imminent physical danger, crisis, trauma or property damage which demands immediate action.

Noise level means the same as sound level the terms are interchangeable.

Person means any individual, association, partnership, corporation, organization, or public agency, including associated officer(s), employee(s) or department(s).

Sound level means the quantity of decibels measured using the frequency weighting of A of a sound level meter.

Sound level meter means an instrument meeting the American National Standards Institute's standard S1.4-1983 or later revision, for Type 1 or Type 2 specifications; or an instrument and the associated recording and analyzing equipment which will provide equivalent data. (Ord. 633 § 1(Exh. A), 1995)

### 8.45.030 Exterior noise level limits.

No person shall operate or cause to be operated any source of sound or allow the creation of sound or noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level, as measured on any other property, to exceed:

A. The noise level for the applicable zone specified in Table A-1 for a cumulative period of more than thirty minutes in any hour of the applicable time period.

**Table A-1**

| Land Use/Zone | Time of Day | Noise Level (dBA) |
|---|---|---|
| Residential, Low Density (R-E, H-R, R-L-2, R-L-3) | 7:00 a.m. to 6:00 p.m. | 55 |
| | 6:00 p.m. to 10:00 p.m. | 50 |
| | 10:00 p.m. to 7:00 a.m. | 45 |
| Residential, Medium and High Density, Hospital, Open Space (OS, R-M, R-H, MHP) | 7:00 a.m. to 6:00 p.m. | 60 |
| | 6:00 p.m. to 10:00 p.m. | 55 |

| | | |
|---|---|---|
| | 10:00 p.m. to 7:00 a.m. | 50 |
| Commercial Office, Resort Commercial, Mixed Use, Institutional (O, P, Rs-H, M-U) | 7:00 a.m. to 6:00 p.m.<br>6:00 p.m. to 10:00 p.m.<br>10:00 p.m. to 7:00 a.m. | 65<br>60<br>55 |
| Commercial Neighborhood, General Commercial, Commercial Recreation, Light Industrial (C-N, C-G, I-L) | 7:00 a.m. to 6:00 p.m.<br>6:00 p.m. to 10:00 p.m.<br>10:00 p.m. to 7:00 a.m. | 70<br>65<br>60 |

B. For cumulative periods of time less than thirty minutes in an hour, all the noise standards in Table A-1 are increased according to Table B-1.

**Table B-1**

| Duration of Sound | dBA Adjustment |
|---|---|
| 15—30 minutes per hour | + 3 |
| 10—15 minutes per hour | + 5 |
| 5—10 minutes per hour | + 10 |
| 1—5 minutes per hour | + 15 |
| Any period of time less than 1 minute per hour | + 20 |

C. If the measured ambient noise level exceeds the dBA limits in Table A-1, the noise limits and their adjustments for the first three categories in Table B-1 shall be increased in five dBA increments as needed to encompass or reflect said ambient noise level. The maximum noise level under the last two categories in Table B-1 shall be increased, if necessary, only to equal the ambient noise level. (Ord. 1015 § 2, 2011; Ord. 633 § 1(Exh. A), 1995)

## 8.45.040 Noise level measurement.

A. The location selected for measuring exterior noise levels shall be at the point of the property line of the affected property nearest the alleged offending noise source. If possible, the ambient noise shall be measured at the same location along the property line.

B. If the measurement location is on a boundary between two different locations, the noise level limit applicable to the lower noise zone shall apply.

C. Upon receipt of a complaint or a request to investigate, the code compliance officer, equipped with an American National Standards Institute Type 2 or better sound level meter, may investigate the complaint. The investigation shall consist of measurements and the gathering of data to adequately define the noise problem and shall include the following:

1. Type and measurement of noise source;
2. Location of noise source relative to complainant's or affected property;
3. Time period during which noise source is considered to be intrusive;
4. Total duration of noise levels measured;
5. Date(s) and time(s) of noise measurement survey. (Ord. 633 § 1(Exh. A), 1995)

## 8.45.050 Special provisions and exemptions.

The following activities and noise sources shall be exempted from the provisions of this chapter:

A. School bands, school athletic and other activities occurring on a school campus;

B. Outdoor gatherings, dance, shows, entertainment for events authorized through the city's special events process;

C. Activities conducted in public parks and public playgrounds that are dependent upon such facilities for their operation;

D. Any emission of sound for purposes of alerting persons to an emergency or the general emission of sound during performance of emergency work;

E. Construction, alteration, repair, grading or improvement of any building, structure, road or improvement to real property for which a permit has been issued by the city if said construction occurs within the allowable hours set forth in Section 15.04.030(A)(10);

F. The operation of any equipment and machinery at any time within any zone by the city, its employees, or any agent or franchisee of the city in the course of performing maintenance, construction or trash collection. (Ord. 633 § 1(Exh. A), 1995)

## 8.45.060 Additional prohibition.

It is unlawful and a nuisance for any person to keep, maintain or permit upon any lot or parcel of land within the city under his or her control any animal, including any fowl, which by any sound or cry shall habitually disturb the peace and comfort of any person in the reasonable and comfortable enjoyment of life or property. (Ord. 633 § 1(Exh. A), 1995)

## 8.45.065 Landscape maintenance.

A. It is unlawful and a public nuisance for any person to permit or perform for-hire landscape and non- emergency exterior hardscape maintenance activities such as, but not limited to, tree trimming, re-seeding, lawn mowing, leaf blowing, dust and debris clearing and any other landscaping or nonemergency exterior hardscape maintenance activities which utilize any motorized saw, sander, drill, grinder, leaf-blower, lawnmower, hedge trimmer, edger, or any other similar tool or device any time on Saturday and Sunday and between the hours of six p.m. and seven a.m. the next day during weekdays, unless otherwise provided in this section.

B. The regular mowing or grooming of golf courses, grass tennis courts, grass croquet courts, and lawn bowling areas shall be exempt from the restrictions set forth in this section. The allowed work hours for mowing or green preparation for golf courses, grass tennis courts, grass croquet courts, and lawn bowling areas shall be between five thirty a.m. and seven p.m., seven days per week and during all seasons of the year.

C. Nothing set forth in this section shall permit any person from engaging in any activities that exceed the exterior noise level limits set forth in Section 8.45.030 or otherwise constitute a public nuisance as set forth in Section 14.60.325 of the Municipal Code. (Ord. 979, § 1, 2009; Ord. 936, § 3, 2006)

## 8.45.070 Administration.

The noise control program established by this chapter shall be administered by and is the responsibility of the code compliance division as directed by the director of the community development department. (Ord. 633 § 1(Exh. A), 1995)

## 8.45.080 Violations and enforcement procedures.

Violations of this chapter are declared to be a nuisance and subject to the procedures, remedies and penalties set forth in Title 14. (Ord. 916 §4, 2006; Ord. 633 § 1(Exh. A), 1995)

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# APPENDIX B

# CONSTRUCTION NOISE LEVEL CALCULATIONS

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# 12610

**CadnaA Noise Prediction Model:** 12610_05_Construction.cna
**Date:** 28.10.24
**Analyst:** B. Lawson

## Calculation Configuration

| Configuration | |
|---|---|
| **Parameter** | **Value** |
| **General** | |
| **Max. Error (dB)** | **0.00** |
| **Max. Search Radius (#(Unit,LEN))** | **2000.01** |
| **Min. Dist Src to Rcvr** | **0.00** |
| **Partition** | |
| **Raster Factor** | **0.50** |
| **Max. Length of Section (#(Unit,LEN))** | **999.99** |
| **Min. Length of Section (#(Unit,LEN))** | **1.01** |
| **Min. Length of Section (%)** | **0.00** |
| **Proj. Line Sources** | **On** |
| **Proj. Area Sources** | **On** |
| **Ref. Time** | |
| **Daytime Penalty (dB)** | **0.00** |
| **Recr. Time Penalty (dB)** | **5.00** |
| **Night-time Penalty (dB)** | **10.00** |
| **DTM** | |
| **Standard Height (m)** | **0.00** |
| **Model of Terrain** | **Triangulation** |
| **Reflection** | |
| **max. Order of Reflection** | **2** |
| **Search Radius Src** | **100.00** |
| **Search Radius Rcvr** | **100.00** |
| **Max. Distance Source - Rcvr** | **1000.00 1000.00** |
| **Min. Distance Rvcr - Reflector** | **1.00 1.00** |
| **Min. Distance Source - Reflector** | **0.10** |
| **Industrial (ISO 9613)** | |
| **Lateral Diffraction** | **some Obj** |
| **Obst. within Area Src do not shield** | **On** |
| **Screening** | **Incl. Ground Att. over Barrier** |
| | **Dz with limit (20/25)** |
| **Barrier Coefficients C1,2,3** | **3.0 20.0 0.0** |
| **Temperature (#(Unit,TEMP))** | **10** |
| **rel. Humidity (%)** | **70** |
| **Ground Absorption G** | **0.50** |
| **Wind Speed for Dir. (#(Unit,SPEED))** | **3.0** |
| **Roads (RLS-90)** | |
| **Strictly acc. to RLS-90** | |
| **Railways (FTA/FRA)** | |
| **Aircraft (???)** | |
| **Strictly acc. to AzB** | |

## Receiver Noise Levels

| Name | Sel. | M. | ID | Level Lr | | | Limit. Value | | | Land Use | | | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Day | Eve | Night | Day | Eve | Night | Type | Auto | Noise Type | | | X | Y | Z |
| | | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | | (ft) | | (ft) | (ft) | (ft) |
| R1 | | | R1 | 51.5 | 32.5 | 32.5 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6498278.71 | 2223255.93 | 612.92 |
| R2 | | | R2 | 69.2 | 38.4 | 38.4 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6498990.95 | 2222767.65 | 647.26 |
| R3 | | | R3 | 69.9 | 42.1 | 42.1 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6498881.84 | 2222114.07 | 677.54 |
| R4 | | | R4 | 70.3 | 32.2 | 32.2 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6498710.78 | 2222103.28 | 685.09 |
| R5 | | | R5 | 69.9 | 38.2 | 38.2 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6498539.14 | 2222093.84 | 677.54 |
| R6 | | | R6 | 64.8 | 35.7 | 35.7 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6498360.19 | 2222003.12 | 674.50 |
| R7 | | | R7 | 66.2 | 36.5 | 36.5 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6498216.10 | 2222028.54 | 671.45 |
| R8 | | | R8 | 55.7 | 25.4 | 25.4 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6497921.76 | 2222287.44 | 640.91 |

## Point Source(s)

| Name | Sel. | M. | ID | Result. PWL | | | Lw / Li | | | Correction | | | Sound Reduction | | Attenuation | Operating Time | | | K0 | Freq. | Direct. | Height | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Day | Evening | Night | Type | Value | norm. | Day | Evening | Night | R | Area | | Day | Special | Night | | | | | X | Y | |
| | | | | (dBA) | (dBA) | (dBA) | | | dB(A) | dB(A) | dB(A) | dB(A) | | ($ft^2$) | | (min) | (min) | (min) | (dB) | (Hz) | | (ft) | (ft) | (ft) | (f |

## Line Source(s)

| Name | Sel. | M. | ID | Result. PWL | | | Result. PWL' | | | Lw / Li | | | Correction | | | Sound Reduction | | Attenuation | Operating Time | | | K0 | Freq. | Direct. | Moving | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Day | Evening | Night | Day | Evening | Night | Type | Value | norm. | Day | Evening | Night | R | Area | | Day | Special | Night | | | | Number | |
| | | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | dB(A) | dB(A) | dB(A) | dB(A) | | ($ft^2$) | | (min) | (min) | (min) | (dB) | (Hz) | | Day | Evening |

| Name | ID | Height | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | x | y | z | Ground |
| | | (ft) | | (ft) | (ft) | (ft) | (ft) | (ft) |

## Area Source(s)

| Name | Sel. | M. | ID | Result. PWL | | | Result. PWL'' | | | Lw / Li | | | Correction | | | Sound Reduction | | Attenuation | Operating Time | | | K0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Day | Evening | Night | Day | Evening | Night | Type | Value | norm. | Day | Evening | Night | R | Area | | Day | Special | Night | |
| | | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | dB(A) | dB(A) | dB(A) | dB(A) | | ($ft^2$) | | (min) | (min) | (min) | (dB) |
| SITEBOUNDARY | | | SITEBOUNDARY00001 | 122.0 | 16.0 | 16.0 | 75.1 | -31.0 | -31.0 | PWL-Pt | 116 | | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 |
| SITEBOUNDARY | | | SITEBOUNDARY00002 | 109.8 | 109.8 | 109.8 | 65.2 | 65.2 | 65.2 | Lw'' | 65.2 | | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 |

| Name | ID | Height | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | x | y | z | Ground |
| | | (ft) | | (ft) | (ft) | (ft) | (ft) | (ft) |
| SITEBOUNDARY | SITEBOUNDARY00001 | 8.00 | r | | 6498380.67 | 2222673.55 | 626.49 | 618.49 |
| | | | | | 6498403.33 | 2222664.71 | 631.50 | 623.50 |
| | | | | | 6498426.73 | 2222658.03 | 633.44 | 625.44 |
| | | | | | 6498450.64 | 2222653.58 | 634.43 | 626.43 |
| | | | | | 6498474.87 | 2222651.40 | 634.75 | 626.75 |
| | | | | | 6498499.19 | 2222651.50 | 634.75 | 626.75 |
| | | | | | 6498523.40 | 2222653.89 | 634.75 | 626.75 |
| | | | | | 6498547.28 | 2222658.54 | 634.75 | 626.75 |
| | | | | | 6498570.61 | 2222665.41 | 634.75 | 626.75 |
| | | | | | 6498593.20 | 2222674.45 | 635.44 | 627.44 |
| | | | | | 6498614.84 | 2222685.56 | 638.57 | 630.57 |
| | | | | | 6498635.33 | 2222698.67 | 640.13 | 632.13 |
| | | | | | 6498651.94 | 2222692.67 | 641.41 | 633.41 |
| | | | | | 6498669.17 | 2222688.83 | 642.77 | 634.77 |
| | | | | | 6498686.74 | 2222687.21 | 643.91 | 635.91 |
| | | | | | 6498704.38 | 2222687.84 | 643.91 | 635.91 |
| | | | | | 6498721.80 | 2222690.70 | 643.91 | 635.91 |
| | | | | | 6498738.72 | 2222695.74 | 643.91 | 635.91 |
| | | | | | 6498754.36 | 2222706.57 | 643.91 | 635.91 |
| | | | | | 6498768.86 | 2222718.88 | 643.91 | 635.91 |
| | | | | | 6498782.07 | 2222732.57 | 643.91 | 635.91 |
| | | | | | 6498793.86 | 2222747.49 | 643.91 | 635.91 |
| | | | | | 6498804.13 | 2222763.50 | 643.91 | 635.91 |
| | | | | | 6498825.16 | 2222752.98 | 643.91 | 635.91 |
| | | | | | 6498832.75 | 2222761.75 | 643.91 | 635.91 |
| | | | | | 6498915.11 | 2222705.67 | 643.91 | 635.91 |
| | | | | | 6498930.30 | 2222730.21 | 643.91 | 635.91 |
| | | | | | 6499123.04 | 2222603.46 | 642.68 | 634.68 |
| | | | | | 6499191.38 | 2222528.70 | 640.08 | 632.08 |
| | | | | | 6499260.30 | 2222491.32 | 637.72 | 629.72 |
| | | | | | 6499259.72 | 2222373.33 | 622.16 | 614.16 |
| | | | | | 6499242.20 | 2222342.37 | 619.18 | 611.18 |
| | | | | | 6499229.93 | 2222314.92 | 611.73 | 603.73 |
| | | | | | 6499090.42 | 2222314.86 | 612.05 | 604.05 |
| | | | | | 6499046.37 | 2222134.12 | 627.90 | 619.90 |
| | | | | | 6498794.92 | 2222135.96 | 698.86 | 690.86 |
| | | | | | 6498633.21 | 2222137.13 | 673.07 | 665.07 |
| | | | | | 6498599.88 | 2222154.65 | 670.29 | 662.29 |
| | | | | | 6498580.56 | 2222160.27 | 668.94 | 660.94 |
| | | | | | 6498560.64 | 2222163.15 | 667.77 | 659.77 |
| | | | | | 6498538.01 | 2222163.03 | 666.72 | 658.72 |
| | | | | | 6498520.58 | 2222160.49 | 665.42 | 657.42 |
| | | | | | 6498501.22 | 2222155.01 | 662.82 | 654.82 |
| | | | | | 6498434.51 | 2222122.97 | 662.10 | 654.10 |
| | | | | | 6498414.61 | 2222116.30 | 660.99 | 652.99 |
| | | | | | 6498394.04 | 2222112.07 | 659.66 | 651.66 |
| | | | | | 6498373.12 | 2222110.36 | 658.96 | 650.96 |
| | | | | | 6498352.14 | 2222111.19 | 658.98 | 650.98 |
| | | | | | 6498331.42 | 2222114.54 | 658.49 | 650.49 |
| | | | | | 6498311.25 | 2222120.37 | 657.36 | 649.36 |
| | | | | | 6498291.93 | 2222128.58 | 654.65 | 646.65 |
| | | | | | 6498273.74 | 2222139.07 | 653.07 | 645.07 |
| | | | | | 6498259.63 | 2222149.79 | 653.07 | 645.07 |
| | | | | | 6498175.29 | 2222238.75 | 653.07 | 645.07 |
| | | | | | 6498136.34 | 2222272.54 | 653.07 | 645.07 |
| | | | | | 6498115.19 | 2222287.32 | 645.57 | 637.57 |
| | | | | | 6498085.39 | 2222304.63 | 643.91 | 635.91 |
| | | | | | 6498082.82 | 2222307.03 | 643.91 | 635.91 |
| | | | | | 6498080.62 | 2222309.79 | 643.91 | 635.91 |
| | | | | | 6498078.86 | 2222312.84 | 643.91 | 635.91 |
| | | | | | 6498077.56 | 2222316.12 | 643.91 | 635.91 |
| | | | | | 6498078.19 | 2222321.70 | 644.98 | 636.98 |
| | | | | | 6498079.76 | 2222327.09 | 645.52 | 637.52 |
| | | | | | 6498082.23 | 2222332.13 | 645.40 | 637.40 |
| | | | | | 6498085.53 | 2222336.67 | 644.80 | 636.80 |
| | | | | | 6498089.55 | 2222340.59 | 644.53 | 636.53 |
| | | | | | 6498101.29 | 2222350.51 | 646.95 | 638.95 |
| | | | | | 6498114.36 | 2222358.60 | 646.48 | 638.48 |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | | | | 6498137.19 | 2222368.16 | 653.05 | 645.05 |
| | | | | | | 6498144.43 | 2222374.05 | 653.07 | 645.07 |
| | | | | | | 6498150.68 | 2222380.99 | 653.07 | 645.07 |
| | | | | | | 6498155.78 | 2222388.82 | 653.07 | 645.06 |
| | | | | | | 6498159.60 | 2222397.34 | 653.07 | 645.07 |
| | | | | | | 6498162.06 | 2222406.34 | 653.07 | 645.07 |
| | | | | | | 6498163.10 | 2222415.62 | 653.07 | 645.07 |
| | | | | | | 6498162.69 | 2222424.95 | 653.07 | 645.07 |
| | | | | | | 6498166.30 | 2222438.83 | 651.01 | 643.01 |
| | | | | | | 6498171.42 | 2222452.22 | 648.96 | 640.96 |
| | | | | | | 6498177.99 | 2222464.96 | 647.18 | 639.18 |
| | | | | | | 6498187.06 | 2222474.99 | 648.53 | 640.53 |
| | | | | | | 6498197.81 | 2222484.51 | 645.71 | 637.71 |
| | | | | | | 6498207.15 | 2222485.16 | 645.52 | 637.52 |
| | | | | | | 6498216.31 | 2222487.12 | 644.48 | 636.48 |
| | | | | | | 6498225.10 | 2222490.34 | 644.02 | 636.02 |
| | | | | | | 6498233.35 | 2222494.78 | 643.91 | 635.91 |
| | | | | | | 6498240.89 | 2222500.33 | 643.91 | 635.91 |
| | | | | | | 6498248.82 | 2222511.15 | 643.91 | 635.91 |
| | | | | | | 6498254.98 | 2222523.06 | 643.91 | 635.91 |
| | | | | | | 6498259.23 | 2222535.77 | 643.91 | 635.91 |
| | | | | | | 6498261.48 | 2222549.00 | 643.91 | 635.91 |
| | | | | | | 6498321.69 | 2222604.40 | 634.75 | 626.75 |
| SITEBOUNDARY | SITEBOUNDARY00002 | 8.00 | r | | | 6499469.57 | 2223172.98 | 500.03 | 492.03 |
| | | | | | | 6499792.64 | 2222957.84 | 41.85 | 33.85 |
| | | | | | | 6499791.42 | 2222791.89 | 54.36 | 46.36 |
| | | | | | | 6499463.63 | 2222514.81 | 654.66 | 646.66 |
| | | | | | | 6499405.40 | 2222589.98 | 653.07 | 645.06 |
| | | | | | | 6499402.30 | 2222644.91 | 653.07 | 645.06 |
| | | | | | | 6499393.79 | 2222696.74 | 659.79 | 651.79 |
| | | | | | | 6499386.06 | 2222729.23 | 662.22 | 654.22 |
| | | | | | | 6499428.61 | 2222850.68 | 653.44 | 645.44 |
| | | | | | | 6499430.15 | 2222879.31 | 650.91 | 642.91 |
| | | | | | | 6499303.28 | 2222958.99 | 625.92 | 617.92 |
| | | | | | | 6499336.55 | 2223017.01 | 598.11 | 590.11 |

## Barrier(s)

| Name | Sel. | M. | ID | Absorption | | Z-Ext. | Cantilever | | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | left | right | | horz. | vert. | Begin | End | x | y | z | Ground |
| | | | | | | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |

## Building(s)

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | Coordinates | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | x | y | z | Ground | |
| | | | | | | | (ft) | (ft) | (ft) | (ft) | (ft) | |

## Ground Absorption(s)

| Name | Sel. | M. | ID | G | Coordinates | |
|---|---|---|---|---|---|---|
| | | | | | x | y |
| | | | | | (ft) | (ft) |

## Vertical Area Source(s)

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |

## Rail

| Name | Sel. | M. | ID | Lw' | | Train Class | Correct. | Vmax |
|---|---|---|---|---|---|---|---|---|
| | | | | Day | Night | | Track | |
| | | | | (dBA) | (dBA) | | (dB) | (km(mph) |

## Sound Level Spectra

| Name | ID | Type | 1/3 Oktave Spectrum (dB) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Weight. | 25 | 31.5 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3150 | 4000 | 5000 | 63 |

## Roads

| Name | Sel. | M. | ID | Lme | | | Count Data | | exact Count Data | | | | | | Speed Limit | | SCS | Surface | | Gradient | Mult. Reflection | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Day | Evening | Night | DTV | Str.class. | M | | | p (%) | | | Auto | Truck | Dist. | Dstro | Type | | Drefl | Hbuild | Dist. |
| | | | | (dBA) | (dBA) | (dBA) | | | Day | Evening | Night | Day | Evening | Night | (mph) | (mph) | | (dB) | | (%) | (dB) | (ft) | (ft) |

## RoadsGeo

| Name | Height | | Coordinates | | | | Dist | LSlope |
|---|---|---|---|---|---|---|---|---|
| | Begin | End | x | y | z | Ground | (ft) | (%) |
| | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | | |

# **Appendix F1**
Traffic Report

# Ritz-Carlton Residences

## TRAFFIC IMPACT ANALYSIS

### CITY OF RANCHO MIRAGE

PREPARED BY:

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JULY 20, 2020

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# LIST OF ABBREVIATED TERMS

| | |
|---|---|
| (1) | Reference |
| ADT | Average Daily Traffic |
| Caltrans | California Department of Transportation |
| CEQA | California Environmental Quality Act |
| CMS | Changeable Message Sign |
| CMP | Congestion Management Program |
| CVAG | Coachella Valley Association of Governments |
| E+P | Existing Plus Project |
| EAP | Existing Plus Ambient Growth Plus Project |
| EAPC | Existing Plus Ambient Growth Plus Project Plus Cumulative |
| HCM | Highway Capacity Manual |
| HCS | Highway Capacity Software |
| ITE | Institute of Transportation Engineers |
| LOS | Level of Service |
| MUTCD | Manual on Uniform Traffic Control Devices |
| N/A | Not Applicable |
| NP | Without Project |
| PeMS | Performance Measurement System |
| PHF | Peak Hour Factor |
| Project | Ritz-Carlton Residences |
| PSA | Public Service Announcements |
| RivTAM | Riverside County Transportation Analysis Model |
| RTP | Regional Transportation Plan |
| SAT | Saturday |
| SCAG | Southern California Association of Governments |
| SCS | Sustainable Communities Strategy |
| sf | Square Feet |
| SHS | State Highway System |
| TIA | Traffic Impact Analysis |
| TUMF | Transportation Uniform Mitigation Fee |
| WP | With Project |

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# 1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed Ritz-Carlton Residences ("Project"), which is located north of Mirada Circle and east of Frank Sinatra Drive, in the City of Rancho Mirage as shown on Exhibit 1-1.

The purpose of this TIA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and recommend improvements to achieve acceptable circulation system operational conditions. This TIA has been prepared based on scoping agreement with the City of Rancho Mirage. (1) To ensure that this TIA satisfies the City of Rancho Mirage's traffic study requirements, Urban Crossroads, Inc. prepared a traffic study scoping package for review by City staff prior to the preparation of this report. The Agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The Agreement approved by the City is included in Appendix 1.1.

## 1.1 SUMMARY OF FINDINGS

For Existing (2019), EAPC (2023), and Horizon Year (2040) traffic conditions, the addition of Project traffic to study area intersections did not result in deficient intersection LOS operations.

However, it is recommended that the following improvements be implemented to accommodate Horizon Year (2040) With Project weekend special event 95$^{th}$ percentile traffic flows:

- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage from 260' to 400' for the NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage from 170' to 250' for the EBL movement

## 1.2 PROJECT OVERVIEW

It is our understanding that the Project is to expand the existing Ritz-Carlton hotel by 106 residential dwelling units, a 6,966 restaurant, and a 23,843 square foot venue. For the purposes of this analysis, it is assumed that the Project will be constructed within a single phase of development with a projected Opening Year of 2023.

Access to the Project site will be provided via the following roadways:

- Frank Sinatra Drive on SR-111 (full access)

Regional access to the project site is provided via the SR-111 at Frank Sinatra Drive.

## EXHIBIT 1-1: PRELIMINARY SITE PLAN



Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, 2017. (2) The proposed Project is anticipated to generate a net total of 1,068 trip-ends per day, 51 AM peak hour trips and 86 PM peak hour trips.

It should be noted that the venue will generate trips outside the weekday AM and PM peak hours. The trip generation estimate during special event has been calculated based on a maximum allowable occupancy of 0.8 per parking space. As such, the proposed Project (special event) is anticipated to generate a net total of 416 weekend peak hour trips.

The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

## 1.3 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential impacts to traffic and circulation have been evaluated for each of the following conditions:

- Existing (2019) Conditions
- E+P Conditions
- Existing plus Ambient Growth plus Project (EAP) (2023) Conditions
- Existing plus Ambient Growth plus Project Plus Cumulative (EAPC) (2023) Conditions
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

All study area intersections will be evaluated using the Highway Capacity Manual (HCM) 6th Edition analysis methodology.

### 1.3.1 EXISTING CONDITIONS

Existing physical conditions have been disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

### 1.3.2 E+P CONDITIONS

The E+P analysis determines circulation system deficiencies that would occur on the existing roadway system in the scenario of the Project being placed upon Existing conditions.

### 1.3.3 EAP CONDITIONS

The EAP (2023) traffic conditions analyses determine potential traffic impacts based on a comparison of the EAP traffic conditions to Existing conditions. To account for background traffic growth, an ambient growth factor from Existing conditions of 6.12% (2 percent per year over 3 years, compounded annually) for 2023 conditions is included for EAP traffic conditions. Consistent with County of Riverside traffic study guidelines, the EAP analysis is intended to identify "Opening Year" deficiencies associated with the development of the proposed Project based on the expected background growth within the study area.

### 1.3.4 EAPC CONDITIONS

The EAPC (2023) traffic conditions analyses determine the potential near-term cumulative circulation system deficiencies. Background traffic for these analysis scenarios follow the same ambient growth methodology described above for EAP traffic conditions. However, EAPC traffic conditions also include the addition of cumulative development traffic. The comprehensive list of cumulative development projects was compiled from information provided by the City of Rancho Mirage and Cathedral City.

### 1.3.5 HORIZON YEAR (2040) CONDITIONS

Traffic projections for Horizon Year (2040) with Project conditions were derived from the Riverside Transportation Analysis Model (RivTAM) modified to represent buildout of the City of Rancho Mirage. The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the City's Development Impact Fee (DIF) program, or other approved funding mechanisms can accommodate the long-range cumulative traffic at the target level of service (LOS) identified by the City of Rancho Mirage (lead agency).

The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the Transportation Uniform Mitigation Fee (TUMF), or other approved funding mechanism (e.g., Community Facilities District, etc.) can accommodate the long-range cumulative traffic at the target Level of Service (LOS) identified in the City of Rancho Mirage (lead agency) General Plan. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-TUMF) are identified as such. Each of these regional transportation fee programs are discussed in more detail in Section 9 *Local and Regional Funding Mechanisms*.

## 1.4 STUDY AREA

The Project study area was defined in coordination with the City of Rancho Mirage. Consistent with County of Riverside traffic study guidelines, the study area includes any intersection of "Collector" or higher classification street, with "Collector" or higher classification streets, at which the proposed project will add 50 or more peak hour trips. Exhibit 1-2 presents the study area and intersection analysis locations.

The "50 peak hour trip" criteria generally represents a minimum number of trips at which a typical intersection would have the potential to be substantively impacted by a given development proposal. Although each intersection may have unique operating characteristics, this traffic engineering rule of thumb is a widely utilized tool for estimating a potential area of impact (i.e., study area).

To ensure that this TIA satisfies the needs of the City of Rancho Mirage, Urban Crossroads, Inc. prepared a Project specific traffic study scoping agreement for review by City staff prior to the preparation of this TIA. The agreement provides an outline of the study area, trip generation, trip distribution, and analysis methodology. The agreement approved by the City of Rancho Mirage is included in Appendix 1.1.

### 1.4.1 INTERSECTIONS

The following 3 study area intersections shown on Exhibit 1-2 and listed in Table 1-1 were selected for this TIA based on consultation with City of Rancho Mirage staff. In general, the study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips, and input from the City of Rancho Mirage staff.

**TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS**

| ID | Intersection Location | Jurisdiction |
|---|---|---|
| 1 | Frank Sinatra Dr. & Dwy. 1 | Rancho Mirage |
| 2 | Frank Sinatra Dr. & Dwy. 2 | Rancho Mirage |
| 3 | Hwy. 111 & Frank Sinatra Dr. | Rancho Mirage |

## 1.5 ANALYSIS FINDINGS

This section provides a summary of the analysis results for Existing (2019), E+P, EAP (2023), EAPC (2023), and Horizon Year (2040) traffic conditions. A summary of intersection LOS by analysis scenario is sown on Exhibit 1-3.

### 1.5.1 EXISTING CONDITIONS

*Intersection Operations*

For Existing traffic conditions, the study area intersections are currently operating at an acceptable LOS during the peak hours.

*Traffic Signal Warrant Analysis*

No study area intersections currently warrant a traffic signal based on peak hour volumes.

*Queuing Analysis*

A queuing analysis was performed for the study area intersections to assess vehicle queues along the roadways. No intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the 95$^{th}$ percentile peak hour traffic flows.

### 1.5.2 E+P CONDITIONS

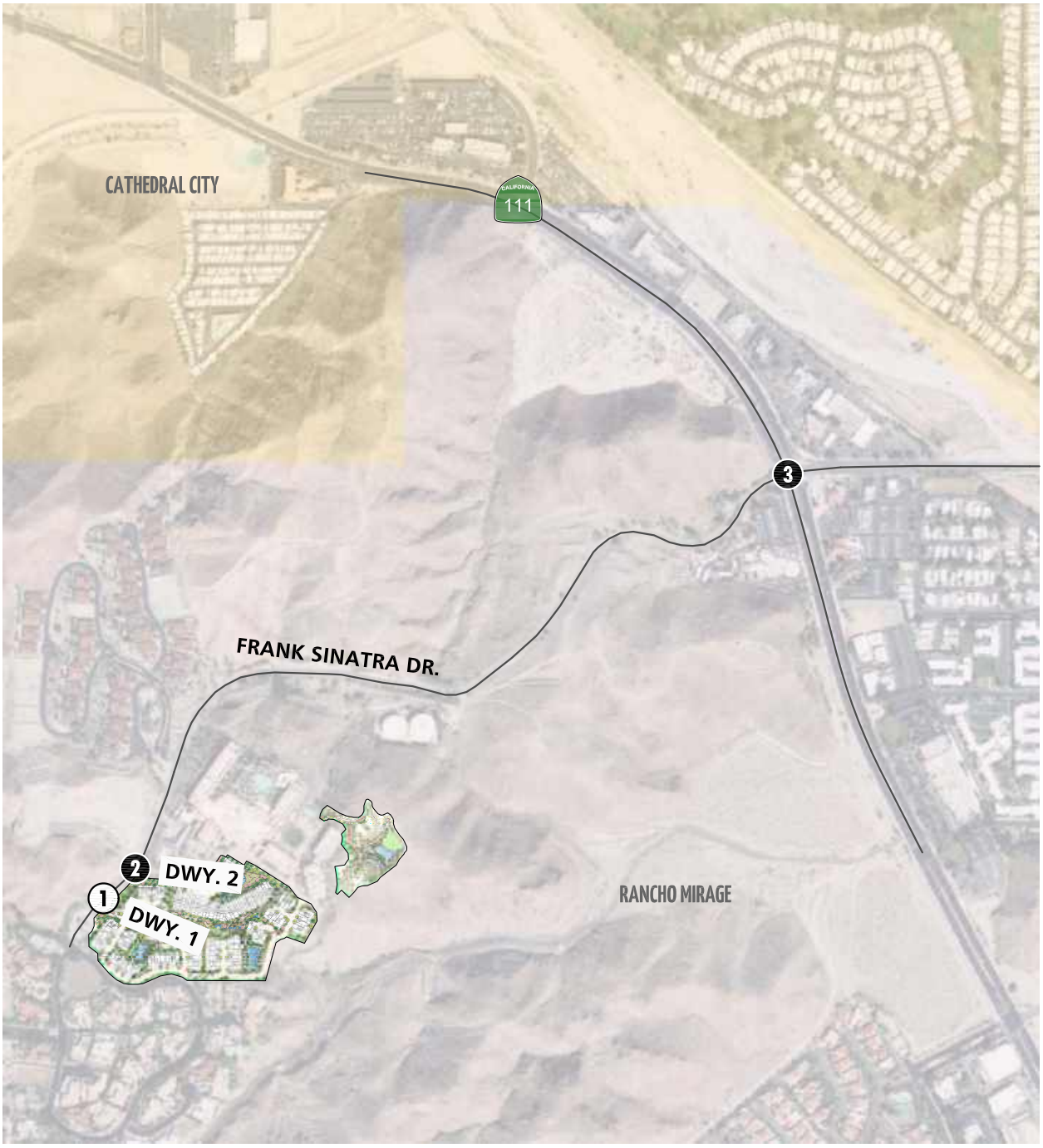
*Intersection Operations*

The addition of Project traffic is not anticipated to result in any deficiencies consistent with Existing traffic conditions.

*Traffic Signal Warrant Analysis*

No study area intersections are anticipated to warrant a traffic signal under E+P traffic conditions.

## EXHIBIT 1-2: LOCATION MAP




**LEGEND:**

0 = EXISTING INTERSECTION ANALYSIS LOCATION

0 = FUTURE INTERSECTION ANALYSIS LOCATION

N

*12609 - locmap.dwg*

URBAN CROSSROADS

**EXHIBIT 1-3: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO**

| # | Intersection | Existing (2019) | E+P | EAP (2023) | EAPC (2023) | Horizon Year (2040) Without Project | Horizon Year (2040) With Project |
|---|---|---|---|---|---|---|---|
| 1 | Frank Sinatra Dr. & Dwy. 1 | NA | | | | NA | |
| 2 | Frank Sinatra Dr. & Dwy. 2 | | | | | | |
| 3 | Highway 111 & Frank Sinatra Dr. | | | | | | |

**LEGEND:**

- = AM PEAK HOUR LOS
- = PM PEAK HOUR LOS
- = SATURDAY LOS
- = LOS A-D
- = LOS E
- = LOS F
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

*Queuing Analysis*

For E+P conditions, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday 95th percentile peak hour traffic flows. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 & Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – EBL movement

### 1.5.3 EAP 2023 Conditions

*Intersection Operations*

For EAP 2023 conditions, the addition of ambient growth and Project traffic is not anticipated to result in any deficiencies consistent with Existing traffic conditions.

*Traffic Signal Warrant Analysis*

No study area intersections are anticipated to warrant a traffic signal under EAP 2023 traffic conditions.

*Queuing Analysis*

For EAP 2023 conditions, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday 95th percentile peak hour traffic flows. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 & Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – EBL movement

### 1.5.4 EAPC 2023 Conditions

*Intersection Operations*

For EAPC 2023 conditions, the addition of ambient growth, cumulative projects, and Project traffic is not anticipated to result in any deficiencies consistent with Existing traffic conditions.

*Traffic Signal Warrant Analysis*

No study area intersections are anticipated to warrant a traffic signal under EAPC 2023 traffic conditions.

*Queuing Analysis*

For EAPC 2023 conditions, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday 95th percentile peak hour traffic flows. However, the following movements are anticipated to exceed the

available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 & Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – EBL movement

### 1.5.4 Horizon Year (2040) Conditions

*Intersection Operations*

For Horizon Year (2040) Without Project conditions, no study area intersections are anticipated to operate at unacceptable levels of service. With the addition of Project traffic, no additional study area intersections are anticipated to operate at unacceptable levels of service.

*Traffic Signal Warrant Analysis*

No study area intersections are anticipated to warrant a traffic signal under Horizon Year (2040) Without and With Project traffic conditions.

*Queuing Analysis*

No intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday and weekend 95th percentile peak hour traffic flows for Horizon Year (2040) Without Project. With the addition of Project traffic, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday 95th percentile peak hour traffic flows. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 & Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – EBL movement

## 1.6 On-Site Roadway and Site Access Improvements

The Project is proposed to have access onto the SR-111 at Frank Sinatra Drive. Regional access to the Project site will be provided by the SR-111.

Roadway improvements necessary to provide site access and on-site circulation are assumed to be constructed in conjunction with site development and are described below. These improvements should be in place prior to occupancy.

### 1.6.1 Site Adjacent Roadway Improvements

The recommended site-adjacent roadway improvements for the Project are described below. These improvements need to be incorporated into the Project description prior to Project approval or imposed as conditions of approval as part of the Project approval. Exhibit 1-4 illustrates the site adjacent and site access roadway improvement recommendations.

Frank Sinatra Drive is a north-south oriented roadway located along the Project's western boundary. Frank Sinatra Drive appears to be currently constructed at its ultimate full-section

width as a Local Street (60-foot right-of-way) between the Project's northern and southern boundaries.

### 1.6.2 SITE ACCESS IMPROVEMENTS

The recommended site access driveway improvements for the Project are described below. Exhibit 1-4 also illustrates the on-site and site adjacent recommended intersection lane improvements for Project traffic conditions.

It is recommended that the following improvements be implemented to accommodate Horizon Year (2040) With Project weekend special event 95$^{th}$ percentile traffic flows:

- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage from 260' to 400' for the NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage from 170' to 250' for the EBL movement

The following intersection recommendations represent the minimum lanes that must be provided to achieve acceptable peak hour operations:

***Frank Sinatra Drive & Driveway 1*** – Construct the intersection with a stop control on the westbound approach and the following geometrics:

- Northbound Approach: One shared through-right turn lane.
- Southbound Approach: One shared left-through lane.
- Eastbound Approach: Not Applicable (N/A).
- Westbound Approach: One shared left-right turn lane.

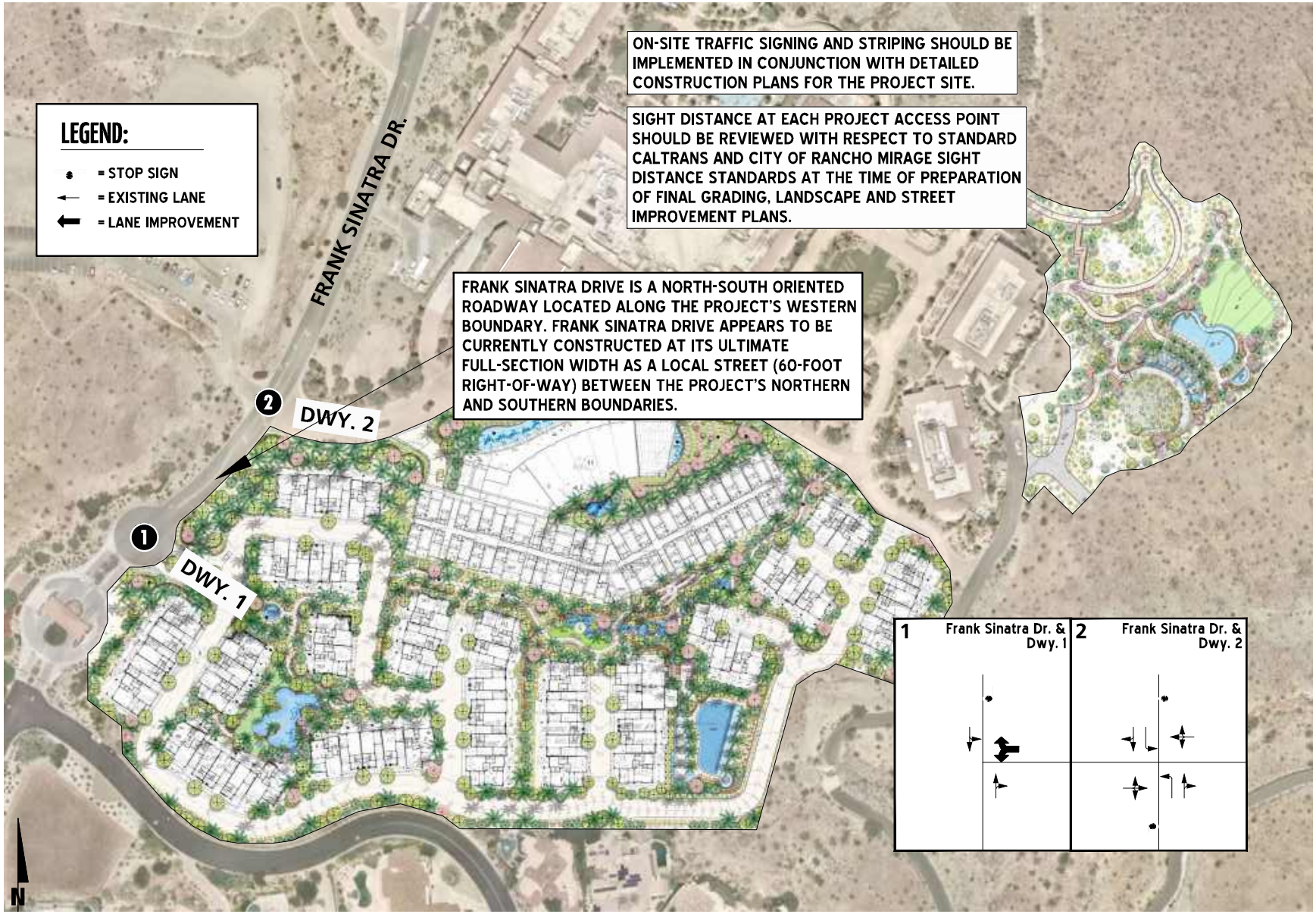
***Driveway 2 & Foothill Boulevard*** – Maintain the existing stop control on the westbound approach and the following existing geometrics:

- Northbound Approach: One left turn lane and one shared through-right turn lane.
- Southbound Approach: One left turn lane and one shared through-right turn lane.
- Eastbound Approach: One shared left-through-right turn lane.
- Westbound Approach: One shared left-through-right turn lane.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of Rancho Mirage sight distance standards at the time of preparation of final grading, landscape and street improvement plans.

## EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS



## 1.7 SIGHT DISTANCE ANALYSIS

The intersection sight distance has been evaluated for Driveway 1 and Driveway 2 on Frank Sinatra Drive. As defined by the California Department of Transportation (Caltrans) Highway Design Manual, sight distance is the continuous length of highway ahead visible to the driver.

At unsignalized intersections, corner sight distance must provide a substantially clear line of sight between the driver of the vehicle waiting on the minor road (driveway) and the driver of an approaching vehicle. For the purposes of this analysis, a 7 ½ second criterion has been applied to the outside travel lanes in either direction to provide the most conservative sight distance. The 7 ½ second criterion allows waiting vehicles to either cross all lanes of through traffic by turning left or cross the near lanes by turning right without requiring through traffic to radically alter their speed.

Adequate visibility for vehicular and pedestrian traffic can be provided at each Project driveway by limiting sight obstructions within the limited use area. Any landscaping/hardscape within the limited use area should not exceed 30-inches (2.5-feet) in height. The limited use area should be kept clear of any landscaping or any other obstructions that may impede the visibility of the driver, including on-street parking. Minimum corner sight distance for the Project driveways is illustrated on Exhibit 1-5, however, sight distance should be re-evaluated once the driveway has been constructed.

## 1.8 SPECIAL EVENT TRAFFIC MANAGEMENT PLAN

It is recommended that the Project applicant coordinate with the City staff to refine the traffic management plan prior to the Special Event. Exhibit 1-6 shows a high-level event operations planning. (3)

Special event flaggers, law enforcement personnel, and portable changeable message signs (CMS) are recommended to facilitate the movement of special event traffic, shuttles and pedestrians.

### 1.8.1 CHANGEABLE MESSAGE SIGNS

Portable changeable message signs (CMS) are recommended along the major routes of Highway 111 and Frank Sinatra Drive in order to facilitate guests to and from the on-site and off-site parking.

### 1.8.2 LAW ENFORCEMENT OFFICERS/EVENT FLAGGERS

Law enforcement personnel and/or special event flaggers are recommended to direct traffic at the following key locations:

- Frank Sinatra Dr. & Dwy. 1
- Frank Sinatra Dr. & Dwy. 2
- Hwy. 111 & Frank Sinatra Dr.

## EXHIBIT 1-5: SIGHT DISTANCE




**LEGEND:**

= MINIMUM SIGHT DISTANCE LINES

= LIMITED USE AREA
(THERE SHALL BE NO OBSTRUCTION WITHIN THE LIMITED USE AREA. OBSTRUCTIONS INCLUDE, BUT NOT LIMITED TO, ANY SIGNS OR OBJECTS HIGHER THAN 2.5' MEASURED FROM PAVEMENT WITHIN THE AREA OF LIMITED USE.)

N

GRAPHIC SCALE
0 60 120
1"=120'

*12609 - sight distance.dwg*

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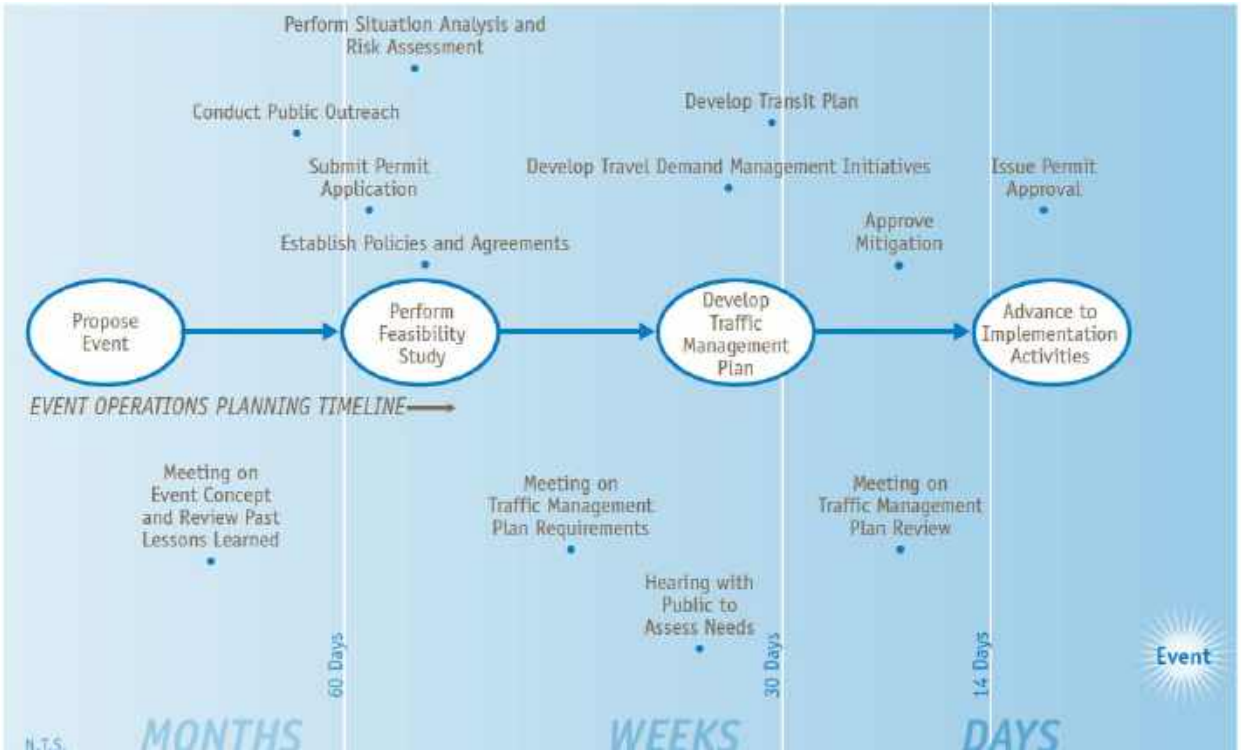
**EXHIBIT 1-6: EVENT OPERATIONS PLANNING SCHEDULE**




Source: Managing Travel for Planned Special Events Handbook: Executive Summary (June 2007) prepared by Federal Highway Administration (FHWA)

### 1.8.3 PUBLIC SERVICE ANNOUNCEMENTS

Public service announcements (PSA) are recommended to provide information to event guests prior to the event. Examples include, but are not limited to:

- Online event information (i.e., suggested routes, parking, etc.)
- CMS prior to the event
- Brochures

### 1.8.4 SIGNAL TIMING ADJUSTMENTS

Coordinate with the City staff to provide traffic signal timing adjustment based on the expected peak arrival and departure periods of the special event at the following intersections:

- Hwy. 111 & Frank Sinatra Dr.

### 1.8.5 PARKING MANAGEMENT STRATEGIES

The recent rise in popularity of Transportation Network Companies (TNCs) such as Uber and Lyft, has the potential to significantly change future parking demands. The TNC or ridesharing model, in which users can request rides through their smartphones, provides on-demand transportation in personal vehicles with direct point-to-point trips. The use rather than ownership model of TNCs may over time substantially reduce the need for dedicated parking. In addition, on-demand

transportation increases the need to promote accessible drop-off and pick-up areas. Recognizing increased parking demand during special events, the following parking management strategies should be considered:

- **Drop-off and Pick-up areas:** Provide convenient and accessible drop-off and pick-up areas to promote ridesharing and reduce parking demands. In addition, the Project applicant may consider providing short-term parking with time restrictions of 10-15 minutes to provide staging areas for ridesharing vehicles.
- **Off-site Employee Parking:** To maximize the available on-site parking supply, employees should park off-site. According to the parking ratios published by ULI, employees can account for approximately 25% of the available parking supply. Providing off-site parking facilities with convenient shuttle service to bring employees to and from an off-site facility during special events can substantially increase the available of on-site parking supply.
- **Valet Parking**: Implementation of valet parking during special events can substantially increase the available on-site parking capacity. In addition, valet parking will also provide for convenient accessible parking special events.

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# 2 METHODOLOGIES

This section documents the methodologies and assumptions used to perform this traffic assessment.

## 2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

## 2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The *Highway Capacity Manual* (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (4) The HCM uses different procedures depending on the type of intersection control.

### 2.2.1 SIGNALIZED INTERSECTIONS

The City of Rancho Mirage require signalized intersection operations analysis based on the methodology described in the HCM 6$^{th}$ Edition (4). Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1.

**TABLE 2-1: SIGNALIZED INTERSECTION DESCRIPTION OF LOS**

| Description | Average Control Delay (Seconds), V/C ≤ 1.0 | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Operations with very low delay occurring with favorable progression and/or short cycle length. | 0 to 10.00 | A | F |
| Operations with low delay occurring with good progression and/or short cycle lengths. | 10.01 to 20.00 | B | F |
| Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. | 20.01 to 35.00 | C | F |
| Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C | 35.01 to 55.00 | D | F |

| | | | |
|---|---|---|---|
| ratios. Many vehicles stop and individual cycle failures are noticeable. | | | |
| Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay. | 55.01 to 80.00 | E | F |
| Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths | 80.01 and up | F | F |

Source: HCM 6th Edition

Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network. All signalized study area intersections have also utilized the Synchro software.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15 minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per Chapter 4 of the HCM 6th Edition, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (7)

### 2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Rancho Mirage require the operations of unsignalized intersections be evaluated using the methodology described in the HCM 6th Edition. (4) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

**TABLE 2-2: UNSIGNALIZED INTERSECTION DESCRIPTION OF LOS**

| Description | Average Control Delay Per Vehicle (Seconds) | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Little or no delays. | 0 to 10.00 | A | F |
| Short traffic delays. | 10.01 to 15.00 | B | F |
| Average traffic delays. | 15.01 to 25.00 | C | F |
| Long traffic delays. | 25.01 to 35.00 | D | F |
| Very long traffic delays. | 35.01 to 50.00 | E | F |
| Extreme traffic delays with intersection capacity exceeded. | > 50.00 | F | F |

Source: HCM 6th Edition

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of

all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

## 2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TIA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD), for all study area intersections. (5)

The signal warrant criteria for Existing conditions are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CAMUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (5) Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing study area intersections for all analysis scenarios. Warrant 3 is appropriate to use for this TIA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets.

Traffic signal warrant analyses were performed for all of the following unsignalized study area intersections (see Table 2-3):

**TABLE 2-3: UNSIGNALIZED INTERSECTION LOCATIONS**

| ID | Intersection Location |
|---|---|
| 1 | Frank Sinatra Drive & Driveway 1 |
| 2 | Frank Sinatra Drive & Driveway 2 |

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Existing Conditions* of this report. The traffic signal warrant analysis for future conditions is presented Section 5 *E+P Traffic Analysis*, Section 6 *EAP (2023) Traffic Analysis*, Section 7 *EAPC (2023) Traffic Analysis, and* Section 8 *Horizon Year (2040) Traffic Analysis* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may

satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

## 2.4 QUEUING ANALYSIS

A queuing analysis has been conducted for all intersections and Project driveways. The 95th percentile queuing of vehicles has been assessed along these roadways to determine potential queuing issues at the intersections.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential impacts/needs of the intersections with traffic added from the proposed Project. The 50th percentile maximum queue is the maximum back of queue on a typical cycle during the peak hour, while the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes during the peak hour. In other words, if traffic were observed for 100 cycles, the 95th percentile queue would be the queue experienced with the 95th busiest cycle (or 5% of the time). The 50th percentile or average queue represents the typical queue length for peak hour traffic conditions, while the 95th percentile queue is derived from the average queue plus 1.65 standard deviations. The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations.

## 2.5 MINIMUM LEVEL OF SERVICE (LOS)

Per Goal 1, Policy 1 of the City of Rancho Mirage General Plan, the following LOS will be utilized for study area intersections located within the City: Require development to achieve a peak hour LOS D or better at intersections and roadway segments.

## 2.6 DEFICIENCY CRITERIA

To determine whether the addition of project traffic at a study intersection would result in a deficiency, the following will be utilized:

- A deficiency occurs at study area intersections if the pre-Project condition is at or better than LOS D (i.e., acceptable LOS), and the addition of project trips causes the peak hour LOS of the study area intersection to operate at unacceptable LOS (i.e., LOS E or F). Per the County of Riverside traffic study guidelines, for intersections currently operating at unacceptable LOS (LOS E or F), a deficiency would occur if the Project contributes 50 or more peak hour trips to pre-project traffic conditions.

# 3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Rancho Mirage General Plan Circulation Network, and a review of existing peak hour intersection operations, traffic signal warrant, and queuing analyses.

## 3.1 EXISTING CIRCULATION NETWORK

The study area includes a total of 3 intersections as shown previously on Exhibit 1-1. Exhibit 3-1 illustrates the study area intersections and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

## 3.2 CITY OF RANCHO MIRAGE GENERAL PLAN CIRCULATION ELEMENT

Exhibit 3-2 shows the City of Rancho Mirage General Plan Circulation Element, and Exhibit 3-3 illustrates the City of Rancho Mirage General Plan roadway cross-sections.

A brief description of each roadway including existing and planned roadway width is provided below:

**Frank Sinatra Drive** is an east-west major collector running through the City of Rancho Mirage. Most of Frank Sinatra Drive is constructed to its ultimate design standards with a 100-foot right-of-way. However, Frank Sinatra Drive, west of Highway 111, is designated as a two lane roadway in the General Plan.

**Highway 111** is the major arterial connecting most of the commercial centers of the Coachella Valley. As a major arterial, the route runs north-west to south-east diagonally within the study area. Highway 111 provides three through travel lanes in each direction. Highway 111 is designated as a Riverside County CMP roadway.

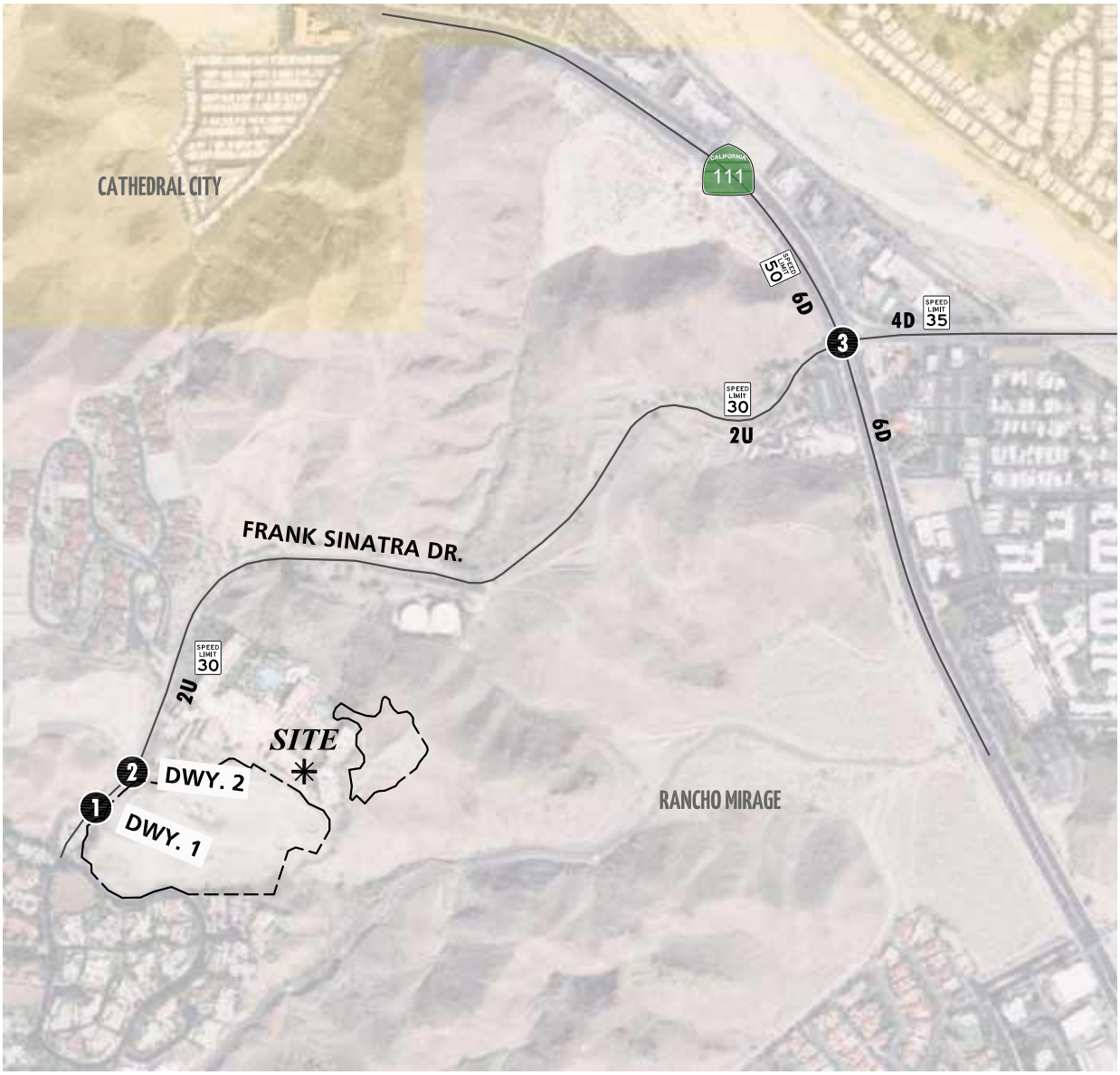
## 3.3 TRUCK ROUTES

The City of Rancho Mirage designated truck route map is shown on Exhibit 3-4. Highway 111 is identified as designated truck route.

## 3.4 TRANSIT SERVICE

The City of Rancho Mirage and is currently served by the SunLine Transit Agency (STA), a public transit agency serving various jurisdictions throughout Coachella Valley. The existing bus routes provided within the City are shown on Exhibit 3-5. Transit service is reviewed and updated by STA periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. It should also be noted that SunDial service provides special services for the disabled and seniors (60+).

## EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| Future Intersection | | |

**LEGEND:**

- = TRAFFIC SIGNAL
- = STOP SIGN
- 4 = NUMBER OF LANES
- D = DIVIDED
- U = UNDIVIDED
- = CHANNELIZED YIELD
- SPEED LIMIT 25 = SPEED LIMIT (MPH)

N

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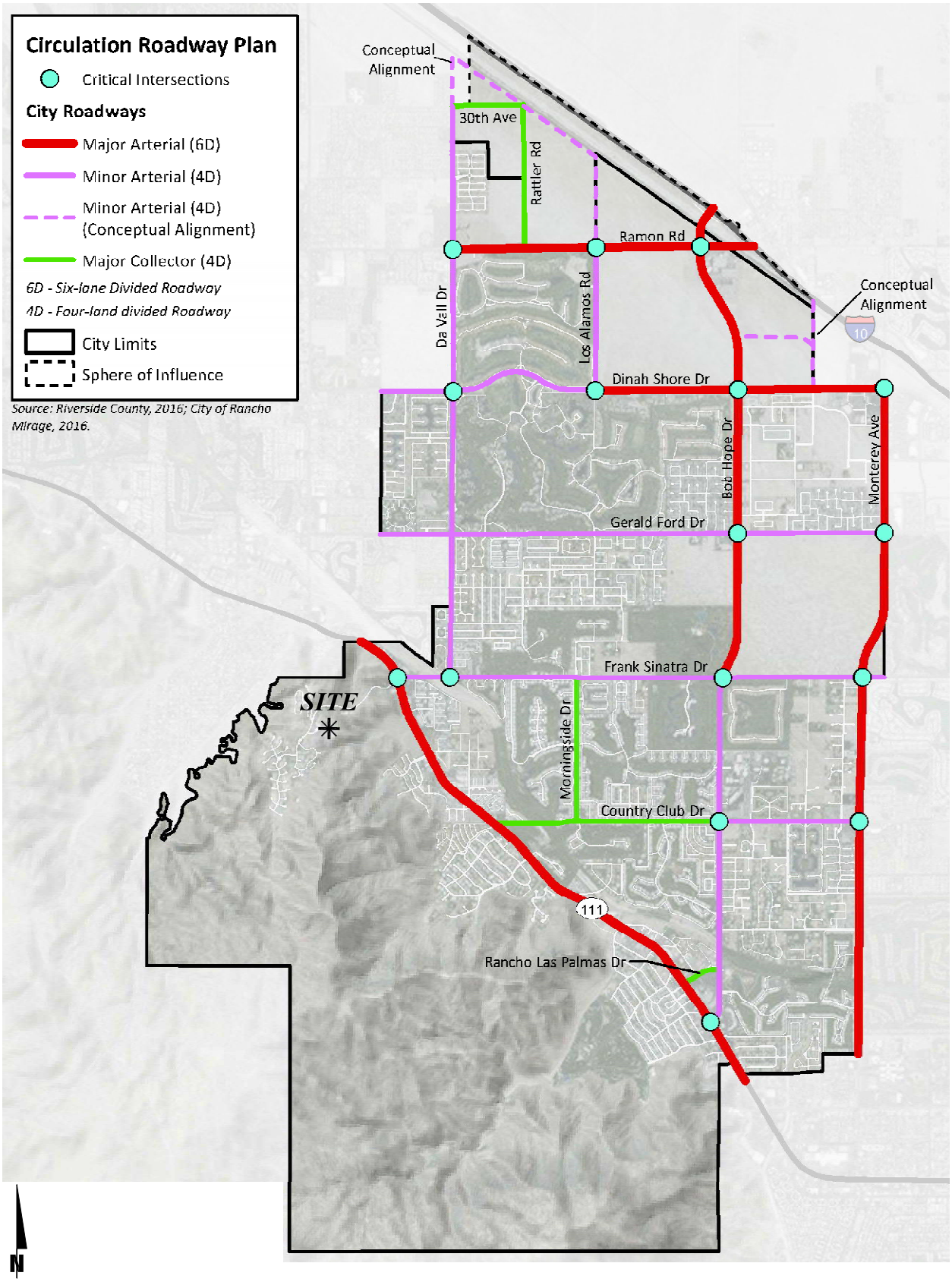
## EXHIBIT 3-2: CITY OF RANCHO MIRAGE GENERAL PLAN CIRCULATION ELEMENT

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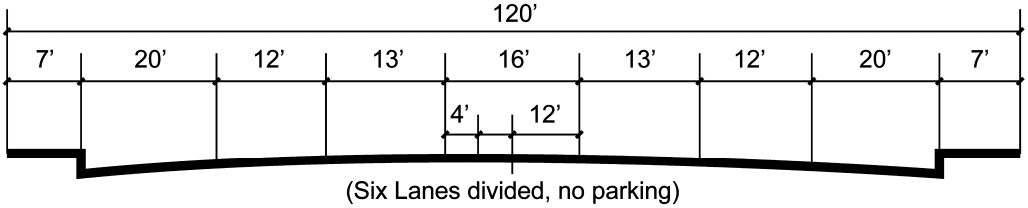
## EXHIBIT 3-3: CITY OF RANCHO MIRAGE GENERAL PLAN STREET CROSS SECTIONS

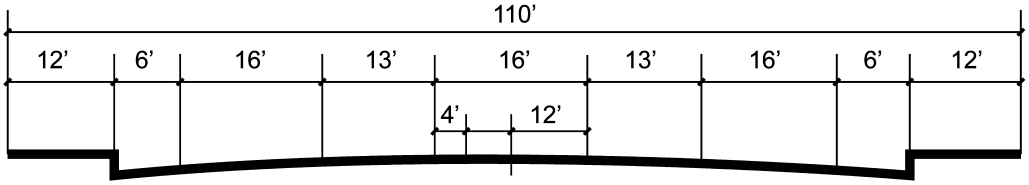
**Major Arterial***




(Six Lanes divided, no parking)

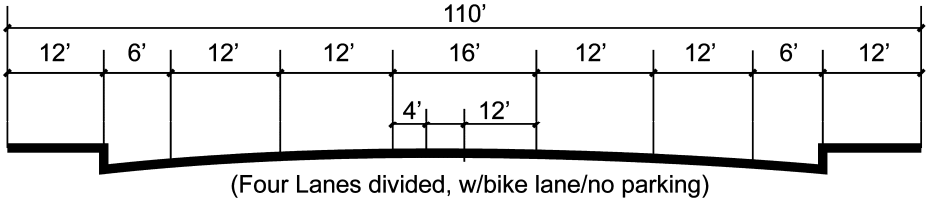
*Highway 111 has special design geometrics, See Rancho Mirage Highway 111 Alignment Study, 1996.

**Minor Arterial**



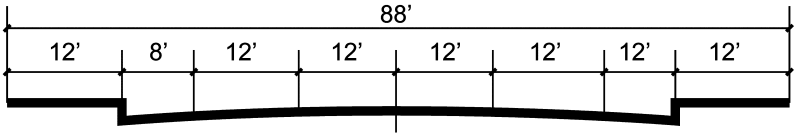

(Four Lanes divided, w/bike lane/no parking)

**Major Collector**



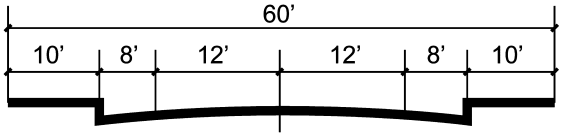

(Four Lanes divided, w/bike lane/no parking)

**Minor Collector**



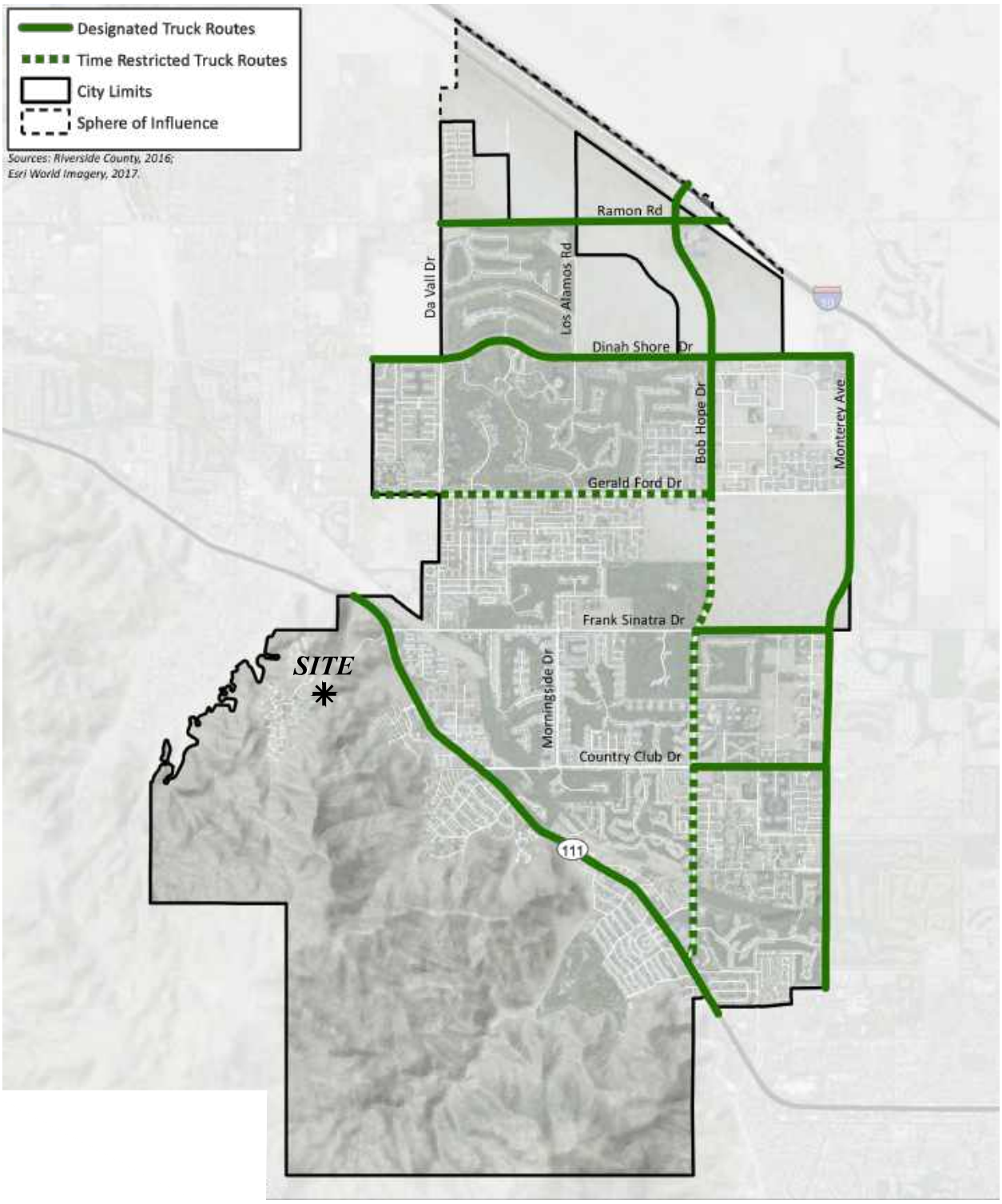

(Four Lanes undivided, w/parking)

**Local**




(Two Lanes, w/parking)

## EXHIBIT 3-4: CITY OF RANCHO MIRAGE GENERAL PLAN DESIGNATED TRUCK ROUTES



## EXHIBIT 3-5: EXISTING TRANSIT ROUTES




**LEGEND:**

= SUNLINE TRANSIT AGENCY ROUTE 111 B = BUS STOP

N

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## 3.5 BICYCLE & PEDESTRIAN FACILITIES

Existing bicycle and pedestrian facilities within City are shown on Exhibit 3-6. The General Plan identifies that Pedestrian and other non-motor circulation is encouraged in the City wherever possible.

## 3.6 EXISTING (2019) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in December 2019. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)
- Saturday Mid-day Peak Hour (peak hour between 10:00 AM and 2:00 PM)

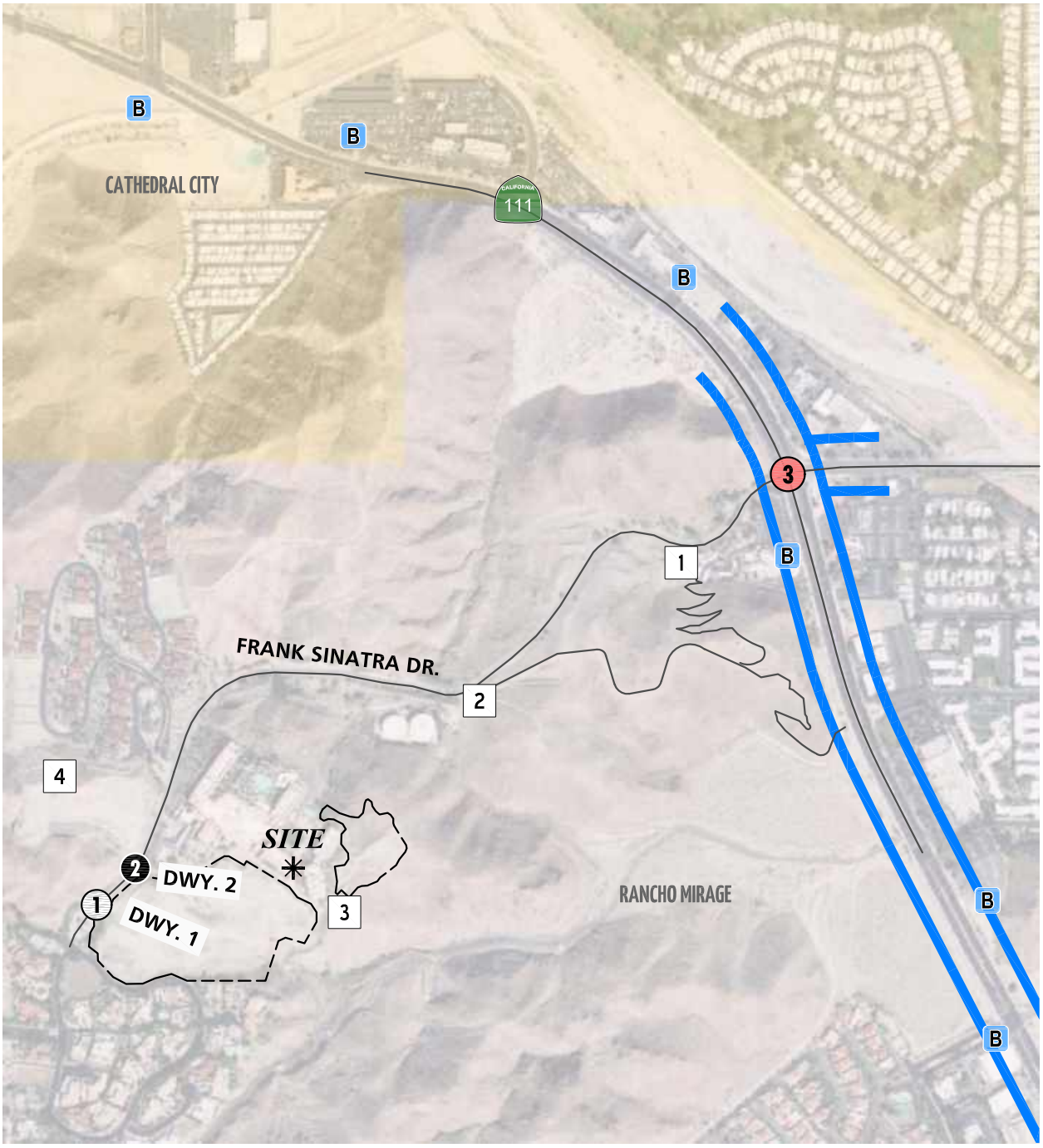
The weekday AM, weekday PM, and Saturday mid-day peak hour count data is representative of typical peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. These raw turning volumes have been flow conserved between intersections with limited access, no access and where there are currently no uses generating traffic.

Existing weekday average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-7. Existing ADT volumes are based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 6.23 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 16.06 percent. As such, the above equation utilizing a factor of 6.23 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 16.06 percent (i.e., 1/0.01606 = 6.23) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday AM and weekday PM intersection volumes are shown on Exhibit 3-7, and Saturday peak hour intersection volumes are shown on Exhibit 3-8.

## EXHIBIT 3-6: EXISTING PEDESTRIAN FACILITIES




**LEGEND:**

- = SIDEWALK
- 0 = CROSSWALK ON TWO APPROACHES
- B = BUS STOP
- 0 = NO CROSSWALK
- 0 = FUTURE INTERSECTION
- 1 = BIGHORN OVERLOOK TRAIL
- 2 = JACK RABBIT TRAIL
- 3 = CHUCKWALLA TRIAL
- 4 = ROAD RUNNER TRAIL

N

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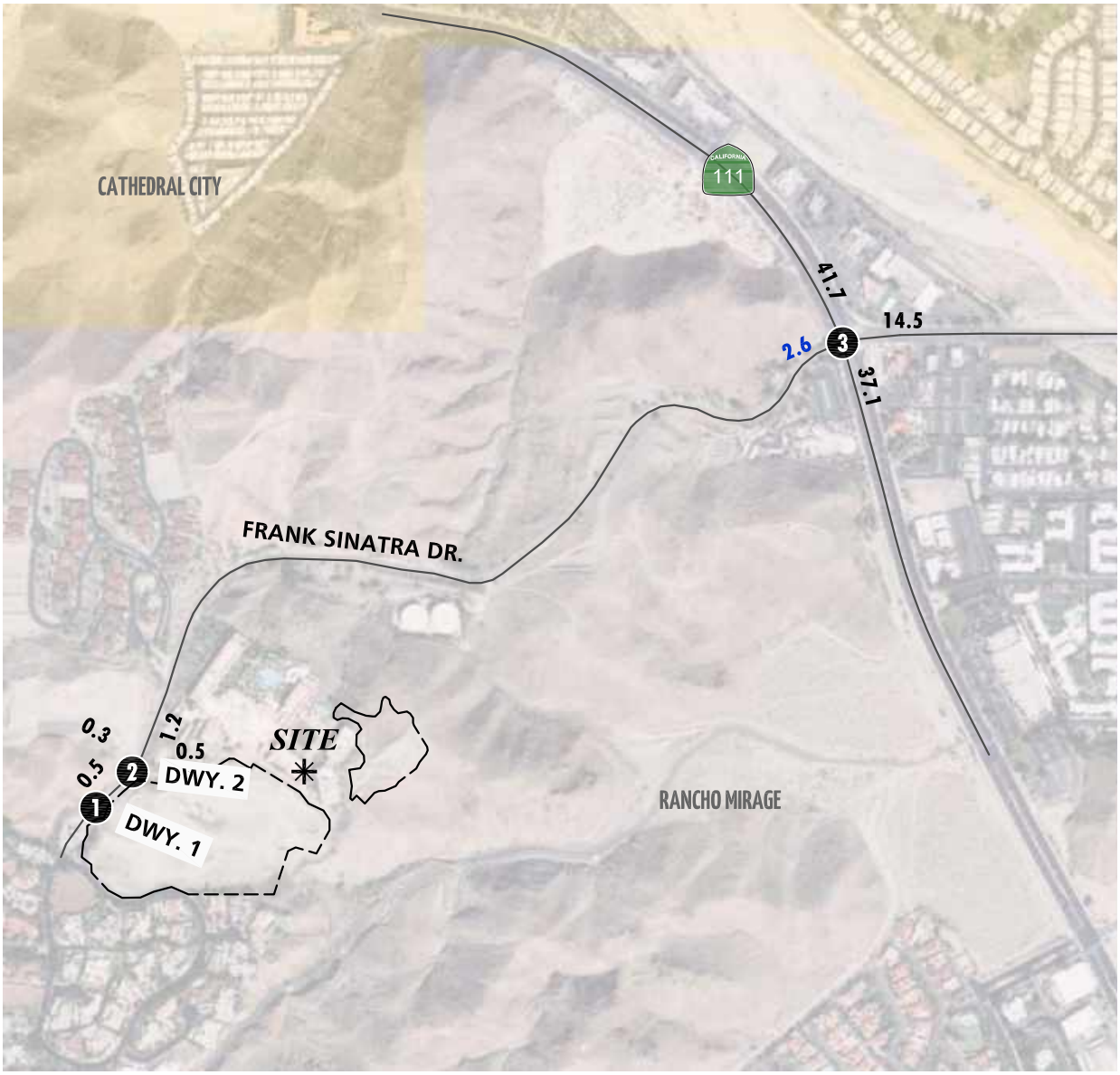
URBAN CROSSROADS

## EXHIBIT 3-7: EXISTING (2019) WEEKDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| Future Intersection | 0(1) 36(18) 12(25) → 15(8) ← 0(4) ← 0(0)<br>0(16) → 1(2) → 1(0) → 1(0) 17(20) 0(0) | 38(19) 1128(1172) 268(368) → 362(301) ← 55(30) ← 260(149)<br>14(33) → 20(51) → 17(24) → 35(32) 714(1193) 87(174) |

**LEGEND:**

**10.0** = ACTUAL (COUNT-BASED) VEHICLES PER DAY (1000'S)
**10.0** = ESTIMATED VEHICLES PER DAY (1000'S)
**10(10)** = AM(PM) PEAK HOUR INTERSECTION VOLUMES

N

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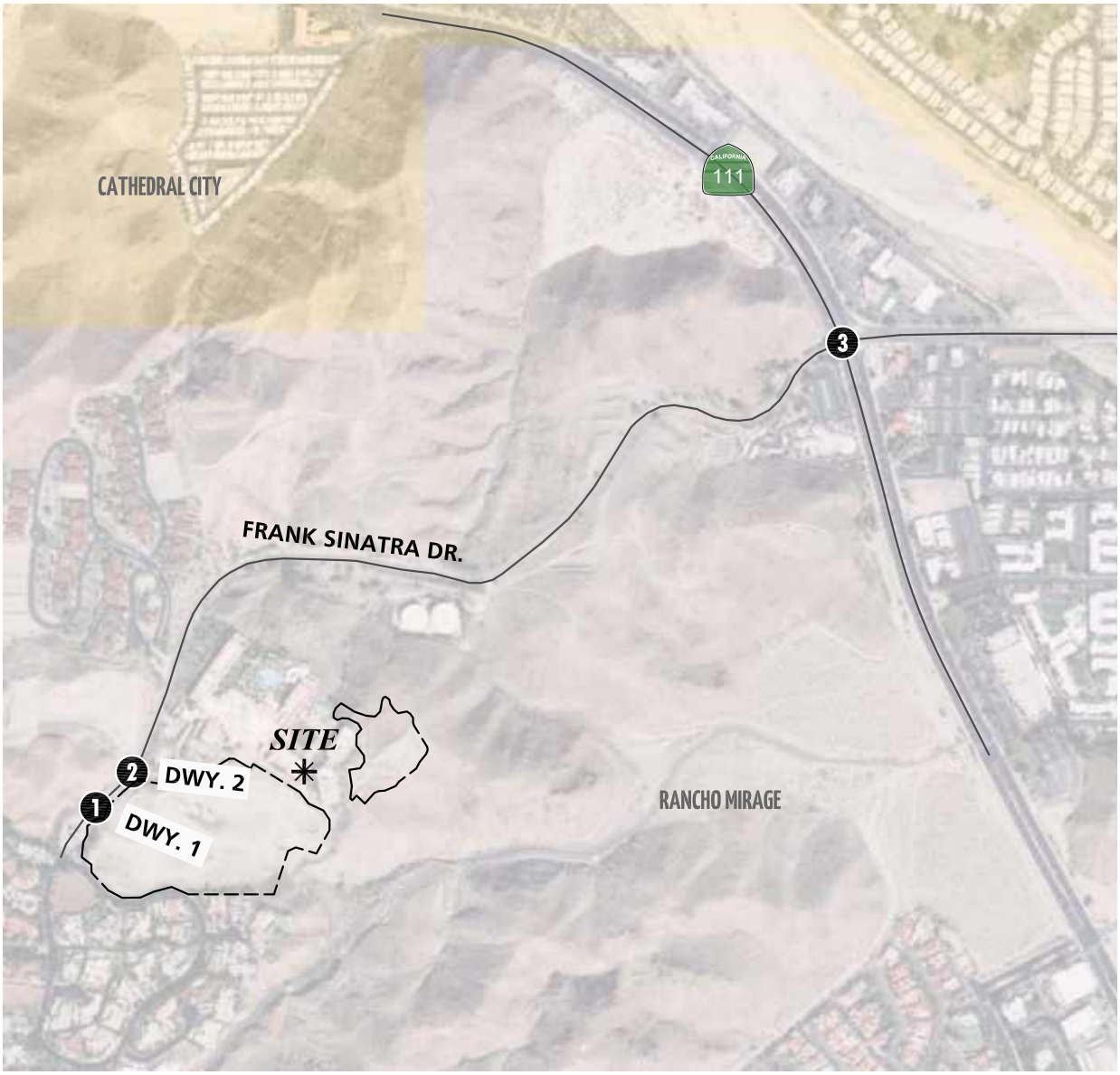
URBAN CROSSROADS

## EXHIBIT 3-8: EXISTING (2019) SATURDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| Future Intersection | 3 19 33 — 27 1 0<br>1 0 0 — 0 17 3 | 36 1171 188 — 160 28 141<br>19 42 11 — 48 1078 95 |

**LEGEND:**

10 = SATURDAY PEAK HOUR INTERSECTION VOLUMES

N

## 3.7 EXISTING CONDITIONS INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1 which indicates that all existing study area intersections are currently operating at an acceptable LOS (i.e., LOS D or better) during one or more of the peak hours.

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-9. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

## 3.8 EXISTING CONDITIONS TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. For Existing (2019) traffic conditions, no existing study area intersections appear to currently warrant a traffic signal based on peak hour traffic flows (see Appendix 3.3).

## 3.9 QUEUING ANALYSIS

A queuing analysis was performed for study area intersection to assess vehicle queues along the roadways. Existing (2019) queuing analysis findings are presented in Table 3-2.

As shown on Table 3-2, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the 95$^{th}$ percentile peak hour traffic flows. Worksheets for Existing (2019) conditions queuing analysis are provided in Appendix 3.4.

## EXHIBIT 3-9: EXISTING (2019) SUMMARY OF LOS

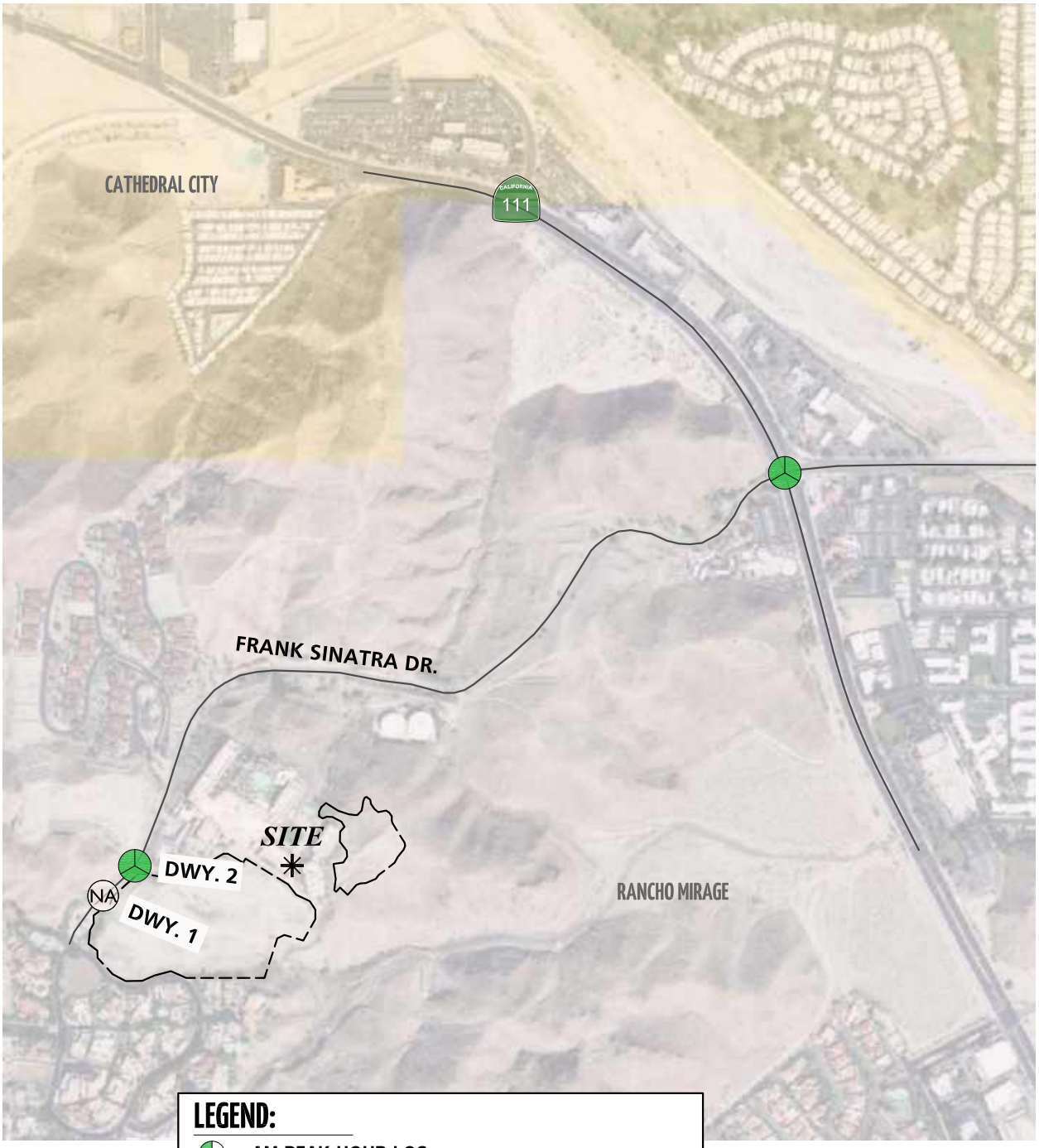



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**Table 3-1**

**Intersection Analysis for Existing (2019) Conditions**

| # | Intersection | Traffic Control[3] | Intersection Approach Lanes[1] | | | | | | | | | | | | Delay[2] (secs.) | | | Level of Service | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Weekday | | | Weekday | | |
| | | | L | T | R | L | T | R | L | T | R | L | T | R | AM | PM | SAT | AM | PM | SAT |
| 1 | Frank Sinatra Dr. & Dwy. 1 | | Future Intersection | | | | | | | | | | | | | | | | | |
| 2 | Frank Sinatra Dr. & Dwy. 2 | CSS | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 9.0 | 9.4 | 9.7 | A | A | A |
| 3 | Hwy. 111 & Frank Sinatra Dr. | TS | 1 | 3 | 1 | 2 | 3 | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 19.9 | 19.2 | 18.1 | B | B | B |

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross-street Stop; TS = Traffic Signal

**Table 3-2**

**Peak Hour Queuing Summary for Existing (2019) Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | 95th Percentile Queue (Feet)[2] | | | Acceptable?[1] | | |
|---|---|---|---|---|---|---|---|---|
| | | | AM | PM | SAT | AM | PM | SAT |
| Frank Sinatra Dr. & Dwy. 1 | | | Future Intersection | | | | | |
| Frank Sinatra Dr. & Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes |
| | WBL/R | 200 | 34 | 28 | 45 | Yes | Yes | Yes |
| Hwy. 111 & Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes |
| | EBT/R | 270 | 41 | 74 | 51 | Yes | Yes | Yes |

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] Maximum queue length for the approach reported.

# 4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network.

It is our understanding that the Project is to expand the existing Ritz-Carlton hotel by 106 residential dwelling units, a 6,966 restaurant, and a 23,843 square foot venue. For the purposes of this analysis, it is assumed that the Project will be constructed within a single phase of development with a projected Opening Year of 2023.

Access to the Project site will be provided via the following roadways:

- Frank Sinatra Drive on SR-111 (full access)

Regional access to the project site is provided via the SR-111 at Frank Sinatra Drive.

## 4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

Weekday trip generation rates used to estimate Project traffic and a summary of the Project's weekday trip generation are shown in Table 4-1. The weekend special event trip generation summary is shown in Table 4-2. The trip generation rates are based upon data collected by the Institute of Transportation Engineers (ITE) for Multifamily Housing (Low-Rise) (ITE Land Use Code 220) and Quality Restaurant (ITE Land Use Code 931) land uses in their published Trip Generation Manual, 10th Edition, 2017. (2) The ITE Trip Generation Manual does not provide trip generation rates for a venue since the use is very specific. As such, vehicle trips are calculated based on a maximum allowable occupancy of 0.8 per parking space.

As shown on Table 4-1, the proposed Project is anticipated to generate a net total of 1,068 trip-ends per day, 51 AM peak hour trips and 86 PM peak hour trips.

It should be noted that the venue will generate trips outside the weekday AM and PM peak hours. As shown on Table 4-2, the proposed Project (special event) is anticipated to generate a net total of 416 weekend peak hour trips.

## 4.2 PROJECT TRIP DISTRIBUTION

The trip distribution patterns for the proposed Project are graphically depicted on Exhibit 4-1. The trip distributions have been developed based on past work experience in the vicinity of the Project site and refined to reflect the roadway network and the surrounding uses in the vicinity of the proposed Project as they exist today.

**Table 4-1**

**Project Trip Generation Summary - Typical Operations**

| Land Use | ITE LU Code | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Project Trip Generation Rates:[1]** | | | | | | | | | |
| Multifamily Housing (Low-Rise) | 220 | DU | 0.11 | 0.35 | 0.46 | 0.35 | 0.21 | 0.56 | 7.32 |
| Quality Restaurant | 931 | TSF | 0.49 | 0.24 | 0.73 | 5.23 | 2.57 | 7.80 | 83.84 |

| Land Use | Quantity | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Project Trip Generation Summary:** | | | | | | | | | |
| Ritz-Carlton Residences | 106 | DU | 11 | 38 | 49 | 37 | 22 | 59 | 776 |
| Sky Mesa Restaurant | 6.966 | TSF | 3 | 2 | 5 | 36 | 18 | 54 | 586 |
| Internal Capture (50%)[3] | | | -2 | -1 | -3 | -18 | -9 | -27 | -294 |
| **Total** | | | **12** | **39** | **51** | **55** | **31** | **86** | **1,068** |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).

[2] DU = Dwelling Units; TSF = Thousand Square Feet

[3] Internal capture reduction of 50% has been applied as a significant portion of the patrons would be internal to the existing hotel.

**Table 4-2**

**Project Trip Generation Summary - Weekend Special Event**

| Land Use | ITE LU Code | Units[2] | Arrival Peak Hour | | | Departure Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| **Project Trip Generation Rates:**[1] | | | | | | | | |
| Multifamily Housing (Low-Rise) | 220 | DU | 0.35 | 0.35 | 0.70 | 0.35 | 0.35 | 0.70 |
| Quality Restaurant | 931 | TSF | 6.30 | 4.38 | 10.68 | 6.30 | 4.38 | 10.68 |
| Venue | Not Available | | | | | | | |

| Land Use | Quantity | Units[2] | Arrival Peak Hour | | | Departure Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| **Project Trip Generation Summary:** | | | | | | | | |
| Ritz-Carlton Residences | 106 | DU | 37 | 37 | 74 | 37 | 37 | 74 |
| Sky Mesa Restaurant | 6.966 | TSF | 44 | 31 | 75 | 44 | 31 | 75 |
| Internal Capture (50%)[3] | | | -22 | -16 | -38 | -22 | -16 | -38 |
| Venue[4] | 381 | Spaces | 295 | 10 | 305 | 10 | 295 | 305 |
| **Total** | | | **354** | **62** | **416** | **69** | **347** | **416** |

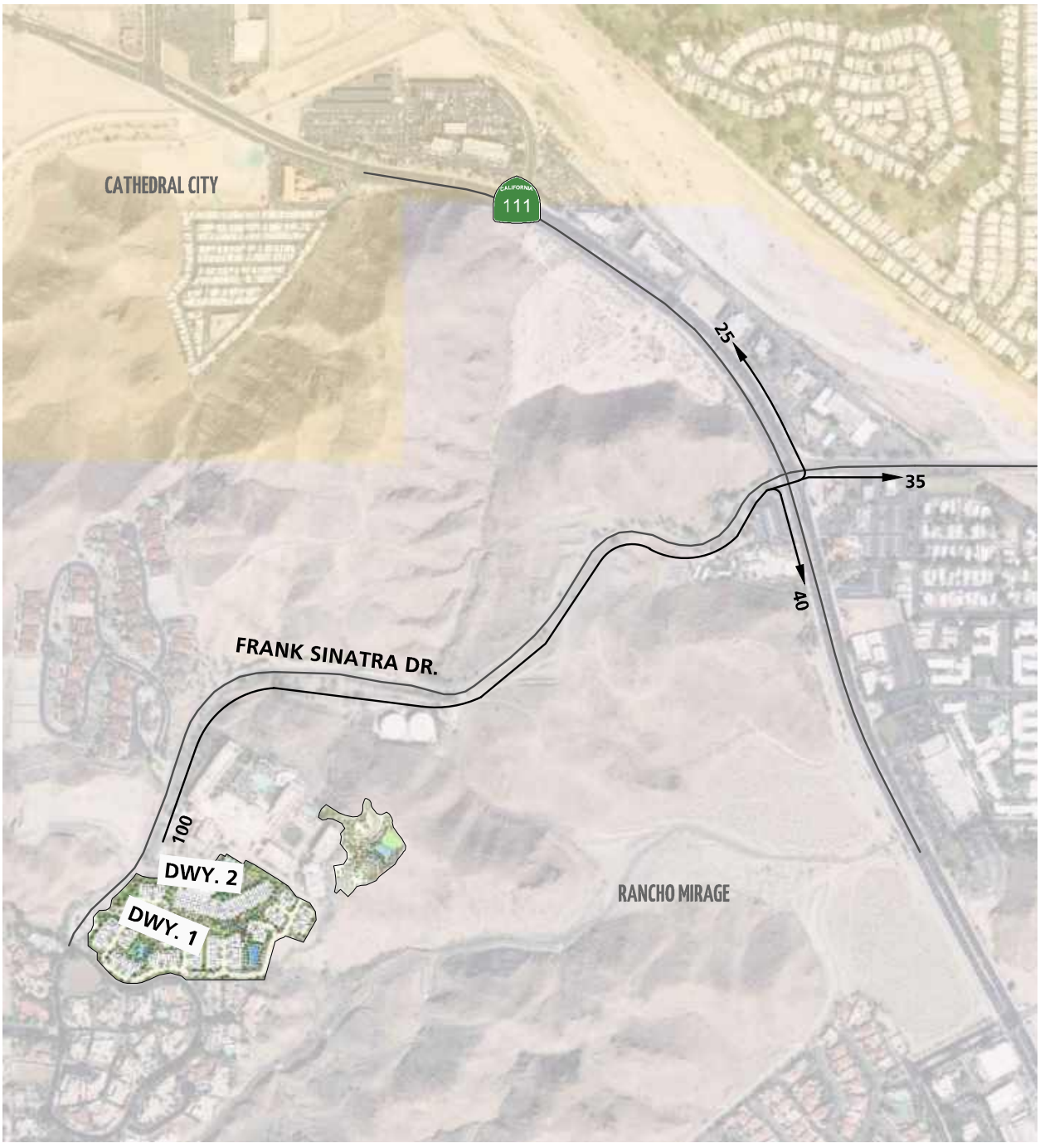
[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).

[2] DU = Dwelling Units; TSF = Thousand Square Feet

[3] Internal capture reduction of 50% has been applied as a significant portion of the patrons would be internal to the existing hotel.

[4] Vehicle trips are calculated based on a maximum allowable occupancy of 0.8 per parking space.

## EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION




**LEGEND:**

10 = PERCENT TO/FROM PROJECT

N

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## 4.3 MODAL SPLIT

Although the use of public transit, walking, and/or bicycling have the potential to reduce Project-related traffic, such reductions have not been taken into considerations in this traffic study in order to provide a conservative analysis of the Project's potential to contribute to circulation system deficiencies.

## 4.4 TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project weekday ADT, weekday AM peak hour, and weekday PM peak hour peak hour intersection turning movement volumes are shown on Exhibit 4-2. Project (Special Event) weekend arrival and departure peak hour intersection turning movement volumes are shown on Exhibit 4-3.

## 4.5 CUMULATIVE GROWTH TRAFFIC

### 4.5.1 AMBIENT GROWTH RATE

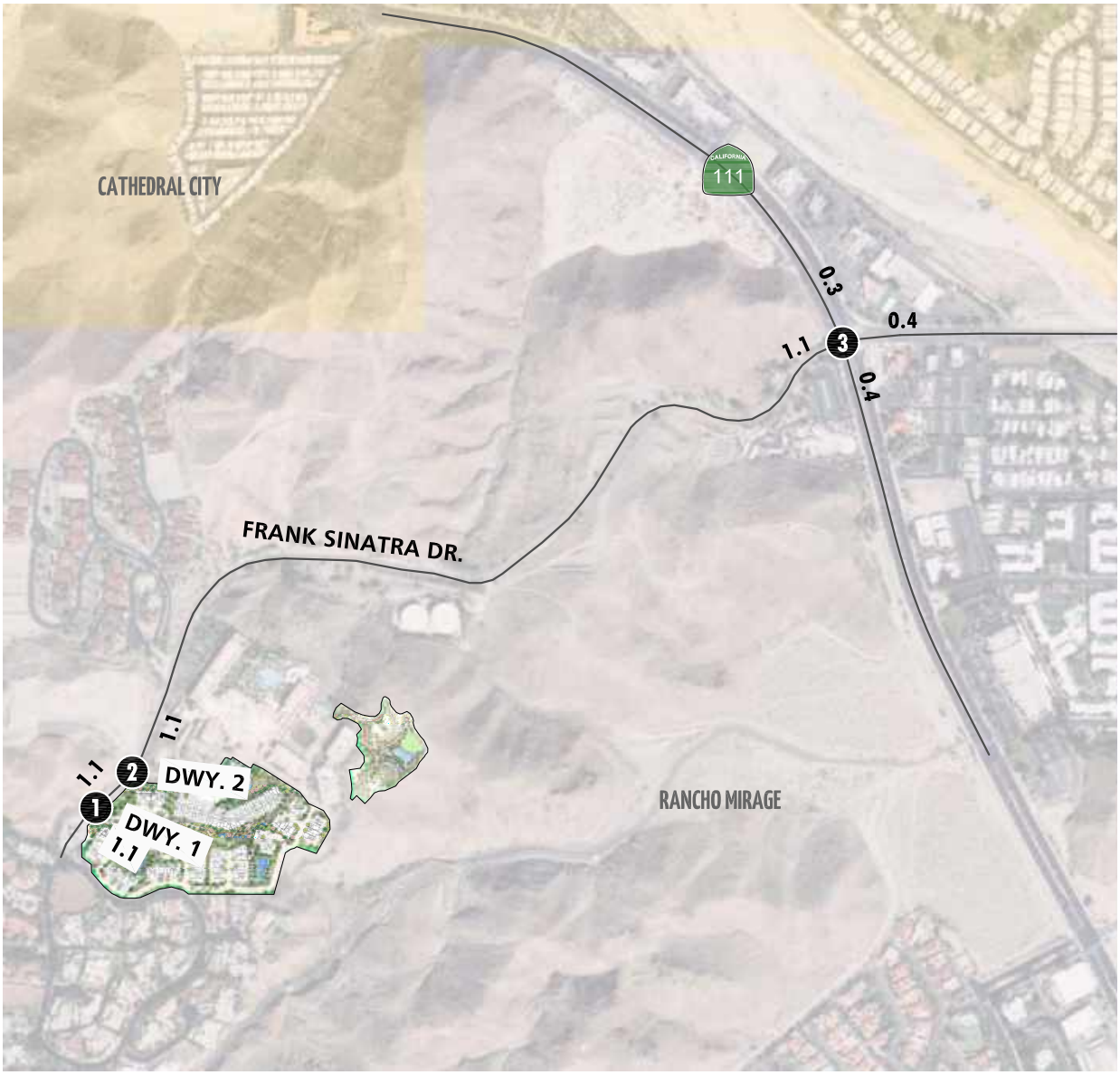
Future year traffic forecasts have been based upon background (ambient) growth at 8.24 percent (2 percent per year over 4 years) for EAP and EAPC traffic conditions. The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies, for EAPC traffic conditions.

### 4.5.2 CUMULATIVE DEVELOPMENT TRAFFIC

California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Rancho Mirage.

Exhibit 4-3 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown on Table 4-3. If applicable, the traffic generated by individual cumulative projects was manually added to the Opening Year Cumulative forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-3 are reflected as part of the background traffic. Trip generation rates used to estimate cumulative development project traffic and a summary of the cumulative development project's weekday trip generation are shown in Table 4-4.

## EXHIBIT 4-2: PROJECT ONLY WEEKDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| 0(0) 12(55) 39(31) 0(0) | 0(0) 12(55) 0(0) 0(0) 0(0) 0(0) | 3(14) 0(0) 0(0) 0(0) 4(19) 0(0) |
| 0(0) 0(0) | 0(0) 0(0) 0(0) 39(31) 0(0) | 10(8) 14(11) 16(12) 5(22) 0(0) 0(0) |

**LEGEND:**

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
**10.0** = VEHICLES PER DAY (1000'S)

N

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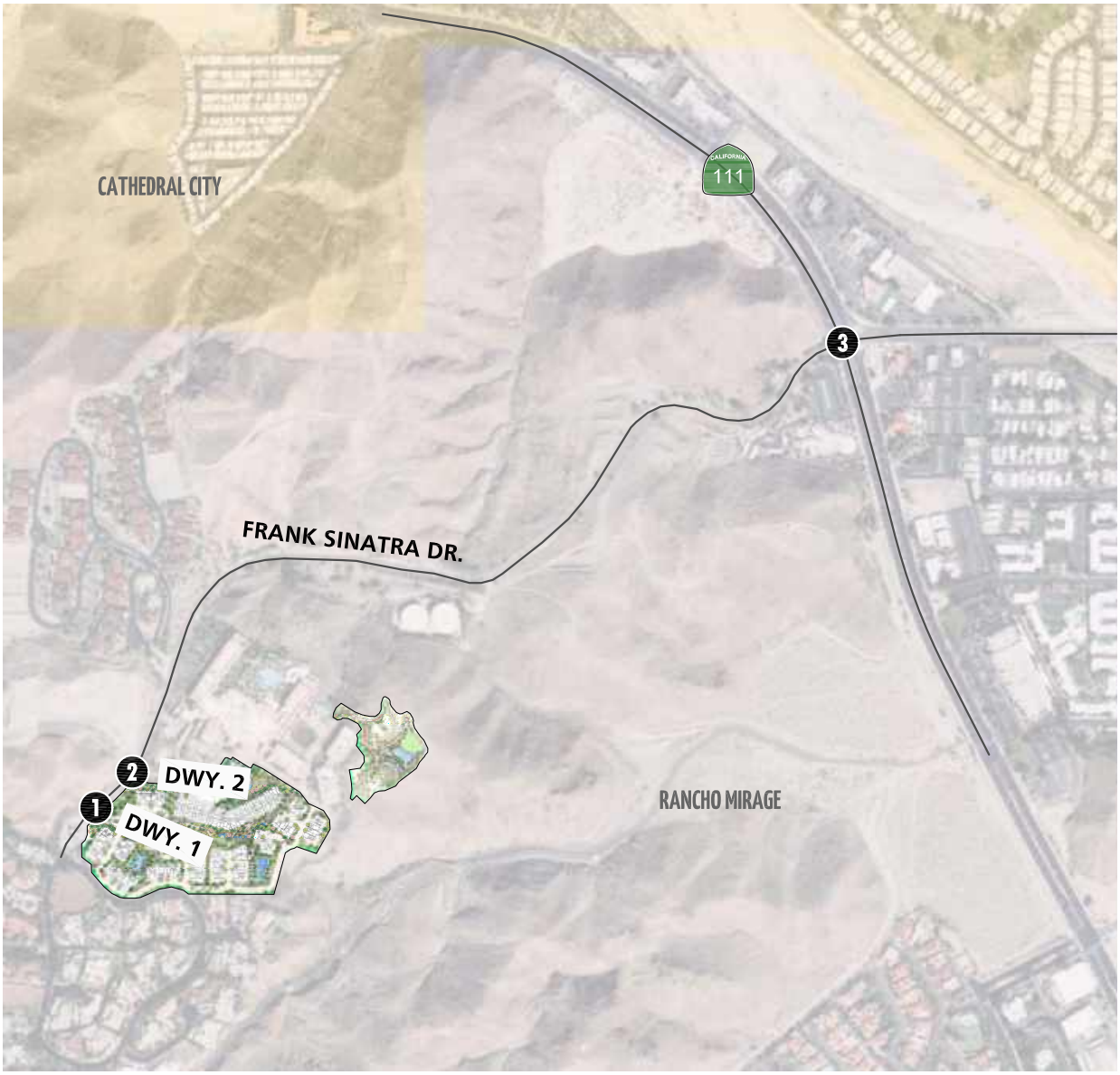
## EXHIBIT 4-3: PROJECT ONLY SATURDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| 0(0) 354(69) 62(347) 0(0) | 0(0) 354(69) 0(0) 0(0) 0(0) 0(0) | 89(17) 0(0) 0(0) 0(0) 124(24) 0(0) |
| 0(0) 0(0) | 0(0) 0(0) 0(0) 0(0) 62(347) 0(0) | 16(87) 22(121) 25(139) 142(28) 0(0) 0(0) |

**LEGEND:**

10(10) = ARRIVAL(DEPARTURE) PEAK HOUR INTERSECTION VOLUMES

N

## EXHIBIT 4-4: CUMULATIVE DEVELOPMENT LOCATION MAP

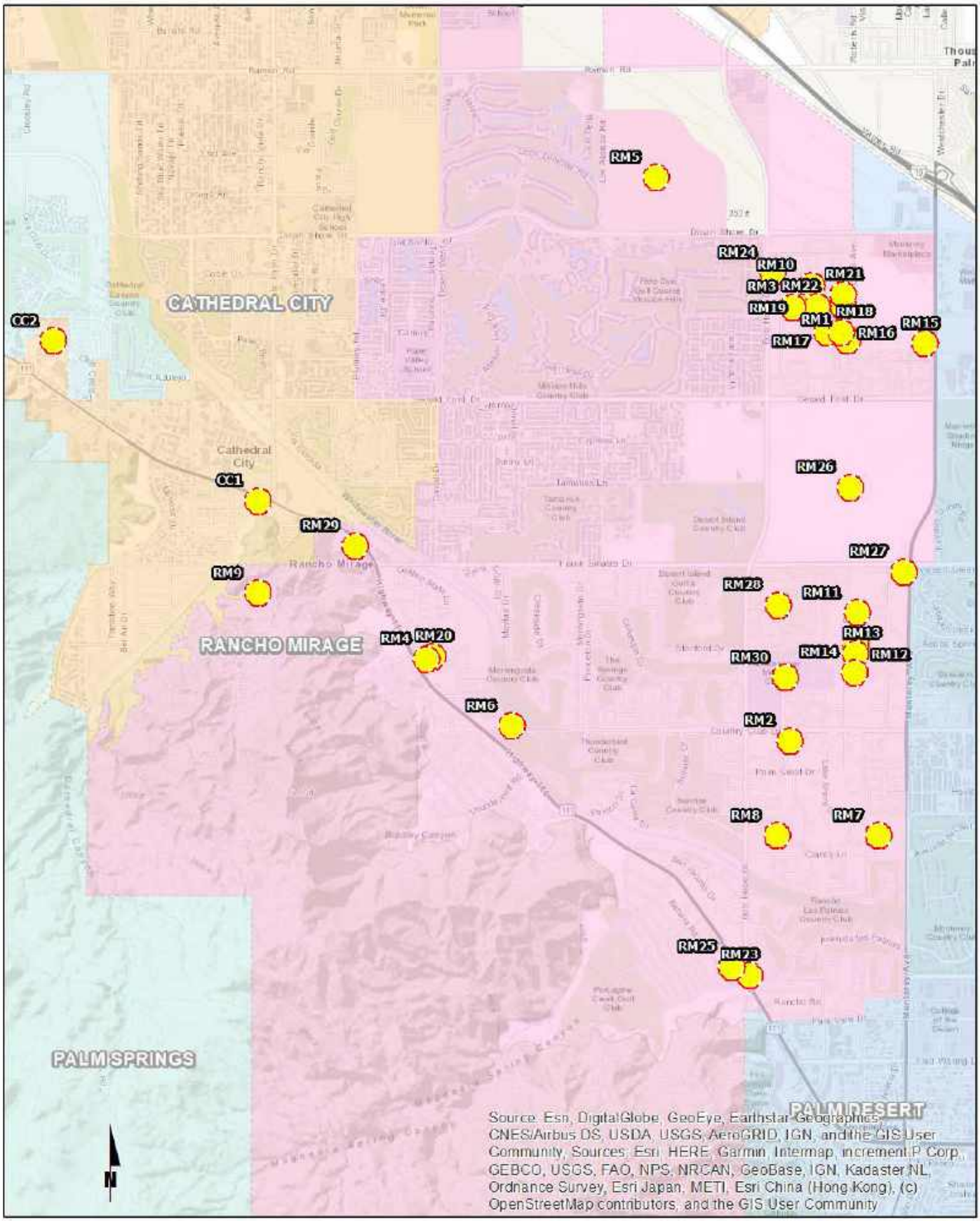


**Table 4-3**

**Cumulative Development Land Use Summary**

| TAZ | Project | Case Number | Land Use | Quantity | Units[1] |
|---|---|---|---|---|---|
| **City of Rancho Mirage** | | | | | |
| RM1 | RM 38 JV LLC | DA190002 / TTM36620 | Residential | 82 | DU |
| RM2 | Carefield Senior Living | PDP18004 / DA180003 / EA180002 | Residential | 84 | DU |
| RM3 | ECHO at Rancho Mirage | PDP18003 | Residential | 9 | DU |
| RM4 | Santa Barbara Cove Estates | PDP18001 / TTM35573 | Residential | 20 | DU |
| RM5 | Pulte Homes/ Del Webb | PDP17001 / TTM36809 | Residential | 1,200 | DU |
| RM6 | Veneto | MOD16019 | Residential | 34 | DU |
| RM7 | Revelle | PDP13003 / FDP13004 | Residential | 32 | DU |
| RM8 | Bella Clancy | ZTA05003 / EA050025 / MOD05016 / FDP04002 / PDP03015 | Residential | 20 | DU |
| RM9 | Mirada Villas | FDP05004 / PDP04011 / MOD06024 / MOD11040 | Residential | 46 | DU |
| RM10 | Estilo | PDP12003 / FDP12005 | Residential | 39 | DU |
| RM11 | RM Five-1 LLC/Kilani | TPM37222R / EA190008 | Residential | 4 | DU |
| RM12 | Heinrich/Steinberg | TPM34232 / TPPMX34232 / TPM34233 / TPMX34233 | Residential | 4 | DU |
| RM13 | Rancho Mirage LLC | TPM34741 / EA060009 / TPMX-34741 / PDPX34741 | Residential | 4 | DU |
| RM14 | La Paloma Homes, Inc. | TTM37637 | Residential | 13 | DU |
| RM15 | Monterey Medical Center | TTM37703 / PDP17002 | Medical Office | 75.164 | TSF |
| RM16 | 38 JV, LLC c/o Meriwether Companies | TTM36621 / EA130007 / TTM3X36621 | Residential | 10 | DU |
| RM17 | 38 JV, LLC c/o Meriwether Companies | TTM36620 / EA130006 / SPA13001 / TTM2X36620 | Residential | 97 | DU |
| RM18 | 38 JV, LLC c/o Meriwether Companies | TTM36622 / EA130008 / TTM3X36622 | Residential | 10 | DU |
| RM19 | GRV Mirage, LLC (ECHO) | TTM35619 / EA070011 | Residential | 9 | DU |
| RM20 | Ken Catanzarite | TTM35573 | Residential | 20 | DU |
| RM21 | Miragedunes Properties | TTM05004 / TTM33329 / TTM2X33329 | Residential | 9 | DU |
| RM22 | AMS Development Group (Bellavia) | TTM35089 | Residential | 18 | DU |
| RM23 | IN-N-OUT Burgers | PDP19002 / EA190004 / CUP19007 / ZTA19002 / DA190001 | Commercial | 3.995 | DU |
| RM24 | DHO Medical Office Building | PDP19001 / EA190001 | Medical Office | 13.800 | TSF |
| RM25 | Chase Bank | PDP18005 | Bank | 3.470 | TSF |
| RM26 | Section 31 Specific Plan Project | SP180001 / EIR18001 / GPZMA18003 | Hotel | 400 | Rooms |
| | | | Commercial | 175.000 | TSF |
| | | | Residential | 1,932 | DU |
| RM27 | Tower Energy Group | CUP18004 / TPM37486 / EA180004 | Commercial | 5.565 | TSF |
| RM28 | Oasis Ranch LLC | PDP18002 / TTM37461 | Hotel | 60 | Rooms |
| | | | Residential | 108 | DU |
| RM29 | Horizon Pacific Rancho Cove<br>MSA Consulting | PDP16003 / TTM37122 | Commercial | 20.000 | TSF |
| | | | Hotel | 100 | Rooms |
| | | | Residential | 35 | DU |
| RM30 | Hazelden Betty Ford Center | -- | Hospital | 56 | Beds |
| | | | Office | 6.399 | TSF |
| **Cathedral City** | | | | | |
| CC1 | Grove @ The Edge | | Commercial | -- | TSF |
| | | | Hotel | 100 | Rooms |
| | | | Residential | -- | DU |
| CC2 | Cathedral City Senior Living | CUP 16-051 | Residential | 140 | DU |

[1] DU = Dwelling Units; TSF = Thousand Square Feet

**Table 4-4**

**Cumulative Development Project Trip Generation Summary**

| Land Use | ITE LU Code | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily | SAT Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | | In | Out | Total |
| **Project Trip Generation Rates:[1]** | | | | | | | | | | | | |
| Single-Family Detached Housing | 210 | DU | 0.19 | 0.56 | 0.74 | 0.62 | 0.37 | 0.99 | 9.44 | 0.50 | 0.43 | 0.93 |
| Hotel | 310 | Rooms | 0.28 | 0.19 | 0.47 | 0.31 | 0.29 | 0.60 | 8.36 | 0.40 | 0.32 | 0.72 |
| Shopping Center | 820 | TSF | 0.58 | 0.36 | 0.94 | 1.83 | 1.98 | 3.81 | 37.75 | 2.34 | 2.16 | 4.50 |

| Land Use | Quantity | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily | SAT Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | | In | Out | Total |
| **Project Trip Generation Summary:** | | | | | | | | | | | | |
| Mirada Villas - SFDU (75% Built) | 9 | DU | 2 | 5 | 7 | 6 | 3 | 9 | 86 | 5 | 4 | 9 |
| Horizon Pacific Rancho Cove MSA Consulting | | | | | | | | | | | | |
| Commercial | 20.000 | TSF | 12 | 7 | 19 | 37 | 40 | 77 | 756 | 47 | 43 | 90 |
| Hotel | 100 | Rooms | 28 | 19 | 47 | 31 | 29 | 60 | 836 | 40 | 32 | 72 |
| SFDU | 35 | DU | 6 | 19 | 25 | 22 | 13 | 35 | 332 | 18 | 15 | 33 |
| | | **Total** | **46** | **45** | **91** | **90** | **82** | **172** | **1,924** | **105** | **90** | **195** |
| Ken Catanzarite - SFDU | 20 | DU | 4 | 11 | 15 | 12 | 7 | 19 | 190 | 10 | 9 | 19 |
| Santa Barbara Cove Estates - SFDU | 20 | DU | 4 | 11 | 15 | 12 | 7 | 19 | 190 | 10 | 9 | 19 |
| | | **Total** | **8** | **22** | **30** | **24** | **14** | **38** | **380** | **20** | **18** | **38** |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).

[2] DU = Dwelling Units; TSF = Thousand Square Feet

Cumulative development project weekday ADT, weekday AM peak hour, and weekday PM peak hour peak hour intersection turning movement volumes are shown on Exhibit 4-5. Cumulative development project weekend peak hour intersection turning movement volumes are shown on Exhibit 4-6.

### 4.5.3 NEAR-TERM TRAFFIC FORECASTS

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast EAP (2023) and EAPC (2023) traffic conditions. An ambient growth factor of 2% per year accounts for background (area-wide) traffic increases that occur over time up to the year 2023 from the year 2019 (compounded 2% per year growth over a 4-year period). Project traffic is added to assess both forecast EAP (2023) and EAPC (2023) traffic conditions. Traffic volumes generated by cumulative development projects are not included in the EAP (2023) traffic conditions.

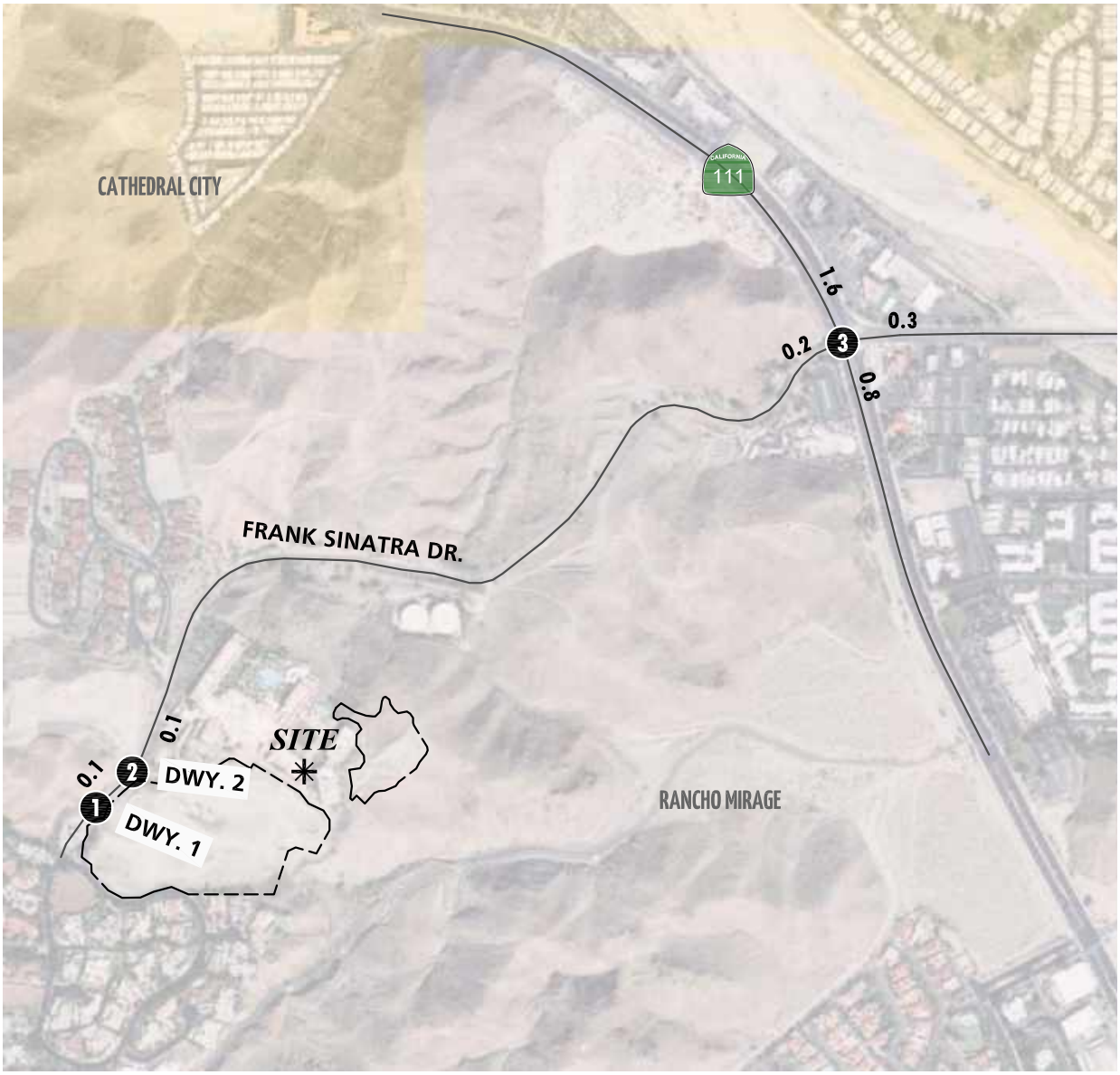
The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- EAP (2023)
    - Existing 2019 volumes
    - Ambient growth traffic (8.24%)
    - Typical Weekday or Saturday Special Event Project Traffic
- EAPC (2023)
    - Existing 2019 volumes
    - Ambient growth traffic (8.24%)
    - Cumulative Development traffic
    - Typical Weekday or Saturday Special Event Project Traffic

The currently adopted Southern California Association of Governments (SCAG) 2016 Regional Transportation Plan (RTP) / Sustainable Communities Strategy (SCS) (April 2016) growth forecasts for the City of Rancho Mirage identifies projected growth in population of 49,800 in 2012 to 61,700 in 2040, or a 23.90 percent increase over the 28-year period. (6) The change in population equates to roughly a 0.77 percent annual growth rate, compounded annually. Similarly, growth over the same 28-year period in households is projected to increase by 34.19 percent, or a 1.06 percent annual growth rate. Finally, growth in employment over the same 28-year period is projected to increase by 45.26 percent, or a 1.34 percent annual growth rate. The average growth rate is 1.34%, compounded annually between Year 2012 and Year 2040.

The average growth rate is estimated at approximately 3.44%, compounded annually between Existing (2019) and EAPC (2023) traffic conditions. The annual growth rate at each individual intersection is not lower than 3.24% compounded annually to as high as 3.63% compounded annually over the same time period. Therefore, the annual growth rate utilized for the purposes of this analysis would appear to conservatively approximate the anticipated regional growth in traffic volumes in the City of Rancho Mirage for EAPC (2023) traffic conditions, especially when considered along with the addition of project-related traffic.

## EXHIBIT 4-5: CUMULATIVE ONLY WEEKDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| Future Intersection | 0(0) 2(4) 0(0) — 0(0) 0(0) 0(0); 0(0) 0(0) 0(0) — 0(0) 2(5) 0(0) | 3(6) 29(65) 5(8) — 5(9) 1(2) 2(7); 4(5) 2(1) 2(1) — 1(2) 48(55) 7(4) |

**LEGEND:**

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

N

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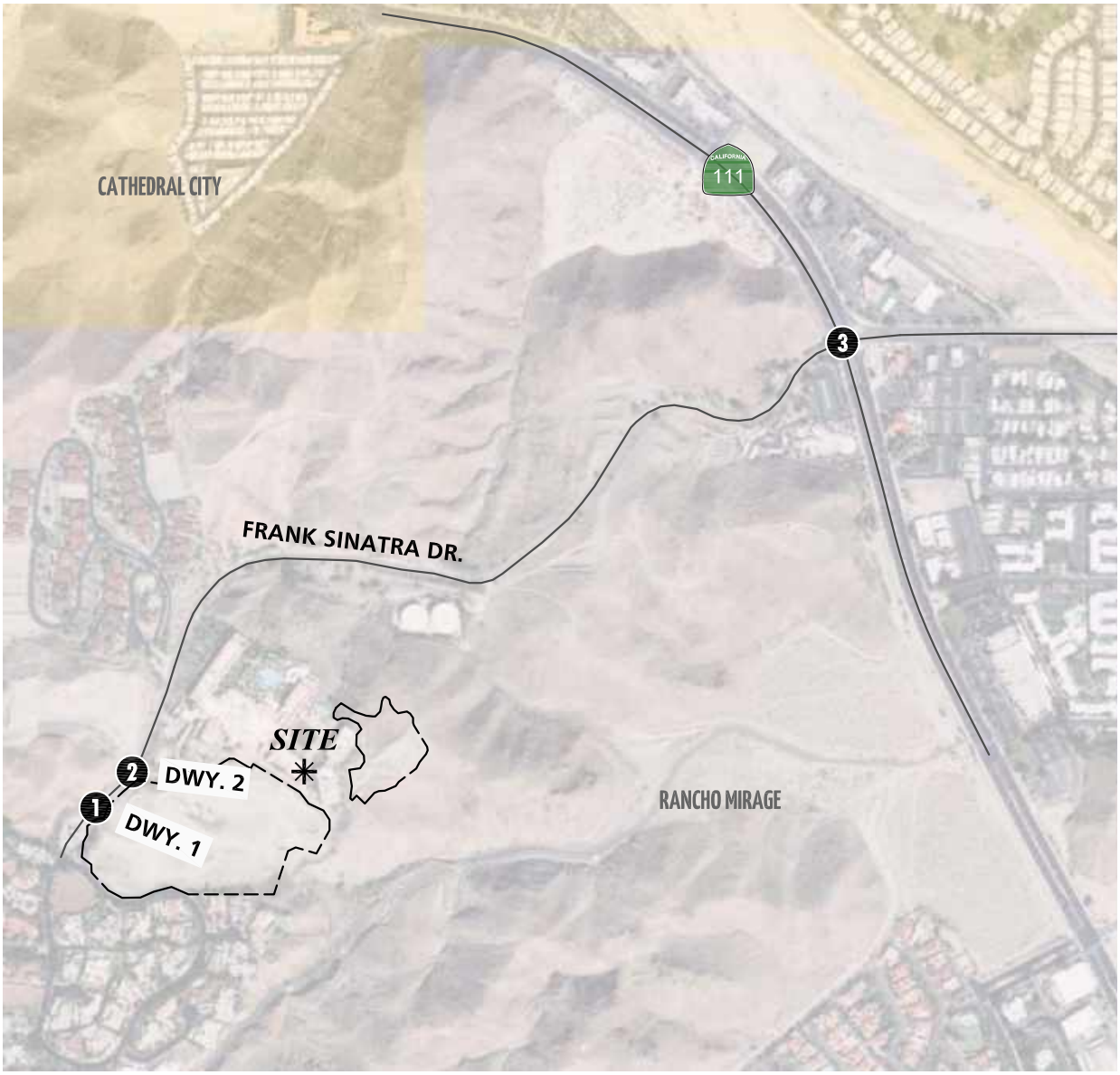
## EXHIBIT 4-6: CUMULATIVE ONLY SATURDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| Future Intersection | 0 5 0 / 0 0 0 / 0 0 0 / 0 5 0 | 6 63 9 / 11 2 6 / 6 1 2 / 2 66 5 |

**LEGEND:**

10 = SATURDAY PEAK HOUR INTERSECTION VOLUMES

N

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## 4.6 HORIZON YEAR (2040) VOLUME DEVELOPMENT

Traffic projections for Horizon Year (2040) without Project conditions were derived from the Riverside Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing for study area intersections located within the County of Riverside. The current version of the RivTAM reflects the local input in the adopted 2016 SCAG RTP within the County of Riverside.

The traffic forecasts reflect the area-wide growth anticipated between Existing (2019) conditions and Horizon Year (2040) traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year (2040) peak hour forecasts were refined using the model derived long range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location in December 2019. The RivTAM has a base (validation) year of 2012 and a horizon (future forecast) year of 2040. The difference in model volumes (2040-2012) defines the growth in traffic over the 28-year period.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year (2040) forecasts. Horizon Year (2040) turning volumes were compared to EAPC (2023) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between EAPC (2023) and Horizon Year (2040) traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2019) and EAPC (2023) conditions. Adjustments have not been made to study area intersections that may be affected by new future roadway connections, where travel patterns would likely get affected and forecasts may potentially decrease from the EAPC conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year (2040) peak hour forecasts.

The future Horizon Year (2040) Without Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel

routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis. Post-processing worksheets for Horizon Year (2040) without Project traffic conditions are provided in Appendix 4.1.

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# 5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing Plus Project (E+P) traffic conditions and the resulting peak hour intersection operations, traffic signal warrant, and queuing analyses.

## 5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

## 5.2 E+P TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. E+P weekday ADT, weekday AM and weekday PM peak hour intersection turning movement volumes are shown on Exhibit 5-1. Weekend special event peak hour intersection turning movement volumes are shown on Exhibit 5-2.

## 5.3 E+P INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 5-1, which indicate that there are no intersections operating at an unacceptable LOS with the addition of Project traffic.

Consistent with Table 5-1, a summary of the peak hour intersection LOS for E+P conditions is shown on Exhibit 5-3. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TIA.

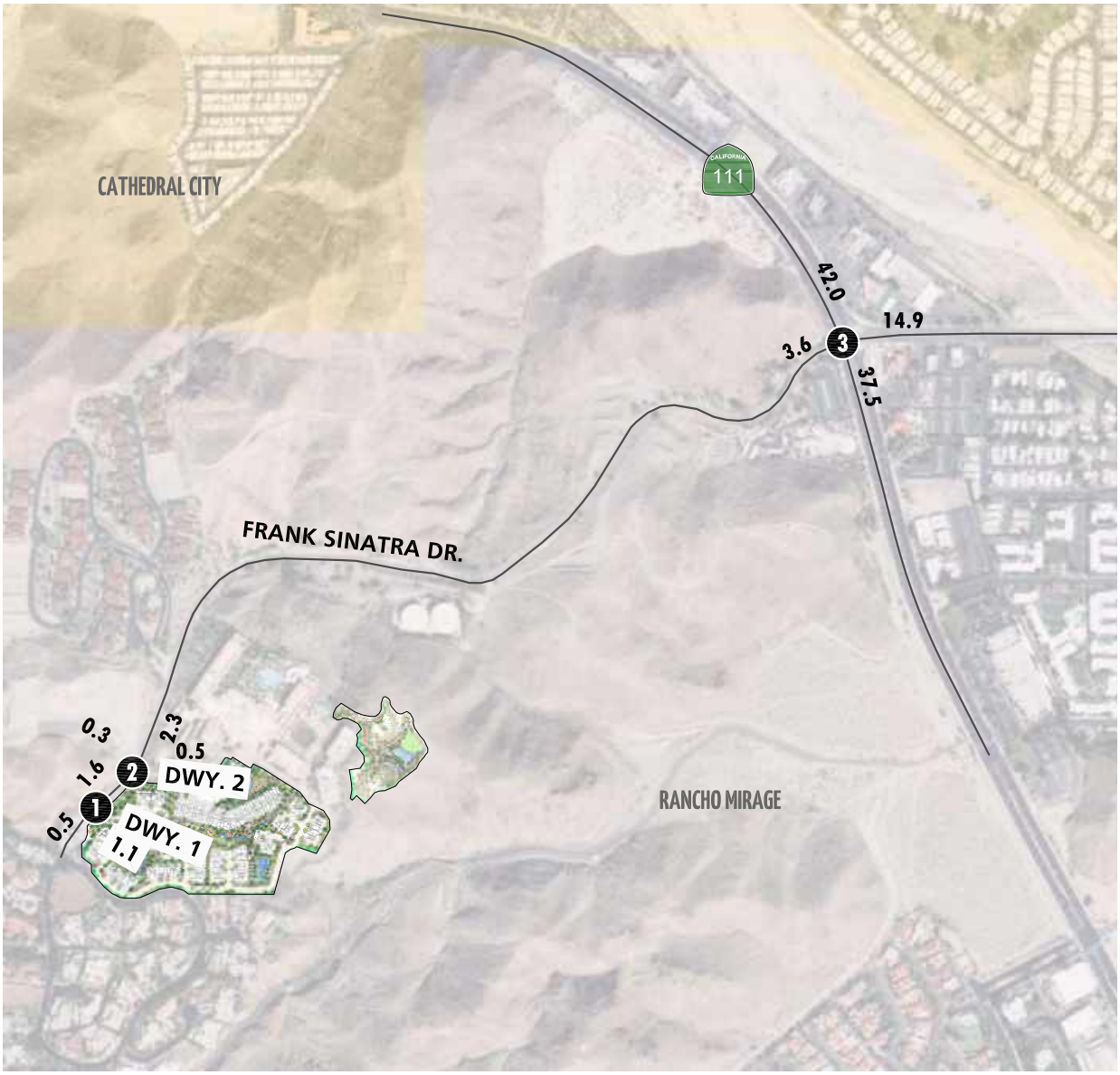
## 5.4 E+P TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for E+P traffic conditions are based on planning level (ADT) and peak hour intersection volumes. For E+P traffic conditions, no study area intersections are anticipated to warrant a traffic signal (see Appendix 5.2).

## 5.5 E+P QUEUING ANALYSIS

A queuing analysis was performed for study area intersections to assess vehicle queues that may potentially impact peak hour operations. Queuing analysis findings are presented in Table 5-2. It is important to note that lengths are consistent with the measured distance between the intersection and the end of the storage area.

## EXHIBIT 5-1: E+P WEEKDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| 37(18) 12(55) → 39(31) ← 0(0) | 0(1) 48(73) → 15(8) ← 0(4) 12(25) ← 0(0) | 41(33) 1128(1172) → 362(301) ← 59(49) 268(368) ← 260(149) |
| 18(20) ↑ 0(0) | 0(16) → 1(2) → 1(0) 1(0) ↑ 56(51) ↑ 0(0) | 24(41) → 34(62) → 33(36) 40(54) ↑ 714(1193) ↑ 87(174) |

**LEGEND:**

**10(10)** = AM(PM) PEAK HOUR INTERSECTION VOLUMES
**10.0** = VEHICLES PER DAY (1000'S)

N

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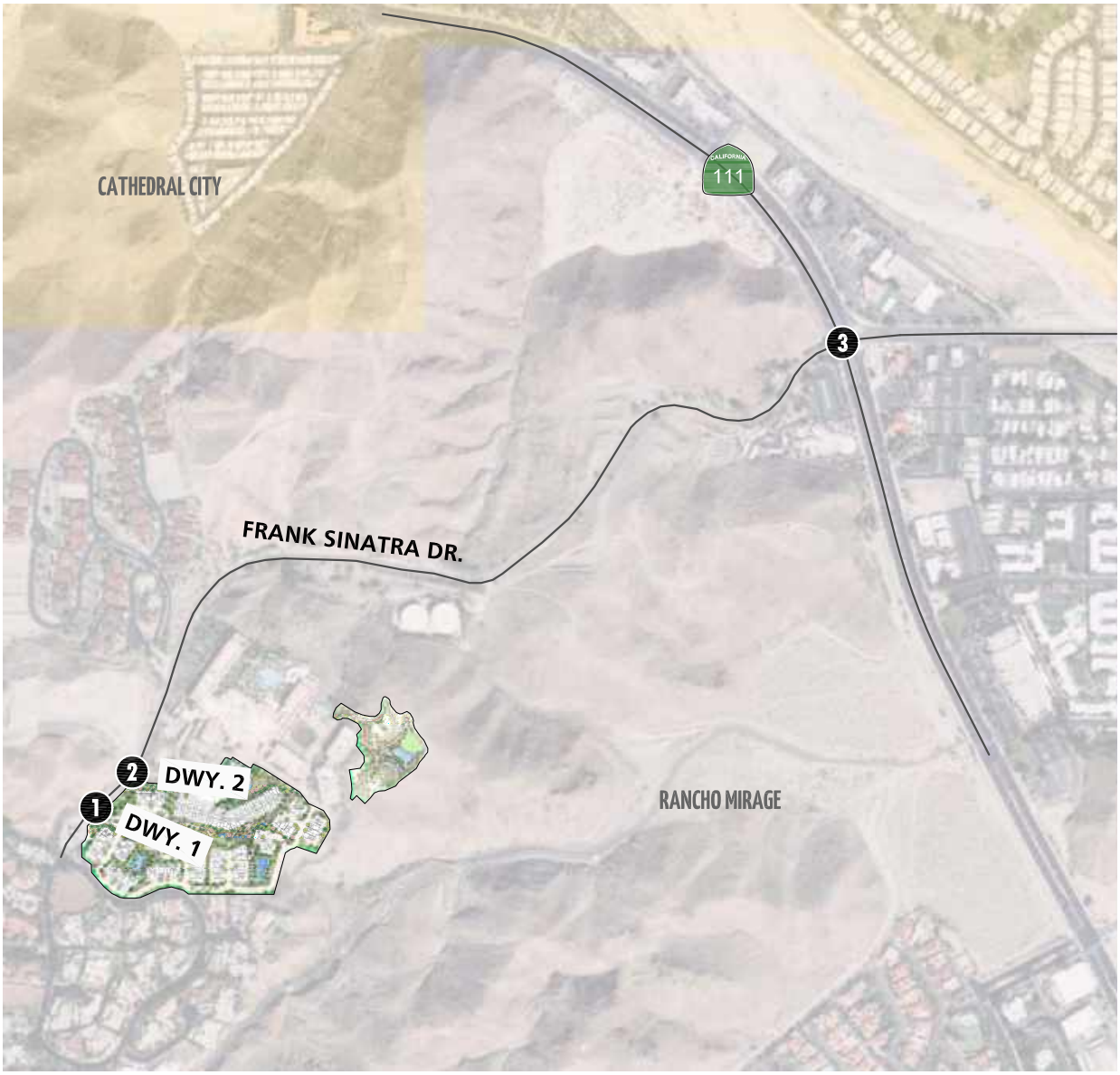
## EXHIBIT 5-2: E+P SATURDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| 19(19) ↓ 354(69) ← 62(347) ← 0(0) | 3(3) ↓ 373(88) ← 33(33) ← 27(27) ← 1(1) ← 0(0) | 125(53) ↓ 1171(1171) ↓ 188(188) ← 160(160) ← 152(52) ← 141(141) |
| 20(20) ↑ 0(0) → | 1(1) → 0(0) → 0(0) → 0(0) ↑ 79(364) ↑ 3(3) → | 35(106) → 64(163) → 36(150) → 190(76) ↑ 1078(1078) ↑ 95(95) → |

**LEGEND:**

**10(10)** = ARRIVAL(DEPARTURE) PEAK HOUR INTERSECTION VOLUMES

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## EXHIBIT 5-3: E+P SUMMARY OF LOS

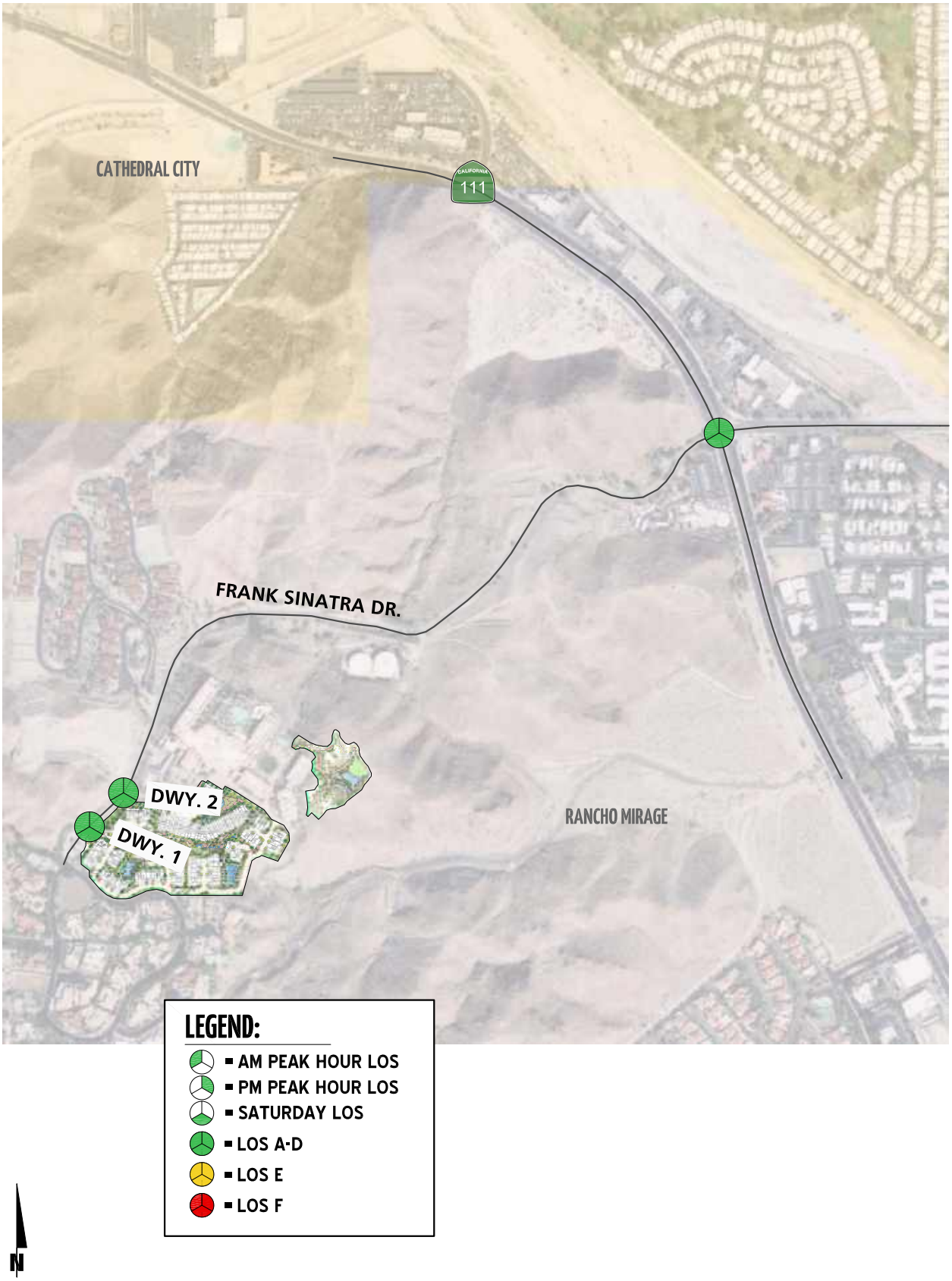


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**Table 5-1**

**Intersection Analysis for E+P Conditions**

| # | Intersection | Traffic Control[1] | Existing (2019) | | | | | | E+P | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. & Dwy. 1 | --/**CSS** | Future Intersection | | | | | | 8.5 | 8.5 | 8.6 | 10.3 | A | A | A | B |
| 2 | Frank Sinatra Dr. & Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.2 | 10.2 | 15.5 | 15.8 | A | B | C | C |
| 3 | Hwy. 111 & Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 20.6 | 20.0 | 23.0 | 26.1 | C | C | C | C |

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal

[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour

**Table 5-2**

**Peak Hour Queuing Summary for E+P Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | Existing (2019) | | | | | | E+P | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet)[2] | | | Acceptable?[1] | | | 95th Percentile Queue (Feet)[2] | | | | Acceptable?[1] | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| Frank Sinatra Dr. & Dwy. 1 | SBL/T | 200 | Future Intersection | | | | | | 0 | 0 | 36 | 0 | Yes | Yes | Yes | Yes |
| | WBL/R | 100 | | | | | | | 46 | 46 | 44 | 89 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. & Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes | 0 | 14 | 9 | 39 | Yes | Yes | Yes | Yes |
| | WBL/R | 200 | 34 | 28 | 45 | Yes | Yes | Yes | 37 | 34 | 45 | 37 | Yes | Yes | Yes | Yes |
| Hwy. 111 & Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes | 72 | 101[2] | **368**[2] | 118 | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 0 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes | 51 | 70 | 67 | **233**[2] | Yes | Yes | Yes | **No** |
| | EBT/R | 270 | 41 | 74 | 51 | Yes | Yes | Yes | 151 | 92 | 101 | **325** | Yes | Yes | Yes | **No** |

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour

As shown on Table 5-2 and consistent with Existing (2019) conditions, there are no potential queuing issues anticipated during the weekday peak 95th percentile traffic flows for E+P traffic conditions. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 & Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – EBL movement

Worksheets for E+P conditions queuing analysis are provided in Appendix 5.3.

## 5.6 RECOMMENDED IMPROVEMENTS

### 5.6.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

No improvement strategies have been recommended for study area intersections as there no deficient intersections for E+P traffic conditions.

### 5.6.2 RECOMMENDED IMPROVEMENTS TO ADDRESS QUEUES

As shown previously on Table 5-2, there are no weekday peak hour queuing issues anticipated at the study area intersections for E+P traffic conditions. However, it is recommended that the following improvements be implemented to accommodate E+P weekend special event 95th percentile traffic flows:

- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage for the NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage for the EBL movement

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# 6 EAP (2023) TRAFFIC CONDITIONS

This section discusses the methods used to develop Existing plus Ambient Growth plus Project (EAP) (2023) traffic conditions and the resulting peak hour intersection operations, traffic signal warrant, and queuing analyses.

## 6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for EAP conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for EAP conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

## 6.2 EAP (2023) TRAFFIC VOLUME FORECASTS

To account for background traffic growth, an ambient growth from Existing conditions of 8.24% (2 percent per year over 4 years, compounded annually) is included for EAP traffic conditions. Cumulative development projects are not included as part of the EAP analysis. EAP weekday ADT, weekday AM, and weekday PM peak hour intersection turning movement volumes are shown on Exhibit 6-1. Weekend special event peak hour intersection turning movement volumes are shown on Exhibit 6-2.

## 6.3 EAP (2023) INTERSECTION OPERATIONS ANALYSIS

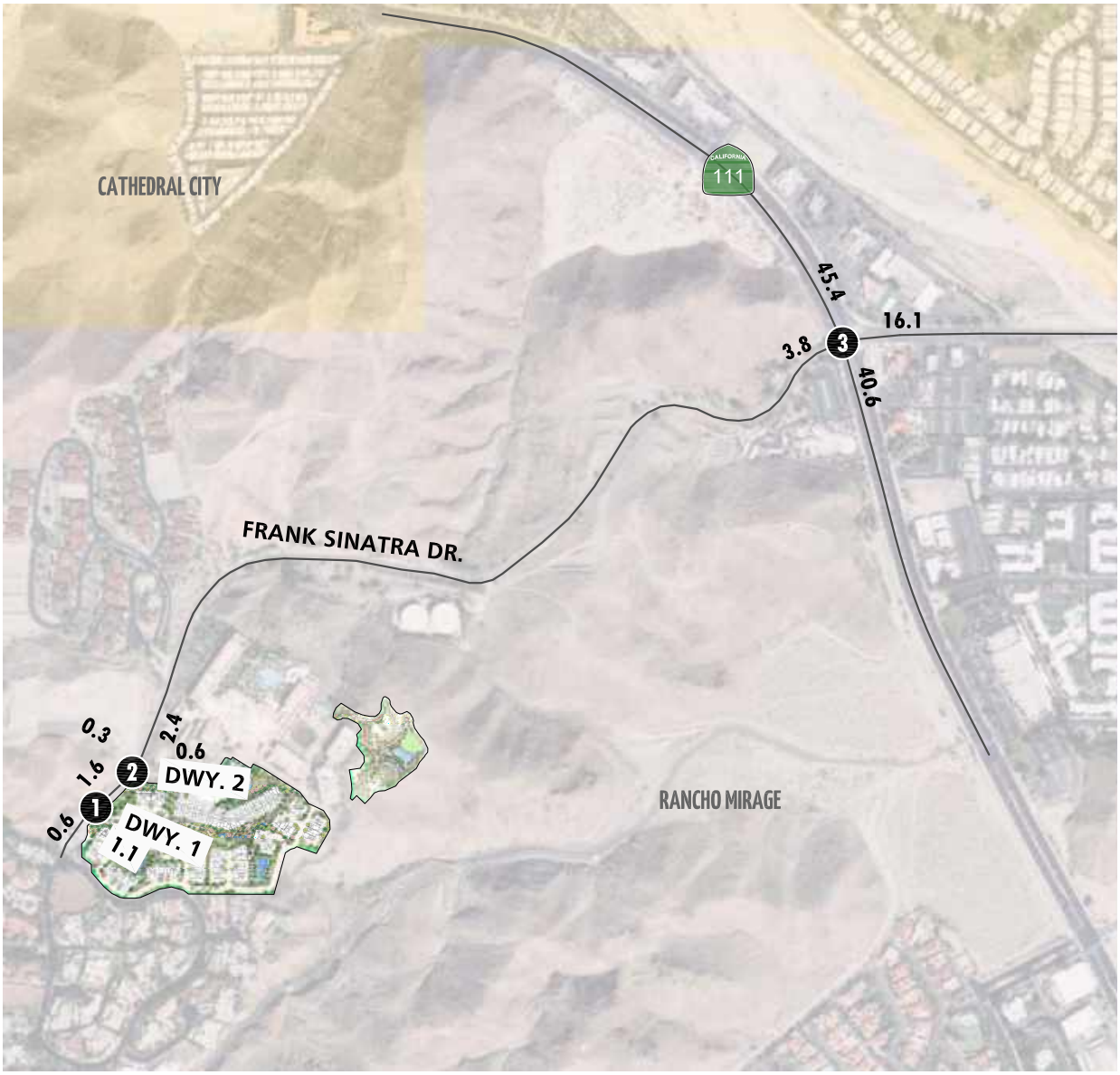
EAP peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 6-1, which indicate that there are no intersections operating at an unacceptable LOS with the addition of ambient growth and Project traffic.

Consistent with Table 6-1, a summary of the peak hour intersection LOS for EAP conditions is shown on Exhibit 6-3. The intersection operations analysis worksheets for EAP traffic conditions is included in Appendix 6.1 of this TIA.

## 6.4 EAP (2023) TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for EAP traffic conditions are based on planning level (ADT) and peak hour intersection volumes. For EAP traffic conditions, no study area intersections are anticipated to warrant a traffic signal (see Appendix 6.2).

## EXHIBIT 6-1: EAP (2023) WEEKDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| 40(19) ↓ 12(55) → 39(31) ← 0(0) | 0(1) ↓ 51(74) ↓ 13(27) → 16(9) ← 0(4) ← 0(0) | 44(35) ↓ 1221(1269) ↓ 290(398) → 392(326) ← 64(51) ← 281(161) |
| 19(22) ↑ 0(0) | 0(17) → 1(2) → 1(0) → 1(0) ↑ 57(53) ↑ 0(0) | 25(44) → 36(66) → 34(38) → 43(57) ↑ 773(1291) ↑ 94(188) |

**LEGEND:**

**10(10)** = AM(PM) PEAK HOUR INTERSECTION VOLUMES
**10.0** = VEHICLES PER DAY (1000'S)

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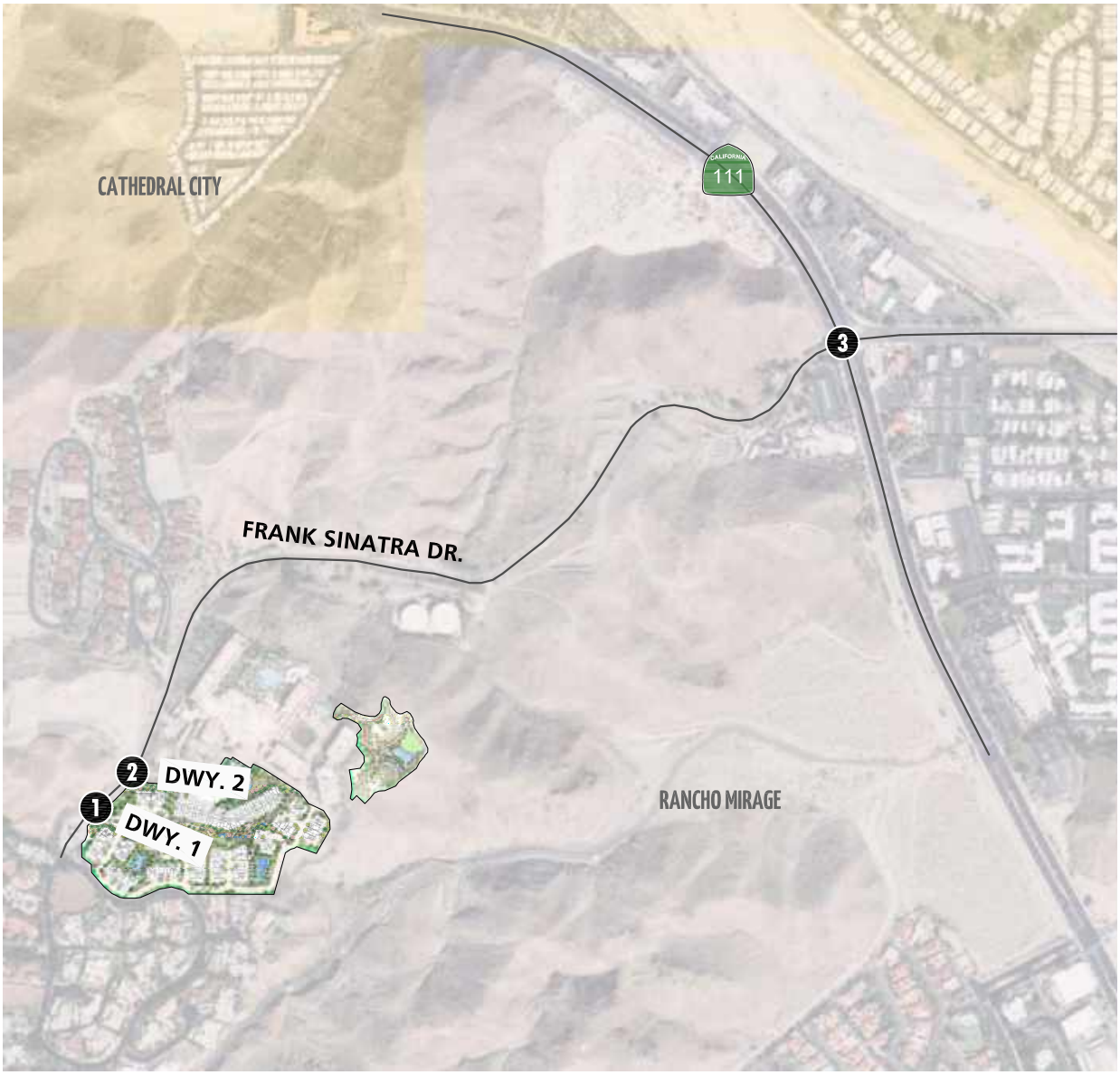
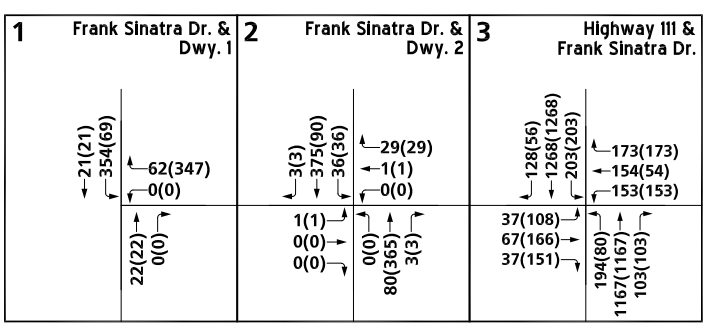
## EXHIBIT 6-2: EAP (2023) SATURDAY TRAFFIC VOLUMES




**LEGEND:**

10(10) = ARRIVAL(DEPARTURE) PEAK HOUR INTERSECTION VOLUMES

N

## EXHIBIT 6-3: EAP (2023) SUMMARY OF LOS

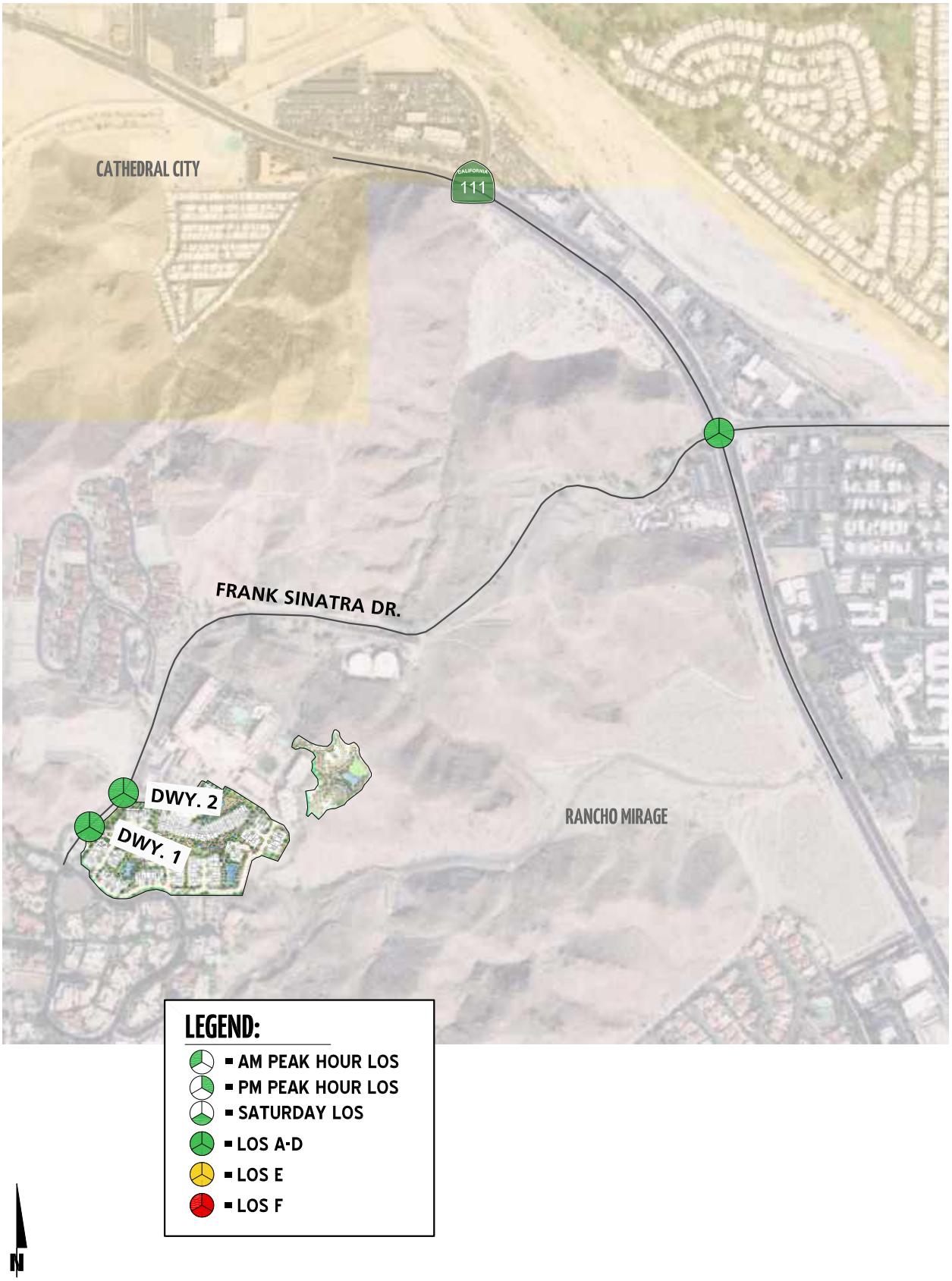



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**Table 6-1**

**Intersection Analysis for EAP (2023) Conditions**

| # | Intersection | Traffic Control[1] | Existing (2019) | | | | | | EAP (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. & Dwy. 1 | --/**CSS** | Future Intersection | | | | | | 8.6 | 8.5 | 8.7 | 10.3 | A | A | A | B |
| 2 | Frank Sinatra Dr. & Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.2 | 10.3 | 15.8 | 16.1 | A | B | C | C |
| 3 | Hwy. 111 & Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 21.5 | 20.8 | 24.1 | 28.3 | C | C | C | C |

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal

[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour

## 6.5 EAP (2023) QUEUING ANALYSIS

A queuing analysis was performed for study area intersections that may potentially impact peak hour operations. Queuing analysis findings are presented in Table 6-2. It is important to note that lengths are consistent with the measured distance between the intersection and the end of the storage area. As shown on Table 6-2 and consistent with Existing (2019) conditions, there are no potential queuing issues anticipated during the peak 95th percentile traffic flows for EAP (2023) traffic conditions. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 & Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – EBL movement

Worksheets for EAP (2023) conditions queuing analysis are provided in Appendix 6.3.

## 6.6 RECOMMENDED IMPROVEMENTS

### 6.6.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

No improvement strategies have been recommended for study area intersections as there no deficient intersections for EAP (2023) traffic conditions.

### 6.6.2 RECOMMENDED IMPROVEMENTS TO ADDRESS QUEUES

As shown previously on Table 6-2, there are no weekday peak hour queuing issues anticipated at the study area intersections for EAP (2023) traffic conditions. However, it is recommended that the following improvements be implemented to accommodate EAP (2023) weekend special event 95th percentile traffic flows:

- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage for the NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage for the EBL movement

**Table 6-2**

**Peak Hour Queuing Summary for EAP (2023) Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | Existing (2019) | | | | | | EAP (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet)[2] | | | Acceptable?[1] | | | 95th Percentile Queue (Feet)[2] | | | | Acceptable?[1] | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| Frank Sinatra Dr. & Dwy. 1 | SBL/T | 200 | Future Intersection | | | | | | 0 | 18 | 27 | 9 | Yes | Yes | Yes | Yes |
| | WBL/R | 100 | | | | | | | 44 | 44 | 48 | 96 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. & Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes | 10 | 22 | 0 | 33 | Yes | Yes | Yes | Yes |
| | WBL/R | 200 | 34 | 28 | 45 | Yes | Yes | Yes | 24 | 32 | 54 | 42 | Yes | Yes | Yes | Yes |
| Hwy. 111 & Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes | 75 | 108[2] | **376**[2] | 125[2] | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 39 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes | 53 | 74 | 70 | **238**[2] | Yes | Yes | Yes | **No** |
| | EBT/R | 270 | 41 | 74 | 51 | Yes | Yes | Yes | 62 | 96 | 106 | **330** | Yes | Yes | Yes | **No** |

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour

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# 7 EAPC (2023) TRAFFIC CONDITIONS

This section discusses the methods used to develop Existing Plus Ambient Growth Plus Cumulative Projects Plus Project (EAPC) (2023) traffic conditions and the resulting peak hour intersection operations, traffic signal warrant, and queuing analyses.

## 7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for EAPC conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for EAPC conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for EAPC conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

## 7.2 EAPC (2023) TRAFFIC VOLUME FORECASTS

To account for background traffic growth, other known cumulative development projects in the study area were included in addition to an ambient growth from Existing conditions of 8.24% (2 percent per year over 4 years, compounded annually) for EAPC traffic conditions. EAPC weekday ADT, weekday AM, and weekday PM peak hour intersection turning movement volumes are shown on Exhibit 7-1. Weekend peak hour intersection turning movement volumes are shown on Exhibit 7-2.

## 7.3 EAPC (2023) INTERSECTION OPERATIONS ANALYSIS

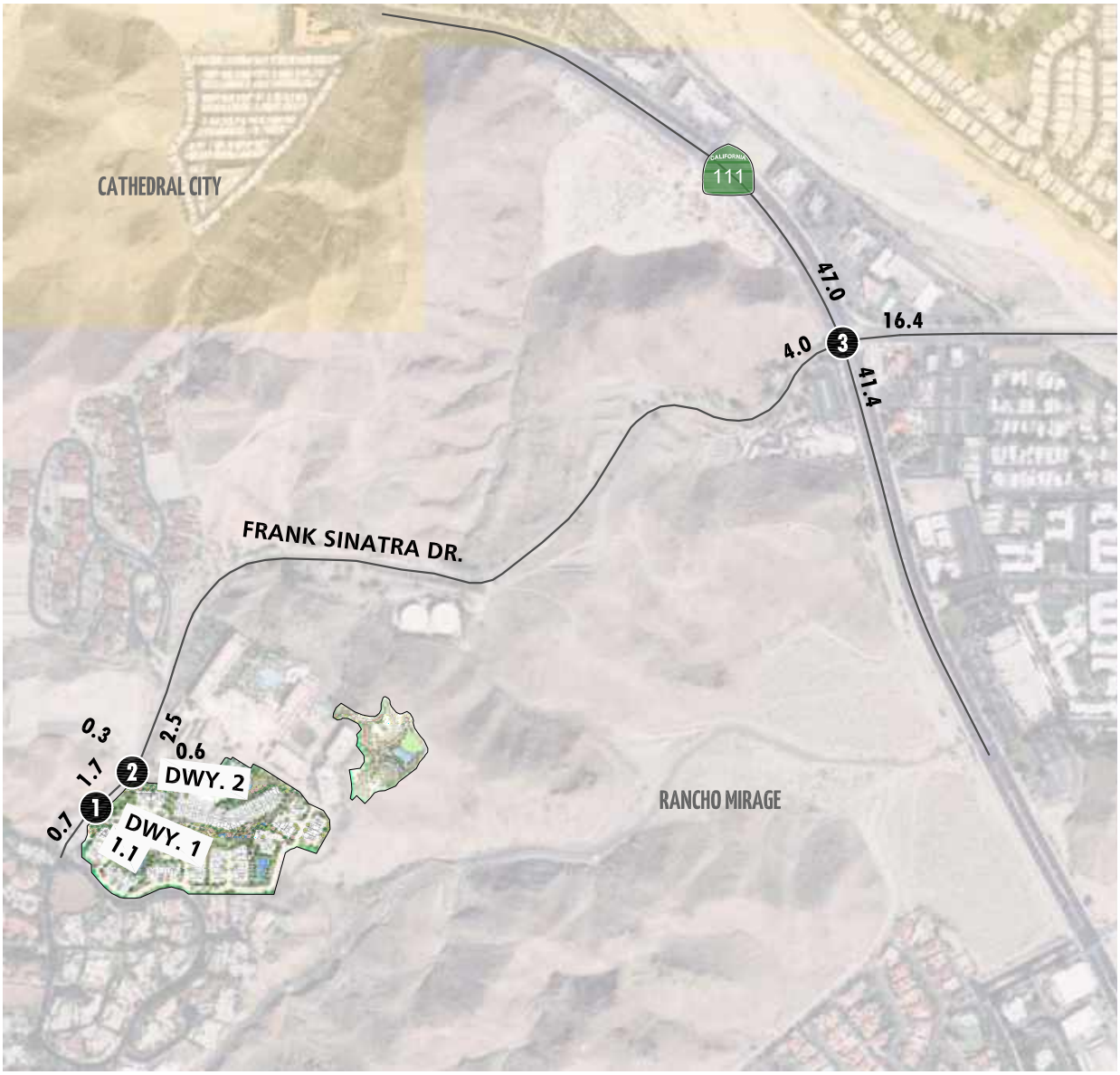
EAPC peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 7-1, which indicate that there are no intersections operating at an unacceptable LOS with the addition of ambient growth, cumulative projects, and Project traffic.

Consistent with Table 7-1, a summary of the peak hour intersection LOS for EAPC conditions is shown on Exhibit 7-3. The intersection operations analysis worksheets for EAPC traffic conditions is included in Appendix 7.1 of this TIA.

## 7.4 EAPC (2023) TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for EAPC traffic conditions are based on planning level (ADT) and peak hour intersection volumes. For EAPC traffic conditions, no study area intersections are anticipated to warrant a traffic signal (see Appendix 7.2).

## EXHIBIT 7-1: EAPC (2023) WEEKDAY TRAFFIC VOLUMES



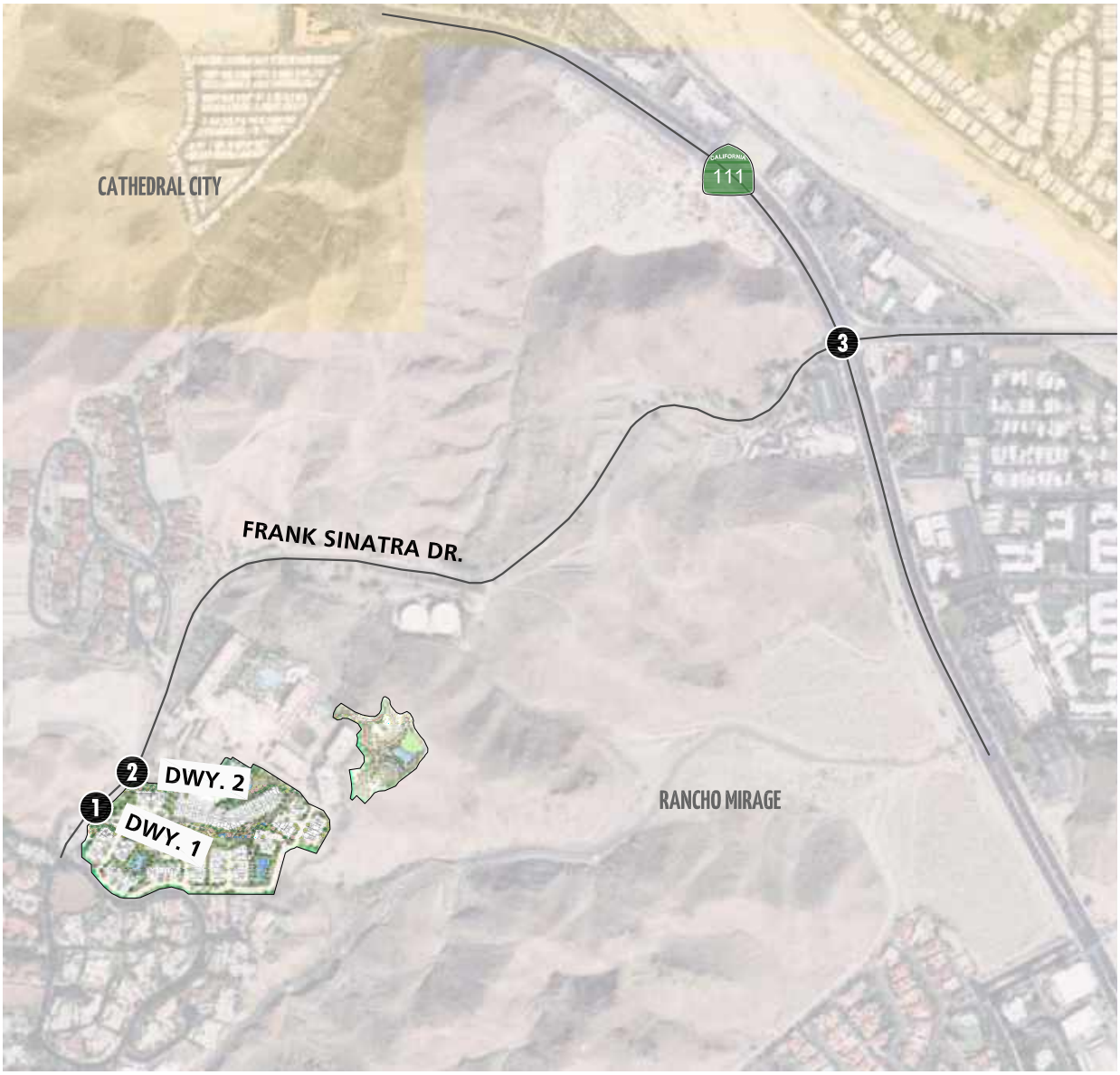

| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| 42(23) 12(55) → 39(31) ← 0(0) | 0(1) 53(78) 13(27) → 16(9) ← 0(4) ← 0(0) | 47(41) 1250(1334) 295(406) → 397(335) ← 65(53) ← 283(168) |
| 21(27) 0(0) ↑ | 0(17) → 1(2) → 1(0) 1(0) 59(58) 0(0) ↑ | 29(49) → 38(67) → 36(39) 44(59) 821(1346) 101(192) ↑ |

**LEGEND:**

**10(10)** = AM(PM) PEAK HOUR INTERSECTION VOLUMES
**10.0** = VEHICLES PER DAY (1000'S)

N

## EXHIBIT 7-2: EAPC (2023) SATURDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| 26(26) 354(69) 62(347) 0(0) | 3(3) 380(95) 36(36) 29(29) 1(1) 0(0) | 134(62) 1331(1331) 212(212) 184(184) 156(56) 159(159) |
| 27(27) 0(0) | 1(1) 0(0) 0(0) 0(0) 85(370) 3(3) | 43(114) 68(167) 39(153) 196(82) 1233(1233) 108(108) |

**LEGEND:**

10(10) = ARRIVAL(DEPARTURE) PEAK HOUR INTERSECTION VOLUMES

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## EXHIBIT 7-3: EAPC (2023) SUMMARY OF LOS

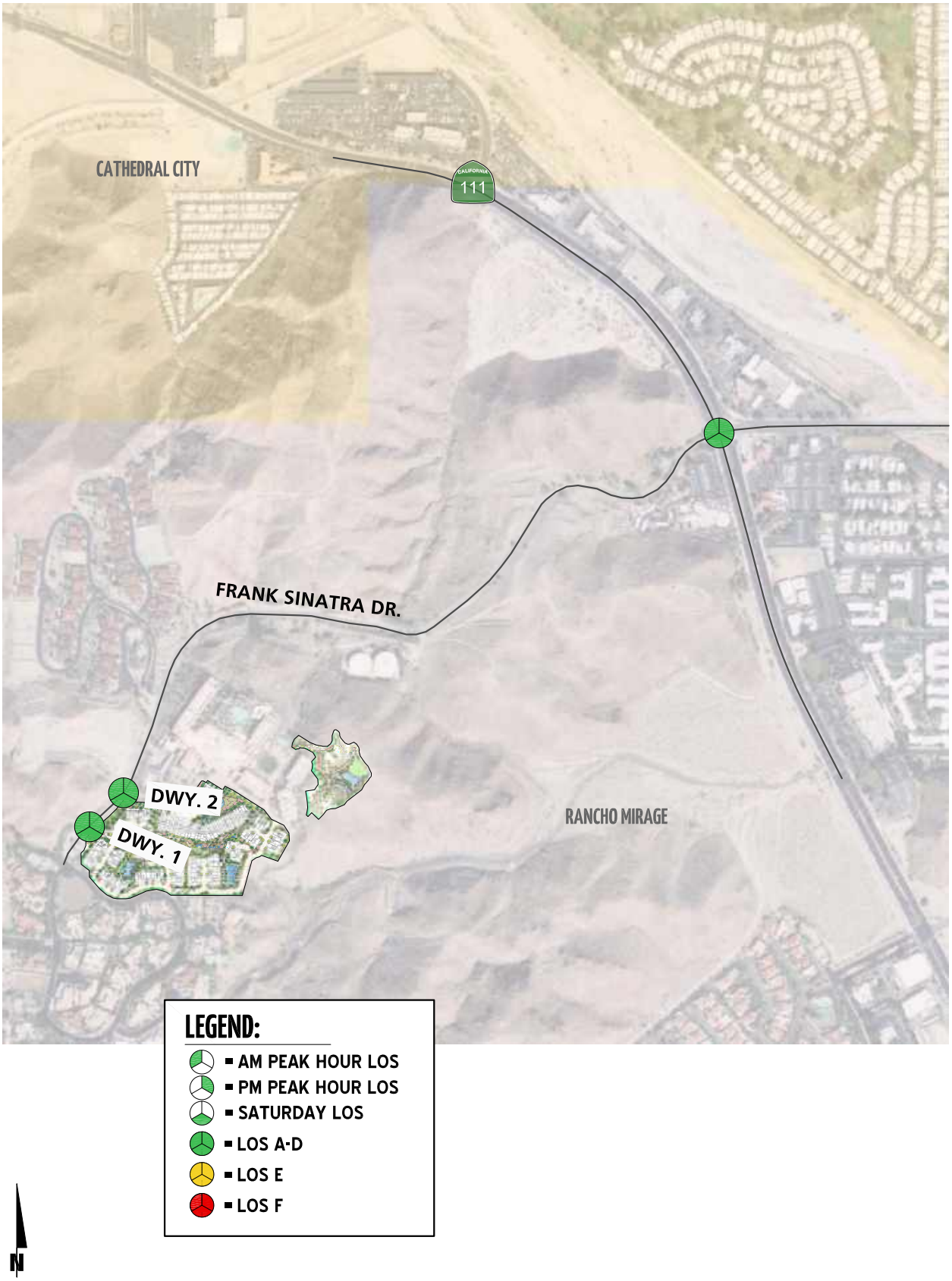


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**Table 7-1**

**Intersection Analysis for EAPC (2023) Conditions**

| # | Intersection | Traffic Control[1] | Existing (2019) | | | | | | EAPC (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. & Dwy. 1 | --/**CSS** | Future Intersection | | | | | | 8.6 | 8.6 | 8.7 | 10.4 | A | A | A | B |
| 2 | Frank Sinatra Dr. & Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.3 | 10.4 | 16.0 | 16.3 | A | B | C | C |
| 3 | Hwy. 111 & Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 21.7 | 21.3 | 24.9 | 30.5 | C | C | C | C |

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal

[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour

## 7.5 EAPC (2023) QUEUING ANALYSIS

A queuing analysis was performed for study area intersections that may potentially impact peak hour operations. Queuing analysis findings are presented in Table 7-2. It is important to note that lengths are consistent with the measured distance between the intersection and the end of the storage area. As shown on Table 7-2 and consistent with Existing (2019) conditions, there are no potential queuing issues anticipated during the peak weekday 95th percentile traffic flows for EAPC (2023) traffic conditions. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 & Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – EBL movement

Worksheets for EAPC (2023) conditions queuing analysis are provided in Appendix 7.3.

## 7.6 RECOMMENDED IMPROVEMENTS

### 7.6.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

No improvement strategies have been recommended for study area intersections as there no deficient intersections for EAPC (2023) traffic conditions.

### 7.6.2 RECOMMENDED IMPROVEMENTS TO ADDRESS QUEUES

As shown previously on Table 7-2, there are no weekday peak hour queuing issues anticipated at the study area intersections for EAPC (2023) traffic conditions. However, it is recommended that the following improvements be implemented to accommodate EAPC (2023) weekend special event 95th percentile traffic flows:

- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage for the NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage for the EBL movement

**Table 7-2**

**Peak Hour Queuing Summary for EAPC (2023) Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | Existing (2019) | | | | | | EAPC (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet)[2] | | | Acceptable?[1] | | | 95th Percentile Queue (Feet)[2] | | | | Acceptable?[1] | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| Frank Sinatra Dr. & Dwy. 1 | SBL/T | 200 | Future Intersection | | | | | | 9 | 0 | 30 | 0 | Yes | Yes | Yes | Yes |
| | WBL/R | 100 | | | | | | | 44 | 45 | 43 | 79 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. & Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes | 0 | 0 | 21 | 34 | Yes | Yes | Yes | Yes |
| | WBL/R | 200 | 34 | 28 | 45 | Yes | Yes | Yes | 28 | 29 | 40 | 48 | Yes | Yes | Yes | Yes |
| Hwy. 111 & Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes | 77 | 113 [2] | **379** [2] | 131 [2] | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 0 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes | 57 | 86 [2] | 82 [2] | **251** [2] | Yes | Yes | Yes | **No** |
| | EBT/R | 270 | 41 | 74 | 51 | Yes | Yes | Yes | 64 | 99 | 109 | **336** | Yes | Yes | Yes | **No** |

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour

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# 8 HORIZON YEAR (2040) TRAFFIC ANALYSIS

This section discusses the methods used to develop Horizon Year Without and With Project and the resulting intersection operations, traffic signal warrants, and queuing analysis.

## 8.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Horizon Year With Project conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

## 8.2 HORIZON YEAR WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the RivTAM (see Section 4.6 *Horizon Year (2040) Volume Development* of this TIA for a detailed discussion on the post-processing methodology). The weekday ADT, weekday AM, and weekday PM peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions are shown on Exhibit 8-1. Weekend peak hour intersection turning movement volumes are shown on Exhibit 8-2.

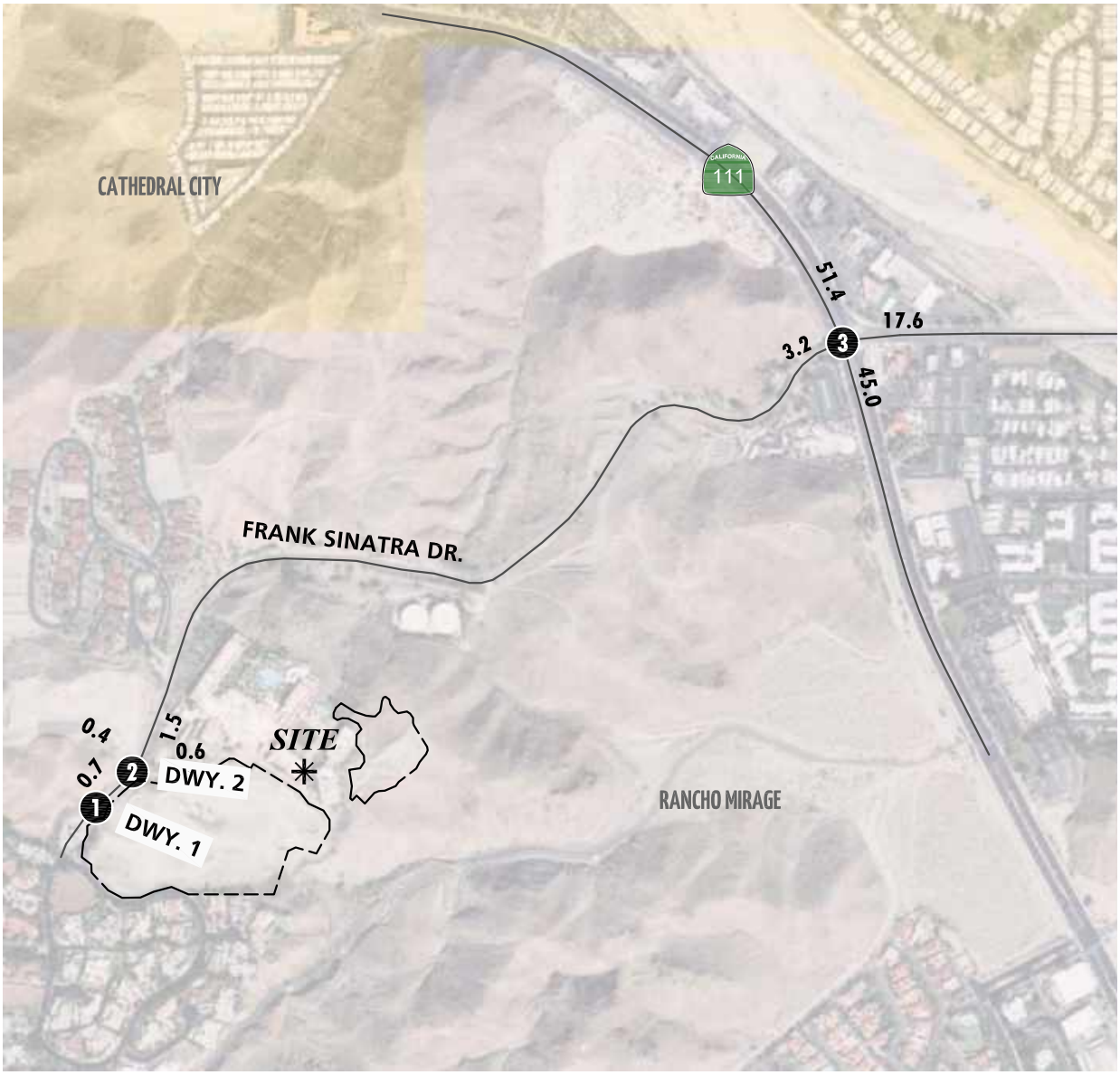
## 8.3 HORIZON YEAR WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the RivTAM, plus the traffic generated by the proposed Project. Horizon Year (2040) With Project traffic forecasts assumes buildout of the Project. The weekday ADT, weekday AM, and weekday PM peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibit 8-3. Weekend peak hour intersection turning movement volumes are shown on Exhibit 8-4.

## 8.4 INTERSECTION OPERATIONS ANALYSIS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) Without Project conditions with roadway and intersection geometrics consistent with Existing conditions. As shown in Table 8-1, no study area intersections are anticipated to operate at unacceptable levels of service under Horizon Year (2040) Without Project conditions. With the addition of Project traffic, no additional study area intersections are anticipated to operate at unacceptable levels of service.

## EXHIBIT 8-1: HORIZON YEAR (2040) WITHOUT PROJECT WEEKDAY TRAFFIC VOLUMES



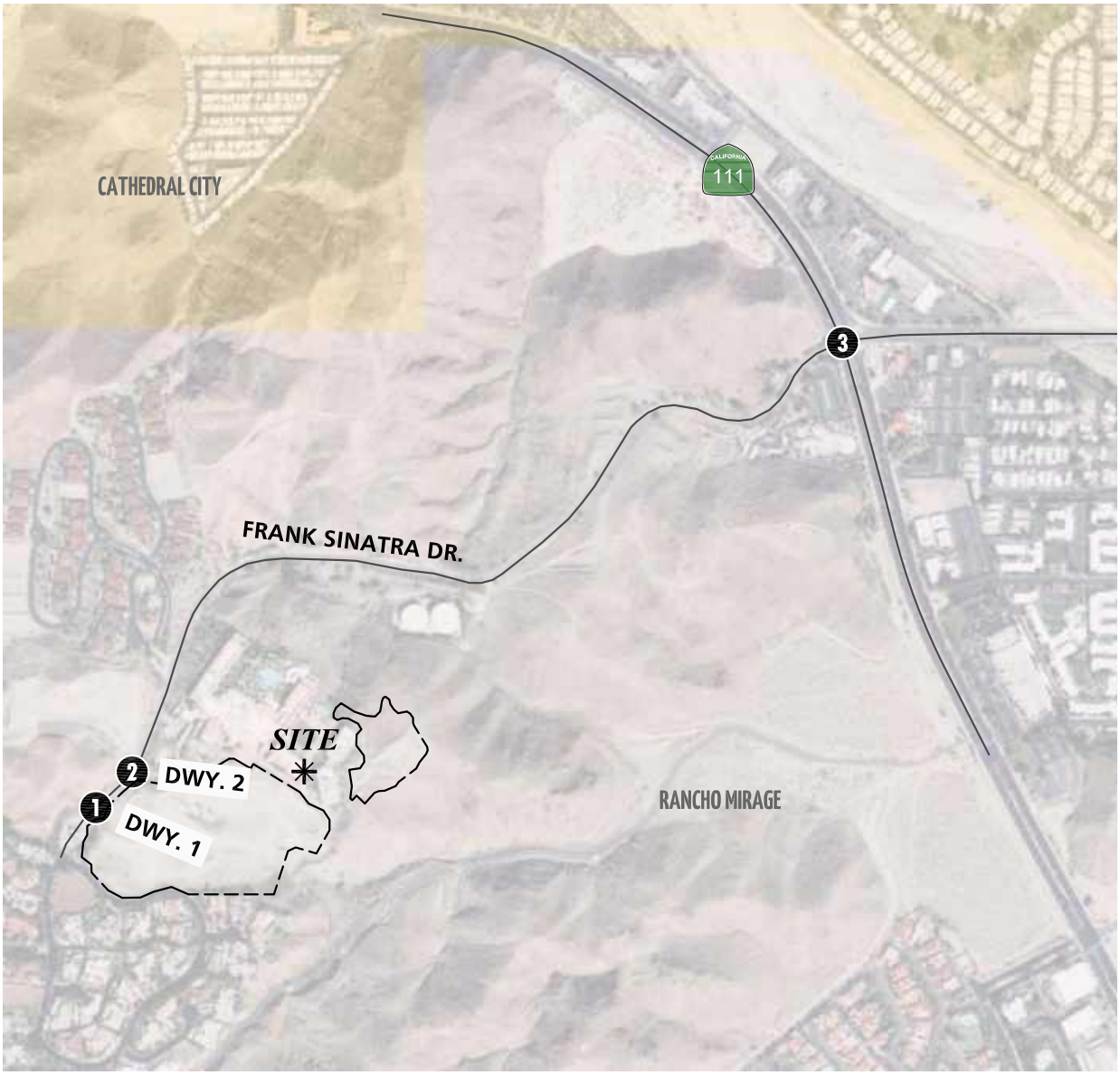

| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| Future Intersection | 0(3) 45(95) 14(36) → 18(29) ← 0(1) ← 0(0)<br>0(1) → 1(0) → 1(0) → 1(0) 22(370) 0(3) | 49(62) 1375(1331) 325(212) → 489(184) ← 62(56) ← 330(159)<br>21(114) → 26(167) → 22(153) → 43(82) 851(1233) 104(108) |

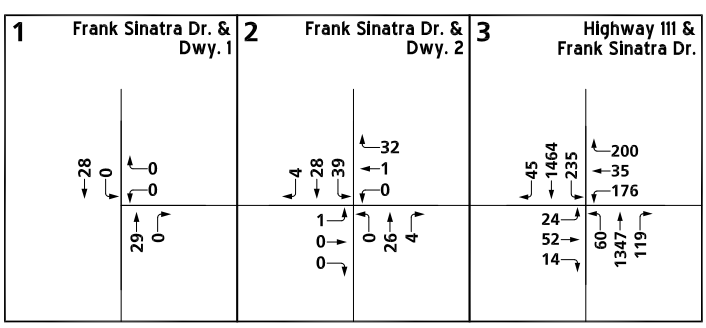
**LEGEND:**

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
**10.0** = VEHICLES PER DAY (1000'S)

N

## EXHIBIT 8-2: HORIZON YEAR (2040) WITHOUT PROJECT SATURDAY TRAFFIC VOLUMES



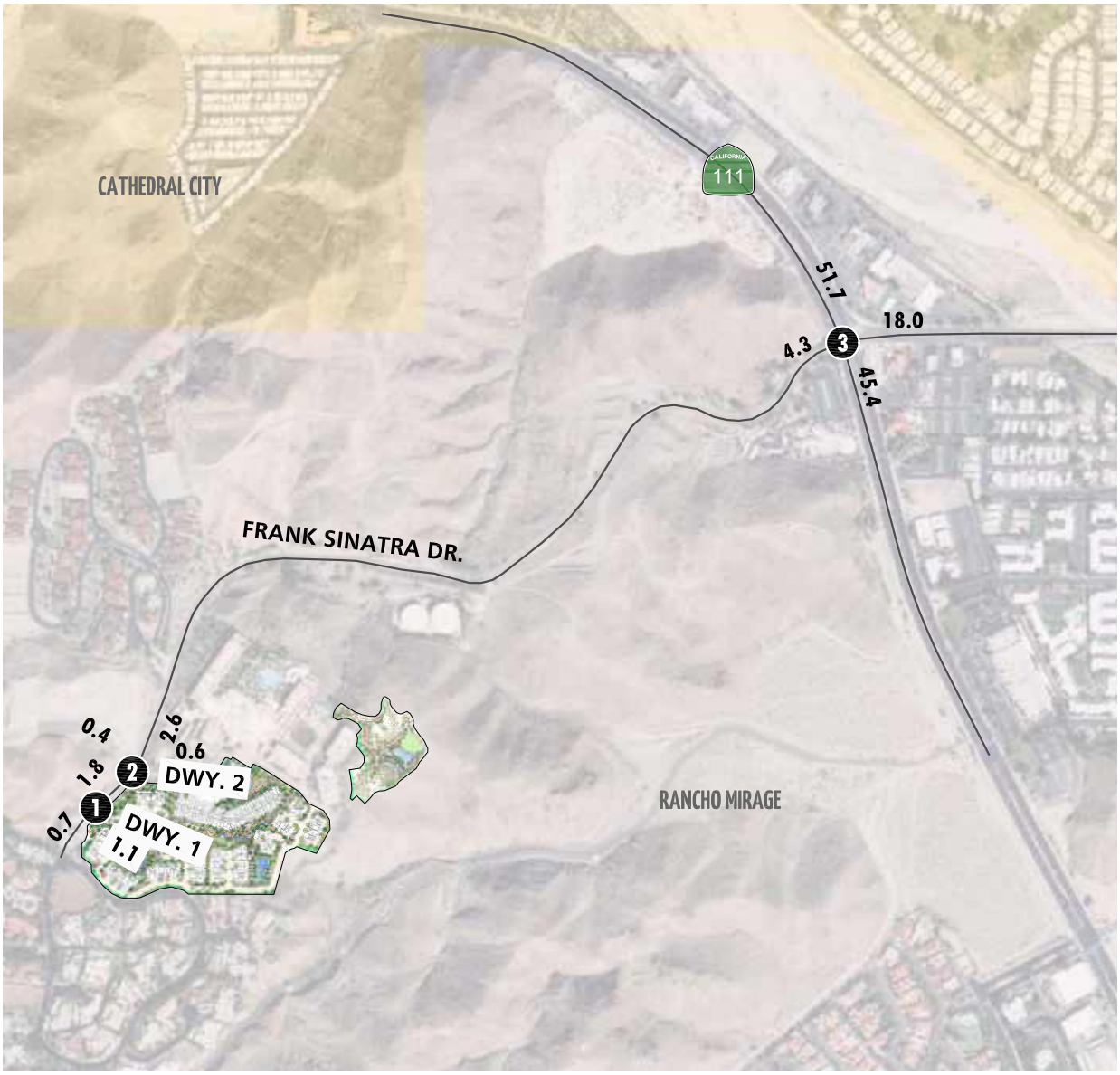




**LEGEND:**

10 = SATURDAY PEAK HOUR INTERSECTION VOLUMES

N

## EXHIBIT 8-3: HORIZON YEAR (2040) WITH PROJECT WEEKDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| 46(26) 12(55) → 39(31) ← 0(0) | 0(1) 57(81) 14(30) → 18(10) ← 0(5) ← 0(0) | 52(43) 1375(1467) 325(481) → 489(354) ← 66(57) ← 330(178) |
| 24(29) 0(0) ↑ | 0(19) → 1(2) → 1(0) 1(0) 61(60) 0(0) ↑ | 31(53) → 40(73) → 38(42) → 48(62) 851(1481) 104(227) ↑ |

**LEGEND:**

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
**10.0** = VEHICLES PER DAY (1000'S)

N

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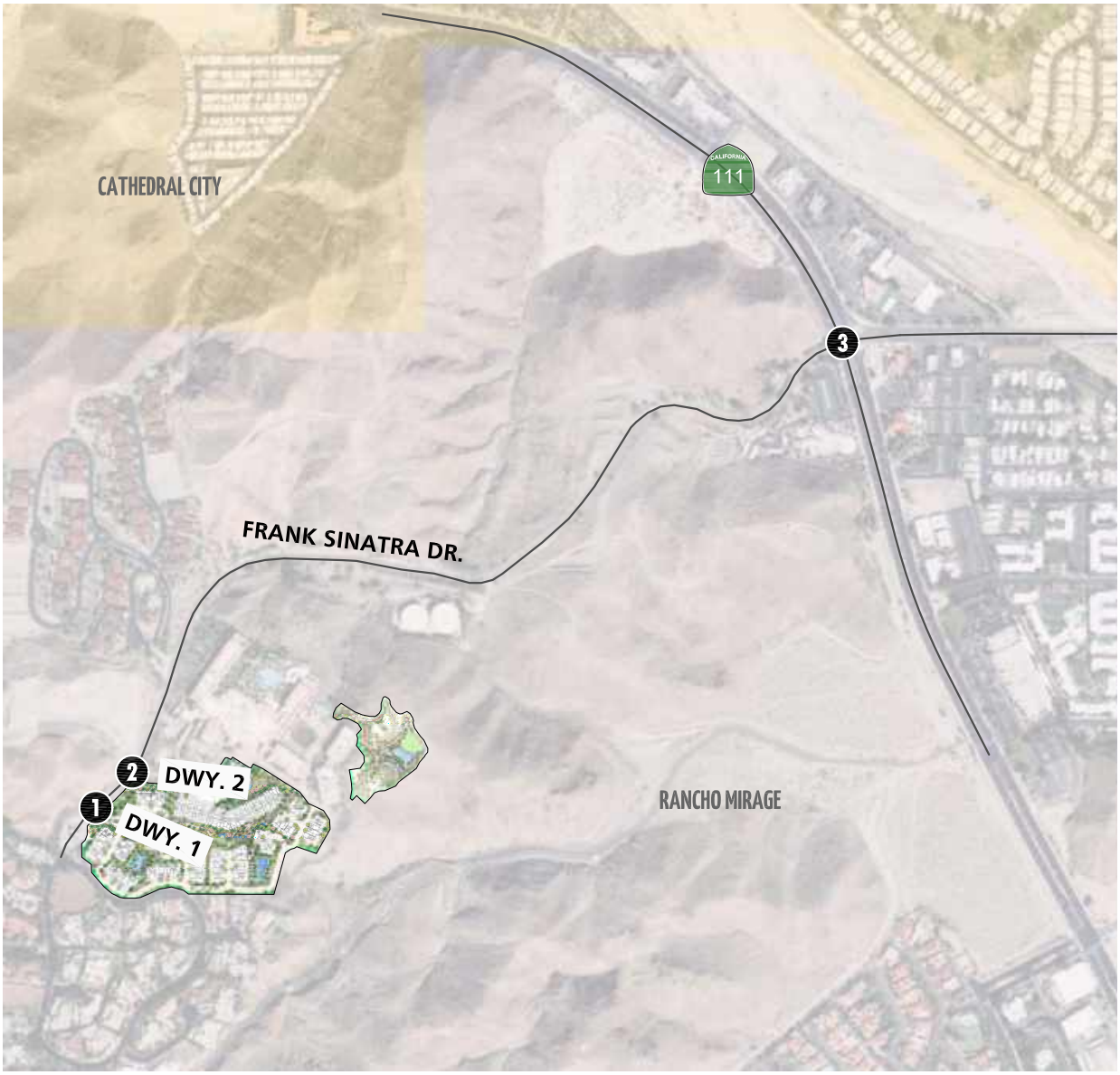
## EXHIBIT 8-4: HORIZON YEAR (2040) WITH PROJECT SATURDAY TRAFFIC VOLUMES




| 1 Frank Sinatra Dr. & Dwy. 1 | 2 Frank Sinatra Dr. & Dwy. 2 | 3 Highway 111 & Frank Sinatra Dr. |
|---|---|---|
| 28(28) ↓ 354(69) ↓ → 62(347) ← 0(0) | 4(4) ↓ 382(97) ↓ 39(39) → 32(32) ← 1(1) ← 0(0) | 134(62) ↓ 1464(1464) ↓ 235(235) → 200(200) ← 159(59) ← 176(176) |
| 29(29) ↑ 0(0) → | 1(1) → 0(0) → 0(0) → 0(0) ↑ 88(373) ↑ 4(4) ← | 40(111) → 74(173) → 39(153) → 202(88) ↑ 1347(1347) ↑ 119(119) ← |

**LEGEND:**

10(10) = ARRIVAL(DEPARTURE) PEAK HOUR INTERSECTION VOLUMES

N

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**Table 8-1**

**Intersection Analysis for Horizon Year (2040) Conditions**

| # | Intersection | Traffic Control[1] | 2040 Without Project | | | | | | 2040 With Project | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. & Dwy. 1 | --/**CSS** | Future Intersection | | | | | | 8.6 | 8.6 | 8.7 | 10.4 | A | A | A | B |
| 2 | Frank Sinatra Dr. & Dwy. 2 | CSS | 9.1 | 9.7 | 10.0 | A | A | B | 9.3 | 10.5 | 16.3 | 16.7 | A | B | C | C |
| 3 | Hwy. 111 & Frank Sinatra Dr. | TS | 22.7 | 22.6 | 20.3 | C | C | C | 23.2 | 23.2 | 27.1 | 34.1 | C | C | C | C |

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal

[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour

A summary of the peak hour intersection LOS for Horizon Year (2040) Without and With Project traffic conditions are shown on Exhibits 8-5 and 8-6, respectively. The intersection operations analysis worksheets for Horizon Year (2040) Without Project conditions are included in Appendix 8.1 of this TIA. The intersection operations analysis worksheets for Horizon Year (2040) With Project conditions are included in Appendix 8.2 of this TIA.

## 8.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

A traffic signal warrant analysis was performed at the unsignalized driveways for Horizon Year (2040) Without and With Project traffic conditions. No study area intersections are anticipated to warrant a traffic signal under Horizon Year (2040) Without and With Project traffic conditions. Traffic signal warrants worksheets for Horizon Year (2040) Without and With Project conditions are provided in Appendix 8.3 and Appendix 8.4, respectively.

## 8.6 QUEUING ANALYSIS

A queuing analysis was performed for the study area intersections to assess vehicle queues along the roadways. Horizon Year (2040) Without and With Project queuing analysis findings are presented in Table 8-2.

As shown on Table 8-2, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday and weekend 95$^{th}$ percentile peak hour traffic flows for Horizon Year (2040) Without Project.

With the addition of Project traffic, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday 95$^{th}$ percentile peak hour traffic flows. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95$^{th}$ percentile peak hour traffic flow:

- Hwy. 111 & Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – EBL movement

Worksheets for Horizon Year (2040) Without and With Project conditions queuing analysis are provided in Appendices 8.5 and 8.6, respectively.

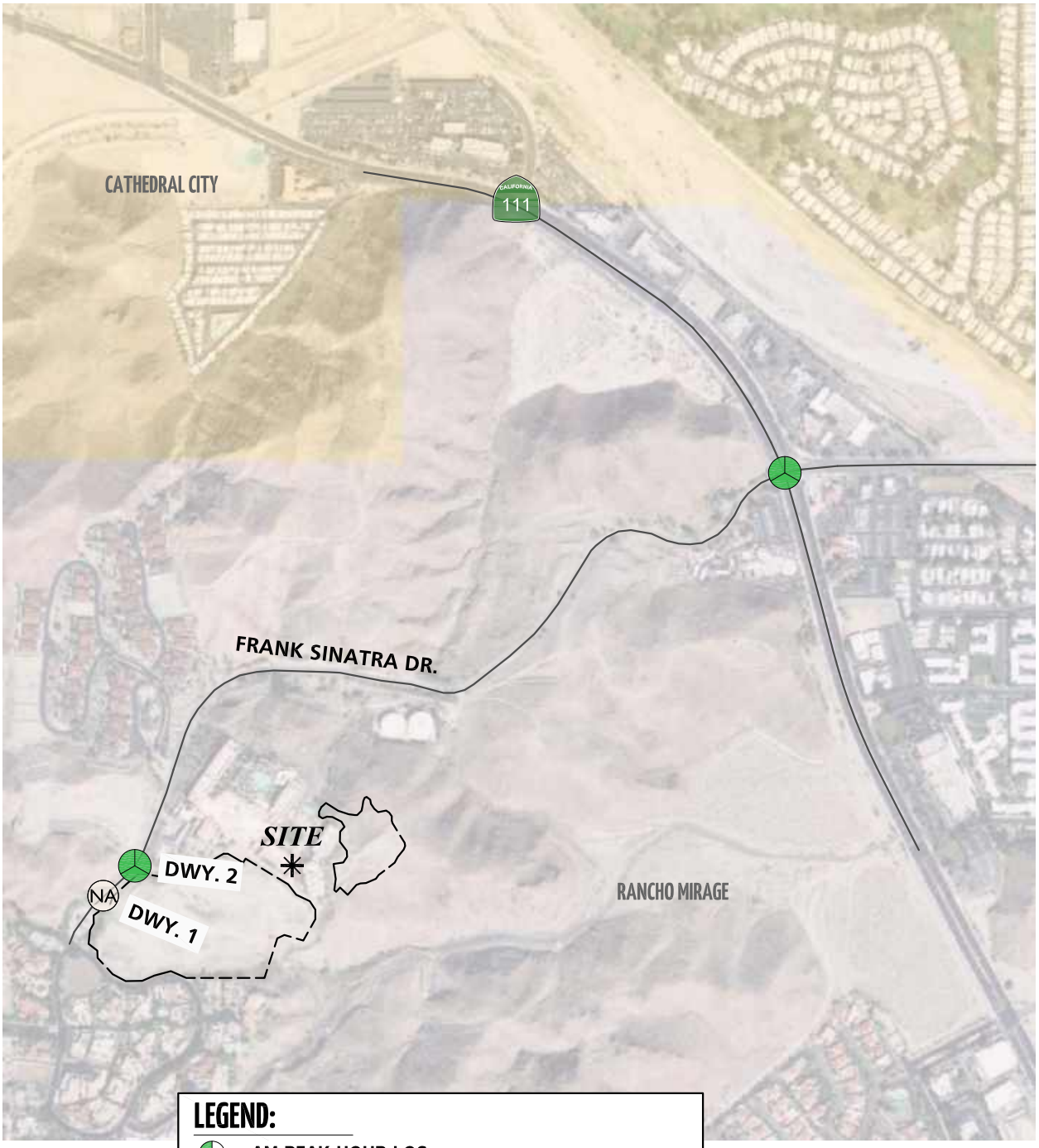
## 8.7 RECOMMENDED IMPROVEMENTS

### 8.7.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The study area intersections are anticipated to operate at an acceptable LOS for Horizon Year (2040) Without Project conditions.

The study area intersections are anticipated to continue to operate at an acceptable LOS with the addition of Project traffic. As such, no improvements have been recommended for Horizon Year (2040) traffic conditions.

## EXHIBIT 8-5: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS

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## EXHIBIT 8-6: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS

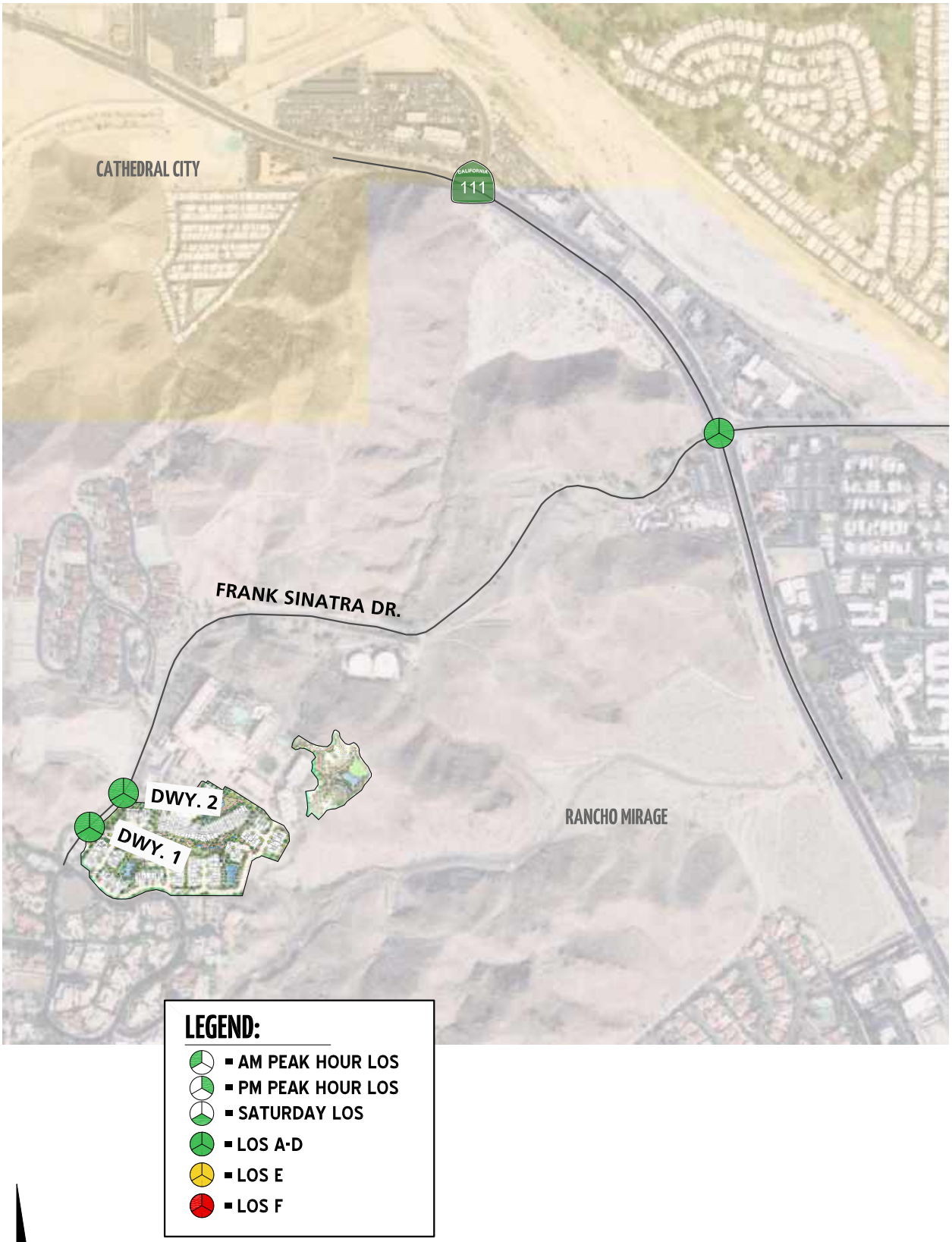


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**Table 8-2**

**Peak Hour Queuing Summary for Horizon Year (2040) Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | 2040 Without Project | | | | | | 2040 With Project | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet)[2] | | | Acceptable?[1] | | | 95th Percentile Queue (Feet)[2] | | | | Acceptable?[1] | | | |
| | | | Weekday | | Saturday | Weekday | | Saturday | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | | AM | PM | | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| Frank Sinatra Dr. & Dwy. 1 | SBL/T | 200 | Future Intersection | | | | | | 10 | 24 | 37 | 15 | Yes | Yes | Yes | Yes |
| | WBL/R | 100 | | | | | | | 47 | 49 | 46 | 89 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. & Dwy. 2 | SBL | 220 | 0 | 0 | 14 | Yes | Yes | Yes | 0 | 10 | 14 | 51 | Yes | Yes | Yes | Yes |
| | WBL/R | 200 | 31 | 36 | 40 | Yes | Yes | Yes | 37 | 31 | 44 | 46 | Yes | Yes | Yes | Yes |
| Hwy. 111 & Frank Sinatra Dr. | NBL | 260 | 75 | 68 | 97 | Yes | Yes | Yes | 83 | 121 [2] | **392** [2] | 146 [2] | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 43 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 46 | 75 | 51 | Yes | Yes | Yes | 61 | 97 [2] | 74 | **246** [2] | Yes | Yes | Yes | **No** |
| | EBT/R | 270 | 48 | 89 | 75 | Yes | Yes | Yes | 68 | 107 | 115 | **343** | Yes | Yes | Yes | **No** |

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Arr = Arrival Peak Hour; Dep = Departure Peak Hour

### 8.7.2 RECOMMENDED IMPROVEMENTS TO ADDRESS QUEUES

As shown previously on Table 8-2, there are no weekday peak hour queuing issues anticipated at the study area intersections for Horizon Year (2040) traffic conditions. However, it is recommended that the following improvements be implemented to accommodate Horizon Year (2040) weekend special event 95$^{th}$ percentile traffic flows:

- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage from 260' to 400' for the NBL movement
- Hwy. 111 & Frank Sinatra Dr. (#3) – extend storage from 170' to 250' for the EBL movement

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# 9 LOCAL AND REGIONAL FUNDING MECHANISMS

## 9.1 TRANSPORTATION UNIFORM MITIGATION FEE (TUMF) PROGRAM

The TUMF program is administered by CVAG based upon a regional Nexus Study most recently updated in 2009 to address major changes in right of way acquisition and improvement cost factors. CVAG is currently in the process of completing a current Nexus Study update to the program. Final changes to network facilities, network cost allocations, and fee changes were not available at the time this assessment was prepared. This regional program was put into place to ensure that development pays its fair share and that funding is in place for construction of facilities needed to maintain the requisite level of service and critical to mobility in the region. The CVAG TUMF boundary covers many of the municipalities in the Coachella Valley while WRCOG TUMF cover those found in Western Riverside County.

TUMF fees are imposed on new residential, industrial, and commercial development through application of the TUMF fee ordinance and fees are collected at the building or occupancy permit stage. In addition, an annual inflation adjustment is considered each year in February. In this way, TUMF fees are adjusted upwards on a regular basis to ensure that the development impact fees collected keep pace with construction and labor costs, etc.

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# 10 REFERENCES

1. **Riverside County Transportation Department.** *Traffic Impact Analysis Preparation Guide.* County of Riverside : s.n., Updated April 2008.

2. **Institute of Transportation Engineers.** *Trip Generation.* 10th Edition. 2017.

3. **Federal Highway Administration (FHWA).** *Managing Travel for Planned Special Events.* s.l. : FHWA, 2003.

4. **Transportation Research Board.** *Highway Capacity Manual (HCM).* s.l. : National Academy of Sciences, 2010.

5. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD).* 2014.

6. **Southern California Association of Governments.** *2016 Regional Transportation Plan/Sustainable Communities Strategy.* April 2016.

7. *City of Rancho Mirage General Plan.* **City of Rancho Mirage.** November 2005.

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# APPENDIX 1.1:

# APPROVED TRAFFIC STUDY SCOPING AGREEMENT

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URBAN CROSSROADS

260 E. Baker St. | Suite 200 | Costa Mesa, CA 92626 | (949) 660-1994
urbanxroads.com

October 15, 2019

Mr. Bill Enos
City of Rancho Mirage
69825 Highway 111
Rancho Mirage, CA 92270

**SUBJECT: SCOPING AGREEMENT FOR RITZ-CARLTON RESIDENCES TRAFFIC IMPACT AND PARKING ANALYSIS**

Dear Mr. Bill Enos:

The firm of Urban Crossroads, Inc. is pleased to submit this scoping agreement for Ritz-Carlton Residences ("Project"), which is located north of Mirada Circle and east of Frank Sinatra Drive, in the City of Rancho Mirage. It is our understanding that the Project is to expand the existing Ritz-Carlton hotel by 106 residential dwelling units, a 6,966 restaurant, and a 23,843 square foot venue. The traffic analysis will be conducted for the buildout of the Project with an anticipated opening year of 2023.

Our goal is to obtain comments from City of Rancho Mirage staff, to ensure that the traffic study fully addresses the potential impacts of the proposed Project. The remainder of this letter describes the proposed analysis methodology, Project trip generation, trip distribution, and Project traffic assignment/project trips on the surrounding roadway network. The following scoping assumptions have been prepared in accordance with the County of Riverside's Traffic Impact Analysis Preparation Guide (April 2008) as the City of Rancho Mirage does not have its own traffic impact analysis guidelines.

The preliminary site plan for the proposed Project is shown on Exhibit 1.

Access to the Project site will be provided via the following roadways:

- Frank Sinatra Drive on SR-111 (full access)

Exhibit 2 depicts the location of the proposed Project in relation to the existing roadway network.

## TRIP GENERATION

Trip generation represents the amount of traffic that is attracted and produced by a development, and is based upon the specific land uses planned for a given project. In order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017) for the proposed land use was used. The trip generation summary illustrating daily and peak hour trip generation estimates for the proposed Project are shown in Table 1. As shown on Table 1, the proposed Project (typical

operations) is anticipated to generate a net total of 1,068 trip-ends per day, 51 AM peak hour trips and 86 PM peak hour trips.

It should be noted that the venue will generate trips outside the weekday AM and PM peak hours. As shown on Table 2, the proposed Project (special event) is anticipated to generate a net total of 416 peak hour trips.

## TRIP DISTRIBUTION

The trip distribution patterns for the Project are graphically depicted on Exhibit 3. The trip distributions have been developed based on past work experience in the vicinity of the Project site and refined to reflect the roadway network and the surrounding uses in the vicinity of the proposed Project as they exist today.

## STUDY AREA

The traffic impact study area was defined in conformance with the requirements of County of Riverside's Traffic Impact Analysis Preparation Guide. Consistent with the County's TIA guidelines, study area intersections have been identified for the Project based on the contribution of 50 or more peak hour trips. Exhibit 2 presents the study area intersection analysis locations.

## TRAFFIC COUNTS

Weekday traffic counts will be conducted during AM (7-9 AM) and PM (4-6 PM) peak hours once the scoping agreement has been approved during a typical Tuesday, Wednesday, or Thursday when local schools are in session and operating on a typical bell schedule. Weekend traffic counts will be conducted during the Saturday mid-day (10 AM to 2 PM) peak hours once the scoping agreement has been approved.

## AMBIENT GROWTH ASSUMPTIONS

The ambient growth rate of 8.24% will be utilized for an opening year of 2023 (2% compounded over 4 years).

## ANALYSIS SCENARIOS

The following analysis scenarios are proposed for this traffic study:

- Existing (2019)
- Existing Plus Project (E+P)
- Existing Plus Ambient Growth Plus Project (E+A+P) (2023)

- Existing Plus Ambient Growth Plus Cumulative Projects Plus Project (E+A+C+P) (2023)
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

## LEVEL OF SERVICE (LOS) CRITERIA

Per Goal 1, Policy 1 of the City of Rancho Mirage General Plan, the following LOS will be utilized for study area intersections located within the City: Require development to achieve a peak hour LOS D or better at intersections and roadway segments.

## PREFERRED ANALYSIS METHODOLOGY

For the purposes of this analysis, signalized intersection operations analysis will be based on the methodology described in the Highway Capacity Manual (6th Edition). Intersection LOS operations are based on an intersection's average control delay. Unsignalized intersections will be evaluated using the methodology described in the HCM 6th Edition. At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane.

## OPEN ITEMS - CUMULATIVE DEVELOPMENT PROJECTS

Please provide a list of cumulative projects to be included in the analysis. The City of Cathedral City will also be consulted for their input on cumulative projects within their jurisdiction.

## SPECIAL ISSUES

The following issues will also be addressed as part of the TIA:

- *Site Access Evaluation:* Recommendations regarding site access and internal circulation features to accommodate peak hour traffic volumes will be included in the traffic study. Queuing analyses will be prepared for all turn lanes into the project site for "with project" scenarios.
- *Site Distance Evaluation:* Recommendations regarding stopping, passing and corner sight distance standards at the Project driveways will be included in the traffic study. The evaluation will be determined from the Caltrans Highway Design Manual and based on the posted speed limit on Frank Sinatra Drive.
- *Traffic Signal Warrant Analysis:* Signal warrant analysis will be prepared for unsignalized intersections for all study scenarios, except when an intersection is warranted in an earlier scenario. Peak hour volume based warrants (CA MUTCD Warrant 3) will be utilized for existing

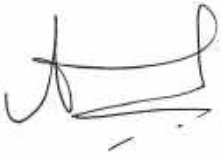
conditions. For future scenarios, CA MUTCD Figure 4C-103, Traffic Signals Warrant Worksheet (Average Traffic Estimate Form) will be utilized.

- *Queuing Analysis:* Queuing analyses will be prepared for all study area intersections in each analysis scenario. The analysis will identify the necessary lengths of turn pockets with storage and appropriate turn pocket transitions which adheres to the General Plan roadway classifications for the site adjacent roadways.
- *Parking Analysis:* Parking analysis will be prepared as described below:
    - Review the parking policies in the City of Rancho Mirage Municipal Code and General Plan Circulation Element.
    - Identify parking requirements such as parking restrictions, minimum aisle widths, minimum turning radius, etc.
    - Calculate the parking requirements and peak parking demand based on the City of Rancho Mirage Zoning Code. Compare the City of Rancho Mirage parking requirements for the Project uses with typical parking rates.
    - Describe the historical monthly parking utilization at the project site based on a review of aerial photos.
    - Estimate the proposed Ritz-Carlton Residences Project parking supply requirements based on a review of the existing parking demand counts. This includes shared parking opportunities and potential parking demand reductions associated with project design features promoting ride-sharing as well as bicycle, pedestrian and transit activities.
    - Determine if adequate parking supply is available to support the proposed uses.
    - Summarize the findings of the parking analysis in a letter report.
- *Special Event Queuing Analysis:* Special Event Queuing analysis will be prepared as described below:
    - Determine trip generation for the Project during special events.
    - Develop the Project trip distribution patterns during special events.
    - Conduct a queuing analysis at the study area intersections to identify the storage necessary to accommodate queuing during peak hour traffic flows for special events.

If you have any questions, please contact me directly at (949) 336-5992.

Respectfully submitted,

URBAN CROSSROADS, INC.



Pranesh Tarikere, PE
Senior Engineer

**Table 1**

**Project Trip Generation Summary - Typical Operations**

| Land Use | ITE LU Code | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Project Trip Generation Rates:[1]** | | | | | | | | | |
| Multifamily Housing (Low-Rise) | 220 | DU | 0.11 | 0.35 | 0.46 | 0.35 | 0.21 | 0.56 | 7.32 |
| Quality Restaurant | 931 | TSF | 0.49 | 0.24 | 0.73 | 5.23 | 2.57 | 7.80 | 83.84 |

| Land Use | Quantity | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Project Trip Generation Summary:** | | | | | | | | | |
| Ritz-Carlton Residences | 106 | DU | 11 | 38 | 49 | 37 | 22 | 59 | 776 |
| Sky Mesa Restaurant | 6.966 | TSF | 3 | 2 | 5 | 36 | 18 | 54 | 586 |
| Internal Capture (50%)[3] | | | -2 | -1 | -3 | -18 | -9 | -27 | -294 |
| **Total** | | | **12** | **39** | **51** | **55** | **31** | **86** | **1,068** |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).

[2] DU = Dwelling Units; TSF = Thousand Square Feet

[3] Internal capture reduction of 50% has been applied as a significant portion of the patrons would be internal to the existing hotel.

**Table 2**

**Project Trip Generation Summary - Weekend Special Event**

| Land Use | ITE LU Code | Units[2] | Arrival Peak Hour | | | Departure Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| **Project Trip Generation Rates:**[1] | | | | | | | | |
| Multifamily Housing (Low-Rise) | 220 | DU | 0.35 | 0.35 | 0.70 | 0.35 | 0.35 | 0.70 |
| Quality Restaurant | 931 | TSF | 6.30 | 4.38 | 10.68 | 6.30 | 4.38 | 10.68 |
| Venue | Not Available | | | | | | | |

| Land Use | Quantity | Units[2] | Arrival Peak Hour | | | Departure Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| **Project Trip Generation Summary:** | | | | | | | | |
| Ritz-Carlton Residences | 106 | DU | 37 | 37 | 74 | 37 | 37 | 74 |
| Sky Mesa Restaurant | 6.966 | TSF | 44 | 31 | 75 | 44 | 31 | 75 |
| Internal Capture (50%)[3] | | | -22 | -16 | -38 | -22 | -16 | -38 |
| Venue[4] | 381 | Spaces | 295 | 10 | 305 | 10 | 295 | 305 |
| **Total** | | | **354** | **62** | **416** | **69** | **347** | **416** |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).

[2] DU = Dwelling Units; TSF = Thousand Square Feet

[3] Internal capture reduction of 50% has been applied as a significant portion of the patrons would be internal to the existing hotel.

[4] Vehicle trips are calculated based on a maximum allowable occupancy of 0.8 per parking space.

## EXHIBIT 1: PRELIMINARY SITE PLAN



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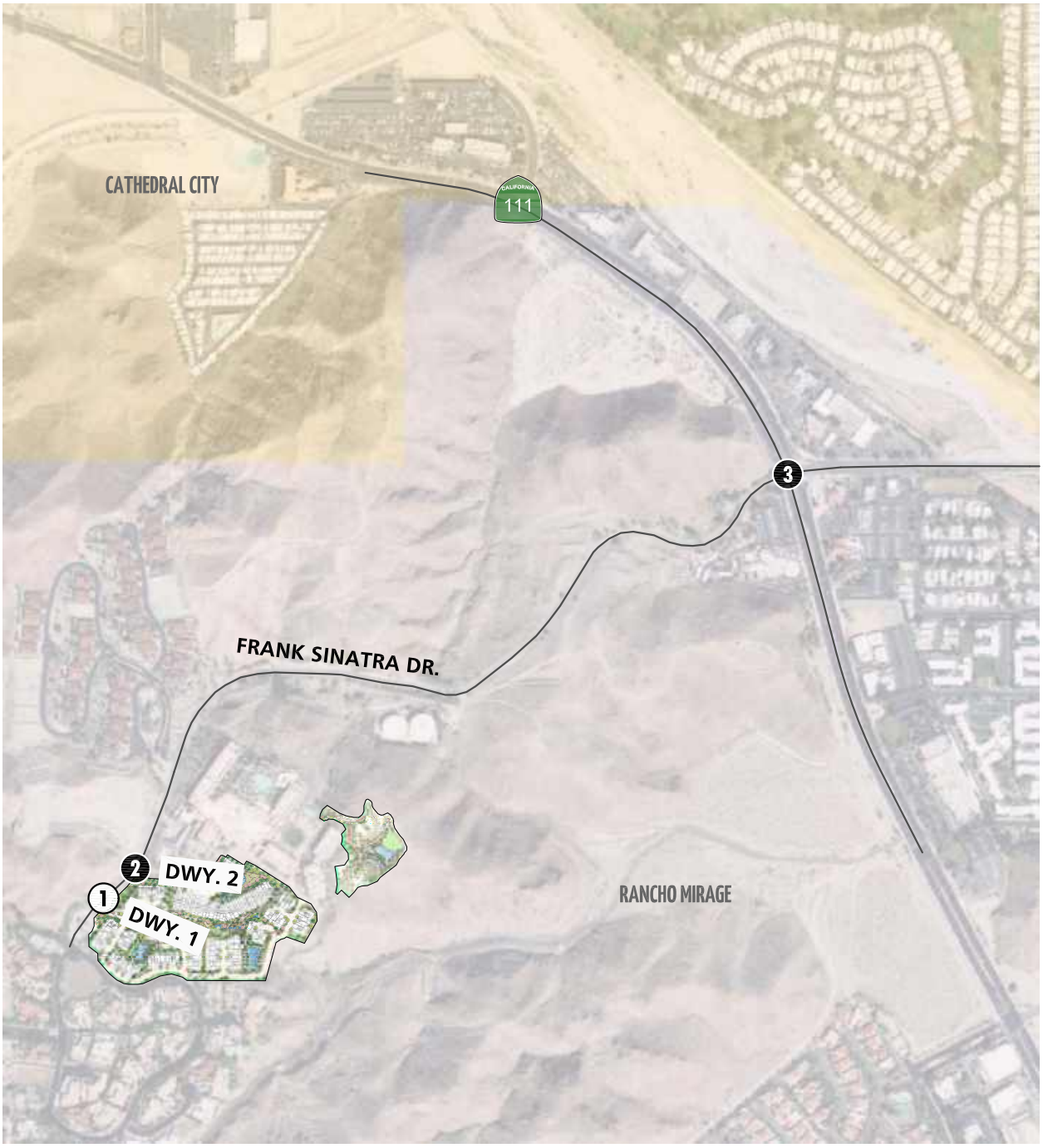
URBAN CROSSROADS

## EXHIBIT 2: LOCATION MAP



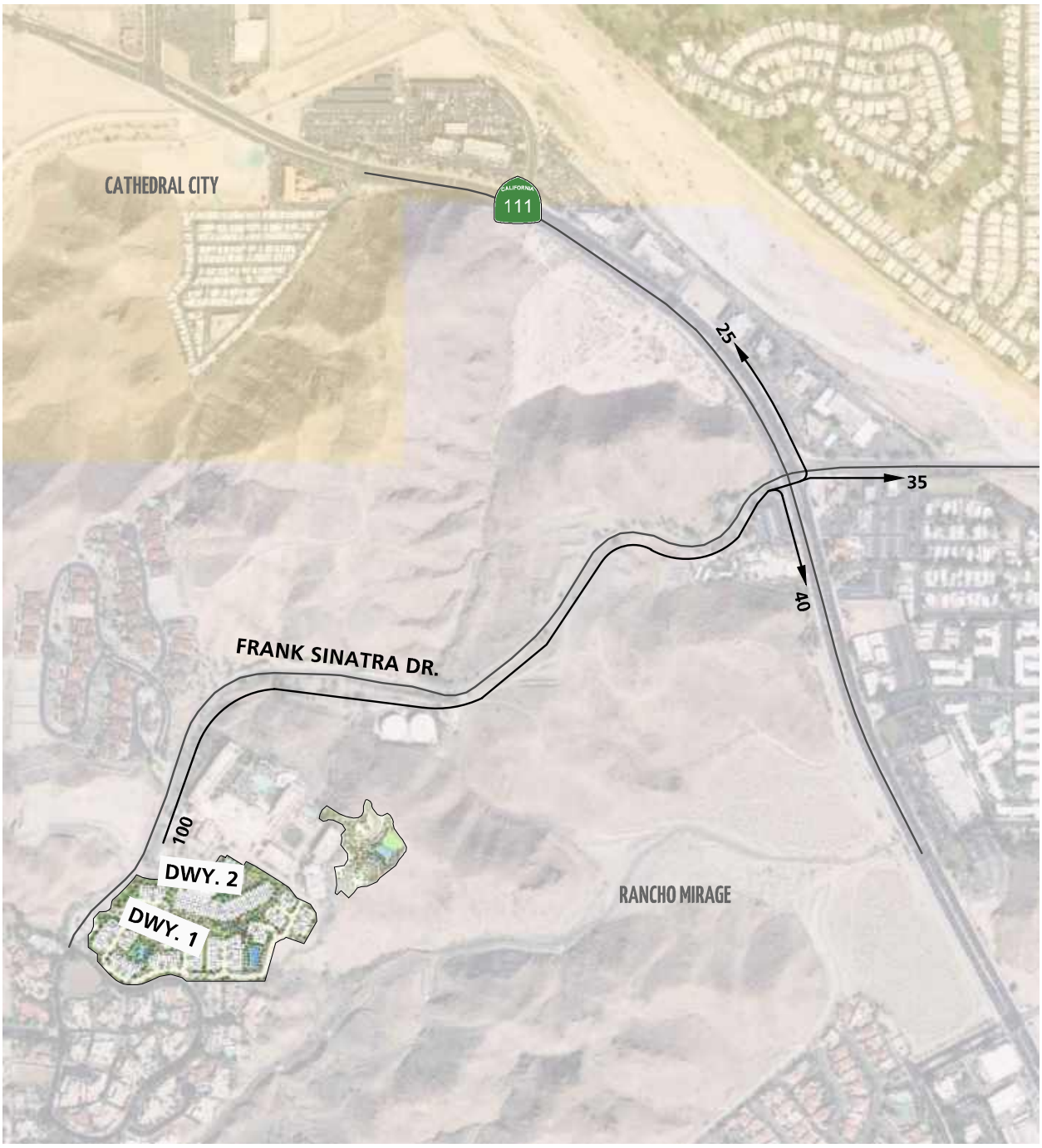

**LEGEND:**

0 = EXISTING INTERSECTION ANALYSIS LOCATION

0 = FUTURE INTERSECTION ANALYSIS LOCATION

N

## EXHIBIT 3: PROJECT TRIP DISTRIBUTION




**LEGEND:**

10 = PERCENT TO/FROM PROJECT

N

*12609 - trip.dwg*

# APPENDIX 3.1:

# EXISTING TRAFFIC COUNTS – DECEMBER 2019

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Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Frank Sinatra Drive
E/W: Driveway 2
Weather: Clear

File Name : 01_RNM_Frank Sinatra_DW2 AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- Total Volume

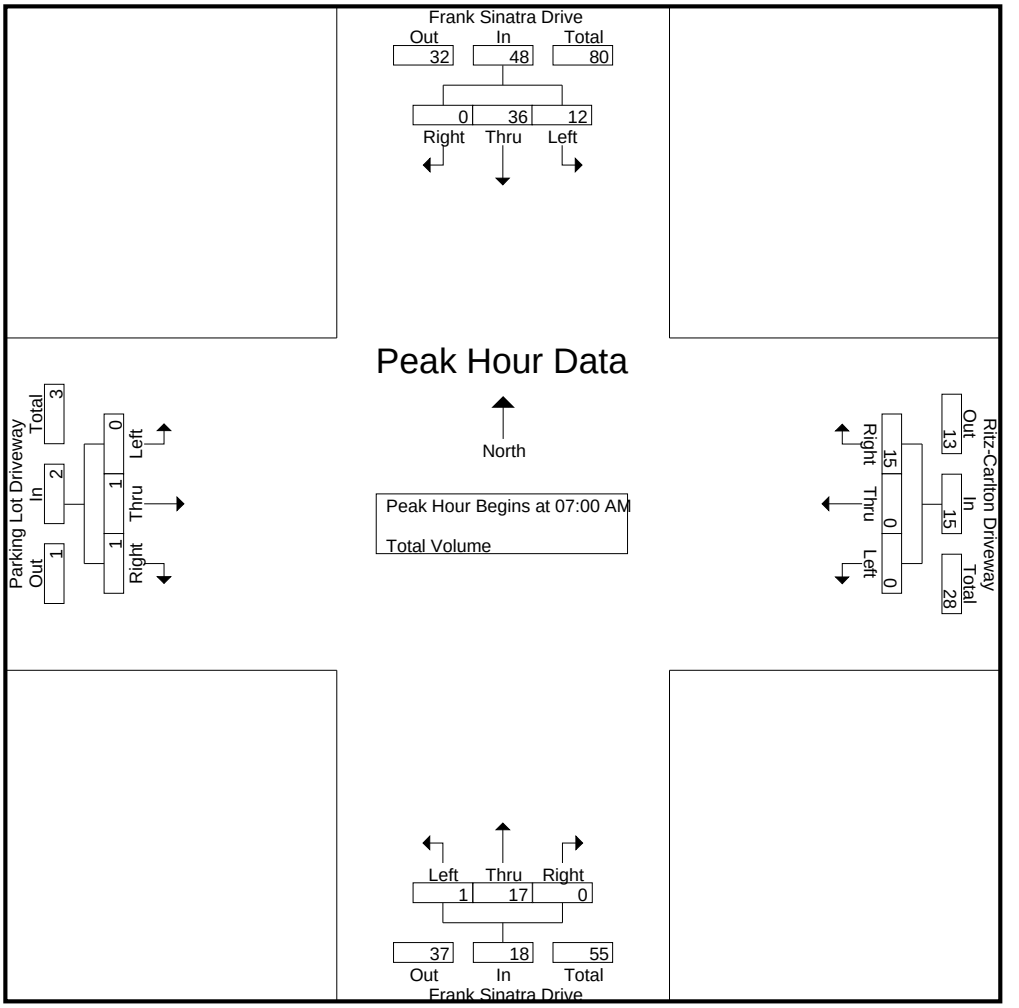
| | Frank Sinatra Drive Southbound | | | | Ritz-Carlton Driveway Westbound | | | | Frank Sinatra Drive Northbound | | | | Parking Lot Driveway Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 07:00 AM | 2 | 9 | 0 | 11 | 0 | 0 | 5 | 5 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 1 | 19 |
| 07:15 AM | 4 | 11 | 0 | 15 | 0 | 0 | 3 | 3 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 23 |
| 07:30 AM | 4 | 8 | 0 | 12 | 0 | 0 | 4 | 4 | 1 | 4 | 0 | 5 | 0 | 0 | 1 | 1 | 22 |
| 07:45 AM | 2 | 8 | 0 | 10 | 0 | 0 | 3 | 3 | 0 | 6 | 0 | 6 | 0 | 0 | 0 | 0 | 19 |
| Total | 12 | 36 | 0 | 48 | 0 | 0 | 15 | 15 | 1 | 17 | 0 | 18 | 0 | 1 | 1 | 2 | 83 |
| | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 7 | 0 | 7 | 0 | 0 | 2 | 2 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 14 |
| 08:15 AM | 1 | 5 | 0 | 6 | 0 | 0 | 1 | 1 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 10 |
| 08:30 AM | 3 | 6 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 9 | 0 | 0 | 0 | 0 | 18 |
| 08:45 AM | 3 | 5 | 3 | 11 | 0 | 0 | 4 | 4 | 0 | 6 | 0 | 6 | 0 | 0 | 0 | 0 | 21 |
| Total | 7 | 23 | 3 | 33 | 0 | 0 | 7 | 7 | 0 | 23 | 0 | 23 | 0 | 0 | 0 | 0 | 63 |
| | | | | | | | | | | | | | | | | | |
| Grand Total | 19 | 59 | 3 | 81 | 0 | 0 | 22 | 22 | 1 | 40 | 0 | 41 | 0 | 1 | 1 | 2 | 146 |
| Apprch % | 23.5 | 72.8 | 3.7 | | 0 | 0 | 100 | | 2.4 | 97.6 | 0 | | 0 | 50 | 50 | | |
| Total % | 13 | 40.4 | 2.1 | 55.5 | 0 | 0 | 15.1 | 15.1 | 0.7 | 27.4 | 0 | 28.1 | 0 | 0.7 | 0.7 | 1.4 | |

| | Frank Sinatra Drive Southbound | | | | Ritz-Carlton Driveway Westbound | | | | Frank Sinatra Drive Northbound | | | | Parking Lot Driveway Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:00 AM | | | | | | | | | | | | | | | | | |
| 07:00 AM | 2 | 9 | 0 | 11 | 0 | 0 | **5** | **5** | 0 | 2 | 0 | 2 | 0 | **1** | 0 | **1** | 19 |
| 07:15 AM | **4** | **11** | 0 | **15** | 0 | 0 | 3 | 3 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | **23** |
| 07:30 AM | 4 | 8 | 0 | 12 | 0 | 0 | 4 | 4 | **1** | 4 | 0 | 5 | 0 | 0 | **1** | 1 | 22 |
| 07:45 AM | 2 | 8 | 0 | 10 | 0 | 0 | 3 | 3 | 0 | **6** | 0 | **6** | 0 | 0 | 0 | 0 | 19 |
| Total Volume | 12 | 36 | 0 | 48 | 0 | 0 | 15 | 15 | 1 | 17 | 0 | 18 | 0 | 1 | 1 | 2 | 83 |
| % App. Total | 25 | 75 | 0 | | 0 | 0 | 100 | | 5.6 | 94.4 | 0 | | 0 | 50 | 50 | | |
| PHF | .750 | .818 | .000 | .800 | .000 | .000 | .750 | .750 | .250 | .708 | .000 | .750 | .000 | .250 | .250 | .500 | .902 |

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Frank Sinatra Drive
E/W: Driveway 2
Weather: Clear

File Name : 01_RNM_Frank Sinatra_DW2 AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 07:00 AM | | | | 07:00 AM | | | | 07:45 AM | | | | 07:00 AM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 2 | 9 | 0 | 11 | 0 | 0 | **5** | **5** | 0 | 6 | 0 | 6 | 0 | **1** | 0 | **1** |
| +15 mins. | **4** | **11** | 0 | **15** | 0 | 0 | 3 | 3 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 |
| +30 mins. | 4 | 8 | 0 | 12 | 0 | 0 | 4 | 4 | 0 | 3 | 0 | 3 | 0 | 0 | **1** | 1 |
| +45 mins. | 2 | 8 | 0 | 10 | 0 | 0 | 3 | 3 | 0 | **9** | 0 | **9** | 0 | 0 | 0 | 0 |
| Total Volume | 12 | 36 | 0 | 48 | 0 | 0 | 15 | 15 | 0 | 23 | 0 | 23 | 0 | 1 | 1 | 2 |
| % App. Total | 25 | 75 | 0 | | 0 | 0 | 100 | | 0 | 100 | 0 | | 0 | 50 | 50 | |
| PHF | .750 | .818 | .000 | .800 | .000 | .000 | .750 | .750 | .000 | .639 | .000 | .639 | .000 | .250 | .250 | .500 |

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Frank Sinatra Drive
E/W: Driveway 2
Weather: Clear

File Name : 01_RNM_Frank Sinatra_DW2 PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- Total Volume

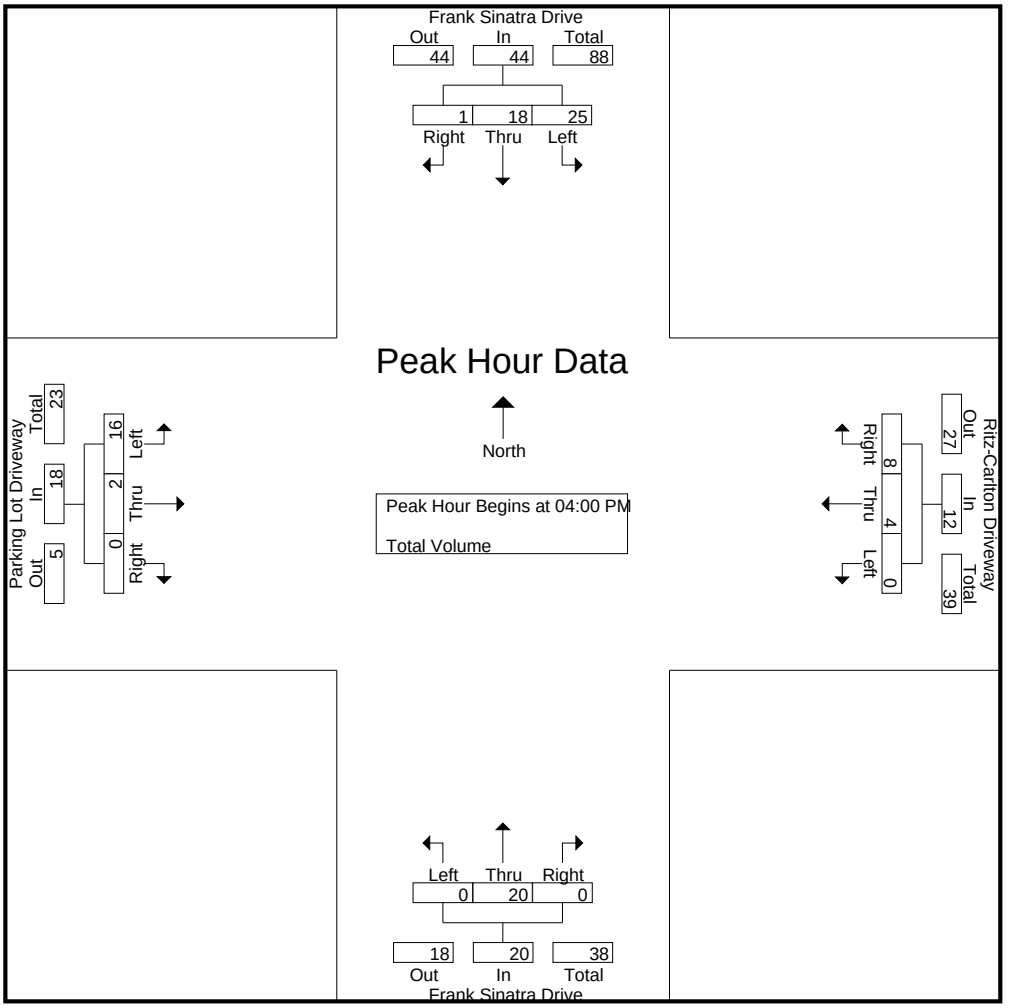
| | Frank Sinatra Drive Southbound | | | | Ritz-Carlton Driveway Westbound | | | | Frank Sinatra Drive Northbound | | | | Parking Lot Driveway Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 04:00 PM | 5 | 7 | 0 | 12 | 0 | 2 | 2 | 4 | 0 | 7 | 0 | 7 | 3 | 2 | 0 | 5 | 28 |
| 04:15 PM | 7 | 5 | 0 | 12 | 0 | 1 | 2 | 3 | 0 | 3 | 0 | 3 | 1 | 0 | 0 | 1 | 19 |
| 04:30 PM | 7 | 3 | 0 | 10 | 0 | 1 | 2 | 3 | 0 | 7 | 0 | 7 | 3 | 0 | 0 | 3 | 23 |
| 04:45 PM | 6 | 3 | 1 | 10 | 0 | 0 | 2 | 2 | 0 | 3 | 0 | 3 | 9 | 0 | 0 | 9 | 24 |
| Total | 25 | 18 | 1 | 44 | 0 | 4 | 8 | 12 | 0 | 20 | 0 | 20 | 16 | 2 | 0 | 18 | 94 |
| | | | | | | | | | | | | | | | | | |
| 05:00 PM | 8 | 2 | 1 | 11 | 0 | 0 | 6 | 6 | 0 | 4 | 0 | 4 | 1 | 0 | 0 | 1 | 22 |
| 05:15 PM | 9 | 4 | 0 | 13 | 1 | 0 | 3 | 4 | 0 | 3 | 0 | 3 | 2 | 0 | 0 | 2 | 22 |
| 05:30 PM | 4 | 4 | 0 | 8 | 0 | 0 | 3 | 3 | 1 | 2 | 0 | 3 | 2 | 0 | 0 | 2 | 16 |
| 05:45 PM | 4 | 5 | 1 | 10 | 0 | 0 | 5 | 5 | 0 | 6 | 1 | 7 | 4 | 0 | 0 | 4 | 26 |
| Total | 25 | 15 | 2 | 42 | 1 | 0 | 17 | 18 | 1 | 15 | 1 | 17 | 9 | 0 | 0 | 9 | 86 |
| | | | | | | | | | | | | | | | | | |
| Grand Total | 50 | 33 | 3 | 86 | 1 | 4 | 25 | 30 | 1 | 35 | 1 | 37 | 25 | 2 | 0 | 27 | 180 |
| Apprch % | 58.1 | 38.4 | 3.5 | | 3.3 | 13.3 | 83.3 | | 2.7 | 94.6 | 2.7 | | 92.6 | 7.4 | 0 | | |
| Total % | 27.8 | 18.3 | 1.7 | 47.8 | 0.6 | 2.2 | 13.9 | 16.7 | 0.6 | 19.4 | 0.6 | 20.6 | 13.9 | 1.1 | 0 | 15 | |

| | Frank Sinatra Drive Southbound | | | | Ritz-Carlton Driveway Westbound | | | | Frank Sinatra Drive Northbound | | | | Parking Lot Driveway Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | |
| 04:00 PM | 5 | **7** | 0 | **12** | 0 | **2** | **2** | **4** | 0 | **7** | 0 | **7** | 3 | **2** | 0 | 5 | **28** |
| 04:15 PM | **7** | 5 | 0 | 12 | 0 | 1 | 2 | 3 | 0 | 3 | 0 | 3 | 1 | 0 | 0 | 1 | 19 |
| 04:30 PM | 7 | 3 | 0 | 10 | 0 | 1 | 2 | 3 | 0 | 7 | 0 | 7 | 3 | 0 | 0 | 3 | 23 |
| 04:45 PM | 6 | 3 | **1** | 10 | 0 | 0 | 2 | 2 | 0 | 3 | 0 | 3 | **9** | 0 | 0 | **9** | 24 |
| Total Volume | 25 | 18 | 1 | 44 | 0 | 4 | 8 | 12 | 0 | 20 | 0 | 20 | 16 | 2 | 0 | 18 | 94 |
| % App. Total | 56.8 | 40.9 | 2.3 | | 0 | 33.3 | 66.7 | | 0 | 100 | 0 | | 88.9 | 11.1 | 0 | | |
| PHF | .893 | .643 | .250 | .917 | .000 | .500 | 1.00 | .750 | .000 | .714 | .000 | .714 | .444 | .250 | .000 | .500 | .839 |

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Frank Sinatra Drive
E/W: Driveway 2
Weather: Clear

File Name : 01_RNM_Frank Sinatra_DW2 PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2




Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 04:00 PM | | | | 05:00 PM | | | | 04:00 PM | | | | 04:00 PM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 5 | **7** | 0 | **12** | 0 | 0 | **6** | **6** | 0 | **7** | 0 | **7** | 3 | **2** | 0 | 5 |
| +15 mins. | **7** | 5 | 0 | 12 | **1** | 0 | 3 | 4 | 0 | 3 | 0 | 3 | 1 | 0 | 0 | 1 |
| +30 mins. | 7 | 3 | 0 | 10 | 0 | 0 | 3 | 3 | 0 | 7 | 0 | 7 | 3 | 0 | 0 | 3 |
| +45 mins. | 6 | 3 | **1** | 10 | 0 | 0 | 5 | 5 | 0 | 3 | 0 | 3 | **9** | 0 | 0 | **9** |
| Total Volume | 25 | 18 | 1 | 44 | 1 | 0 | 17 | 18 | 0 | 20 | 0 | 20 | 16 | 2 | 0 | 18 |
| % App. Total | 56.8 | 40.9 | 2.3 | | 5.6 | 0 | 94.4 | | 0 | 100 | 0 | | 88.9 | 11.1 | 0 | |
| PHF | .893 | .643 | .250 | .917 | .250 | .000 | .708 | .750 | .000 | .714 | .000 | .714 | .444 | .250 | .000 | .500 |

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Frank Sinatra Drive
E/W: Driveway 2
Weather: Clear

File Name : 01_RNM_Frank Sinatra_DW2 SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 1

Groups Printed- Total Volume

| | Frank Sinatra Drive Southbound | | | | Ritz-Carlton Driveway Westbound | | | | Frank Sinatra Drive Northbound | | | | Parking Lot Driveway Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 10:00 AM | 3 | 3 | 1 | 7 | 0 | 0 | 5 | 5 | 0 | 6 | 0 | 6 | 0 | 0 | 0 | 0 | 18 |
| 10:15 AM | 0 | 2 | 1 | 3 | 0 | 0 | 7 | 7 | 0 | 7 | 0 | 7 | 0 | 0 | 0 | 0 | 17 |
| 10:30 AM | 3 | 1 | 0 | 4 | 0 | 0 | 6 | 6 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 12 |
| 10:45 AM | 5 | 3 | 2 | 10 | 1 | 0 | 9 | 10 | 0 | 7 | 0 | 7 | 1 | 0 | 0 | 1 | 28 |
| Total | 11 | 9 | 4 | 24 | 1 | 0 | 27 | 28 | 0 | 22 | 0 | 22 | 1 | 0 | 0 | 1 | 75 |
| | | | | | | | | | | | | | | | | | |
| 11:00 AM | 4 | 1 | 0 | 5 | 0 | 0 | 7 | 7 | 0 | 4 | 0 | 4 | 1 | 1 | 0 | 2 | 18 |
| 11:15 AM | 7 | 1 | 1 | 9 | 2 | 0 | 8 | 10 | 1 | 3 | 0 | 4 | 1 | 0 | 0 | 1 | 24 |
| 11:30 AM | 5 | 8 | 1 | 14 | 0 | 0 | 7 | 7 | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 24 |
| 11:45 AM | 7 | 4 | 2 | 13 | 0 | 0 | 5 | 5 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 22 |
| Total | 23 | 14 | 4 | 41 | 2 | 0 | 27 | 29 | 1 | 13 | 1 | 15 | 2 | 1 | 0 | 3 | 88 |
| | | | | | | | | | | | | | | | | | |
| 12:00 PM | 5 | 5 | 1 | 11 | 1 | 0 | 5 | 6 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 21 |
| 12:15 PM | 8 | 5 | 0 | 13 | 0 | 1 | 10 | 11 | 0 | 7 | 2 | 9 | 0 | 0 | 0 | 0 | 33 |
| 12:30 PM | 4 | 3 | 1 | 8 | 0 | 0 | 6 | 6 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 17 |
| 12:45 PM | 12 | 5 | 2 | 19 | 0 | 0 | 5 | 5 | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 27 |
| Total | 29 | 18 | 4 | 51 | 1 | 1 | 26 | 28 | 0 | 16 | 3 | 19 | 0 | 0 | 0 | 0 | 98 |
| | | | | | | | | | | | | | | | | | |
| 01:00 PM | 9 | 6 | 0 | 15 | 0 | 0 | 6 | 6 | 0 | 5 | 0 | 5 | 1 | 0 | 0 | 1 | 27 |
| 01:15 PM | 5 | 5 | 4 | 14 | 0 | 1 | 6 | 7 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 24 |
| 01:30 PM | 11 | 4 | 1 | 16 | 0 | 0 | 4 | 4 | 1 | 2 | 0 | 3 | 0 | 1 | 0 | 1 | 24 |
| 01:45 PM | 8 | 4 | 0 | 12 | 0 | 0 | 10 | 10 | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 3 | 26 |
| Total | 33 | 19 | 5 | 57 | 0 | 1 | 26 | 27 | 1 | 8 | 1 | 10 | 5 | 1 | 1 | 7 | 101 |
| | | | | | | | | | | | | | | | | | |
| Grand Total | 96 | 60 | 17 | 173 | 4 | 2 | 106 | 112 | 2 | 59 | 5 | 66 | 8 | 2 | 1 | 11 | 362 |
| Apprch % | 55.5 | 34.7 | 9.8 | | 3.6 | 1.8 | 94.6 | | 3 | 89.4 | 7.6 | | 72.7 | 18.2 | 9.1 | | |
| Total % | 26.5 | 16.6 | 4.7 | 47.8 | 1.1 | 0.6 | 29.3 | 30.9 | 0.6 | 16.3 | 1.4 | 18.2 | 2.2 | 0.6 | 0.3 | 3 | |

| | Frank Sinatra Drive Southbound | | | | Ritz-Carlton Driveway Westbound | | | | Frank Sinatra Drive Northbound | | | | Parking Lot Driveway Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 12:15 PM | | | | | | | | | | | | | | | | | |
| 12:15 PM | 8 | 5 | 0 | 13 | 0 | **1** | **10** | **11** | 0 | **7** | **2** | **9** | 0 | 0 | 0 | 0 | **33** |
| 12:30 PM | 4 | 3 | 1 | 8 | 0 | 0 | 6 | 6 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 17 |
| 12:45 PM | **12** | 5 | **2** | **19** | 0 | 0 | 5 | 5 | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 27 |
| 01:00 PM | 9 | **6** | 0 | 15 | 0 | 0 | 6 | 6 | 0 | 5 | 0 | 5 | **1** | 0 | 0 | **1** | 27 |
| Total Volume | 33 | 19 | 3 | 55 | 0 | 1 | 27 | 28 | 0 | 17 | 3 | 20 | 1 | 0 | 0 | 1 | 104 |
| % App. Total | 60 | 34.5 | 5.5 | | 0 | 3.6 | 96.4 | | 0 | 85 | 15 | | 100 | 0 | 0 | | |
| PHF | .688 | .792 | .375 | .724 | .000 | .250 | .675 | .636 | .000 | .607 | .375 | .556 | .250 | .000 | .000 | .250 | .788 |

Counts Unlimited
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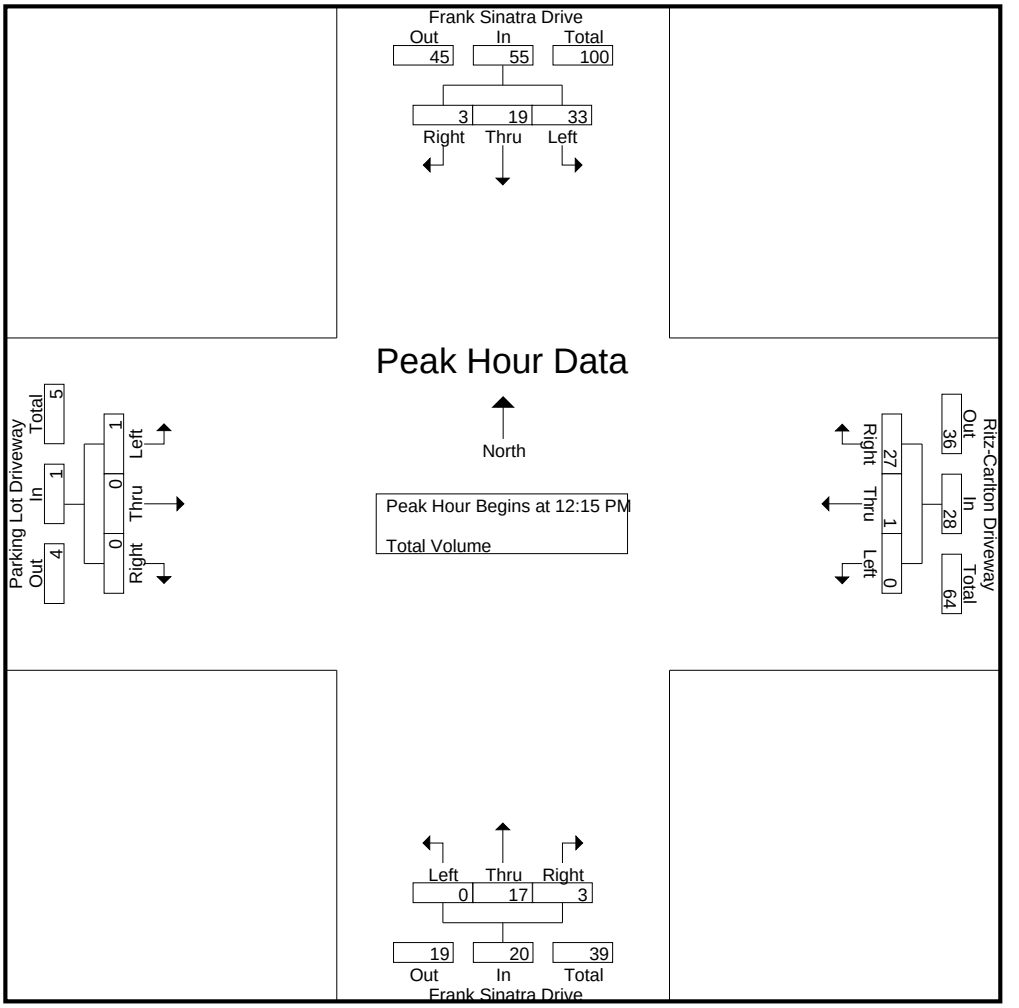
City of Rancho Mirage
N/S: Frank Sinatra Drive
E/W: Driveway 2
Weather: Clear

File Name : 01_RNM_Frank Sinatra_DW2 SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 2




Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 12:45 PM | | | | 10:45 AM | | | | 10:00 AM | | | | 01:00 PM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | **12** | 5 | 2 | **19** | 1 | 0 | **9** | **10** | 0 | 6 | 0 | 6 | 1 | 0 | 0 | 1 |
| +15 mins. | 9 | **6** | 0 | 15 | 0 | 0 | 7 | 7 | 0 | **7** | 0 | **7** | **2** | 0 | 0 | 2 |
| +30 mins. | 5 | 5 | **4** | 14 | **2** | 0 | 8 | 10 | 0 | 2 | 0 | 2 | 0 | **1** | 0 | 1 |
| +45 mins. | 11 | 4 | 1 | 16 | 0 | 0 | 7 | 7 | 0 | 7 | 0 | 7 | 2 | 0 | **1** | **3** |
| Total Volume | 37 | 20 | 7 | 64 | 3 | 0 | 31 | 34 | 0 | 22 | 0 | 22 | 5 | 1 | 1 | 7 |
| % App. Total | 57.8 | 31.2 | 10.9 | | 8.8 | 0 | 91.2 | | 0 | 100 | 0 | | 71.4 | 14.3 | 14.3 | |
| PHF | .771 | .833 | .438 | .842 | .375 | .000 | .861 | .850 | .000 | .786 | .000 | .786 | .625 | .250 | .250 | .583 |

Location: Rancho Mirage
N/S: Frank Sinatra Drive
E/W: Driveway 2

**PEDESTRIANS**

Date: 12/11/2019
Day: Wednesday

| | North Leg<br>Frank Sinatra Drive | East Leg<br>Ritz-Carlton Driveway | South Leg<br>Frank Sinatra Drive | West Leg<br>Parking Lot Driveway | |
|---|---|---|---|---|---|
| | Pedestrians | Pedestrians | Pedestrians | Pedestrians | |
| 7:00 AM | 0 | 0 | 1 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 2 | 2 | 0 | 0 | 4 |
| 8:15 AM | 2 | 0 | 1 | 0 | 3 |
| 8:30 AM | 0 | 0 | 2 | 0 | 2 |
| 8:45 AM | 0 | 0 | 5 | 0 | 5 |
| TOTAL VOLUMES: | 4 | 2 | 9 | 0 | 15 |

Date: 12/11/2019
Day: Wednesday

| | North Leg<br>Frank Sinatra Drive | East Leg<br>Ritz-Carlton Driveway | South Leg<br>Frank Sinatra Drive | West Leg<br>Parking Lot Driveway | |
|---|---|---|---|---|---|
| | Pedestrians | Pedestrians | Pedestrians | Pedestrians | |
| 4:00 PM | 1 | 0 | 0 | 1 | 2 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 3 | 0 | 3 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 |
| TOTAL VOLUMES: | 1 | 0 | 3 | 1 | 5 |

Date: 12/7/2019
Day: Saturday

| | North Leg<br>Frank Sinatra Drive | East Leg<br>Ritz-Carlton Driveway | South Leg<br>Frank Sinatra Drive | West Leg<br>Parking Lot Driveway | |
|---|---|---|---|---|---|
| | Pedestrians | Pedestrians | Pedestrians | Pedestrians | |
| 10:00 AM | 3 | 0 | 0 | 0 | 3 |
| 10:15 AM | 0 | 0 | 0 | 0 | 0 |
| 10:30 AM | 0 | 0 | 2 | 0 | 2 |
| 10:45 AM | 0 | 0 | 2 | 0 | 2 |
| 11:00 AM | 4 | 0 | 0 | 0 | 4 |
| 11:15 AM | 2 | 0 | 0 | 0 | 2 |
| 11:30 AM | 0 | 0 | 7 | 0 | 7 |
| 11:45 AM | 1 | 0 | 0 | 0 | 1 |
| 12:00 PM | 1 | 0 | 0 | 0 | 1 |
| 12:15 PM | 1 | 0 | 0 | 0 | 1 |
| 12:30 PM | 0 | 0 | 0 | 0 | 0 |
| 12:45 PM | 1 | 0 | 0 | 0 | 1 |
| 1:00 PM | 1 | 0 | 0 | 0 | 1 |
| 1:15 PM | 7 | 0 | 3 | 0 | 10 |
| 1:30 PM | 0 | 0 | 0 | 0 | 0 |
| 1:45 PM | 4 | 0 | 0 | 0 | 4 |
| TOTAL VOLUMES: | 25 | 0 | 14 | 0 | 39 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-6268

Location: Rancho Mirage
N/S: Frank Sinatra Drive
E/W: Driveway 2

**BICYCLES**

Date: 12/11/2019
Day: Wednesday

| | Southbound Frank Sinatra Drive | | | Westbound Ritz-Carlton Driveway | | | Northbound Frank Sinatra Drive | | | Eastbound Parking Lot Driveway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL VOLUMES: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Date: 12/11/2019
Day: Wednesday

| | Southbound Frank Sinatra Drive | | | Westbound Ritz-Carlton Driveway | | | Northbound Frank Sinatra Drive | | | Eastbound Parking Lot Driveway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL VOLUMES: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Date: 12/7/2019
Day: Saturday

| | Southbound Frank Sinatra Drive | | | Westbound Ritz-Carlton Driveway | | | Northbound Frank Sinatra Drive | | | Eastbound Parking Lot Driveway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL VOLUMES: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Corona, CA 92878
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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 07:00 AM | 36 | 136 | 8 | 1 | 180 | 33 | 13 | 39 | 0 | 85 | 6 | 145 | 18 | 0 | 169 | 6 | 3 | 1 | 1 | 10 | 2 | 444 | 446 |
| 07:15 AM | 58 | 176 | 9 | 5 | 243 | 40 | 16 | 74 | 0 | 130 | 5 | 194 | 23 | 0 | 222 | 7 | 2 | 2 | 0 | 11 | 5 | 606 | 611 |
| 07:30 AM | 83 | 262 | 11 | 6 | 356 | 57 | 13 | 100 | 0 | 170 | 8 | 170 | 21 | 0 | 199 | 4 | 4 | 8 | 1 | 16 | 7 | 741 | 748 |
| 07:45 AM | 67 | 301 | 14 | 3 | 382 | 66 | 14 | 107 | 0 | 187 | 13 | 183 | 23 | 0 | 219 | 6 | 6 | 4 | 2 | 16 | 5 | 804 | 809 |
| Total | 244 | 875 | 42 | 15 | 1161 | 196 | 56 | 320 | 0 | 572 | 32 | 692 | 85 | 0 | 809 | 23 | 15 | 15 | 4 | 53 | 19 | 2595 | 2614 |
| 08:00 AM | 58 | 270 | 7 | 3 | 335 | 69 | 14 | 77 | 0 | 160 | 6 | 177 | 17 | 0 | 200 | 2 | 4 | 4 | 2 | 10 | 5 | 705 | 710 |
| 08:15 AM | 60 | 295 | 6 | 1 | 361 | 68 | 14 | 78 | 0 | 160 | 8 | 184 | 26 | 0 | 218 | 2 | 6 | 1 | 1 | 9 | 2 | 748 | 750 |
| 08:30 AM | 62 | 220 | 8 | 5 | 290 | 55 | 6 | 90 | 0 | 151 | 6 | 221 | 13 | 0 | 240 | 2 | 9 | 4 | 1 | 15 | 6 | 696 | 702 |
| 08:45 AM | 68 | 271 | 10 | 5 | 349 | 59 | 9 | 94 | 0 | 162 | 8 | 222 | 28 | 0 | 258 | 4 | 7 | 6 | 3 | 17 | 8 | 786 | 794 |
| Total | 248 | 1056 | 31 | 14 | 1335 | 251 | 43 | 339 | 0 | 633 | 28 | 804 | 84 | 0 | 916 | 10 | 26 | 15 | 7 | 51 | 21 | 2935 | 2956 |
| Grand Total | 492 | 1931 | 73 | 29 | 2496 | 447 | 99 | 659 | 0 | 1205 | 60 | 1496 | 169 | 0 | 1725 | 33 | 41 | 30 | 11 | 104 | 40 | 5530 | 5570 |
| Apprch % | 19.7 | 77.4 | 2.9 | | | 37.1 | 8.2 | 54.7 | | | 3.5 | 86.7 | 9.8 | | | 31.7 | 39.4 | 28.8 | | | | | |
| Total % | 8.9 | 34.9 | 1.3 | | 45.1 | 8.1 | 1.8 | 11.9 | | 21.8 | 1.1 | 27.1 | 3.1 | | 31.2 | 0.6 | 0.7 | 0.5 | | 1.9 | 0.7 | 99.3 | |
| Passenger Vehicles | 469 | 1829 | 67 | | 2392 | 431 | 95 | 642 | | 1168 | 57 | 1459 | 168 | | 1684 | 30 | 41 | 28 | | 109 | 0 | 0 | 5353 |
| % Passenger Vehicles | 95.3 | 94.7 | 91.8 | 93.1 | 94.7 | 96.4 | 96 | 97.4 | 0 | 96.9 | 95 | 97.5 | 99.4 | 0 | 97.6 | 90.9 | 100 | 93.3 | 90.9 | 94.8 | 0 | 0 | 96.1 |
| Large 2 Axle Vehicles | 20 | 90 | 6 | | 118 | 15 | 3 | 15 | | 33 | 3 | 32 | 0 | | 35 | 2 | 0 | 2 | | 5 | 0 | 0 | 191 |
| % Large 2 Axle Vehicles | 4.1 | 4.7 | 8.2 | 6.9 | 4.7 | 3.4 | 3 | 2.3 | 0 | 2.7 | 5 | 2.1 | 0 | 0 | 2 | 6.1 | 0 | 6.7 | 9.1 | 4.3 | 0 | 0 | 3.4 |
| 3 Axle Vehicles | 2 | 5 | 0 | | 7 | 1 | 0 | 1 | | 2 | 0 | 4 | 0 | | 4 | 1 | 0 | 0 | | 1 | 0 | 0 | 14 |
| % 3 Axle Vehicles | 0.4 | 0.3 | 0 | 0 | 0.3 | 0.2 | 0 | 0.2 | 0 | 0.2 | 0 | 0.3 | 0 | 0 | 0.2 | 3 | 0 | 0 | 0 | 0.9 | 0 | 0 | 0.3 |
| 4+ Axle Trucks | 1 | 7 | 0 | | 8 | 0 | 1 | 1 | | 2 | 0 | 1 | 1 | | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 12 |
| % 4+ Axle Trucks | 0.2 | 0.4 | 0 | 0 | 0.3 | 0 | 1 | 0.2 | 0 | 0.2 | 0 | 0.1 | 0.6 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 |

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | **83** | 262 | 11 | 356 | 57 | 13 | 100 | 170 | 8 | 170 | 21 | 199 | 4 | 4 | **8** | **16** | 741 |
| 07:45 AM | 67 | **301** | **14** | **382** | 66 | **14** | **107** | **187** | **13** | 183 | 23 | **219** | **6** | **6** | 4 | 16 | **804** |
| 08:00 AM | 58 | 270 | 7 | 335 | **69** | 14 | 77 | 160 | 6 | 177 | 17 | 200 | 2 | 4 | 4 | 10 | 705 |
| 08:15 AM | 60 | 295 | 6 | 361 | 68 | 14 | 78 | 160 | 8 | **184** | **26** | 218 | 2 | 6 | 1 | 9 | 748 |
| Total Volume | 268 | 1128 | 38 | 1434 | 260 | 55 | 362 | 677 | 35 | 714 | 87 | 836 | 14 | 20 | 17 | 51 | 2998 |
| % App. Total | 18.7 | 78.7 | 2.6 | | 38.4 | 8.1 | 53.5 | | 4.2 | 85.4 | 10.4 | | 27.5 | 39.2 | 33.3 | | |
| PHF | .807 | .937 | .679 | .938 | .942 | .982 | .846 | .905 | .673 | .970 | .837 | .954 | .583 | .833 | .531 | .797 | .932 |

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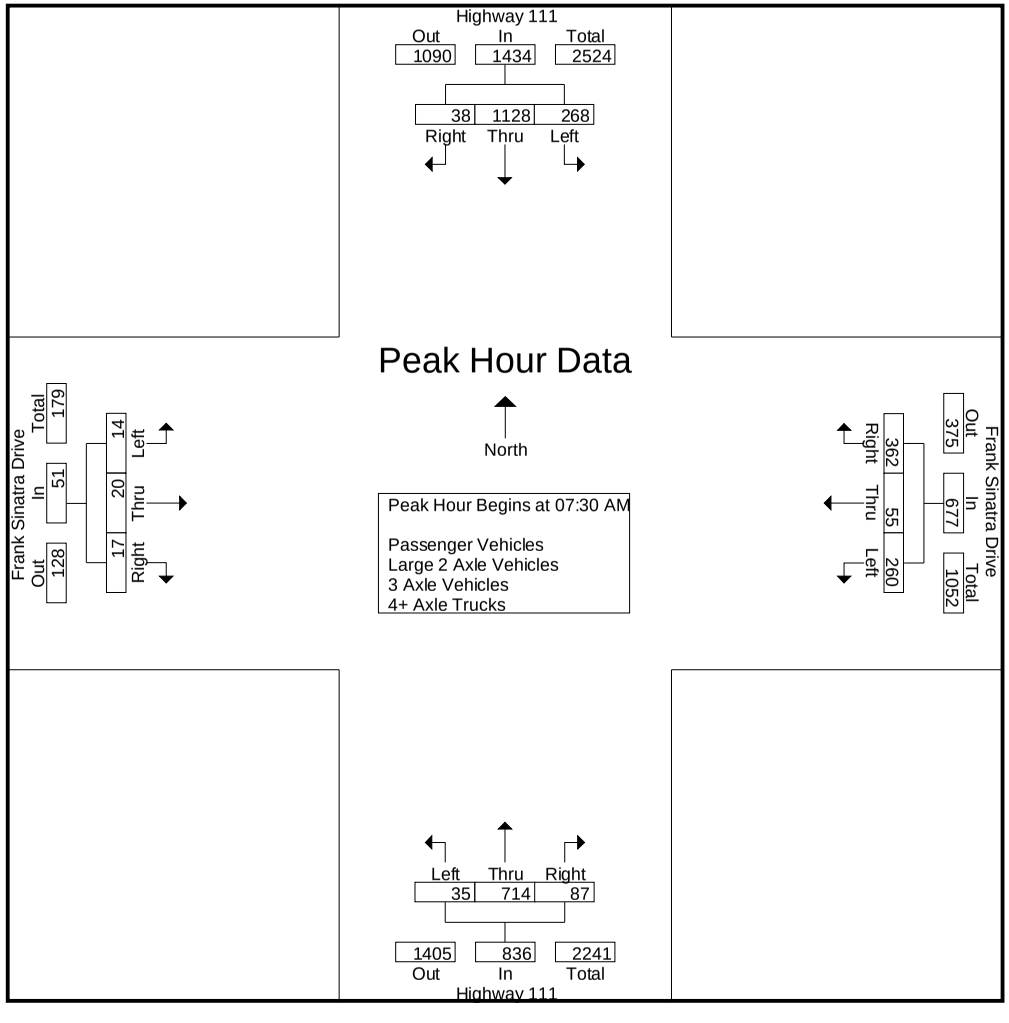
City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2



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(951) 268-6268

City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 07:30 AM | | | | 07:30 AM | | | | 08:00 AM | | | | 07:00 AM | | | | |
| +0 mins. | **83** | 262 | 11 | 356 | 57 | 13 | 100 | 170 | 6 | 177 | 17 | 200 | 6 | 3 | 1 | 10 | |
| +15 mins. | 67 | **301** | **14** | **382** | 66 | **14** | **107** | **187** | **8** | 184 | 26 | 218 | **7** | 2 | 2 | 11 | |
| +30 mins. | 58 | 270 | 7 | 335 | **69** | 14 | 77 | 160 | 6 | 221 | 13 | 240 | 4 | 4 | **8** | **16** | |
| +45 mins. | 60 | 295 | 6 | 361 | 68 | 14 | 78 | 160 | 8 | **222** | **28** | **258** | 6 | **6** | 4 | 16 | |
| Total Volume | 268 | 1128 | 38 | 1434 | 260 | 55 | 362 | 677 | 28 | 804 | 84 | 916 | 23 | 15 | 15 | 53 | |
| % App. Total | 18.7 | 78.7 | 2.6 | | 38.4 | 8.1 | 53.5 | | 3.1 | 87.8 | 9.2 | | 43.4 | 28.3 | 28.3 | | |
| PHF | .807 | .937 | .679 | .938 | .942 | .982 | .846 | .905 | .875 | .905 | .750 | .888 | .821 | .625 | .469 | .828 | |

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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- Passenger Vehicles

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 07:00 AM | 35 | 117 | 6 | 0 | 158 | 29 | 12 | 38 | 0 | 79 | 6 | 142 | 18 | 0 | 166 | 6 | 3 | 1 | 1 | 10 | 1 | 413 | 414 |
| 07:15 AM | 55 | 167 | 7 | 4 | 229 | 39 | 16 | 73 | 0 | 128 | 5 | 190 | 23 | 0 | 218 | 6 | 2 | 2 | 0 | 10 | 4 | 585 | 589 |
| 07:30 AM | 81 | 245 | 11 | 6 | 337 | 55 | 12 | 99 | 0 | 166 | 8 | 168 | 21 | 0 | 197 | 4 | 4 | 7 | 0 | 15 | 6 | 715 | 721 |
| 07:45 AM | 60 | 290 | 13 | 3 | 363 | 63 | 13 | 103 | 0 | 179 | 12 | 181 | 23 | 0 | 216 | 5 | 6 | 4 | 2 | 15 | 5 | 773 | 778 |
| Total | 231 | 819 | 37 | 13 | 1087 | 186 | 53 | 313 | 0 | 552 | 31 | 681 | 85 | 0 | 797 | 21 | 15 | 14 | 3 | 50 | 16 | 2486 | 2502 |
| 08:00 AM | 55 | 253 | 7 | 3 | 315 | 66 | 14 | 77 | 0 | 157 | 5 | 172 | 17 | 0 | 194 | 2 | 4 | 4 | 2 | 10 | 5 | 676 | 681 |
| 08:15 AM | 58 | 281 | 6 | 1 | 345 | 67 | 13 | 73 | 0 | 153 | 8 | 178 | 25 | 0 | 211 | 1 | 6 | 1 | 1 | 8 | 2 | 717 | 719 |
| 08:30 AM | 57 | 211 | 8 | 5 | 276 | 54 | 6 | 89 | 0 | 149 | 6 | 216 | 13 | 0 | 235 | 2 | 9 | 4 | 1 | 15 | 6 | 675 | 681 |
| 08:45 AM | 68 | 265 | 9 | 5 | 342 | 58 | 9 | 90 | 0 | 157 | 7 | 212 | 28 | 0 | 247 | 4 | 7 | 5 | 3 | 16 | 8 | 762 | 770 |
| Total | 238 | 1010 | 30 | 14 | 1278 | 245 | 42 | 329 | 0 | 616 | 26 | 778 | 83 | 0 | 887 | 9 | 26 | 14 | 7 | 49 | 21 | 2830 | 2851 |
| Grand Total | 469 | 1829 | 67 | 27 | 2365 | 431 | 95 | 642 | 0 | 1168 | 57 | 1459 | 168 | 0 | 1684 | 30 | 41 | 28 | 10 | 99 | 37 | 5316 | 5353 |
| Apprch % | 19.8 | 77.3 | 2.8 | | | 36.9 | 8.1 | 55 | | | 3.4 | 86.6 | 10 | | | 30.3 | 41.4 | 28.3 | | | | | |
| Total % | 8.8 | 34.4 | 1.3 | | 44.5 | 8.1 | 1.8 | 12.1 | | 22 | 1.1 | 27.4 | 3.2 | | 31.7 | 0.6 | 0.8 | 0.5 | | 1.9 | 0.7 | 99.3 | |

3.1-12

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | **81** | 245 | 11 | 337 | 55 | 12 | 99 | 166 | 8 | 168 | 21 | 197 | 4 | 4 | **7** | **15** | 715 |
| 07:45 AM | 60 | **290** | **13** | **363** | 63 | 13 | **103** | **179** | **12** | **181** | 23 | **216** | **5** | **6** | 4 | 15 | **773** |
| 08:00 AM | 55 | 253 | 7 | 315 | 66 | **14** | 77 | 157 | 5 | 172 | 17 | 194 | 2 | 4 | 4 | 10 | 676 |
| 08:15 AM | 58 | 281 | 6 | 345 | **67** | 13 | 73 | 153 | 8 | 178 | **25** | 211 | 1 | 6 | 1 | 8 | 717 |
| Total Volume | 254 | 1069 | 37 | 1360 | 251 | 52 | 352 | 655 | 33 | 699 | 86 | 818 | 12 | 20 | 16 | 48 | 2881 |
| % App. Total | 18.7 | 78.6 | 2.7 | | 38.3 | 7.9 | 53.7 | | 4 | 85.5 | 10.5 | | 25 | 41.7 | 33.3 | | |
| PHF | .784 | .922 | .712 | .937 | .937 | .929 | .854 | .915 | .688 | .965 | .860 | .947 | .600 | .833 | .571 | .800 | .932 |

Counts Unlimited
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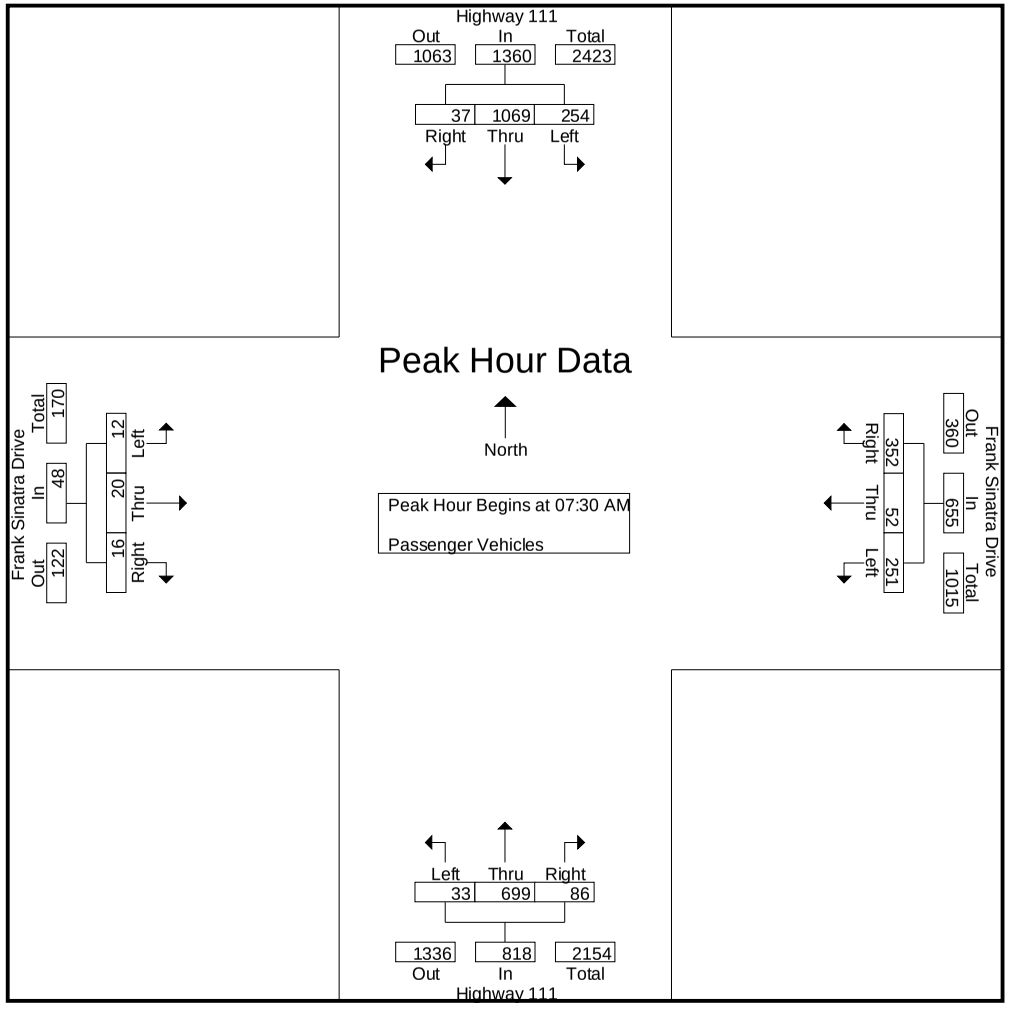
(951) 268-6268

City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2



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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 07:30 AM | | | | 07:30 AM | | | | 07:30 AM | | | | 07:30 AM | | | | |
| +0 mins. | **81** | 245 | 11 | 337 | 55 | 12 | 99 | 166 | 8 | 168 | 21 | 197 | 4 | 4 | **7** | **15** | |
| +15 mins. | 60 | **290** | **13** | **363** | 63 | 13 | **103** | **179** | **12** | **181** | 23 | **216** | **5** | **6** | 4 | 15 | |
| +30 mins. | 55 | 253 | 7 | 315 | 66 | **14** | 77 | 157 | 5 | 172 | 17 | 194 | 2 | 4 | 4 | 10 | |
| +45 mins. | 58 | 281 | 6 | 345 | **67** | 13 | 73 | 153 | 8 | 178 | **25** | 211 | 1 | 6 | 1 | 8 | |
| Total Volume | 254 | 1069 | 37 | 1360 | 251 | 52 | 352 | 655 | 33 | 699 | 86 | 818 | 12 | 20 | 16 | 48 | |
| % App. Total | 18.7 | 78.6 | 2.7 | | 38.3 | 7.9 | 53.7 | | 4 | 85.5 | 10.5 | | 25 | 41.7 | 33.3 | | |
| PHF | .784 | .922 | .712 | .937 | .937 | .929 | .854 | .915 | .688 | .965 | .860 | .947 | .600 | .833 | .571 | .800 | |

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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 07:00 AM | 1 | 15 | 2 | 1 | 18 | 3 | 1 | 1 | 0 | 5 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 25 | 26 |
| 07:15 AM | 3 | 9 | 2 | 1 | 14 | 1 | 0 | 1 | 0 | 2 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 19 | 20 |
| 07:30 AM | 2 | 15 | 0 | 0 | 17 | 2 | 0 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 22 | 23 |
| 07:45 AM | 6 | 10 | 1 | 0 | 17 | 3 | 1 | 4 | 0 | 8 | 1 | 2 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 29 | 29 |
| Total | 12 | 49 | 5 | 2 | 66 | 9 | 2 | 7 | 0 | 18 | 1 | 8 | 0 | 0 | 9 | 1 | 0 | 1 | 1 | 2 | 3 | 95 | 98 |
| 08:00 AM | 3 | 13 | 0 | 0 | 16 | 3 | 0 | 0 | 0 | 3 | 1 | 5 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 25 |
| 08:15 AM | 2 | 14 | 0 | 0 | 16 | 1 | 1 | 4 | 0 | 6 | 0 | 6 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 1 | 0 | 29 | 29 |
| 08:30 AM | 3 | 8 | 0 | 0 | 11 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 16 |
| 08:45 AM | 0 | 6 | 1 | 0 | 7 | 1 | 0 | 4 | 0 | 5 | 1 | 9 | 0 | 0 | 10 | 0 | 0 | 1 | 0 | 1 | 0 | 23 | 23 |
| Total | 8 | 41 | 1 | 0 | 50 | 6 | 1 | 8 | 0 | 15 | 2 | 24 | 0 | 0 | 26 | 1 | 0 | 1 | 0 | 2 | 0 | 93 | 93 |
| Grand Total | 20 | 90 | 6 | 2 | 116 | 15 | 3 | 15 | 0 | 33 | 3 | 32 | 0 | 0 | 35 | 2 | 0 | 2 | 1 | 4 | 3 | 188 | 191 |
| Apprch % | 17.2 | 77.6 | 5.2 | | | 45.5 | 9.1 | 45.5 | | | 8.6 | 91.4 | 0 | | | 50 | 0 | 50 | | | | | |
| Total % | 10.6 | 47.9 | 3.2 | | 61.7 | 8 | 1.6 | 8 | | 17.6 | 1.6 | 17 | 0 | | 18.6 | 1.1 | 0 | 1.1 | | 2.1 | 1.6 | 98.4 | |

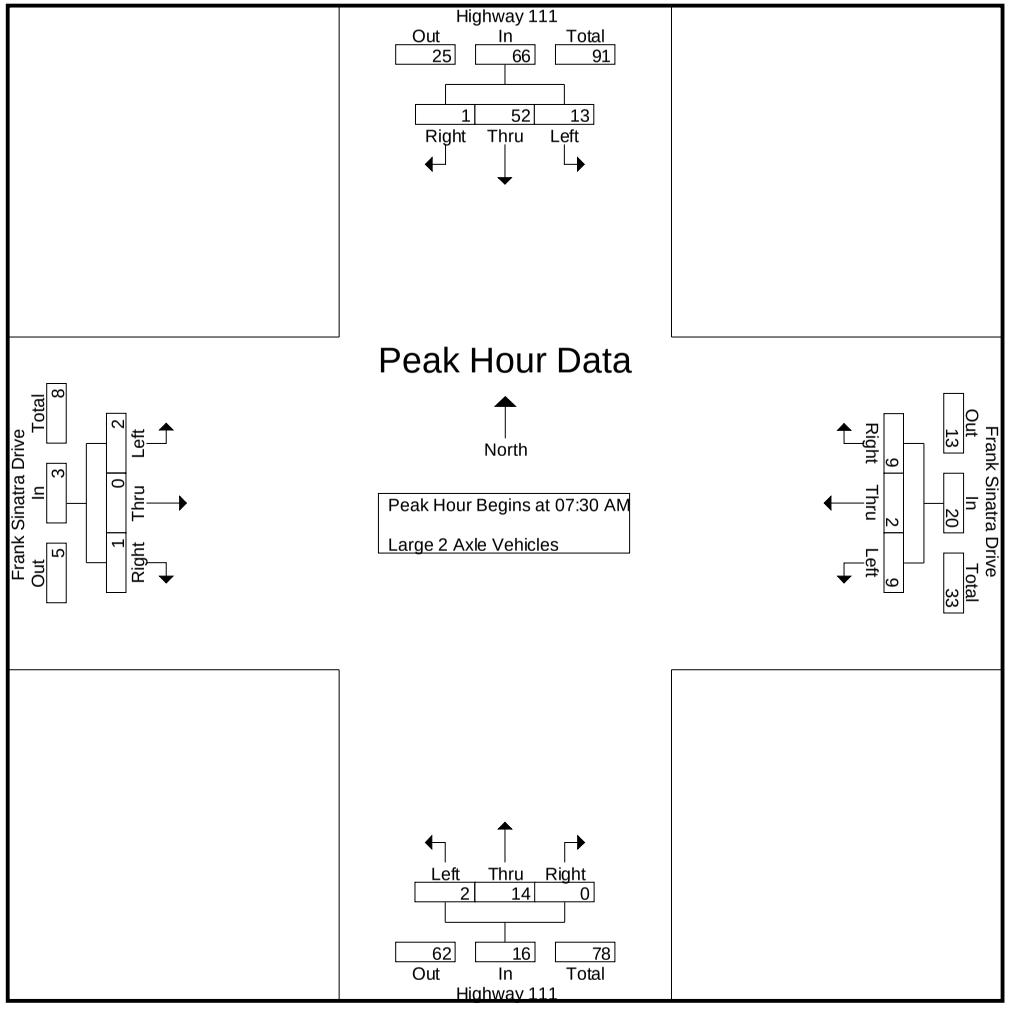
3.1-15

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | 2 | **15** | 0 | **17** | 2 | 0 | 1 | 3 | 0 | 1 | 0 | 1 | 0 | 0 | **1** | **1** | 22 |
| 07:45 AM | **6** | 10 | **1** | 17 | **3** | **1** | **4** | **8** | **1** | 2 | 0 | 3 | **1** | 0 | 0 | 1 | **29** |
| 08:00 AM | 3 | 13 | 0 | 16 | 3 | 0 | 0 | 3 | 1 | 5 | 0 | **6** | 0 | 0 | 0 | 0 | 25 |
| 08:15 AM | 2 | 14 | 0 | 16 | 1 | 1 | 4 | 6 | 0 | **6** | 0 | 6 | 1 | 0 | 0 | 1 | 29 |
| Total Volume | 13 | 52 | 1 | 66 | 9 | 2 | 9 | 20 | 2 | 14 | 0 | 16 | 2 | 0 | 1 | 3 | 105 |
| % App. Total | 19.7 | 78.8 | 1.5 | | 45 | 10 | 45 | | 12.5 | 87.5 | 0 | | 66.7 | 0 | 33.3 | | |
| PHF | .542 | .867 | .250 | .971 | .750 | .500 | .563 | .625 | .500 | .583 | .000 | .667 | .500 | .000 | .250 | .750 | .905 |

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2



Counts Unlimited
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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 07:30 AM | | | | 07:30 AM | | | | 07:30 AM | | | | 07:30 AM | | | | |
| +0 mins. | 2 | **15** | 0 | **17** | 2 | 0 | 1 | 3 | 0 | 1 | 0 | 1 | 0 | 0 | **1** | **1** | |
| +15 mins. | **6** | 10 | **1** | 17 | **3** | **1** | **4** | **8** | **1** | 2 | 0 | 3 | **1** | 0 | 0 | 1 | |
| +30 mins. | 3 | 13 | 0 | 16 | 3 | 0 | 0 | 3 | 1 | 5 | 0 | **6** | 0 | 0 | 0 | 0 | |
| +45 mins. | 2 | 14 | 0 | 16 | 1 | 1 | 4 | 6 | 0 | **6** | 0 | 6 | 1 | 0 | 0 | 1 | |
| Total Volume | 13 | 52 | 1 | 66 | 9 | 2 | 9 | 20 | 2 | 14 | 0 | 16 | 2 | 0 | 1 | 3 | |
| % App. Total | 19.7 | 78.8 | 1.5 | | 45 | 10 | 45 | | 12.5 | 87.5 | 0 | | 66.7 | 0 | 33.3 | | |
| PHF | .542 | .867 | .250 | .971 | .750 | .500 | .563 | .625 | .500 | .583 | .000 | .667 | .500 | .000 | .250 | .750 | |

Counts Unlimited
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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 07:00 AM | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 2 |
| 07:30 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 07:45 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 1 | 2 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 7 | 7 |
| 08:00 AM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 08:30 AM | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 1 | 3 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 7 |
| Grand Total | 2 | 5 | 0 | 0 | 7 | 1 | 0 | 1 | 0 | 2 | 0 | 4 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 1 | 0 | 14 | 14 |
| Apprch % | 28.6 | 71.4 | 0 | | | 50 | 0 | 50 | | | 0 | 100 | 0 | | | 100 | 0 | 0 | | | | | |
| Total % | 14.3 | 35.7 | 0 | | 50 | 7.1 | 0 | 7.1 | | 14.3 | 0 | 28.6 | 0 | | 28.6 | 7.1 | 0 | 0 | | 7.1 | 0 | 100 | |

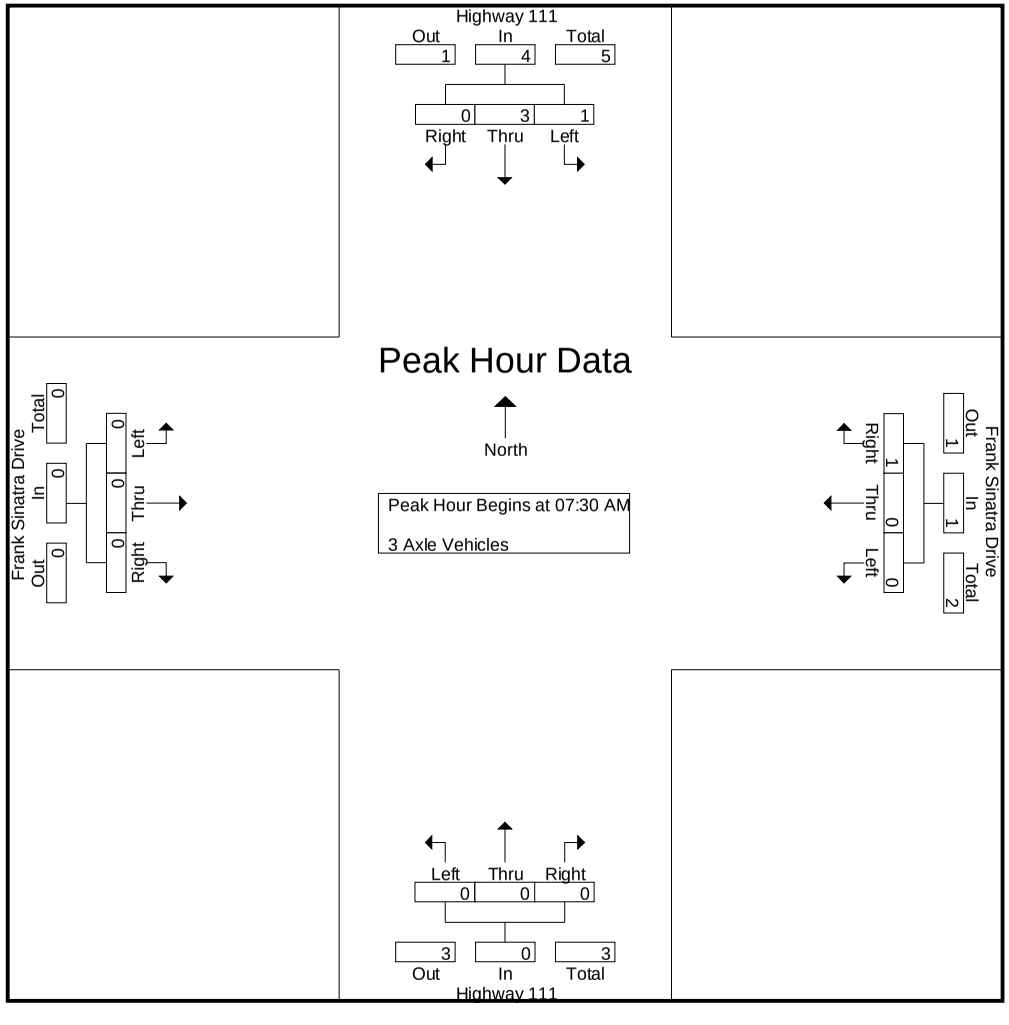
3.1-18

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 07:45 AM | **1** | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:00 AM | 0 | **2** | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2** |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total Volume | 1 | 3 | 0 | 4 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| % App. Total | 25 | 75 | 0 | | 0 | 0 | 100 | | 0 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .250 | .375 | .000 | .500 | .000 | .000 | .250 | .250 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .625 |

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2



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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 07:30 AM | | | | 07:30 AM | | | | 07:30 AM | | | | 07:30 AM | | | | |
| +0 mins. | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +15 mins. | **1** | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +30 mins. | 0 | **2** | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +45 mins. | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total Volume | 1 | 3 | 0 | 4 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| % App. Total | 25 | 75 | 0 | | 0 | 0 | 100 | | 0 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .250 | .375 | .000 | .500 | .000 | .000 | .250 | .250 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | |

Counts Unlimited
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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 07:00 AM | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 AM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 07:45 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 0 | 5 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 7 |
| 08:00 AM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 08:30 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| Grand Total | 1 | 7 | 0 | 0 | 8 | 0 | 1 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 |
| Apprch % | 12.5 | 87.5 | 0 | | | 0 | 50 | 50 | | | 0 | 50 | 50 | | | 0 | 0 | 0 | | | | | |
| Total % | 8.3 | 58.3 | 0 | | 66.7 | 0 | 8.3 | 8.3 | | 16.7 | 0 | 8.3 | 8.3 | | 16.7 | 0 | 0 | 0 | | 0 | 0 | 100 | |

3.1-21

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | 0 | 1 | 0 | 1 | 0 | **1** | 0 | **1** | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | **3** |
| 07:45 AM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:00 AM | 0 | **2** | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 1 | 0 | 0 | 0 | 0 | 1 |
| Total Volume | 0 | 4 | 0 | 4 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 7 |
| % App. Total | 0 | 100 | 0 | | 0 | 100 | 0 | | 0 | 50 | 50 | | 0 | 0 | 0 | | |
| PHF | .000 | .500 | .000 | .500 | .000 | .250 | .000 | .250 | .000 | .250 | .250 | .500 | .000 | .000 | .000 | .000 | .583 |

Counts Unlimited
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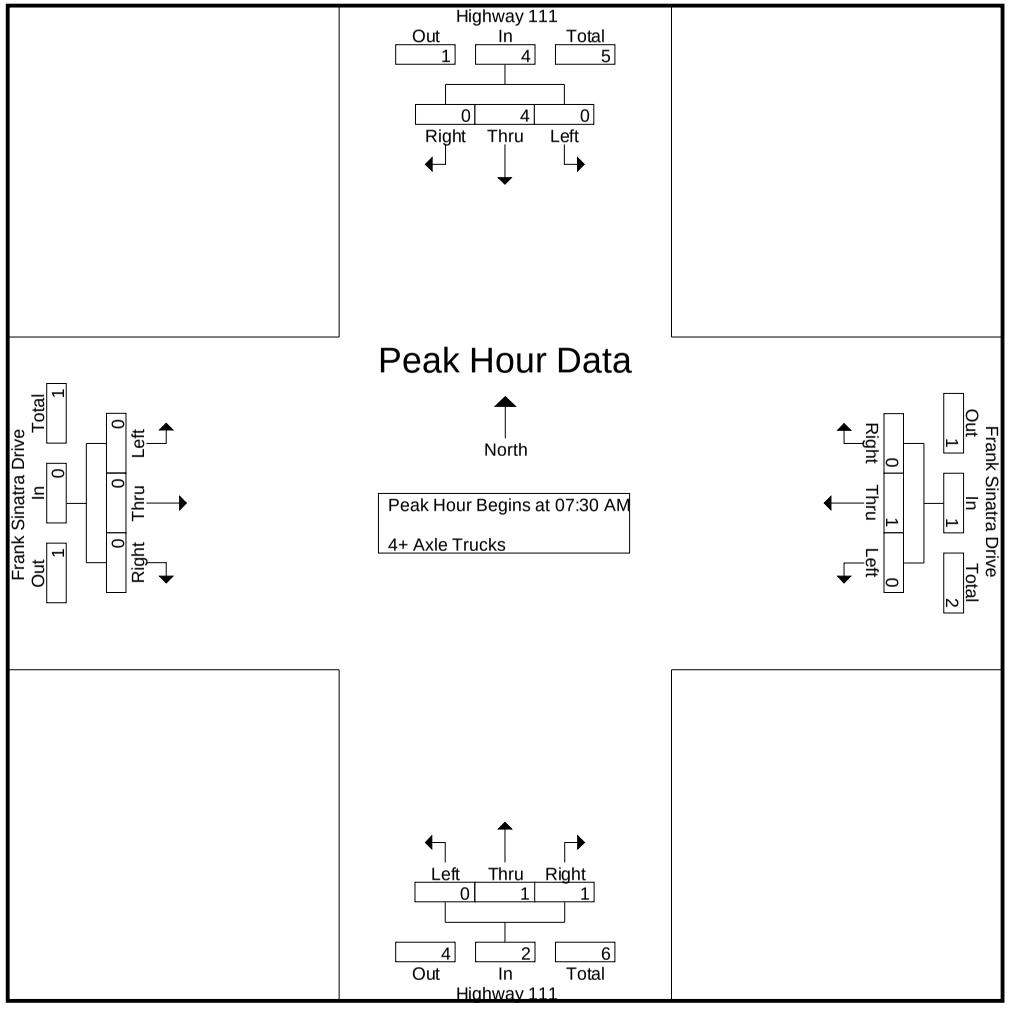
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2



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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra AM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 07:30 AM | | | | 07:30 AM | | | | 07:30 AM | | | | 07:30 AM | | | | |
| +0 mins. | 0 | 1 | 0 | 1 | 0 | **1** | 0 | **1** | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | |
| +15 mins. | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +30 mins. | 0 | **2** | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +45 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 1 | 0 | 0 | 0 | 0 | |
| Total Volume | 0 | 4 | 0 | 4 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | |
| % App. Total | 0 | 100 | 0 | | 0 | 100 | 0 | | 0 | 50 | 50 | | 0 | 0 | 0 | | |
| PHF | .000 | .500 | .000 | .500 | .000 | .250 | .000 | .250 | .000 | .250 | .250 | .500 | .000 | .000 | .000 | .000 | |

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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

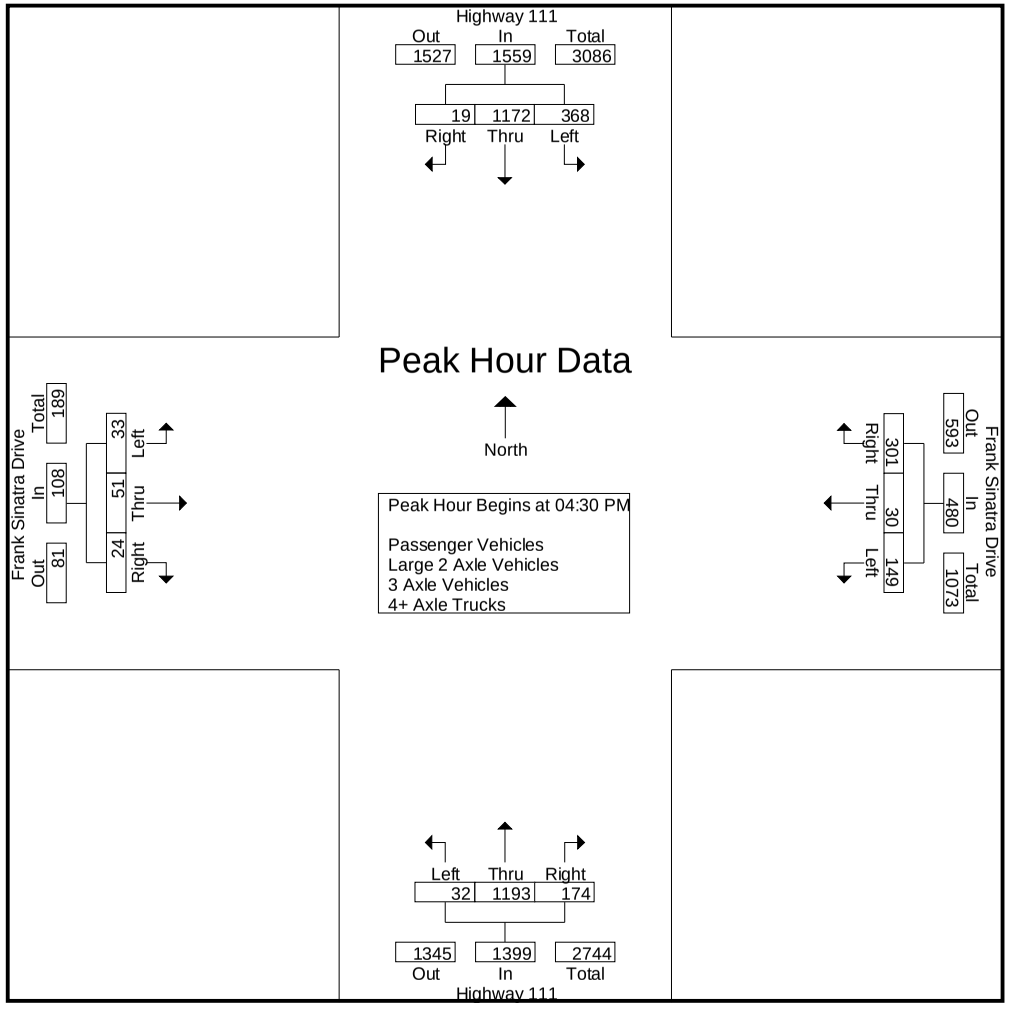
| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 04:00 PM | 77 | 275 | 4 | 1 | 356 | 40 | 9 | 82 | 0 | 131 | 7 | 339 | 48 | 0 | 394 | 7 | 7 | 7 | 0 | 21 | 1 | 902 | 903 |
| 04:15 PM | 60 | 278 | 7 | 2 | 345 | 37 | 5 | 78 | 0 | 120 | 10 | 323 | 51 | 0 | 384 | 8 | 6 | 4 | 0 | 18 | 2 | 867 | 869 |
| 04:30 PM | 106 | 289 | 4 | 1 | 399 | 43 | 10 | 80 | 0 | 133 | 8 | 274 | 52 | 0 | 334 | 5 | 8 | 5 | 1 | 18 | 2 | 884 | 886 |
| 04:45 PM | 99 | 293 | 6 | 1 | 398 | 35 | 7 | 80 | 0 | 122 | 7 | 289 | 50 | 0 | 346 | 10 | 9 | 5 | 1 | 24 | 2 | 890 | 892 |
| Total | 342 | 1135 | 21 | 5 | 1498 | 155 | 31 | 320 | 0 | 506 | 32 | 1225 | 201 | 0 | 1458 | 30 | 30 | 21 | 2 | 81 | 7 | 3543 | 3550 |
| 05:00 PM | 86 | 252 | 4 | 2 | 342 | 40 | 3 | 65 | 0 | 108 | 9 | 319 | 50 | 0 | 378 | 13 | 26 | 7 | 1 | 46 | 3 | 874 | 877 |
| 05:15 PM | 77 | 338 | 5 | 2 | 420 | 31 | 10 | 76 | 0 | 117 | 8 | 311 | 22 | 1 | 341 | 5 | 8 | 7 | 3 | 20 | 6 | 898 | 904 |
| 05:30 PM | 86 | 257 | 0 | 0 | 343 | 27 | 5 | 63 | 0 | 95 | 9 | 306 | 35 | 0 | 350 | 5 | 3 | 8 | 3 | 16 | 3 | 804 | 807 |
| 05:45 PM | 49 | 222 | 5 | 2 | 276 | 22 | 3 | 42 | 0 | 67 | 10 | 268 | 23 | 0 | 301 | 5 | 5 | 7 | 1 | 17 | 3 | 661 | 664 |
| Total | 298 | 1069 | 14 | 6 | 1381 | 120 | 21 | 246 | 0 | 387 | 36 | 1204 | 130 | 1 | 1370 | 28 | 42 | 29 | 8 | 99 | 15 | 3237 | 3252 |
| Grand Total | 640 | 2204 | 35 | 11 | 2879 | 275 | 52 | 566 | 0 | 893 | 68 | 2429 | 331 | 1 | 2828 | 58 | 72 | 50 | 10 | 180 | 22 | 6780 | 6802 |
| Apprch % | 22.2 | 76.6 | 1.2 | | | 30.8 | 5.8 | 63.4 | | | 2.4 | 85.9 | 11.7 | | | 32.2 | 40 | 27.8 | | | | | |
| Total % | 9.4 | 32.5 | 0.5 | | 42.5 | 4.1 | 0.8 | 8.3 | | 13.2 | 1 | 35.8 | 4.9 | | 41.7 | 0.9 | 1.1 | 0.7 | | 2.7 | 0.3 | 99.7 | |
| Passenger Vehicles | 636 | 2177 | 35 | | 2859 | 274 | 51 | 560 | | 885 | 67 | 2380 | 323 | | 2771 | 58 | 70 | 50 | | 188 | 0 | 0 | 6703 |
| % Passenger Vehicles | 99.4 | 98.8 | 100 | 100 | 98.9 | 99.6 | 98.1 | 98.9 | 0 | 99.1 | 98.5 | 98 | 97.6 | 100 | 97.9 | 100 | 97.2 | 100 | 100 | 98.9 | 0 | 0 | 98.5 |
| Large 2 Axle Vehicles | 3 | 24 | 0 | | 27 | 0 | 1 | 6 | | 7 | 1 | 44 | 7 | | 52 | 0 | 2 | 0 | | 2 | 0 | 0 | 88 |
| % Large 2 Axle Vehicles | 0.5 | 1.1 | 0 | 0 | 0.9 | 0 | 1.9 | 1.1 | 0 | 0.8 | 1.5 | 1.8 | 2.1 | 0 | 1.8 | 0 | 2.8 | 0 | 0 | 1.1 | 0 | 0 | 1.3 |
| 3 Axle Vehicles | 1 | 1 | 0 | | 2 | 0 | 0 | 0 | | 0 | 0 | 3 | 1 | | 4 | 0 | 0 | 0 | | 0 | 0 | 0 | 6 |
| % 3 Axle Vehicles | 0.2 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.3 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 |
| 4+ Axle Trucks | 0 | 2 | 0 | | 2 | 1 | 0 | 0 | | 1 | 0 | 2 | 0 | | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 5 |
| % 4+ Axle Trucks | 0 | 0.1 | 0 | 0 | 0.1 | 0.4 | 0 | 0 | 0 | 0.1 | 0 | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 |

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | | | | | |
| 04:30 PM | **106** | 289 | 4 | 399 | **43** | **10** | **80** | **133** | 8 | 274 | **52** | 334 | 5 | 8 | 5 | 18 | 884 |
| 04:45 PM | 99 | 293 | **6** | 398 | 35 | 7 | 80 | 122 | 7 | 289 | 50 | 346 | 10 | 9 | 5 | 24 | 890 |
| 05:00 PM | 86 | 252 | 4 | 342 | 40 | 3 | 65 | 108 | **9** | **319** | 50 | **378** | **13** | **26** | **7** | **46** | 874 |
| 05:15 PM | 77 | **338** | 5 | **420** | 31 | 10 | 76 | 117 | 8 | 311 | 22 | 341 | 5 | 8 | 7 | 20 | **898** |
| Total Volume | 368 | 1172 | 19 | 1559 | 149 | 30 | 301 | 480 | 32 | 1193 | 174 | 1399 | 33 | 51 | 24 | 108 | 3546 |
| % App. Total | 23.6 | 75.2 | 1.2 | | 31 | 6.2 | 62.7 | | 2.3 | 85.3 | 12.4 | | 30.6 | 47.2 | 22.2 | | |
| PHF | .868 | .867 | .792 | .928 | .866 | .750 | .941 | .902 | .889 | .935 | .837 | .925 | .635 | .490 | .857 | .587 | .987 |

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2



Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 04:30 PM | | | | 04:00 PM | | | | 04:00 PM | | | | 04:30 PM | | | | |
| +0 mins. | **106** | 289 | 4 | 399 | 40 | 9 | **82** | 131 | 7 | **339** | 48 | **394** | 5 | 8 | 5 | 18 | |
| +15 mins. | 99 | 293 | **6** | 398 | 37 | 5 | 78 | 120 | **10** | 323 | 51 | 384 | 10 | 9 | 5 | 24 | |
| +30 mins. | 86 | 252 | 4 | 342 | **43** | **10** | 80 | **133** | 8 | 274 | **52** | 334 | **13** | **26** | **7** | **46** | |
| +45 mins. | 77 | **338** | 5 | **420** | 35 | 7 | 80 | 122 | 7 | 289 | 50 | 346 | 5 | 8 | 7 | 20 | |
| Total Volume | 368 | 1172 | 19 | 1559 | 155 | 31 | 320 | 506 | 32 | 1225 | 201 | 1458 | 33 | 51 | 24 | 108 | |
| % App. Total | 23.6 | 75.2 | 1.2 | | 30.6 | 6.1 | 63.2 | | 2.2 | 84 | 13.8 | | 30.6 | 47.2 | 22.2 | | |
| PHF | .868 | .867 | .792 | .928 | .901 | .775 | .976 | .951 | .800 | .903 | .966 | .925 | .635 | .490 | .857 | .587 | |

Counts Unlimited
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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- Passenger Vehicles

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 04:00 PM | 77 | 273 | 4 | 1 | 354 | 39 | 9 | 81 | 0 | 129 | 7 | 329 | 47 | 0 | 383 | 7 | 7 | 7 | 0 | 21 | 1 | 887 | 888 |
| 04:15 PM | 60 | 275 | 7 | 2 | 342 | 37 | 5 | 78 | 0 | 120 | 10 | 313 | 46 | 0 | 369 | 8 | 6 | 4 | 0 | 18 | 2 | 849 | 851 |
| 04:30 PM | 104 | 282 | 4 | 1 | 390 | 43 | 10 | 79 | 0 | 132 | 8 | 270 | 51 | 0 | 329 | 5 | 7 | 5 | 1 | 17 | 2 | 868 | 870 |
| 04:45 PM | 99 | 290 | 6 | 1 | 395 | 35 | 7 | 80 | 0 | 122 | 7 | 283 | 49 | 0 | 339 | 10 | 9 | 5 | 1 | 24 | 2 | 880 | 882 |
| Total | 340 | 1120 | 21 | 5 | 1481 | 154 | 31 | 318 | 0 | 503 | 32 | 1195 | 193 | 0 | 1420 | 30 | 29 | 21 | 2 | 80 | 7 | 3484 | 3491 |
| 05:00 PM | 85 | 250 | 4 | 2 | 339 | 40 | 3 | 62 | 0 | 105 | 8 | 314 | 50 | 0 | 372 | 13 | 26 | 7 | 1 | 46 | 3 | 862 | 865 |
| 05:15 PM | 76 | 333 | 5 | 2 | 414 | 31 | 10 | 75 | 0 | 116 | 8 | 307 | 22 | 1 | 337 | 5 | 8 | 7 | 3 | 20 | 6 | 887 | 893 |
| 05:30 PM | 86 | 256 | 0 | 0 | 342 | 27 | 4 | 63 | 0 | 94 | 9 | 299 | 35 | 0 | 343 | 5 | 3 | 8 | 3 | 16 | 3 | 795 | 798 |
| 05:45 PM | 49 | 218 | 5 | 2 | 272 | 22 | 3 | 42 | 0 | 67 | 10 | 265 | 23 | 0 | 298 | 5 | 4 | 7 | 1 | 16 | 3 | 653 | 656 |
| Total | 296 | 1057 | 14 | 6 | 1367 | 120 | 20 | 242 | 0 | 382 | 35 | 1185 | 130 | 1 | 1350 | 28 | 41 | 29 | 8 | 98 | 15 | 3197 | 3212 |
| Grand Total | 636 | 2177 | 35 | 11 | 2848 | 274 | 51 | 560 | 0 | 885 | 67 | 2380 | 323 | 1 | 2770 | 58 | 70 | 50 | 10 | 178 | 22 | 6681 | 6703 |
| Apprch % | 22.3 | 76.4 | 1.2 | | | 31 | 5.8 | 63.3 | | | 2.4 | 85.9 | 11.7 | | | 32.6 | 39.3 | 28.1 | | | | | |
| Total % | 9.5 | 32.6 | 0.5 | | 42.6 | 4.1 | 0.8 | 8.4 | | 13.2 | 1 | 35.6 | 4.8 | | 41.5 | 0.9 | 1 | 0.7 | | 2.7 | 0.3 | 99.7 | |



| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | | | | | |
| 04:30 PM | **104** | 282 | 4 | 390 | **43** | **10** | 79 | **132** | **8** | 270 | **51** | 329 | 5 | 7 | 5 | 17 | 868 |
| 04:45 PM | 99 | 290 | **6** | 395 | 35 | 7 | **80** | 122 | 7 | 283 | 49 | 339 | 10 | 9 | 5 | 24 | 880 |
| 05:00 PM | 85 | 250 | 4 | 339 | 40 | 3 | 62 | 105 | 8 | **314** | 50 | **372** | **13** | **26** | **7** | **46** | 862 |
| 05:15 PM | 76 | **333** | 5 | **414** | 31 | 10 | 75 | 116 | 8 | 307 | 22 | 337 | 5 | 8 | 7 | 20 | **887** |
| Total Volume | 364 | 1155 | 19 | 1538 | 149 | 30 | 296 | 475 | 31 | 1174 | 172 | 1377 | 33 | 50 | 24 | 107 | 3497 |
| % App. Total | 23.7 | 75.1 | 1.2 | | 31.4 | 6.3 | 62.3 | | 2.3 | 85.3 | 12.5 | | 30.8 | 46.7 | 22.4 | | |
| PHF | .875 | .867 | .792 | .929 | .866 | .750 | .925 | .900 | .969 | .935 | .843 | .925 | .635 | .481 | .857 | .582 | .986 |

Counts Unlimited
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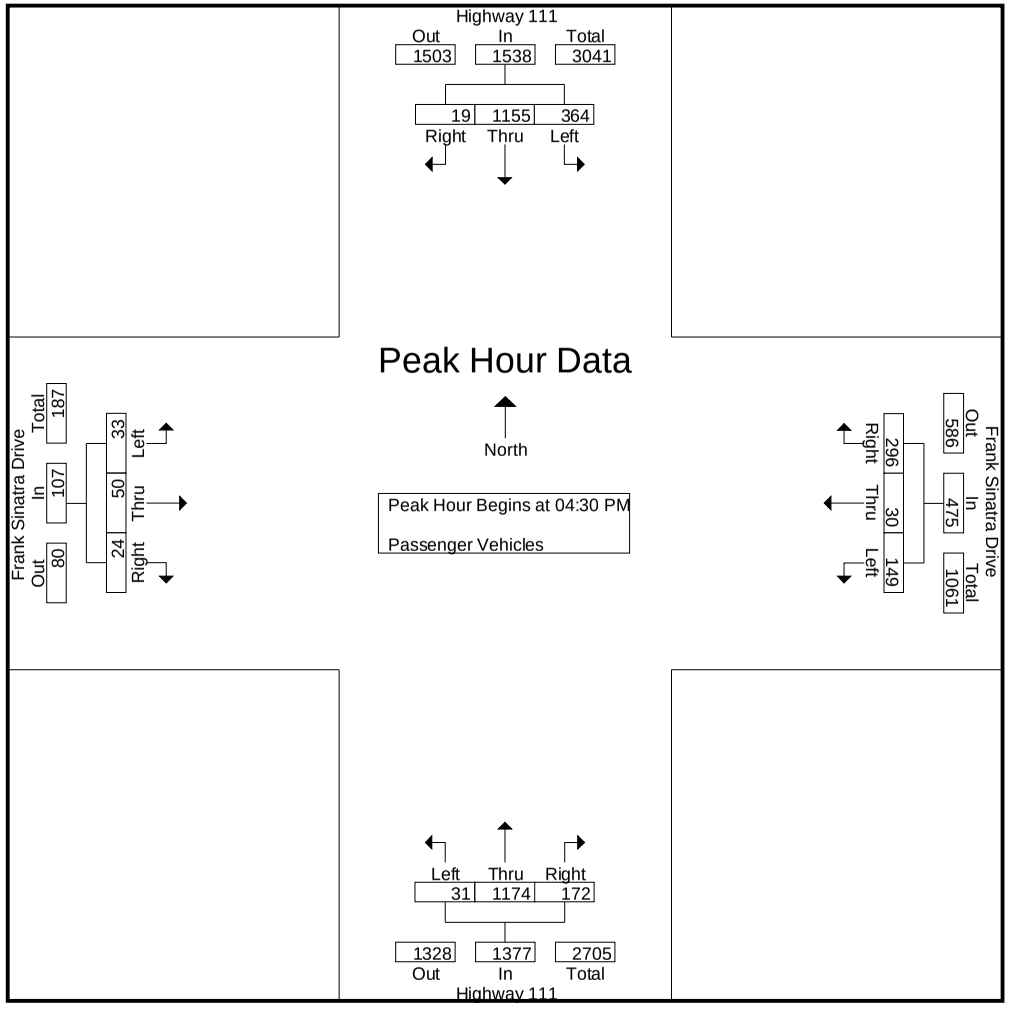
City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2



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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 04:30 PM | | | | 04:30 PM | | | | 04:30 PM | | | | 04:30 PM | | | | |
| +0 mins. | **104** | 282 | 4 | 390 | **43** | **10** | 79 | **132** | **8** | 270 | **51** | 329 | 5 | 7 | 5 | 17 | |
| +15 mins. | 99 | 290 | **6** | 395 | 35 | 7 | **80** | 122 | 7 | 283 | 49 | 339 | 10 | 9 | 5 | 24 | |
| +30 mins. | 85 | 250 | 4 | 339 | 40 | 3 | 62 | 105 | 8 | **314** | 50 | **372** | **13** | **26** | **7** | **46** | |
| +45 mins. | 76 | **333** | 5 | **414** | 31 | 10 | 75 | 116 | 8 | 307 | 22 | 337 | 5 | 8 | 7 | 20 | |
| Total Volume | 364 | 1155 | 19 | 1538 | 149 | 30 | 296 | 475 | 31 | 1174 | 172 | 1377 | 33 | 50 | 24 | 107 | |
| % App. Total | 23.7 | 75.1 | 1.2 | | 31.4 | 6.3 | 62.3 | | 2.3 | 85.3 | 12.5 | | 30.8 | 46.7 | 22.4 | | |
| PHF | .875 | .867 | .792 | .929 | .866 | .750 | .925 | .900 | .969 | .935 | .843 | .925 | .635 | .481 | .857 | .582 | |

Counts Unlimited
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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 04:00 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 10 | 1 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 13 |
| 04:15 PM | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 5 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 15 |
| 04:30 PM | 1 | 7 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 1 | 0 | 4 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 1 | 0 | 14 | 14 |
| 04:45 PM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 8 |
| Total | 1 | 13 | 0 | 0 | 14 | 0 | 0 | 2 | 0 | 2 | 0 | 26 | 7 | 0 | 33 | 0 | 1 | 0 | 0 | 1 | 0 | 50 | 50 |
| 05:00 PM | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 3 | 1 | 4 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 11 |
| 05:15 PM | 1 | 4 | 0 | 0 | 5 | 0 | 0 | 1 | 0 | 1 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 |
| 05:30 PM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 |
| 05:45 PM | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 8 | 8 |
| Total | 2 | 11 | 0 | 0 | 13 | 0 | 1 | 4 | 0 | 5 | 1 | 18 | 0 | 0 | 19 | 0 | 1 | 0 | 0 | 1 | 0 | 38 | 38 |
| Grand Total | 3 | 24 | 0 | 0 | 27 | 0 | 1 | 6 | 0 | 7 | 1 | 44 | 7 | 0 | 52 | 0 | 2 | 0 | 0 | 2 | 0 | 88 | 88 |
| Apprch % | 11.1 | 88.9 | 0 | | | 0 | 14.3 | 85.7 | | | 1.9 | 84.6 | 13.5 | | | 0 | 100 | 0 | | | | | |
| Total % | 3.4 | 27.3 | 0 | | 30.7 | 0 | 1.1 | 6.8 | | 8 | 1.1 | 50 | 8 | | 59.1 | 0 | 2.3 | 0 | | 2.3 | 0 | 100 | |



| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | | | | | |
| 04:30 PM | **1** | **7** | 0 | **8** | 0 | 0 | 1 | 1 | 0 | 4 | 0 | 4 | 0 | **1** | 0 | **1** | **14** |
| 04:45 PM | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **5** | **1** | **6** | 0 | 0 | 0 | 0 | 8 |
| 05:00 PM | 1 | 2 | 0 | 3 | 0 | 0 | **3** | **3** | **1** | 4 | 0 | 5 | 0 | 0 | 0 | 0 | 11 |
| 05:15 PM | 1 | 4 | 0 | 5 | 0 | 0 | 1 | 1 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 10 |
| Total Volume | 3 | 15 | 0 | 18 | 0 | 0 | 5 | 5 | 1 | 17 | 1 | 19 | 0 | 1 | 0 | 1 | 43 |
| % App. Total | 16.7 | 83.3 | 0 | | 0 | 0 | 100 | | 5.3 | 89.5 | 5.3 | | 0 | 100 | 0 | | |
| PHF | .750 | .536 | .000 | .563 | .000 | .000 | .417 | .417 | .250 | .850 | .250 | .792 | .000 | .250 | .000 | .250 | .768 |

Counts Unlimited
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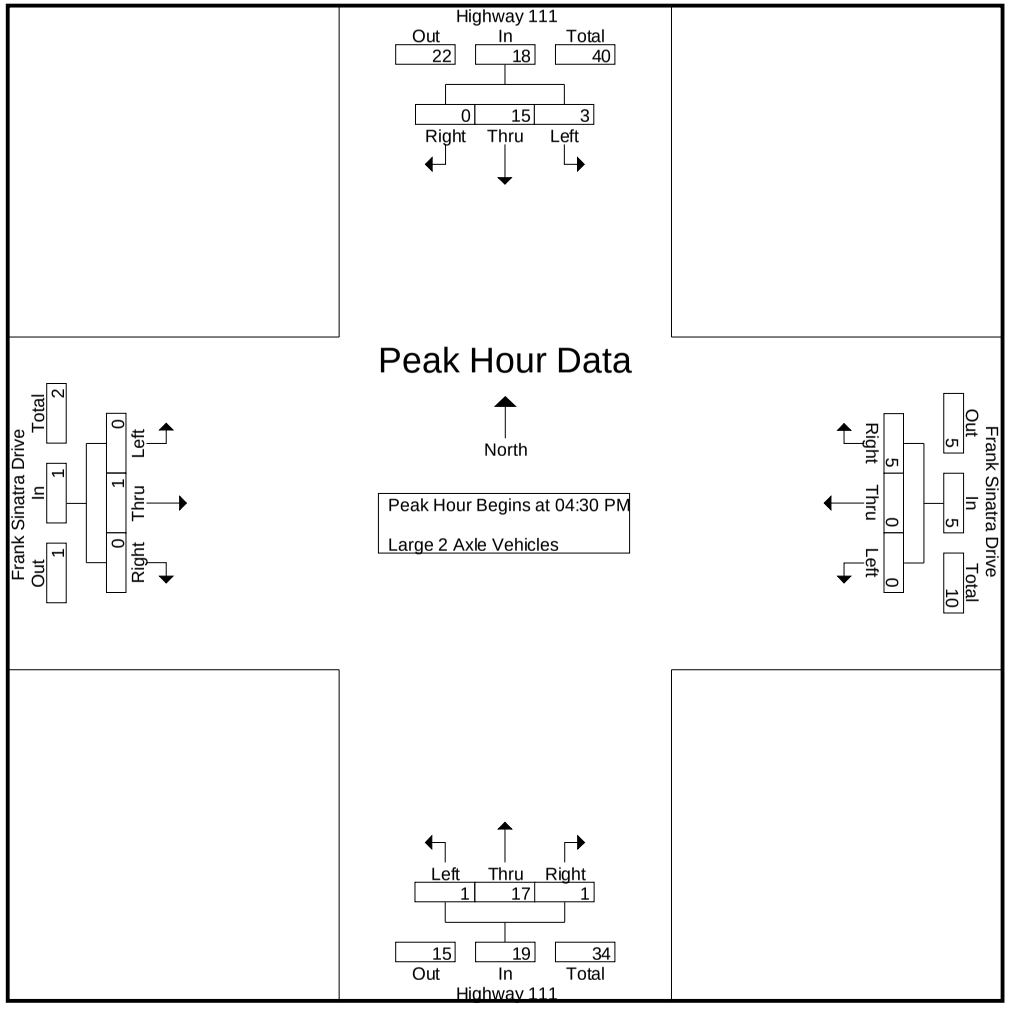
City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2



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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 04:30 PM | | | | 04:30 PM | | | | 04:30 PM | | | | 04:30 PM | | | | |
| +0 mins. | **1** | **7** | 0 | **8** | 0 | 0 | 1 | 1 | 0 | 4 | 0 | 4 | 0 | **1** | 0 | **1** | |
| +15 mins. | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **5** | **1** | **6** | 0 | 0 | 0 | 0 | |
| +30 mins. | 1 | 2 | 0 | 3 | 0 | 0 | **3** | **3** | **1** | 4 | 0 | 5 | 0 | 0 | 0 | 0 | |
| +45 mins. | 1 | 4 | 0 | 5 | 0 | 0 | 1 | 1 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | |
| Total Volume | 3 | 15 | 0 | 18 | 0 | 0 | 5 | 5 | 1 | 17 | 1 | 19 | 0 | 1 | 0 | 1 | |
| % App. Total | 16.7 | 83.3 | 0 | | 0 | 0 | 100 | | 5.3 | 89.5 | 5.3 | | 0 | 100 | 0 | | |
| PHF | .750 | .536 | .000 | .563 | .000 | .000 | .417 | .417 | .250 | .850 | .250 | .792 | .000 | .250 | .000 | .250 | |

Counts Unlimited
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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 04:00 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 04:30 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grand Total | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 |
| Apprch % | 50 | 50 | 0 | | | 0 | 0 | 0 | | | 0 | 75 | 25 | | | 0 | 0 | 0 | | | | | |
| Total % | 16.7 | 16.7 | 0 | | 33.3 | 0 | 0 | 0 | | 0 | 0 | 50 | 16.7 | | 66.7 | 0 | 0 | 0 | | 0 | 0 | 100 | |



| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | | | | | |
| 04:30 PM | **1** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | **2** |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Volume | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 3 |
| % App. Total | 100 | 0 | 0 | | 0 | 0 | 0 | | 0 | 50 | 50 | | 0 | 0 | 0 | | |
| PHF | .250 | .000 | .000 | .250 | .000 | .000 | .000 | .000 | .000 | .250 | .250 | .500 | .000 | .000 | .000 | .000 | .375 |

Counts Unlimited
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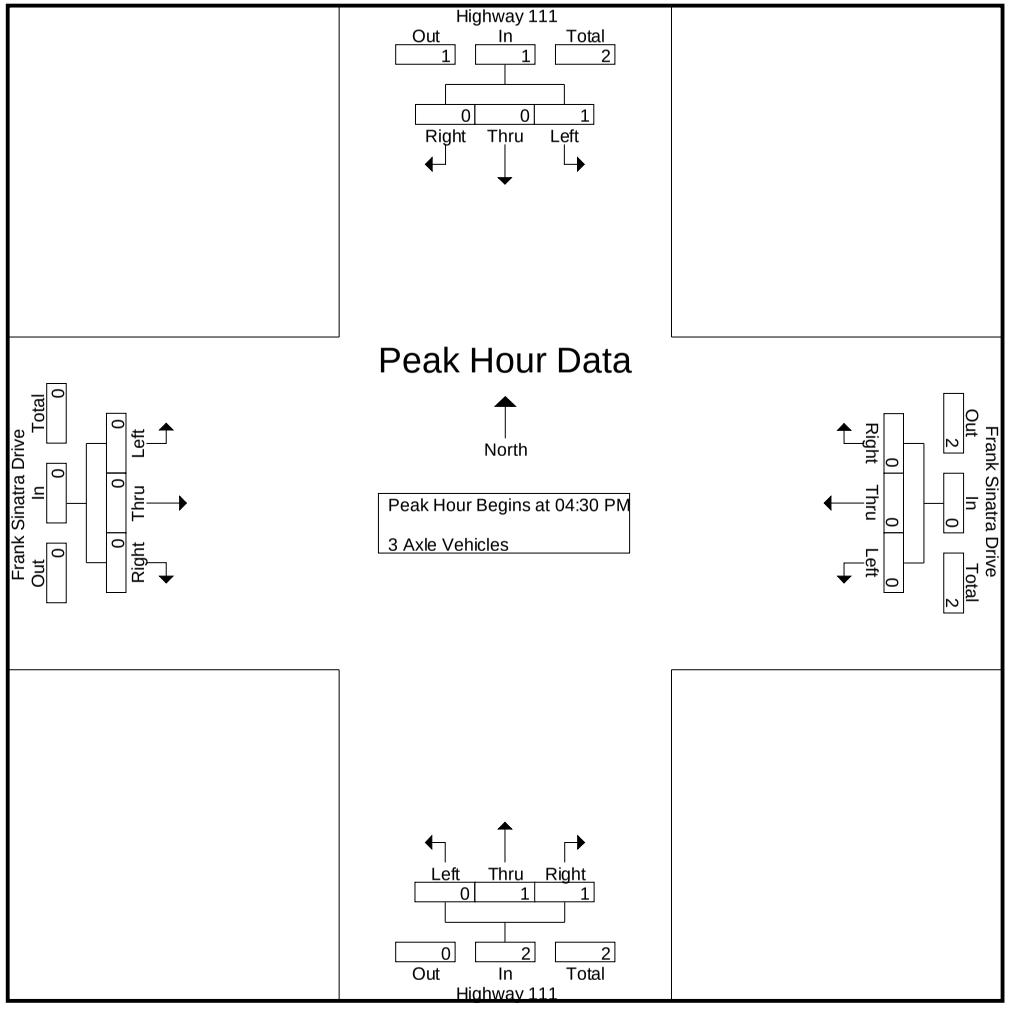
City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2



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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 04:30 PM | | | | 04:30 PM | | | | 04:30 PM | | | | 04:30 PM | | | | |
| +0 mins. | **1** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | |
| +15 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 1 | 0 | 0 | 0 | 0 | |
| +30 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +45 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total Volume | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | |
| % App. Total | 100 | 0 | 0 | | 0 | 0 | 0 | | 0 | 50 | 50 | | 0 | 0 | 0 | | |
| PHF | .250 | .000 | .000 | .250 | .000 | .000 | .000 | .000 | .000 | .250 | .250 | .500 | .000 | .000 | .000 | .000 | |

Counts Unlimited
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Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 05:15 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Grand Total | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| Apprch % | 0 | 100 | 0 | | | 100 | 0 | 0 | | | 0 | 100 | 0 | | | 0 | 0 | 0 | | | | | |
| Total % | 0 | 40 | 0 | | 40 | 20 | 0 | 0 | | 20 | 0 | 40 | 0 | | 40 | 0 | 0 | 0 | | 0 | 0 | 100 | |

3.1-36

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | | | | | |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 1 |
| 05:15 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total Volume | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| % App. Total | 0 | 100 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .500 | .000 | .500 | .000 | .000 | .000 | .000 | .000 | .250 | .000 | .250 | .000 | .000 | .000 | .000 | .750 |

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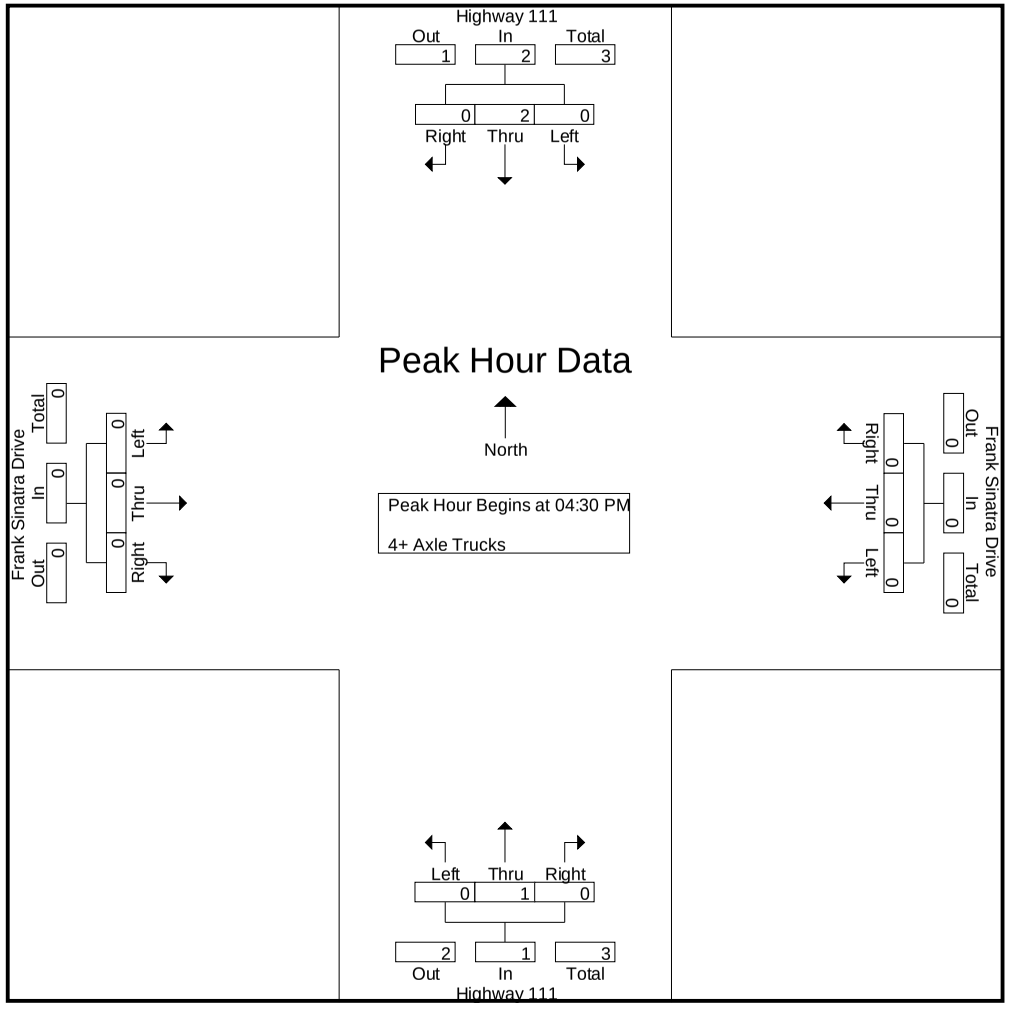
City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 2



Counts Unlimited
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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra PM
Site Code : 05119831
Start Date : 12/11/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 04:30 PM | | | | 04:30 PM | | | | 04:30 PM | | | | 04:30 PM | | | | |
| +0 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +15 mins. | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +30 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | |
| +45 mins. | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total Volume | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | |
| % App. Total | 0 | 100 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .500 | .000 | .500 | .000 | .000 | .000 | .000 | .000 | .250 | .000 | .250 | .000 | .000 | .000 | .000 | |

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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 10:00 AM | 48 | 236 | 5 | 1 | 289 | 35 | 1 | 61 | 50 | 97 | 2 | 194 | 24 | 6 | 220 | 8 | 9 | 8 | 0 | 25 | 57 | 631 | 688 |
| 10:15 AM | 37 | 237 | 4 | 0 | 278 | 51 | 7 | 45 | 39 | 103 | 3 | 190 | 25 | 4 | 218 | 3 | 11 | 4 | 0 | 18 | 43 | 617 | 660 |
| 10:30 AM | 33 | 265 | 4 | 2 | 302 | 30 | 1 | 55 | 46 | 86 | 5 | 202 | 22 | 2 | 229 | 9 | 7 | 4 | 0 | 20 | 50 | 637 | 687 |
| 10:45 AM | 38 | 276 | 7 | 1 | 321 | 38 | 1 | 63 | 52 | 102 | 9 | 206 | 29 | 4 | 244 | 2 | 12 | 5 | 0 | 19 | 57 | 686 | 743 |
| Total | 156 | 1014 | 20 | 4 | 1190 | 154 | 10 | 224 | 187 | 388 | 19 | 792 | 100 | 16 | 911 | 22 | 39 | 21 | 0 | 82 | 207 | 2571 | 2778 |
| 11:00 AM | 47 | 294 | 4 | 0 | 345 | 36 | 5 | 37 | 26 | 78 | 8 | 227 | 29 | 4 | 264 | 9 | 8 | 3 | 0 | 20 | 30 | 707 | 737 |
| 11:15 AM | 49 | 277 | 8 | 0 | 334 | 36 | 5 | 59 | 52 | 100 | 8 | 255 | 26 | 3 | 289 | 6 | 10 | 4 | 0 | 20 | 55 | 743 | 798 |
| 11:30 AM | 54 | 310 | 6 | 2 | 370 | 35 | 10 | 54 | 49 | 99 | 9 | 283 | 31 | 5 | 323 | 7 | 8 | 3 | 0 | 18 | 56 | 810 | 866 |
| 11:45 AM | 44 | 291 | 7 | 1 | 342 | 37 | 8 | 47 | 44 | 92 | 12 | 252 | 31 | 2 | 295 | 7 | 5 | 3 | 0 | 15 | 47 | 744 | 791 |
| Total | 194 | 1172 | 25 | 3 | 1391 | 144 | 28 | 197 | 171 | 369 | 37 | 1017 | 117 | 14 | 1171 | 29 | 31 | 13 | 0 | 73 | 188 | 3004 | 3192 |
| 12:00 PM | 45 | 277 | 5 | 0 | 327 | 32 | 4 | 44 | 42 | 80 | 7 | 245 | 39 | 4 | 291 | 9 | 4 | 2 | 0 | 15 | 46 | 713 | 759 |
| 12:15 PM | 50 | 225 | 6 | 1 | 281 | 35 | 4 | 44 | 23 | 83 | 10 | 229 | 20 | 1 | 259 | 6 | 9 | 4 | 0 | 19 | 25 | 642 | 667 |
| 12:30 PM | 51 | 288 | 9 | 0 | 348 | 39 | 3 | 55 | 45 | 97 | 8 | 268 | 49 | 3 | 325 | 8 | 8 | 3 | 0 | 19 | 48 | 789 | 837 |
| 12:45 PM | 52 | 277 | 11 | 4 | 340 | 34 | 11 | 55 | 42 | 100 | 9 | 280 | 28 | 4 | 317 | 9 | 6 | 3 | 0 | 18 | 50 | 775 | 825 |
| Total | 198 | 1067 | 31 | 5 | 1296 | 140 | 22 | 198 | 152 | 360 | 34 | 1022 | 136 | 12 | 1192 | 32 | 27 | 12 | 0 | 71 | 169 | 2919 | 3088 |
| 01:00 PM | 43 | 285 | 7 | 2 | 335 | 34 | 13 | 41 | 37 | 88 | 12 | 236 | 25 | 3 | 273 | 4 | 9 | 2 | 0 | 15 | 42 | 711 | 753 |
| 01:15 PM | 43 | 281 | 10 | 1 | 334 | 38 | 7 | 50 | 41 | 95 | 11 | 265 | 17 | 3 | 293 | 7 | 7 | 3 | 0 | 17 | 45 | 739 | 784 |
| 01:30 PM | 50 | 275 | 11 | 1 | 336 | 34 | 6 | 34 | 29 | 74 | 14 | 273 | 20 | 3 | 307 | 5 | 12 | 4 | 0 | 21 | 33 | 738 | 771 |
| 01:45 PM | 52 | 330 | 8 | 0 | 390 | 35 | 2 | 35 | 31 | 72 | 11 | 304 | 33 | 3 | 348 | 3 | 14 | 2 | 0 | 19 | 34 | 829 | 863 |
| Total | 188 | 1171 | 36 | 4 | 1395 | 141 | 28 | 160 | 138 | 329 | 48 | 1078 | 95 | 12 | 1221 | 19 | 42 | 11 | 0 | 72 | 154 | 3017 | 3171 |
| Grand Total | 736 | 4424 | 112 | 16 | 5272 | 579 | 88 | 779 | 648 | 1446 | 138 | 3909 | 448 | 54 | 4495 | 102 | 139 | 57 | 0 | 298 | 718 | 11511 | 12229 |
| Apprch % | 14 | 83.9 | 2.1 | | | 40 | 6.1 | 53.9 | | | 3.1 | 87 | 10 | | | 34.2 | 46.6 | 19.1 | | | | | |
| Total % | 6.4 | 38.4 | 1 | | 45.8 | 5 | 0.8 | 6.8 | | 12.6 | 1.2 | 34 | 3.9 | | 39 | 0.9 | 1.2 | 0.5 | | 2.6 | 5.9 | 94.1 | |
| Passenger Vehicles | 729 | 4373 | 110 | | 5226 | 575 | 85 | 771 | | 2074 | 138 | 3859 | 444 | | 4495 | 100 | 136 | 55 | | 291 | 0 | 0 | 12086 |
| % Passenger Vehicles | 99 | 98.8 | 98.2 | 87.5 | 98.8 | 99.3 | 96.6 | 99 | 99.2 | 99 | 100 | 98.7 | 99.1 | 100 | 98.8 | 98 | 97.8 | 96.5 | 0 | 97.7 | 0 | 0 | 98.8 |
| Large 2 Axle Vehicles | 7 | 44 | 2 | | 55 | 4 | 3 | 6 | | 17 | 0 | 37 | 4 | | 41 | 2 | 3 | 2 | | 7 | 0 | 0 | 120 |
| % Large 2 Axle Vehicles | 1 | 1 | 1.8 | 12.5 | 1 | 0.7 | 3.4 | 0.8 | 0.6 | 0.8 | 0 | 0.9 | 0.9 | 0 | 0.9 | 2 | 2.2 | 3.5 | 0 | 2.3 | 0 | 0 | 1 |
| 3 Axle Vehicles | 0 | 1 | 0 | | 1 | 0 | 0 | 2 | | 3 | 0 | 3 | 0 | | 3 | 0 | 0 | 0 | | 0 | 0 | 0 | 7 |
| % 3 Axle Vehicles | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.2 | 0.1 | 0 | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 |
| 4+ Axle Trucks | 0 | 6 | 0 | | 6 | 0 | 0 | 0 | | 0 | 0 | 10 | 0 | | 10 | 0 | 0 | 0 | | 0 | 0 | 0 | 16 |
| % 4+ Axle Trucks | 0 | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 |

Counts Unlimited
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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 2

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 01:00 PM | | | | | | | | | | | | | | | | | |
| 01:00 PM | 43 | 285 | 7 | 335 | 34 | **13** | 41 | 88 | 12 | 236 | 25 | 273 | 4 | 9 | 2 | 15 | 711 |
| 01:15 PM | 43 | 281 | 10 | 334 | **38** | 7 | **50** | **95** | 11 | 265 | 17 | 293 | **7** | 7 | 3 | 17 | 739 |
| 01:30 PM | 50 | 275 | **11** | 336 | 34 | 6 | 34 | 74 | **14** | 273 | 20 | 307 | 5 | 12 | **4** | **21** | 738 |
| 01:45 PM | **52** | **330** | 8 | **390** | 35 | 2 | 35 | 72 | 11 | **304** | **33** | **348** | 3 | **14** | 2 | 19 | **829** |
| Total Volume | 188 | 1171 | 36 | 1395 | 141 | 28 | 160 | 329 | 48 | 1078 | 95 | 1221 | 19 | 42 | 11 | 72 | 3017 |
| % App. Total | 13.5 | 83.9 | 2.6 | | 42.9 | 8.5 | 48.6 | | 3.9 | 88.3 | 7.8 | | 26.4 | 58.3 | 15.3 | | |
| PHF | .904 | .887 | .818 | .894 | .928 | .538 | .800 | .866 | .857 | .887 | .720 | .877 | .679 | .750 | .688 | .857 | .910 |

Counts Unlimited
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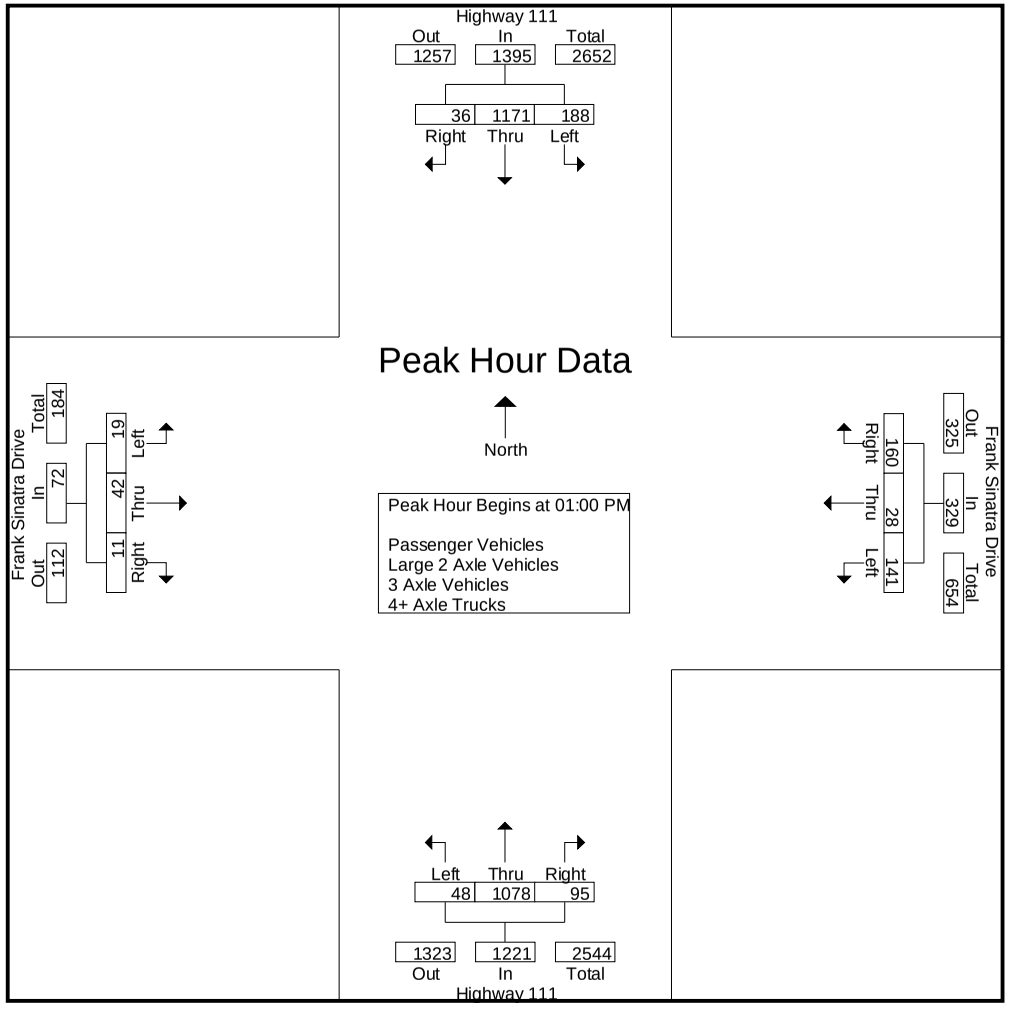
City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 3



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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 4

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 01:00 PM | | | | 10:00 AM | | | | 01:00 PM | | | | 10:00 AM | | | | |
| +0 mins. | 43 | 285 | 7 | 335 | 35 | 1 | 61 | 97 | 12 | 236 | 25 | 273 | 8 | 9 | **8** | **25** | |
| +15 mins. | 43 | 281 | 10 | 334 | **51** | **7** | 45 | **103** | 11 | 265 | 17 | 293 | 3 | 11 | 4 | 18 | |
| +30 mins. | 50 | 275 | **11** | 336 | 30 | 1 | 55 | 86 | **14** | 273 | 20 | 307 | **9** | 7 | 4 | 20 | |
| +45 mins. | **52** | **330** | 8 | **390** | 38 | 1 | **63** | 102 | 11 | **304** | **33** | **348** | 2 | **12** | 5 | 19 | |
| Total Volume | 188 | 1171 | 36 | 1395 | 154 | 10 | 224 | 388 | 48 | 1078 | 95 | 1221 | 22 | 39 | 21 | 82 | |
| % App. Total | 13.5 | 83.9 | 2.6 | | 39.7 | 2.6 | 57.7 | | 3.9 | 88.3 | 7.8 | | 26.8 | 47.6 | 25.6 | | |
| PHF | .904 | .887 | .818 | .894 | .755 | .357 | .889 | .942 | .857 | .887 | .720 | .877 | .611 | .813 | .656 | .820 | |

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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 1

Groups Printed- Passenger Vehicles

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 10:00 AM | 47 | 223 | 5 | 1 | 275 | 35 | 1 | 60 | 50 | 96 | 2 | 191 | 24 | 6 | 217 | 7 | 8 | 7 | 0 | 22 | 57 | 610 | 667 |
| 10:15 AM | 37 | 233 | 4 | 0 | 274 | 51 | 7 | 45 | 39 | 103 | 3 | 188 | 25 | 4 | 216 | 3 | 11 | 4 | 0 | 18 | 43 | 611 | 654 |
| 10:30 AM | 33 | 262 | 3 | 1 | 298 | 28 | 1 | 54 | 46 | 83 | 5 | 199 | 21 | 2 | 225 | 9 | 6 | 3 | 0 | 18 | 49 | 624 | 673 |
| 10:45 AM | 38 | 273 | 7 | 1 | 318 | 38 | 0 | 63 | 52 | 101 | 9 | 204 | 29 | 4 | 242 | 2 | 12 | 5 | 0 | 19 | 57 | 680 | 737 |
| Total | 155 | 991 | 19 | 3 | 1165 | 152 | 9 | 222 | 187 | 383 | 19 | 782 | 99 | 16 | 900 | 21 | 37 | 19 | 0 | 77 | 206 | 2525 | 2731 |
| 11:00 AM | 47 | 291 | 4 | 0 | 342 | 36 | 5 | 37 | 26 | 78 | 8 | 225 | 29 | 4 | 262 | 9 | 8 | 3 | 0 | 20 | 30 | 702 | 732 |
| 11:15 AM | 47 | 275 | 8 | 0 | 330 | 35 | 5 | 59 | 52 | 99 | 8 | 253 | 26 | 3 | 287 | 6 | 10 | 4 | 0 | 20 | 55 | 736 | 791 |
| 11:30 AM | 54 | 307 | 6 | 2 | 367 | 34 | 10 | 54 | 49 | 98 | 9 | 280 | 31 | 5 | 320 | 7 | 8 | 3 | 0 | 18 | 56 | 803 | 859 |
| 11:45 AM | 44 | 287 | 7 | 1 | 338 | 37 | 8 | 46 | 43 | 91 | 12 | 251 | 31 | 2 | 294 | 7 | 5 | 3 | 0 | 15 | 46 | 738 | 784 |
| Total | 192 | 1160 | 25 | 3 | 1377 | 142 | 28 | 196 | 170 | 366 | 37 | 1009 | 117 | 14 | 1163 | 29 | 31 | 13 | 0 | 73 | 187 | 2979 | 3166 |
| 12:00 PM | 45 | 274 | 5 | 0 | 324 | 32 | 3 | 44 | 42 | 79 | 7 | 240 | 38 | 4 | 285 | 9 | 4 | 2 | 0 | 15 | 46 | 703 | 749 |
| 12:15 PM | 49 | 225 | 5 | 0 | 279 | 35 | 3 | 43 | 22 | 81 | 10 | 228 | 20 | 1 | 258 | 6 | 9 | 4 | 0 | 19 | 23 | 637 | 660 |
| 12:30 PM | 51 | 285 | 9 | 0 | 345 | 39 | 3 | 55 | 45 | 97 | 8 | 262 | 48 | 3 | 318 | 7 | 8 | 3 | 0 | 18 | 48 | 778 | 826 |
| 12:45 PM | 51 | 273 | 11 | 4 | 335 | 34 | 11 | 54 | 42 | 99 | 9 | 276 | 28 | 4 | 313 | 9 | 5 | 3 | 0 | 17 | 50 | 764 | 814 |
| Total | 196 | 1057 | 30 | 4 | 1283 | 140 | 20 | 196 | 151 | 356 | 34 | 1006 | 134 | 12 | 1174 | 31 | 26 | 12 | 0 | 69 | 167 | 2882 | 3049 |
| 01:00 PM | 42 | 283 | 7 | 2 | 332 | 34 | 13 | 40 | 36 | 87 | 12 | 232 | 25 | 3 | 269 | 4 | 9 | 2 | 0 | 15 | 41 | 703 | 744 |
| 01:15 PM | 43 | 280 | 10 | 1 | 333 | 38 | 7 | 49 | 40 | 94 | 11 | 261 | 17 | 3 | 289 | 7 | 7 | 3 | 0 | 17 | 44 | 733 | 777 |
| 01:30 PM | 49 | 274 | 11 | 1 | 334 | 34 | 6 | 34 | 29 | 74 | 14 | 269 | 20 | 3 | 303 | 5 | 12 | 4 | 0 | 21 | 33 | 732 | 765 |
| 01:45 PM | 52 | 328 | 8 | 0 | 388 | 35 | 2 | 34 | 30 | 71 | 11 | 300 | 32 | 3 | 343 | 3 | 14 | 2 | 0 | 19 | 33 | 821 | 854 |
| Total | 186 | 1165 | 36 | 4 | 1387 | 141 | 28 | 157 | 135 | 326 | 48 | 1062 | 94 | 12 | 1204 | 19 | 42 | 11 | 0 | 72 | 151 | 2989 | 3140 |
| Grand Total | 729 | 4373 | 110 | 14 | 5212 | 575 | 85 | 771 | 643 | 1431 | 138 | 3859 | 444 | 54 | 4441 | 100 | 136 | 55 | 0 | 291 | 711 | 11375 | 12086 |
| Apprch % | 14 | 83.9 | 2.1 | | | 40.2 | 5.9 | 53.9 | | | 3.1 | 86.9 | 10 | | | 34.4 | 46.7 | 18.9 | | | | | |
| Total % | 6.4 | 38.4 | 1 | | 45.8 | 5.1 | 0.7 | 6.8 | | 12.6 | 1.2 | 33.9 | 3.9 | | 39 | 0.9 | 1.2 | 0.5 | | 2.6 | 5.9 | 94.1 | |

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 01:00 PM | | | | | | | | | | | | | | | | | |
| 01:00 PM | 42 | 283 | 7 | 332 | 34 | **13** | 40 | 87 | 12 | 232 | 25 | 269 | 4 | 9 | 2 | 15 | 703 |
| 01:15 PM | 43 | 280 | 10 | 333 | **38** | 7 | **49** | **94** | 11 | 261 | 17 | 289 | **7** | 7 | 3 | 17 | 733 |
| 01:30 PM | 49 | 274 | **11** | 334 | 34 | 6 | 34 | 74 | **14** | 269 | 20 | 303 | 5 | 12 | **4** | **21** | 732 |
| 01:45 PM | **52** | **328** | 8 | **388** | 35 | 2 | 34 | 71 | 11 | **300** | **32** | **343** | 3 | **14** | 2 | 19 | **821** |
| Total Volume | 186 | 1165 | 36 | 1387 | 141 | 28 | 157 | 326 | 48 | 1062 | 94 | 1204 | 19 | 42 | 11 | 72 | 2989 |
| % App. Total | 13.4 | 84 | 2.6 | | 43.3 | 8.6 | 48.2 | | 4 | 88.2 | 7.8 | | 26.4 | 58.3 | 15.3 | | |
| PHF | .894 | .888 | .818 | .894 | .928 | .538 | .801 | .867 | .857 | .885 | .734 | .878 | .679 | .750 | .688 | .857 | .910 |

Counts Unlimited
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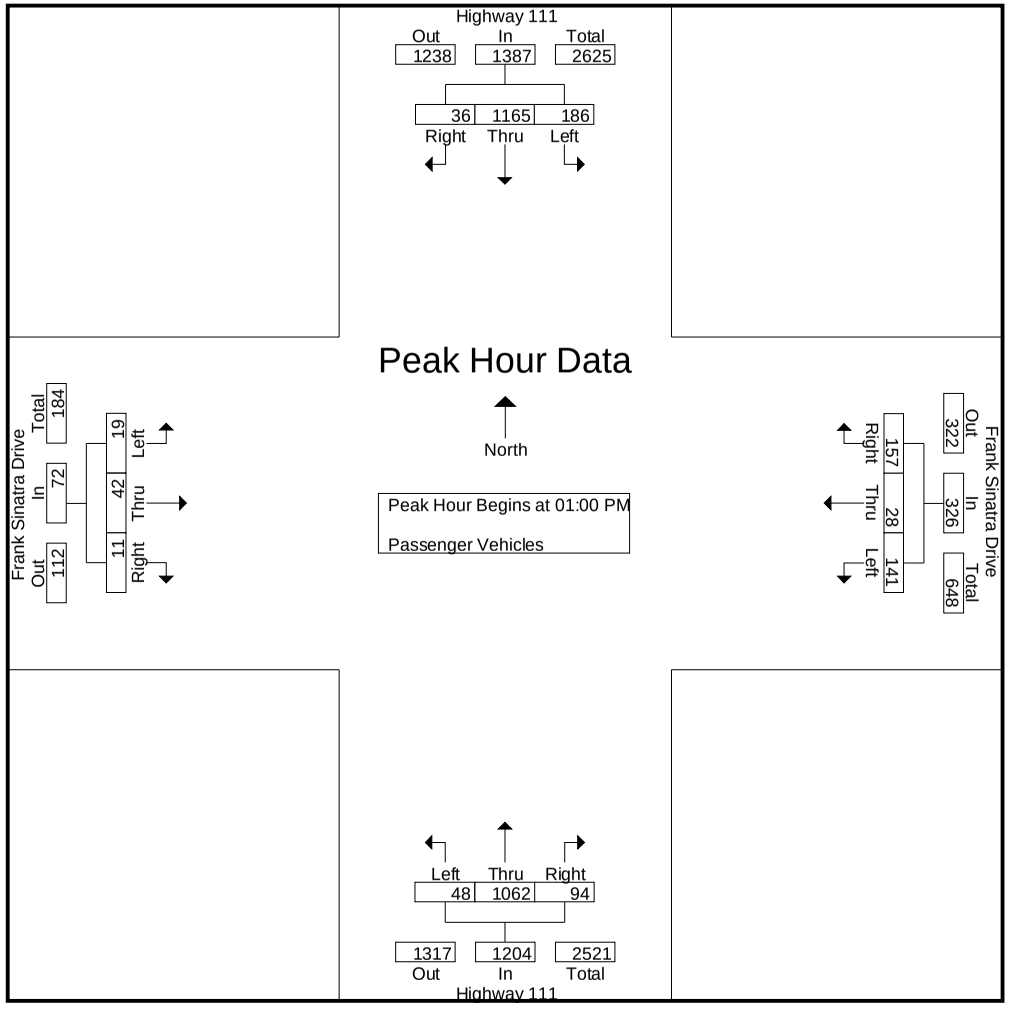
City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 2



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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019


| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 01:00 PM | | | | 01:00 PM | | | | 01:00 PM | | | | 01:00 PM | | | | |
| +0 mins. | 42 | 283 | 7 | 332 | 34 | **13** | 40 | 87 | 12 | 232 | 25 | 269 | 4 | 9 | 2 | 15 | |
| +15 mins. | 43 | 280 | 10 | 333 | **38** | 7 | **49** | **94** | 11 | 261 | 17 | 289 | **7** | 7 | 3 | 17 | |
| +30 mins. | 49 | 274 | **11** | 334 | 34 | 6 | 34 | 74 | **14** | 269 | 20 | 303 | 5 | 12 | **4** | **21** | |
| +45 mins. | **52** | **328** | 8 | **388** | 35 | 2 | 34 | 71 | 11 | **300** | **32** | **343** | 3 | **14** | 2 | 19 | |
| Total Volume | 186 | 1165 | 36 | 1387 | 141 | 28 | 157 | 326 | 48 | 1062 | 94 | 1204 | 19 | 42 | 11 | 72 | |
| % App. Total | 13.4 | 84 | 2.6 | | 43.3 | 8.6 | 48.2 | | 4 | 88.2 | 7.8 | | 26.4 | 58.3 | 15.3 | | |
| PHF | .894 | .888 | .818 | .894 | .928 | .538 | .801 | .867 | .857 | .885 | .734 | .878 | .679 | .750 | .688 | .857 | |

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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 10:00 AM | 1 | 12 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 3 | 0 | 18 | 18 |
| 10:15 AM | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| 10:30 AM | 0 | 3 | 1 | 1 | 4 | 2 | 0 | 1 | 0 | 3 | 0 | 2 | 1 | 0 | 3 | 0 | 1 | 1 | 0 | 2 | 1 | 12 | 13 |
| 10:45 AM | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| Total | 1 | 21 | 1 | 1 | 23 | 2 | 1 | 1 | 0 | 4 | 0 | 7 | 1 | 0 | 8 | 1 | 2 | 2 | 0 | 5 | 1 | 40 | 41 |
| 11:00 AM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 11:15 AM | 2 | 1 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 |
| 11:30 AM | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 |
| 11:45 AM | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 6 |
| Total | 2 | 8 | 0 | 0 | 10 | 2 | 0 | 1 | 1 | 3 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 17 | 18 |
| 12:00 PM | 0 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 8 |
| 12:15 PM | 1 | 0 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 7 |
| 12:30 PM | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 5 | 1 | 0 | 0 | 0 | 1 | 0 | 9 | 9 |
| 12:45 PM | 1 | 3 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 9 | 9 |
| Total | 2 | 9 | 1 | 1 | 12 | 0 | 2 | 2 | 1 | 4 | 0 | 11 | 2 | 0 | 13 | 1 | 1 | 0 | 0 | 2 | 2 | 31 | 33 |
| 01:00 PM | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 7 |
| 01:15 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 7 |
| 01:30 PM | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 |
| 01:45 PM | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 3 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 8 |
| Total | 2 | 6 | 0 | 0 | 8 | 0 | 0 | 2 | 2 | 2 | 0 | 15 | 1 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 2 | 26 | 28 |
| Grand Total | 7 | 44 | 2 | 2 | 53 | 4 | 3 | 6 | 4 | 13 | 0 | 37 | 4 | 0 | 41 | 2 | 3 | 2 | 0 | 7 | 6 | 114 | 120 |
| Apprch % | 13.2 | 83 | 3.8 | | | 30.8 | 23.1 | 46.2 | | | 0 | 90.2 | 9.8 | | | 28.6 | 42.9 | 28.6 | | | | | |
| Total % | 6.1 | 38.6 | 1.8 | | 46.5 | 3.5 | 2.6 | 5.3 | | 11.4 | 0 | 32.5 | 3.5 | | 36 | 1.8 | 2.6 | 1.8 | | 6.1 | 5 | 95 | |



| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 01:00 PM | | | | | | | | | | | | | | | | | |
| 01:00 PM | **1** | **2** | 0 | **3** | 0 | 0 | 0 | 0 | 0 | **4** | 0 | **4** | 0 | 0 | 0 | 0 | **7** |
| 01:15 PM | 0 | 1 | 0 | 1 | 0 | 0 | **1** | **1** | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 6 |
| 01:30 PM | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 6 |
| 01:45 PM | 0 | 2 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 3 | **1** | 4 | 0 | 0 | 0 | 0 | 7 |
| Total Volume | 2 | 6 | 0 | 8 | 0 | 0 | 2 | 2 | 0 | 15 | 1 | 16 | 0 | 0 | 0 | 0 | 26 |
| % App. Total | 25 | 75 | 0 | | 0 | 0 | 100 | | 0 | 93.8 | 6.2 | | 0 | 0 | 0 | | |
| PHF | .500 | .750 | .000 | .667 | .000 | .000 | .500 | .500 | .000 | .938 | .250 | 1.00 | .000 | .000 | .000 | .000 | .929 |

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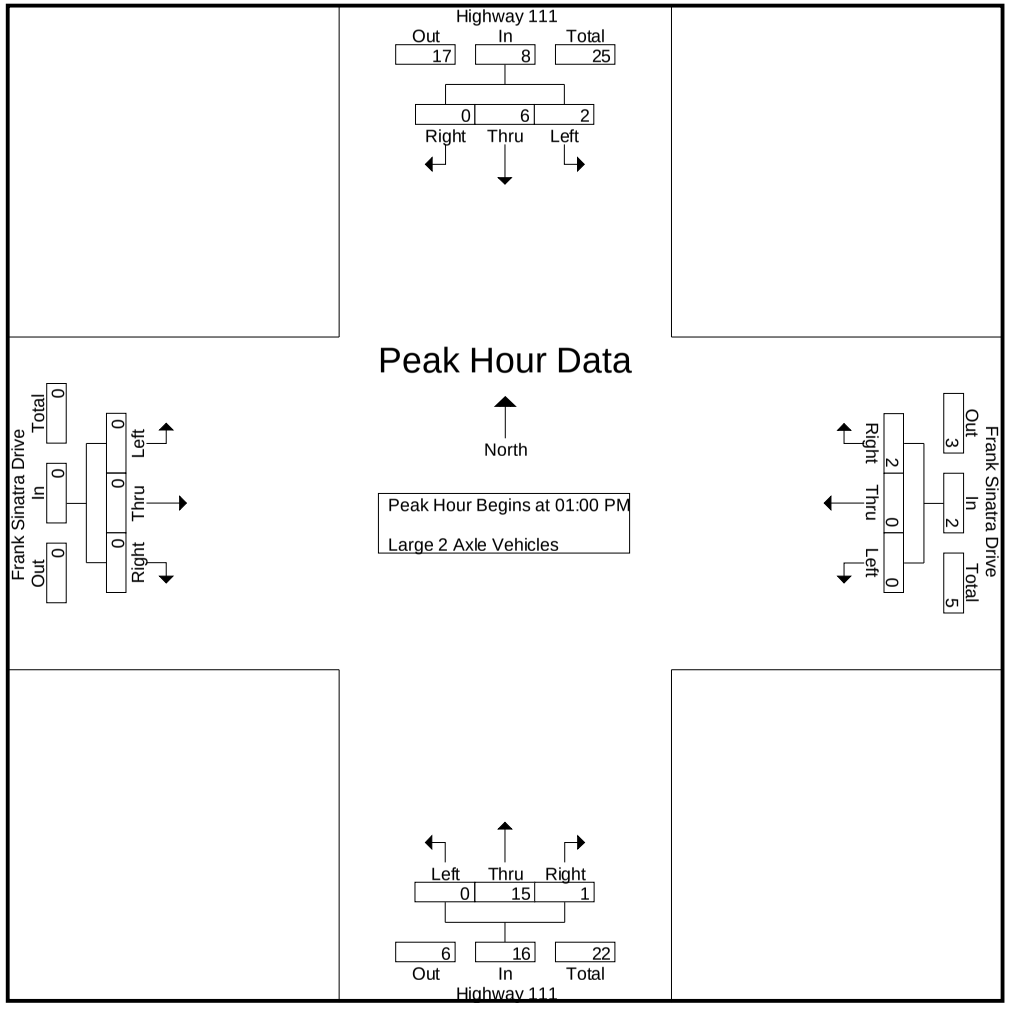
City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 2



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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 01:00 PM | | | | 01:00 PM | | | | 01:00 PM | | | | 01:00 PM | | | | |
| +0 mins. | **1** | **2** | 0 | **3** | 0 | 0 | 0 | 0 | 0 | **4** | 0 | **4** | 0 | 0 | 0 | 0 | |
| +15 mins. | 0 | 1 | 0 | 1 | 0 | 0 | **1** | **1** | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | |
| +30 mins. | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | |
| +45 mins. | 0 | 2 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 3 | **1** | 4 | 0 | 0 | 0 | 0 | |
| Total Volume | 2 | 6 | 0 | 8 | 0 | 0 | 2 | 2 | 0 | 15 | 1 | 16 | 0 | 0 | 0 | 0 | |
| % App. Total | 25 | 75 | 0 | | 0 | 0 | 100 | | 0 | 93.8 | 6.2 | | 0 | 0 | 0 | | |
| PHF | .500 | .750 | .000 | .667 | .000 | .000 | .500 | .500 | .000 | .938 | .250 | 1.000 | .000 | .000 | .000 | .000 | |

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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 10:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 10:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 11:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 11:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 12:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 12:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 01:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| 01:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| Grand Total | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 2 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 7 |
| Apprch % | 0 | 100 | 0 | | | 0 | 0 | 100 | | | 0 | 100 | 0 | | | 0 | 0 | 0 | | | | | |
| Total % | 0 | 16.7 | 0 | | 16.7 | 0 | 0 | 33.3 | | 33.3 | 0 | 50 | 0 | | 50 | 0 | 0 | 0 | | 0 | 14.3 | 85.7 | |



| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 01:00 PM | | | | | | | | | | | | | | | | | |
| 01:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 01:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| % App. Total | 0 | 0 | 0 | | 0 | 0 | 100 | | 0 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .250 | .250 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .250 |

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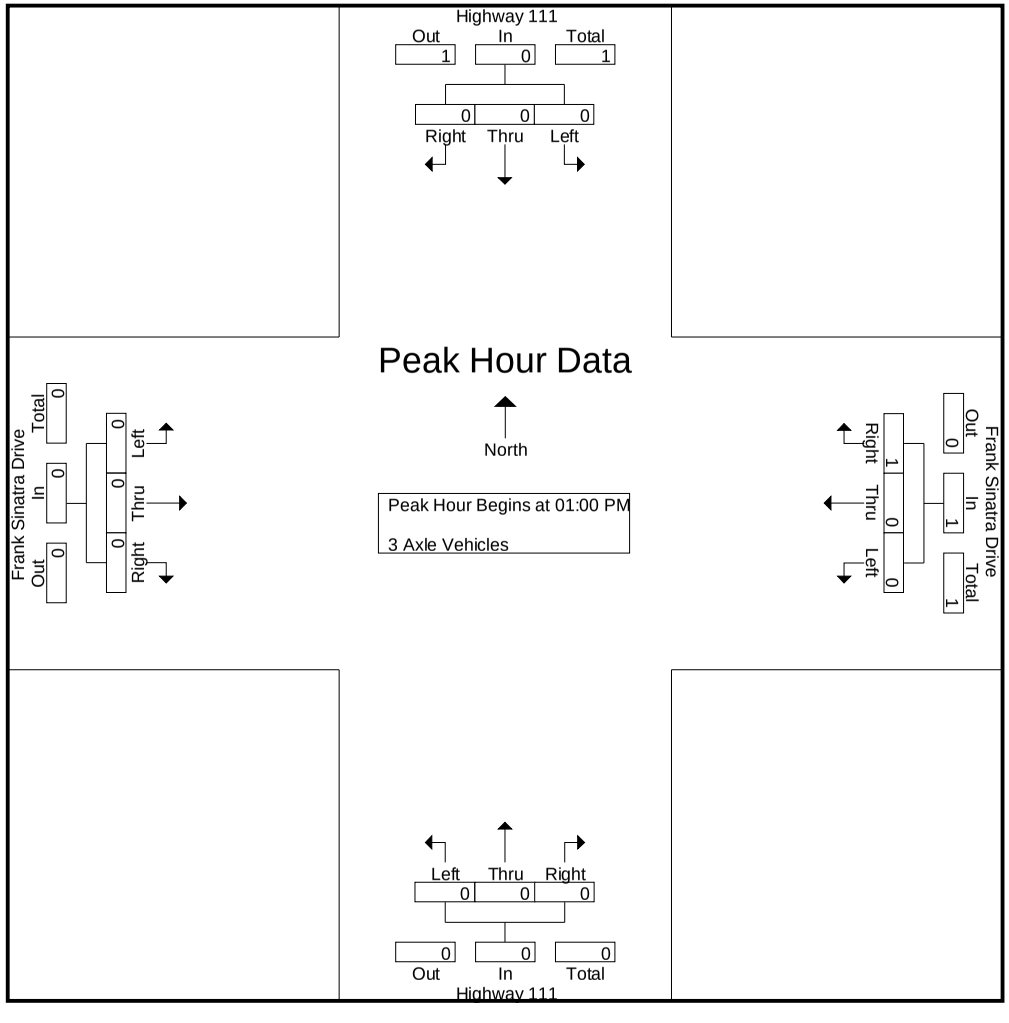
City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 2



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City of Rancho Mirage
N/S: Highway 111
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Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 01:00 PM | | | | 01:00 PM | | | | 01:00 PM | | | | 01:00 PM | | | | |
| +0 mins. | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +15 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +30 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +45 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| % App. Total | 0 | 0 | 0 | | 0 | 0 | 100 | | 0 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .250 | .250 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | |

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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

| | Highway 111 Southbound | | | | | Frank Sinatra Drive Westbound | | | | | Highway 111 Northbound | | | | | Frank Sinatra Drive Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 10:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 10:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 10:45 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 11:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 11:15 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 11:30 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 11:45 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 7 |
| 12:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 12:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 12:45 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Total | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| 01:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Grand Total | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 16 |
| Apprch % | 0 | 100 | 0 | | | 0 | 0 | 0 | | | 0 | 100 | 0 | | | 0 | 0 | 0 | | | | | |
| Total % | 0 | 37.5 | 0 | | 37.5 | 0 | 0 | 0 | | 0 | 0 | 62.5 | 0 | | 62.5 | 0 | 0 | 0 | | 0 | 0 | 100 | |

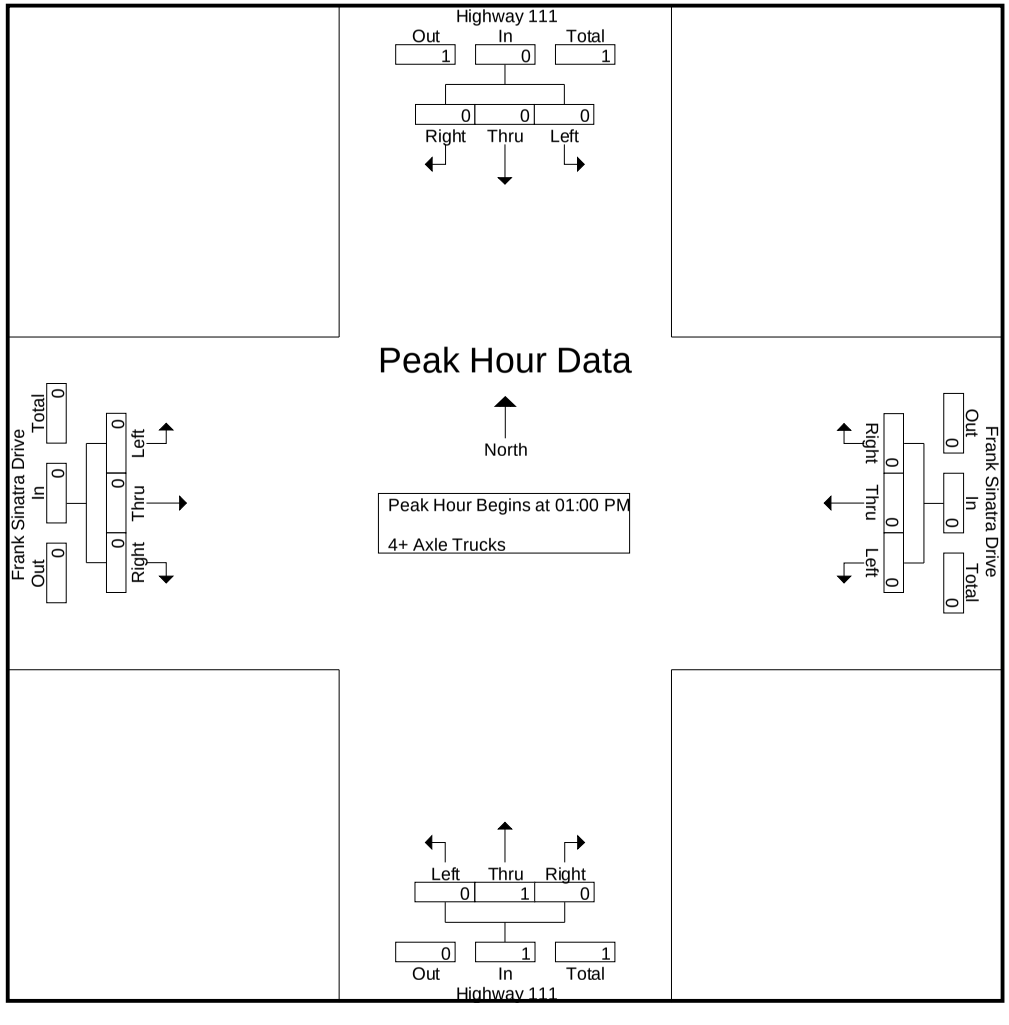


| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 01:00 PM | | | | | | | | | | | | | | | | | |
| 01:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | **1** |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| % App. Total | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .250 | .000 | .250 | .000 | .000 | .000 | .000 | .250 |

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 2



Counts Unlimited
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City of Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive
Weather: Clear

File Name : 02_RNM_Hwy 111_Frank Sinatra SAT
Site Code : 05119831
Start Date : 12/7/2019
Page No : 3

| | Highway 111 Southbound | | | | Frank Sinatra Drive Westbound | | | | Highway 111 Northbound | | | | Frank Sinatra Drive Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Each Approach Begins at: | | | | | | | | | | | | | | | | | |
| | 01:00 PM | | | | 01:00 PM | | | | 01:00 PM | | | | 01:00 PM | | | | |
| +0 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +15 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +30 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| +45 mins. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | |
| % App. Total | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 100 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .250 | .000 | .250 | .000 | .000 | .000 | .000 | |

Location: Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive

**PEDESTRIANS**

Date: 12/11/2019
Day: Wednesday

| | North Leg Highway 111 | East Leg Frank Sinatra Drive | South Leg Highway 111 | West Leg Frank Sinatra Drive | |
|---|---|---|---|---|---|
| | Pedestrians | Pedestrians | Pedestrians | Pedestrians | |
| 7:00 AM | 0 | 4 | 4 | 0 | 8 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 1 | 2 | 0 | 3 |
| 7:45 AM | 0 | 3 | 3 | 0 | 6 |
| 8:00 AM | 0 | 2 | 0 | 0 | 2 |
| 8:15 AM | 0 | 2 | 0 | 0 | 2 |
| 8:30 AM | 0 | 2 | 1 | 0 | 3 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 |
| TOTAL VOLUMES: | 0 | 14 | 10 | 0 | 24 |

Date: 12/11/2019
Day: Wednesday

| | North Leg Highway 111 | East Leg Frank Sinatra Drive | South Leg Highway 111 | West Leg Frank Sinatra Drive | |
|---|---|---|---|---|---|
| | Pedestrians | Pedestrians | Pedestrians | Pedestrians | |
| 4:00 PM | 0 | 0 | 1 | 0 | 1 |
| 4:15 PM | 0 | 0 | 1 | 0 | 1 |
| 4:30 PM | 0 | 1 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 1 | 0 | 1 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 |
| TOTAL VOLUMES: | 0 | 1 | 3 | 0 | 4 |

Date: 12/7/2019
Day: Saturday

| | North Leg Highway 111 | East Leg Frank Sinatra Drive | South Leg Highway 111 | West Leg Frank Sinatra Drive | |
|---|---|---|---|---|---|
| | Pedestrians | Pedestrians | Pedestrians | Pedestrians | |
| 10:00 AM | 0 | 0 | 0 | 0 | 0 |
| 10:15 AM | 0 | 0 | 4 | 0 | 4 |
| 10:30 AM | 0 | 0 | 0 | 0 | 0 |
| 10:45 AM | 0 | 0 | 0 | 0 | 0 |
| 11:00 AM | 0 | 3 | 3 | 0 | 6 |
| 11:15 AM | 0 | 4 | 4 | 0 | 8 |
| 11:30 AM | 0 | 1 | 1 | 0 | 2 |
| 11:45 AM | 0 | 0 | 0 | 0 | 0 |
| 12:00 PM | 0 | 0 | 5 | 0 | 5 |
| 12:15 PM | 0 | 0 | 0 | 0 | 0 |
| 12:30 PM | 0 | 0 | 0 | 0 | 0 |
| 12:45 PM | 0 | 2 | 2 | 0 | 4 |
| 1:00 PM | 0 | 0 | 0 | 0 | 0 |
| 1:15 PM | 0 | 0 | 0 | 0 | 0 |
| 1:30 PM | 0 | 0 | 0 | 0 | 0 |
| 1:45 PM | 3 | 0 | 0 | 3 | 6 |
| TOTAL VOLUMES: | 3 | 10 | 19 | 3 | 35 |

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Corona, CA 92878
951-268-6268

Location: Rancho Mirage
N/S: Highway 111
E/W: Frank Sinatra Drive

**BICYCLES**

Date: 12/11/2019
Day: Wednesday

| | Southbound Highway 111 | | | Westbound Frank Sinatra Drive | | | Northbound Highway 111 | | | Eastbound Frank Sinatra Drive | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL VOLUMES: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |

Date: 12/11/2019
Day: Wednesday

| | Southbound Highway 111 | | | Westbound Frank Sinatra Drive | | | Northbound Highway 111 | | | Eastbound Frank Sinatra Drive | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 4:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 4:30 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL VOLUMES: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |

Date: 12/7/2019
Day: Saturday

| | Southbound Highway 111 | | | Westbound Frank Sinatra Drive | | | Northbound Highway 111 | | | Eastbound Frank Sinatra Drive | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| 10:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:45 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 12:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 12:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 1:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL VOLUMES: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |

Counts Unlimited, Inc.
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951-268-6268

# Counts Unlimited, Inc.

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Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Rancho Mirage
Frank Sinatra Drive
W/ Highway 111
24 Hour Directional Volume Count

RNMFSW111
Site Code: 051-19831

| Start Time | 12/7/2019 Sat | Eastbound Morning | Eastbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Westbound Morning | Westbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Combined Totals Morning | Combined Totals Afternoon |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:00 | | 9 | 16 | | | 4 | 17 | | | | |
| 12:15 | | 7 | 21 | | | 2 | 25 | | | | |
| 12:30 | | 4 | 18 | | | 1 | 17 | | | | |
| 12:45 | | 2 | 19 | 22 | 74 | 2 | 30 | 9 | 89 | 31 | 163 |
| 01:00 | | 1 | 16 | | | 0 | 29 | | | | |
| 01:15 | | 0 | 22 | | | 4 | 27 | | | | |
| 01:30 | | 1 | 24 | | | 0 | 30 | | | | |
| 01:45 | | 2 | 22 | 4 | 84 | 1 | 18 | 5 | 104 | 9 | 188 |
| 02:00 | | 2 | 13 | | | 1 | 25 | | | | |
| 02:15 | | 1 | 18 | | | 0 | 26 | | | | |
| 02:30 | | 0 | 14 | | | 1 | 30 | | | | |
| 02:45 | | 1 | 20 | 4 | 65 | 1 | 29 | 3 | 110 | 7 | 175 |
| 03:00 | | 1 | 11 | | | 0 | 28 | | | | |
| 03:15 | | 1 | 16 | | | 1 | 26 | | | | |
| 03:30 | | 0 | **23** | | | 1 | **31** | | | | |
| 03:45 | | 0 | **20** | 2 | 70 | 1 | **28** | 3 | 113 | 5 | 183 |
| 04:00 | | 2 | **16** | | | 1 | **30** | | | | |
| 04:15 | | 0 | **28** | | | 0 | **32** | | | | |
| 04:30 | | 1 | 18 | | | 0 | 19 | | | | |
| 04:45 | | 2 | 10 | 5 | 72 | 6 | 24 | 7 | 105 | 12 | 177 |
| 05:00 | | 6 | 24 | | | 2 | 22 | | | | |
| 05:15 | | 4 | 24 | | | 3 | 16 | | | | |
| 05:30 | | 0 | 18 | | | 7 | 15 | | | | |
| 05:45 | | 4 | 20 | 14 | 86 | 10 | 10 | 22 | 63 | 36 | 149 |
| 06:00 | | 2 | 18 | | | 7 | 14 | | | | |
| 06:15 | | 5 | 18 | | | 7 | 13 | | | | |
| 06:30 | | 2 | 19 | | | 8 | 18 | | | | |
| 06:45 | | 8 | 16 | 17 | 71 | 21 | 13 | 43 | 58 | 60 | 129 |
| 07:00 | | 12 | 15 | | | 15 | 10 | | | | |
| 07:15 | | 7 | 13 | | | 13 | 9 | | | | |
| 07:30 | | 12 | 16 | | | **16** | 12 | | | | |
| 07:45 | | 19 | 8 | 50 | 52 | **33** | 12 | 77 | 43 | 127 | 95 |
| 08:00 | | 9 | 12 | | | **17** | 8 | | | | |
| 08:15 | | 16 | 9 | | | **20** | 10 | | | | |
| 08:30 | | 14 | 11 | | | 7 | 8 | | | | |
| 08:45 | | 16 | 20 | 55 | 52 | 20 | 20 | 64 | 46 | 119 | 98 |
| 09:00 | | **26** | 15 | | | 20 | 12 | | | | |
| 09:15 | | **16** | 3 | | | 17 | 14 | | | | |
| 09:30 | | **16** | 13 | | | 10 | 8 | | | | |
| 09:45 | | **22** | 8 | 80 | 39 | 21 | 6 | 68 | 40 | 148 | 79 |
| 10:00 | | 17 | 16 | | | 8 | 13 | | | | |
| 10:15 | | 20 | 17 | | | 10 | 12 | | | | |
| 10:30 | | 16 | 16 | | | 12 | 7 | | | | |
| 10:45 | | 19 | 20 | 72 | 69 | 14 | 11 | 44 | 43 | 116 | 112 |
| 11:00 | | 20 | 8 | | | 12 | 5 | | | | |
| 11:15 | | 20 | 11 | | | 23 | 5 | | | | |
| 11:30 | | 16 | 16 | | | 20 | 4 | | | | |
| 11:45 | | 13 | 2 | 69 | 37 | 22 | 2 | 77 | 16 | 146 | 53 |
| Total | | 394 | 771 | 394 | 771 | 422 | 830 | 422 | 830 | 816 | 1601 |
| Combined Total | | 1165 | | 1165 | | 1252 | | 1252 | | 2417 | |
| AM Peak | - | 09:00 | - | - | - | 07:30 | - | - | - | - | - |
| Vol. | - | 80 | - | - | - | 86 | - | - | - | - | - |
| P.H.F. | | 0.769 | | | | 0.652 | | | | | |
| PM Peak | - | - | 03:30 | - | - | - | 03:30 | - | - | - | - |
| Vol. | - | - | 87 | - | - | - | 121 | - | - | - | - |
| P.H.F. | | | 0.777 | | | | 0.945 | | | | |
| Percentage | | 33.8% | 66.2% | | | 33.7% | 66.3% | | | | |

# Counts Unlimited, Inc.

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Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Rancho Mirage
Frank Sinatra Drive
W/ Highway 111
24 Hour Directional Volume Count

RNMFSW111
Site Code: 051-19831

| Start Time | 12/8/2019 Sun | Eastbound Morning | Eastbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Westbound Morning | Westbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Combined Totals Morning | Combined Totals Afternoon |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:00 | | 3 | **24** | | | 2 | 14 | | | | |
| 12:15 | | 3 | **21** | | | 3 | 5 | | | | |
| 12:30 | | 6 | **15** | | | 0 | 14 | | | | |
| 12:45 | | 6 | **18** | 18 | 78 | 0 | 20 | 5 | 53 | 23 | 131 |
| 01:00 | | 0 | 24 | | | 2 | 20 | | | | |
| 01:15 | | 3 | 15 | | | 1 | 10 | | | | |
| 01:30 | | 1 | 11 | | | 0 | 20 | | | | |
| 01:45 | | 2 | 18 | 6 | 68 | 0 | 21 | 3 | 71 | 9 | 139 |
| 02:00 | | 1 | 12 | | | 0 | 9 | | | | |
| 02:15 | | 0 | 17 | | | 0 | 16 | | | | |
| 02:30 | | 0 | 16 | | | 1 | 22 | | | | |
| 02:45 | | 2 | 18 | 3 | 63 | 1 | 23 | 2 | 70 | 5 | 133 |
| 03:00 | | 1 | 22 | | | 1 | **28** | | | | |
| 03:15 | | 0 | 16 | | | 0 | **16** | | | | |
| 03:30 | | 0 | 15 | | | 0 | **34** | | | | |
| 03:45 | | 1 | 21 | 2 | 74 | 3 | **36** | 4 | 114 | 6 | 188 |
| 04:00 | | 4 | 9 | | | 2 | 10 | | | | |
| 04:15 | | 1 | 14 | | | 2 | 16 | | | | |
| 04:30 | | 3 | 18 | | | 0 | 19 | | | | |
| 04:45 | | 2 | 10 | 10 | 51 | 6 | 12 | 10 | 57 | 20 | 108 |
| 05:00 | | 4 | 13 | | | 5 | 7 | | | | |
| 05:15 | | 5 | 12 | | | 1 | 9 | | | | |
| 05:30 | | 4 | 14 | | | 6 | 10 | | | | |
| 05:45 | | 5 | 19 | 18 | 58 | 8 | 11 | 20 | 37 | 38 | 95 |
| 06:00 | | 2 | 17 | | | 3 | 6 | | | | |
| 06:15 | | 1 | 17 | | | 5 | 10 | | | | |
| 06:30 | | 4 | 11 | | | 6 | 8 | | | | |
| 06:45 | | 7 | 20 | 14 | 65 | 16 | 11 | 30 | 35 | 44 | 100 |
| 07:00 | | 3 | 21 | | | 9 | 6 | | | | |
| 07:15 | | 2 | 8 | | | 7 | 7 | | | | |
| 07:30 | | 16 | 6 | | | **18** | 3 | | | | |
| 07:45 | | 14 | 5 | 35 | 40 | **22** | 12 | 56 | 28 | 91 | 68 |
| 08:00 | | 12 | 12 | | | **21** | 7 | | | | |
| 08:15 | | 18 | 6 | | | **20** | 5 | | | | |
| 08:30 | | 10 | 3 | | | 12 | 4 | | | | |
| 08:45 | | 9 | 6 | 49 | 27 | 20 | 5 | 73 | 21 | 122 | 48 |
| 09:00 | | 16 | 12 | | | 7 | 8 | | | | |
| 09:15 | | 14 | 7 | | | 12 | 14 | | | | |
| 09:30 | | 18 | 14 | | | 18 | 15 | | | | |
| 09:45 | | 24 | 10 | 72 | 43 | 18 | 6 | 55 | 43 | 127 | 86 |
| 10:00 | | 22 | 13 | | | 8 | 8 | | | | |
| 10:15 | | **20** | 3 | | | 12 | 7 | | | | |
| 10:30 | | **21** | 10 | | | 10 | 2 | | | | |
| 10:45 | | **25** | 10 | 88 | 36 | 17 | 4 | 47 | 21 | 135 | 57 |
| 11:00 | | **24** | 10 | | | 8 | 5 | | | | |
| 11:15 | | 16 | 8 | | | 11 | 1 | | | | |
| 11:30 | | 24 | 5 | | | 12 | 1 | | | | |
| 11:45 | | 16 | 1 | 80 | 24 | 7 | 0 | 38 | 7 | 118 | 31 |
| Total | | 395 | 627 | 395 | 627 | 343 | 557 | 343 | 557 | 738 | 1184 |
| Combined Total | | 1022 | | 1022 | | 900 | | 900 | | 1922 | |
| AM Peak | - | 10:15 | - | - | - | 07:30 | - | - | - | - | - |
| Vol. | - | 90 | - | - | - | 81 | - | - | - | - | - |
| P.H.F. | | 0.900 | | | | 0.920 | | | | | |
| PM Peak | - | - | 12:00 | - | - | - | 03:00 | - | - | - | - |
| Vol. | - | - | 78 | - | - | - | 114 | - | - | - | - |
| P.H.F. | | | 0.813 | | | | 0.792 | | | | |
| Percentage | | 38.6% | 61.4% | | | 38.1% | 61.9% | | | | |

# Counts Unlimited, Inc.

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Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Rancho Mirage
Frank Sinatra Drive
W/ Highway 111
24 Hour Directional Volume Count

RNMFSW111
Site Code: 051-19831

| Start Time | 12/9/2019 Mon | Eastbound Morning | Eastbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Westbound Morning | Westbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Combined Totals Morning | Combined Totals Afternoon |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:00 | | 1 | 24 | | | 0 | 26 | | | | |
| 12:15 | | 1 | 18 | | | 1 | 12 | | | | |
| 12:30 | | 2 | 22 | | | 1 | 19 | | | | |
| 12:45 | | 0 | 27 | 4 | 91 | 0 | 22 | 2 | 79 | 6 | 170 |
| 01:00 | | 1 | 16 | | | 2 | 12 | | | | |
| 01:15 | | 1 | 14 | | | 1 | 24 | | | | |
| 01:30 | | 2 | 24 | | | 0 | 35 | | | | |
| 01:45 | | 1 | 19 | 5 | 73 | 0 | 16 | 3 | 87 | 8 | 160 |
| 02:00 | | 0 | 18 | | | 0 | 26 | | | | |
| 02:15 | | 0 | 20 | | | 0 | 28 | | | | |
| 02:30 | | 0 | 22 | | | 0 | 28 | | | | |
| 02:45 | | 2 | 15 | 2 | 75 | 2 | 30 | 2 | 112 | 4 | 187 |
| 03:00 | | 1 | 44 | | | 1 | 37 | | | | |
| 03:15 | | 0 | 30 | | | 1 | 34 | | | | |
| 03:30 | | 2 | 25 | | | 2 | 22 | | | | |
| 03:45 | | 4 | 25 | 7 | 124 | 4 | 38 | 8 | 131 | 15 | 255 |
| 04:00 | | 1 | 34 | | | 3 | 33 | | | | |
| 04:15 | | 1 | 24 | | | 2 | 22 | | | | |
| 04:30 | | 1 | 18 | | | 1 | 28 | | | | |
| 04:45 | | 4 | 12 | 7 | 88 | 11 | 21 | 17 | 104 | 24 | 192 |
| 05:00 | | 5 | 35 | | | 5 | 28 | | | | |
| 05:15 | | 4 | 24 | | | 2 | 22 | | | | |
| 05:30 | | 8 | 16 | | | 10 | 23 | | | | |
| 05:45 | | 6 | 16 | 23 | 91 | 16 | 20 | 33 | 93 | 56 | 184 |
| 06:00 | | 6 | 16 | | | 9 | **39** | | | | |
| 06:15 | | 4 | 20 | | | 4 | **52** | | | | |
| 06:30 | | 8 | 18 | | | 13 | **38** | | | | |
| 06:45 | | 13 | 8 | 31 | 62 | 30 | **28** | 56 | 157 | 87 | 219 |
| 07:00 | | 14 | 12 | | | 20 | 19 | | | | |
| 07:15 | | 14 | 4 | | | 14 | 19 | | | | |
| 07:30 | | 12 | 6 | | | 12 | 12 | | | | |
| 07:45 | | 16 | 8 | 56 | 30 | **34** | 11 | 80 | 61 | 136 | 91 |
| 08:00 | | 12 | 6 | | | **28** | 8 | | | | |
| 08:15 | | 18 | 8 | | | **18** | 4 | | | | |
| 08:30 | | 12 | 9 | | | **30** | 10 | | | | |
| 08:45 | | 14 | 13 | 56 | 36 | 11 | 4 | 87 | 26 | 143 | 62 |
| 09:00 | | 26 | 30 | | | 13 | 5 | | | | |
| 09:15 | | 20 | 38 | | | 24 | 16 | | | | |
| 09:30 | | 14 | **27** | | | 18 | 13 | | | | |
| 09:45 | | 20 | **36** | 80 | 131 | 22 | 10 | 77 | 44 | 157 | 175 |
| 10:00 | | 21 | **50** | | | 21 | 21 | | | | |
| 10:15 | | 21 | **42** | | | 22 | 8 | | | | |
| 10:30 | | 14 | 19 | | | 20 | 4 | | | | |
| 10:45 | | 23 | 13 | 79 | 124 | 29 | 2 | 92 | 35 | 171 | 159 |
| 11:00 | | **26** | 7 | | | 18 | 4 | | | | |
| 11:15 | | **24** | 7 | | | 28 | 1 | | | | |
| 11:30 | | **30** | 6 | | | 22 | 1 | | | | |
| 11:45 | | **28** | 3 | 108 | 23 | 34 | 0 | 102 | 6 | 210 | 29 |
| Total | | 458 | 948 | 458 | 948 | 559 | 935 | 559 | 935 | 1017 | 1883 |
| Combined Total | | 1406 | | 1406 | | 1494 | | 1494 | | 2900 | |
| AM Peak | - | 11:00 | - | - | - | 07:45 | - | - | - | - | - |
| Vol. | - | 108 | - | - | - | 110 | - | - | - | - | - |
| P.H.F. | | 0.900 | | | | 0.809 | | | | | |
| PM Peak | - | - | 09:30 | - | - | - | 06:00 | - | - | - | - |
| Vol. | - | - | 155 | - | - | - | 157 | - | - | - | - |
| P.H.F. | | | 0.775 | | | | 0.755 | | | | |
| Percentage | | 32.6% | 67.4% | | | 37.4% | 62.6% | | | | |

# Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Rancho Mirage
Frank Sinatra Drive
W/ Highway 111
24 Hour Directional Volume Count

RNMFSW111
Site Code: 051-19831

| Start | 12/10/2019 | Eastbound | | Hour Totals | | Westbound | | Hour Totals | | Combined Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Tue | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon |
| 12:00 | | 0 | 28 | | | 2 | 22 | | | | |
| 12:15 | | 2 | 36 | | | 0 | 26 | | | | |
| 12:30 | | 2 | 30 | | | 1 | 24 | | | | |
| 12:45 | | 0 | 28 | 4 | 122 | 0 | 36 | 3 | 108 | 7 | 230 |
| 01:00 | | 1 | 20 | | | 1 | 22 | | | | |
| 01:15 | | 0 | 24 | | | 0 | 18 | | | | |
| 01:30 | | 3 | 28 | | | 0 | 26 | | | | |
| 01:45 | | 2 | 30 | 6 | 102 | 0 | **41** | 1 | 107 | 7 | 209 |
| 02:00 | | 1 | 18 | | | 1 | **29** | | | | |
| 02:15 | | 1 | 32 | | | 0 | **30** | | | | |
| 02:30 | | 0 | **34** | | | 0 | **42** | | | | |
| 02:45 | | 0 | **31** | 2 | 115 | 0 | 30 | 1 | 131 | 3 | 246 |
| 03:00 | | 1 | **23** | | | 2 | 16 | | | | |
| 03:15 | | 1 | **36** | | | 2 | 31 | | | | |
| 03:30 | | 1 | 31 | | | 2 | 24 | | | | |
| 03:45 | | 3 | 20 | 6 | 110 | 2 | 26 | 8 | 97 | 14 | 207 |
| 04:00 | | 0 | 18 | | | 1 | 18 | | | | |
| 04:15 | | 2 | 26 | | | 2 | 36 | | | | |
| 04:30 | | 1 | 19 | | | 3 | 11 | | | | |
| 04:45 | | 3 | 20 | 6 | 83 | 8 | 15 | 14 | 80 | 20 | 163 |
| 05:00 | | 8 | 42 | | | 4 | 26 | | | | |
| 05:15 | | 2 | 34 | | | 7 | 22 | | | | |
| 05:30 | | 1 | 20 | | | 5 | 16 | | | | |
| 05:45 | | 7 | 14 | 18 | 110 | 18 | 15 | 34 | 79 | 52 | 189 |
| 06:00 | | 6 | 18 | | | 6 | 18 | | | | |
| 06:15 | | 4 | 16 | | | 5 | 10 | | | | |
| 06:30 | | 6 | 12 | | | 14 | 9 | | | | |
| 06:45 | | 12 | 16 | 28 | 62 | 26 | 4 | 51 | 41 | 79 | 103 |
| 07:00 | | 18 | 4 | | | 32 | 6 | | | | |
| 07:15 | | 20 | 18 | | | 26 | 9 | | | | |
| 07:30 | | 26 | 8 | | | 24 | 12 | | | | |
| 07:45 | | 18 | 3 | 82 | 33 | **35** | 9 | 117 | 36 | 199 | 69 |
| 08:00 | | 17 | 4 | | | **42** | 2 | | | | |
| 08:15 | | 18 | 16 | | | **38** | 12 | | | | |
| 08:30 | | 22 | 14 | | | **28** | 6 | | | | |
| 08:45 | | 23 | 7 | 80 | 41 | 32 | 10 | 140 | 30 | 220 | 71 |
| 09:00 | | 17 | 6 | | | 29 | 10 | | | | |
| 09:15 | | 22 | 12 | | | 22 | 14 | | | | |
| 09:30 | | 30 | 10 | | | 34 | 5 | | | | |
| 09:45 | | 23 | 10 | 92 | 38 | 42 | 12 | 127 | 41 | 219 | 79 |
| 10:00 | | 27 | 8 | | | 43 | 6 | | | | |
| 10:15 | | 23 | 8 | | | 18 | 14 | | | | |
| 10:30 | | 28 | 6 | | | 32 | 1 | | | | |
| 10:45 | | 17 | 3 | 95 | 25 | 18 | 4 | 111 | 25 | 206 | 50 |
| 11:00 | | **21** | 7 | | | 28 | 1 | | | | |
| 11:15 | | **24** | 7 | | | 20 | 2 | | | | |
| 11:30 | | **44** | 3 | | | 21 | 3 | | | | |
| 11:45 | | **46** | 4 | 135 | 21 | 45 | 1 | 114 | 7 | 249 | 28 |
| Total | | 554 | 862 | 554 | 862 | 721 | 782 | 721 | 782 | 1275 | 1644 |
| Combined Total | | 1416 | | 1416 | | 1503 | | 1503 | | 2919 | |
| AM Peak | - | 11:00 | - | - | - | 07:45 | - | - | - | - | - |
| Vol. | - | 135 | - | - | - | 143 | - | - | - | - | - |
| P.H.F. | | 0.734 | | | | 0.851 | | | | | |
| PM Peak | - | - | 02:30 | - | - | - | 01:45 | - | - | - | - |
| Vol. | - | - | 124 | - | - | - | 142 | - | - | - | - |
| P.H.F. | | | 0.861 | | | | 0.845 | | | | |
| Percentage | | 39.1% | 60.9% | | | 48.0% | 52.0% | | | | |

# Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Rancho Mirage
Frank Sinatra Drive
W/ Highway 111
24 Hour Directional Volume Count

RNMFSW111
Site Code: 051-19831

| Start Time | 12/11/2019 Wed | Eastbound Morning | Eastbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Westbound Morning | Westbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Combined Totals Morning | Combined Totals Afternoon |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:00 | | 2 | 12 | | | 1 | 15 | | | | |
| 12:15 | | 4 | 20 | | | 4 | 20 | | | | |
| 12:30 | | 4 | 26 | | | 2 | 23 | | | | |
| 12:45 | | 3 | 20 | 13 | 78 | 2 | 21 | 9 | 79 | 22 | 157 |
| 01:00 | | 2 | 42 | | | 1 | 14 | | | | |
| 01:15 | | 0 | 16 | | | 0 | 14 | | | | |
| 01:30 | | 0 | 20 | | | 0 | 19 | | | | |
| 01:45 | | 1 | 16 | 3 | 94 | 0 | 33 | 1 | 80 | 4 | 174 |
| 02:00 | | 6 | 18 | | | 6 | **28** | | | | |
| 02:15 | | 0 | 16 | | | 0 | **26** | | | | |
| 02:30 | | 0 | **36** | | | 0 | **30** | | | | |
| 02:45 | | 0 | **30** | 6 | 100 | 0 | **43** | 6 | 127 | 12 | 227 |
| 03:00 | | 0 | **25** | | | 1 | 14 | | | | |
| 03:15 | | 1 | **30** | | | 3 | 24 | | | | |
| 03:30 | | 2 | 29 | | | 1 | 30 | | | | |
| 03:45 | | 0 | 12 | 3 | 96 | 3 | 25 | 8 | 93 | 11 | 189 |
| 04:00 | | 2 | 22 | | | 0 | 18 | | | | |
| 04:15 | | 0 | 18 | | | 0 | 21 | | | | |
| 04:30 | | 2 | 22 | | | 4 | 20 | | | | |
| 04:45 | | 2 | 22 | 6 | 84 | 4 | 18 | 8 | 77 | 14 | 161 |
| 05:00 | | 5 | 47 | | | 4 | 28 | | | | |
| 05:15 | | 8 | 20 | | | 9 | 18 | | | | |
| 05:30 | | 4 | 17 | | | 15 | 12 | | | | |
| 05:45 | | 2 | 21 | 19 | 105 | 18 | 16 | 46 | 74 | 65 | 179 |
| 06:00 | | 2 | 25 | | | 7 | 10 | | | | |
| 06:15 | | 6 | 14 | | | 5 | 15 | | | | |
| 06:30 | | 4 | 18 | | | 6 | 9 | | | | |
| 06:45 | | 12 | 12 | 24 | 69 | 32 | 8 | 50 | 42 | 74 | 111 |
| 07:00 | | 14 | 10 | | | **29** | 10 | | | | |
| 07:15 | | 15 | 8 | | | **29** | 8 | | | | |
| 07:30 | | 18 | 10 | | | **32** | 10 | | | | |
| 07:45 | | 22 | 10 | 69 | 38 | **46** | 6 | 136 | 34 | 205 | 72 |
| 08:00 | | 15 | 6 | | | 28 | 12 | | | | |
| 08:15 | | 12 | 7 | | | 26 | 14 | | | | |
| 08:30 | | 16 | 6 | | | 19 | 6 | | | | |
| 08:45 | | 20 | 6 | 63 | 25 | 27 | 8 | 100 | 40 | 163 | 65 |
| 09:00 | | 24 | 8 | | | 21 | 9 | | | | |
| 09:15 | | 22 | 7 | | | 18 | 8 | | | | |
| 09:30 | | 22 | 10 | | | 16 | 8 | | | | |
| 09:45 | | 23 | 4 | 91 | 29 | 16 | 4 | 71 | 29 | 162 | 58 |
| 10:00 | | 21 | 8 | | | 12 | 9 | | | | |
| 10:15 | | 22 | 5 | | | 24 | 5 | | | | |
| 10:30 | | 15 | 14 | | | 25 | 6 | | | | |
| 10:45 | | **31** | 6 | 89 | 33 | 28 | 4 | 89 | 24 | 178 | 57 |
| 11:00 | | **24** | 11 | | | 14 | 4 | | | | |
| 11:15 | | **27** | 7 | | | 20 | 4 | | | | |
| 11:30 | | **44** | 0 | | | 34 | 1 | | | | |
| 11:45 | | 26 | 5 | 121 | 23 | 26 | 0 | 94 | 9 | 215 | 32 |
| Total | | 507 | 774 | 507 | 774 | 618 | 708 | 618 | 708 | 1125 | 1482 |
| Combined Total | | 1281 | | 1281 | | 1326 | | 1326 | | 2607 | |
| AM Peak | - | 10:45 | - | - | - | 07:00 | - | - | - | - | - |
| Vol. | - | 126 | - | - | - | 136 | - | - | - | - | - |
| P.H.F. | | 0.716 | | | | 0.739 | | | | | |
| PM Peak | - | - | 02:30 | - | - | - | 02:00 | - | - | - | - |
| Vol. | - | - | 121 | - | - | - | 127 | - | - | - | - |
| P.H.F. | | | 0.720 | | | | 0.738 | | | | |
| Percentage | | 39.6% | 60.4% | | | 46.6% | 53.4% | | | | |
| ADT/AADT | | ADT 2,553 | | AADT 2,553 | | | | | | | |

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# APPENDIX 3.2:

# EXISTING (2019) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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| Intersection | |
|---|---|
| Int Delay, s/veh | 2.9 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 15 | 1 | 17 | 0 | 12 | 36 | 0 |
| Future Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 15 | 1 | 17 | 0 | 12 | 36 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1 | 1 | 0 | 0 | 17 | 1 | 19 | 0 | 13 | 40 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 96 | 87 | 40 | 88 | 87 | 19 | 40 | 0 | 0 | 19 | 0 | 0 |
| Stage 1 | 66 | 66 | - | 21 | 21 | - | - | - | - | - | - | - |
| Stage 2 | 30 | 21 | - | 67 | 66 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 887 | 803 | 1031 | 897 | 803 | 1059 | 1570 | - | - | 1597 | - | - |
| Stage 1 | 945 | 840 | - | 998 | 878 | - | - | - | - | - | - | - |
| Stage 2 | 987 | 878 | - | 943 | 840 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 867 | 796 | 1031 | 889 | 796 | 1059 | 1570 | - | - | 1597 | - | - |
| Mov Cap-2 Maneuver | 867 | 796 | - | 889 | 796 | - | - | - | - | - | - | - |
| Stage 1 | 944 | 833 | - | 997 | 877 | - | - | - | - | - | - | - |
| Stage 2 | 971 | 877 | - | 933 | 833 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 9 | 8.5 | 0.4 | 1.8 |
| HCM LOS | A | A | | |

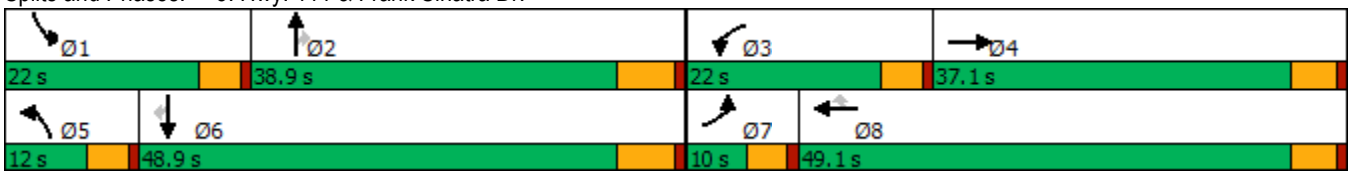
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1570 | - | - | 898 | 1059 | 1597 | - | - |
| HCM Lane V/C Ratio | 0.001 | - | - | 0.002 | 0.016 | 0.008 | - | - |
| HCM Control Delay (s) | 7.3 | - | - | 9 | 8.5 | 7.3 | - | - |
| HCM Lane LOS | A | - | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0 | 0 | - | - |

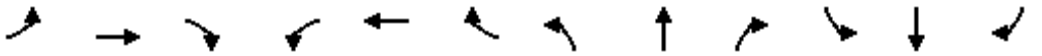
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 14 | 20 | 260 | 55 | 362 | 35 | 714 | 87 | 268 | 1128 | 38 |
| Future Volume (vph) | 14 | 20 | 260 | 55 | 362 | 35 | 714 | 87 | 268 | 1128 | 38 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 10.0 | 37.1 | 22.0 | 49.1 | 49.1 | 12.0 | 38.9 | 38.9 | 22.0 | 48.9 | 48.9 |
| Total Split (%) | 8.3% | 30.9% | 18.3% | 40.9% | 40.9% | 10.0% | 32.4% | 32.4% | 18.3% | 40.8% | 40.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 73.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 14 | 20 | 17 | 260 | 55 | 362 | 35 | 714 | 87 | 268 | 1128 | 38 |
| Future Volume (veh/h) | 14 | 20 | 17 | 260 | 55 | 362 | 35 | 714 | 87 | 268 | 1128 | 38 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 15 | 22 | 12 | 280 | 59 | 0 | 38 | 768 | 0 | 288 | 1213 | 27 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 33 | 168 | 92 | 398 | 458 | | 69 | 1494 | | 405 | 1896 | 589 |
| Arrive On Green | 0.02 | 0.15 | 0.15 | 0.12 | 0.25 | 0.00 | 0.04 | 0.29 | 0.00 | 0.12 | 0.37 | 0.37 |
| Sat Flow, veh/h | 1781 | 1135 | 619 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1585 |
| Grp Volume(v), veh/h | 15 | 0 | 34 | 280 | 59 | 0 | 38 | 768 | 0 | 288 | 1213 | 27 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1753 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1585 |
| Q Serve(g_s), s | 0.5 | 0.0 | 1.1 | 4.9 | 1.5 | 0.0 | 1.3 | 7.9 | 0.0 | 5.0 | 12.3 | 0.7 |
| Cycle Q Clear(g_c), s | 0.5 | 0.0 | 1.1 | 4.9 | 1.5 | 0.0 | 1.3 | 7.9 | 0.0 | 5.0 | 12.3 | 0.7 |
| Prop In Lane | 1.00 | | 0.35 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 33 | 0 | 260 | 398 | 458 | | 69 | 1494 | | 405 | 1896 | 589 |
| V/C Ratio(X) | 0.46 | 0.00 | 0.13 | 0.70 | 0.13 | | 0.55 | 0.51 | | 0.71 | 0.64 | 0.05 |
| Avail Cap(c_a), veh/h | 153 | 0 | 894 | 958 | 1312 | | 210 | 2661 | | 958 | 3475 | 1079 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 30.5 | 0.0 | 23.2 | 26.7 | 18.5 | 0.0 | 29.6 | 18.5 | 0.0 | 26.7 | 16.3 | 12.6 |
| Incr Delay (d2), s/veh | 3.7 | 0.0 | 0.2 | 0.9 | 0.1 | 0.0 | 2.6 | 0.3 | 0.0 | 0.9 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.2 | 0.0 | 0.4 | 1.9 | 0.6 | 0.0 | 0.6 | 2.6 | 0.0 | 1.9 | 3.9 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 34.2 | 0.0 | 23.4 | 27.6 | 18.6 | 0.0 | 32.2 | 18.8 | 0.0 | 27.5 | 16.6 | 12.6 |
| LnGrp LOS | C | A | C | C | B | | C | B | | C | B | B |
| Approach Vol, veh/h | | 49 | | | 339 | A | | 806 | A | | 1528 | |
| Approach Delay, s/veh | | 26.7 | | | 26.0 | | | 19.4 | | | 18.6 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.0 | 24.6 | 11.8 | 14.4 | 7.0 | 29.5 | 5.8 | 20.5 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 17.4 | 32.7 | 17.4 | 32.0 | 7.4 | 42.7 | 5.4 | 44.0 |
| Max Q Clear Time (g_c+I1), s | 7.0 | 9.9 | 6.9 | 3.1 | 3.3 | 14.3 | 2.5 | 3.5 |
| Green Ext Time (p_c), s | 0.4 | 4.8 | 0.4 | 0.1 | 0.0 | 9.0 | 0.0 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 19.9 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.9 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 16 | 2 | 0 | 0 | 4 | 8 | 0 | 20 | 0 | 25 | 18 | 1 |
| Future Vol, veh/h | 16 | 2 | 0 | 0 | 4 | 8 | 0 | 20 | 0 | 25 | 18 | 1 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 19 | 2 | 0 | 0 | 5 | 10 | 0 | 24 | 0 | 30 | 21 | 1 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 114 | 106 | 22 | 107 | 106 | 24 | 22 | 0 | 0 | 24 | 0 | 0 |
| Stage 1 | 82 | 82 | - | 24 | 24 | - | - | - | - | - | - | - |
| Stage 2 | 32 | 24 | - | 83 | 82 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 863 | 784 | 1055 | 872 | 784 | 1052 | 1593 | - | - | 1591 | - | - |
| Stage 1 | 926 | 827 | - | 994 | 875 | - | - | - | - | - | - | - |
| Stage 2 | 984 | 875 | - | 925 | 827 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 839 | 769 | 1055 | 857 | 769 | 1052 | 1593 | - | - | 1591 | - | - |
| Mov Cap-2 Maneuver | 839 | 769 | - | 857 | 769 | - | - | - | - | - | - | - |
| Stage 1 | 926 | 811 | - | 994 | 875 | - | - | - | - | - | - | - |
| Stage 2 | 970 | 875 | - | 905 | 811 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 9.4 | 8.9 | 0 | 4.2 |
| HCM LOS | A | A | | |

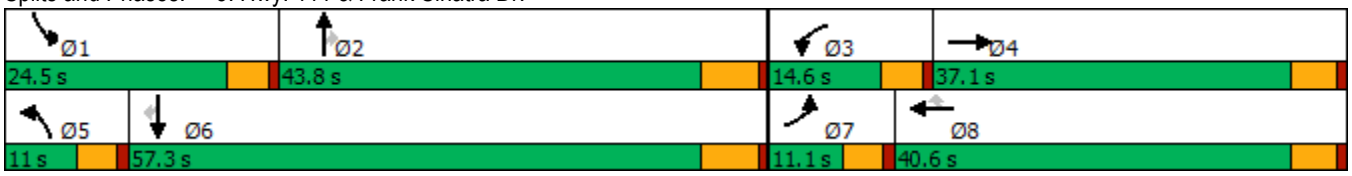
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1593 | - | - | 831 | 937 | 1591 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.026 | 0.015 | 0.019 | - | - |
| HCM Control Delay (s) | 0 | - | - | 9.4 | 8.9 | 7.3 | - | - |
| HCM Lane LOS | A | - | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0.1 | 0 | 0.1 | - | - |

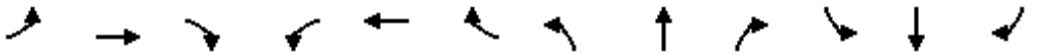
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 33 | 51 | 149 | 30 | 301 | 32 | 1193 | 174 | 368 | 1172 | 19 |
| Future Volume (vph) | 33 | 51 | 149 | 30 | 301 | 32 | 1193 | 174 | 368 | 1172 | 19 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.1 | 37.1 | 14.6 | 40.6 | 40.6 | 11.0 | 43.8 | 43.8 | 24.5 | 57.3 | 57.3 |
| Total Split (%) | 9.3% | 30.9% | 12.2% | 33.8% | 33.8% | 9.2% | 36.5% | 36.5% | 20.4% | 47.8% | 47.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 84.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 33 | 51 | 24 | 149 | 30 | 301 | 32 | 1193 | 174 | 368 | 1172 | 19 |
| Future Volume (veh/h) | 33 | 51 | 24 | 149 | 30 | 301 | 32 | 1193 | 174 | 368 | 1172 | 19 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 33 | 52 | 18 | 151 | 30 | 0 | 32 | 1205 | 0 | 372 | 1184 | 13 |
| Peak Hour Factor | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 61 | 184 | 64 | 240 | 325 | | 59 | 1782 | | 486 | 2330 | 708 |
| Arrive On Green | 0.03 | 0.14 | 0.14 | 0.07 | 0.17 | 0.00 | 0.03 | 0.35 | 0.00 | 0.14 | 0.46 | 0.46 |
| Sat Flow, veh/h | 1781 | 1327 | 459 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1552 |
| Grp Volume(v), veh/h | 33 | 0 | 70 | 151 | 30 | 0 | 32 | 1205 | 0 | 372 | 1184 | 13 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1787 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1552 |
| Q Serve(g_s), s | 1.2 | 0.0 | 2.4 | 2.9 | 0.9 | 0.0 | 1.2 | 13.6 | 0.0 | 7.0 | 11.1 | 0.3 |
| Cycle Q Clear(g_c), s | 1.2 | 0.0 | 2.4 | 2.9 | 0.9 | 0.0 | 1.2 | 13.6 | 0.0 | 7.0 | 11.1 | 0.3 |
| Prop In Lane | 1.00 | | 0.26 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 61 | 0 | 248 | 240 | 325 | | 59 | 1782 | | 486 | 2330 | 708 |
| V/C Ratio(X) | 0.54 | 0.00 | 0.28 | 0.63 | 0.09 | | 0.54 | 0.68 | | 0.77 | 0.51 | 0.02 |
| Avail Cap(c_a), veh/h | 171 | 0 | 843 | 509 | 979 | | 168 | 2831 | | 1014 | 3847 | 1169 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 32.2 | 0.0 | 26.2 | 30.7 | 23.5 | 0.0 | 32.3 | 18.8 | 0.0 | 28.1 | 13.0 | 10.1 |
| Incr Delay (d2), s/veh | 2.8 | 0.0 | 0.6 | 1.0 | 0.1 | 0.0 | 2.8 | 0.5 | 0.0 | 1.0 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.0 | 1.0 | 1.2 | 0.4 | 0.0 | 0.5 | 4.5 | 0.0 | 2.6 | 3.3 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.0 | 0.0 | 26.8 | 31.7 | 23.6 | 0.0 | 35.1 | 19.3 | 0.0 | 29.0 | 13.2 | 10.1 |
| LnGrp LOS | D | A | C | C | C | | D | B | | C | B | B |
| Approach Vol, veh/h | | 103 | | | 181 | A | | 1237 | A | | 1569 | |
| Approach Delay, s/veh | | 29.4 | | | 30.4 | | | 19.7 | | | 16.9 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 14.1 | 29.9 | 9.3 | 14.5 | 6.9 | 37.2 | 6.9 | 16.9 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 19.9 | 37.6 | 10.0 | 32.0 | 6.4 | 51.1 | 6.5 | 35.5 |
| Max Q Clear Time (g_c+I1), s | 9.0 | 15.6 | 4.9 | 4.4 | 3.2 | 13.1 | 3.2 | 2.9 |
| Green Ext Time (p_c), s | 0.5 | 8.0 | 0.1 | 0.3 | 0.0 | 9.3 | 0.0 | 0.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 19.2 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 27 | 0 | 17 | 3 | 33 | 19 | 3 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 27 | 0 | 17 | 3 | 33 | 19 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 34 | 0 | 22 | 4 | 42 | 24 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 152 | 136 | 26 | 134 | 136 | 24 | 28 | 0 | 0 | 26 | 0 | 0 |
| Stage 1 | 110 | 110 | - | 24 | 24 | - | - | - | - | - | - | - |
| Stage 2 | 42 | 26 | - | 110 | 112 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 815 | 755 | 1050 | 838 | 755 | 1052 | 1585 | - | - | 1588 | - | - |
| Stage 1 | 895 | 804 | - | 994 | 875 | - | - | - | - | - | - | - |
| Stage 2 | 972 | 874 | - | 895 | 803 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 772 | 735 | 1050 | 821 | 735 | 1052 | 1585 | - | - | 1588 | - | - |
| Mov Cap-2 Maneuver | 772 | 735 | - | 821 | 735 | - | - | - | - | - | - | - |
| Stage 1 | 895 | 783 | - | 994 | 875 | - | - | - | - | - | - | - |
| Stage 2 | 939 | 874 | - | 871 | 782 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 9.7 | 8.6 | 0 | 4.4 |
| HCM LOS | A | A | | |

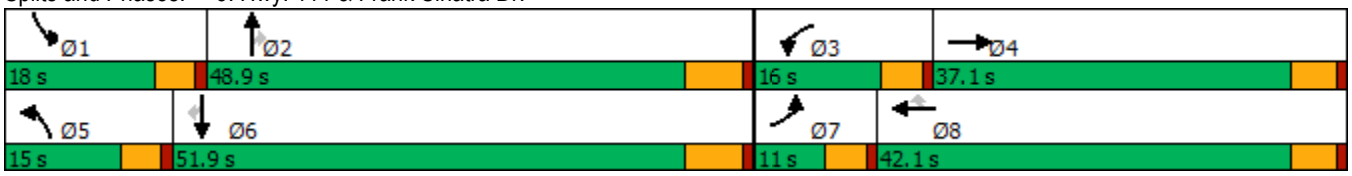
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1585 | - | - | 772 | 1036 | 1588 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.002 | 0.034 | 0.026 | - | - |
| HCM Control Delay (s) | 0 | - | - | 9.7 | 8.6 | 7.3 | - | - |
| HCM Lane LOS | A | - | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0.1 | - | - |

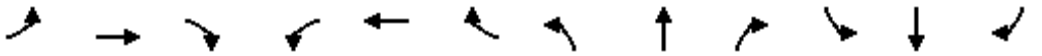
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 19 | 42 | 141 | 28 | 160 | 48 | 1078 | 95 | 188 | 1171 | 36 |
| Future Volume (vph) | 19 | 42 | 141 | 28 | 160 | 48 | 1078 | 95 | 188 | 1171 | 36 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 78.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 19 | 42 | 11 | 141 | 28 | 160 | 48 | 1078 | 95 | 188 | 1171 | 36 |
| Future Volume (veh/h) | 19 | 42 | 11 | 141 | 28 | 160 | 48 | 1078 | 95 | 188 | 1171 | 36 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 21 | 46 | 12 | 155 | 31 | 0 | 53 | 1185 | 0 | 207 | 1287 | 36 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 44 | 209 | 54 | 257 | 366 | | 86 | 1851 | | 313 | 2068 | 640 |
| Arrive On Green | 0.02 | 0.15 | 0.15 | 0.07 | 0.20 | 0.00 | 0.05 | 0.36 | 0.00 | 0.09 | 0.40 | 0.40 |
| Sat Flow, veh/h | 1781 | 1430 | 373 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1579 |
| Grp Volume(v), veh/h | 21 | 0 | 58 | 155 | 31 | 0 | 53 | 1185 | 0 | 207 | 1287 | 36 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1803 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1579 |
| Q Serve(g_s), s | 0.7 | 0.0 | 1.8 | 2.7 | 0.9 | 0.0 | 1.8 | 12.1 | 0.0 | 3.6 | 12.6 | 0.9 |
| Cycle Q Clear(g_c), s | 0.7 | 0.0 | 1.8 | 2.7 | 0.9 | 0.0 | 1.8 | 12.1 | 0.0 | 3.6 | 12.6 | 0.9 |
| Prop In Lane | 1.00 | | 0.21 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 44 | 0 | 263 | 257 | 366 | | 86 | 1851 | | 313 | 2068 | 640 |
| V/C Ratio(X) | 0.48 | 0.00 | 0.22 | 0.60 | 0.08 | | 0.62 | 0.64 | | 0.66 | 0.62 | 0.06 |
| Avail Cap(c_a), veh/h | 182 | 0 | 920 | 628 | 1103 | | 295 | 3476 | | 738 | 3720 | 1151 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 30.2 | 0.0 | 23.6 | 28.1 | 20.6 | 0.0 | 29.3 | 16.6 | 0.0 | 27.6 | 14.8 | 11.4 |
| Incr Delay (d2), s/veh | 3.1 | 0.0 | 0.4 | 0.9 | 0.1 | 0.0 | 2.7 | 0.4 | 0.0 | 0.9 | 0.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.0 | 0.7 | 1.1 | 0.4 | 0.0 | 0.8 | 3.8 | 0.0 | 1.4 | 3.8 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 33.3 | 0.0 | 24.1 | 29.0 | 20.7 | 0.0 | 32.0 | 17.0 | 0.0 | 28.5 | 15.2 | 11.4 |
| LnGrp LOS | C | A | C | C | C | | C | B | | C | B | B |
| Approach Vol, veh/h | | 79 | | | 186 | A | | 1238 | A | | 1530 | |
| Approach Delay, s/veh | | 26.5 | | | 27.6 | | | 17.6 | | | 16.9 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.3 | 28.9 | 9.3 | 14.2 | 7.6 | 31.6 | 6.1 | 17.4 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 5.6 | 14.1 | 4.7 | 3.8 | 3.8 | 14.6 | 2.7 | 2.9 |
| Green Ext Time (p_c), s | 0.2 | 8.6 | 0.1 | 0.3 | 0.0 | 10.1 | 0.0 | 0.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 18.1 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 27 | 0 | 17 | 3 | 33 | 19 | 3 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 27 | 0 | 17 | 3 | 33 | 19 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 34 | 0 | 22 | 4 | 42 | 24 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 152 | 136 | 26 | 134 | 136 | 24 | 28 | 0 | 0 | 26 | 0 | 0 |
| Stage 1 | 110 | 110 | - | 24 | 24 | - | - | - | - | - | - | - |
| Stage 2 | 42 | 26 | - | 110 | 112 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 815 | 755 | 1050 | 838 | 755 | 1052 | 1585 | - | - | 1588 | - | - |
| Stage 1 | 895 | 804 | - | 994 | 875 | - | - | - | - | - | - | - |
| Stage 2 | 972 | 874 | - | 895 | 803 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 772 | 735 | 1050 | 821 | 735 | 1052 | 1585 | - | - | 1588 | - | - |
| Mov Cap-2 Maneuver | 772 | 735 | - | 821 | 735 | - | - | - | - | - | - | - |
| Stage 1 | 895 | 783 | - | 994 | 875 | - | - | - | - | - | - | - |
| Stage 2 | 939 | 874 | - | 871 | 782 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 9.7 | 8.6 | 0 | 4.4 |
| HCM LOS | A | A | | |

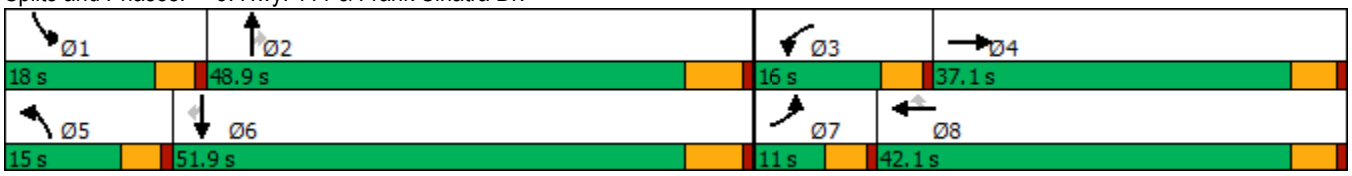
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1585 | - | - | 772 | 1036 | 1588 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.002 | 0.034 | 0.026 | - | - |
| HCM Control Delay (s) | 0 | - | - | 9.7 | 8.6 | 7.3 | - | - |
| HCM Lane LOS | A | - | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0.1 | - | - |

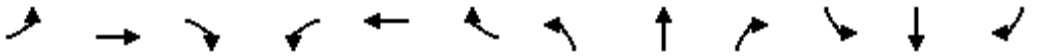
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 19 | 42 | 141 | 28 | 160 | 48 | 1078 | 95 | 188 | 1171 | 36 |
| Future Volume (vph) | 19 | 42 | 141 | 28 | 160 | 48 | 1078 | 95 | 188 | 1171 | 36 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 78.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 19 | 42 | 11 | 141 | 28 | 160 | 48 | 1078 | 95 | 188 | 1171 | 36 |
| Future Volume (veh/h) | 19 | 42 | 11 | 141 | 28 | 160 | 48 | 1078 | 95 | 188 | 1171 | 36 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 21 | 46 | 12 | 155 | 31 | 0 | 53 | 1185 | 0 | 207 | 1287 | 36 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 44 | 209 | 54 | 257 | 366 | | 86 | 1851 | | 313 | 2068 | 640 |
| Arrive On Green | 0.02 | 0.15 | 0.15 | 0.07 | 0.20 | 0.00 | 0.05 | 0.36 | 0.00 | 0.09 | 0.40 | 0.40 |
| Sat Flow, veh/h | 1781 | 1430 | 373 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1579 |
| Grp Volume(v), veh/h | 21 | 0 | 58 | 155 | 31 | 0 | 53 | 1185 | 0 | 207 | 1287 | 36 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1803 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1579 |
| Q Serve(g_s), s | 0.7 | 0.0 | 1.8 | 2.7 | 0.9 | 0.0 | 1.8 | 12.1 | 0.0 | 3.6 | 12.6 | 0.9 |
| Cycle Q Clear(g_c), s | 0.7 | 0.0 | 1.8 | 2.7 | 0.9 | 0.0 | 1.8 | 12.1 | 0.0 | 3.6 | 12.6 | 0.9 |
| Prop In Lane | 1.00 | | 0.21 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 44 | 0 | 263 | 257 | 366 | | 86 | 1851 | | 313 | 2068 | 640 |
| V/C Ratio(X) | 0.48 | 0.00 | 0.22 | 0.60 | 0.08 | | 0.62 | 0.64 | | 0.66 | 0.62 | 0.06 |
| Avail Cap(c_a), veh/h | 182 | 0 | 920 | 628 | 1103 | | 295 | 3476 | | 738 | 3720 | 1151 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 30.2 | 0.0 | 23.6 | 28.1 | 20.6 | 0.0 | 29.3 | 16.6 | 0.0 | 27.6 | 14.8 | 11.4 |
| Incr Delay (d2), s/veh | 3.1 | 0.0 | 0.4 | 0.9 | 0.1 | 0.0 | 2.7 | 0.4 | 0.0 | 0.9 | 0.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.0 | 0.7 | 1.1 | 0.4 | 0.0 | 0.8 | 3.8 | 0.0 | 1.4 | 3.8 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 33.3 | 0.0 | 24.1 | 29.0 | 20.7 | 0.0 | 32.0 | 17.0 | 0.0 | 28.5 | 15.2 | 11.4 |
| LnGrp LOS | C | A | C | C | C | | C | B | | C | B | B |
| Approach Vol, veh/h | | 79 | | | 186 | A | | 1238 | A | | 1530 | |
| Approach Delay, s/veh | | 26.5 | | | 27.6 | | | 17.6 | | | 16.9 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.3 | 28.9 | 9.3 | 14.2 | 7.6 | 31.6 | 6.1 | 17.4 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 5.6 | 14.1 | 4.7 | 3.8 | 3.8 | 14.6 | 2.7 | 2.9 |
| Green Ext Time (p_c), s | 0.2 | 8.6 | 0.1 | 0.3 | 0.0 | 10.1 | 0.0 | 0.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 18.1 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

# APPENDIX 3.3:

# EXISTING (2019) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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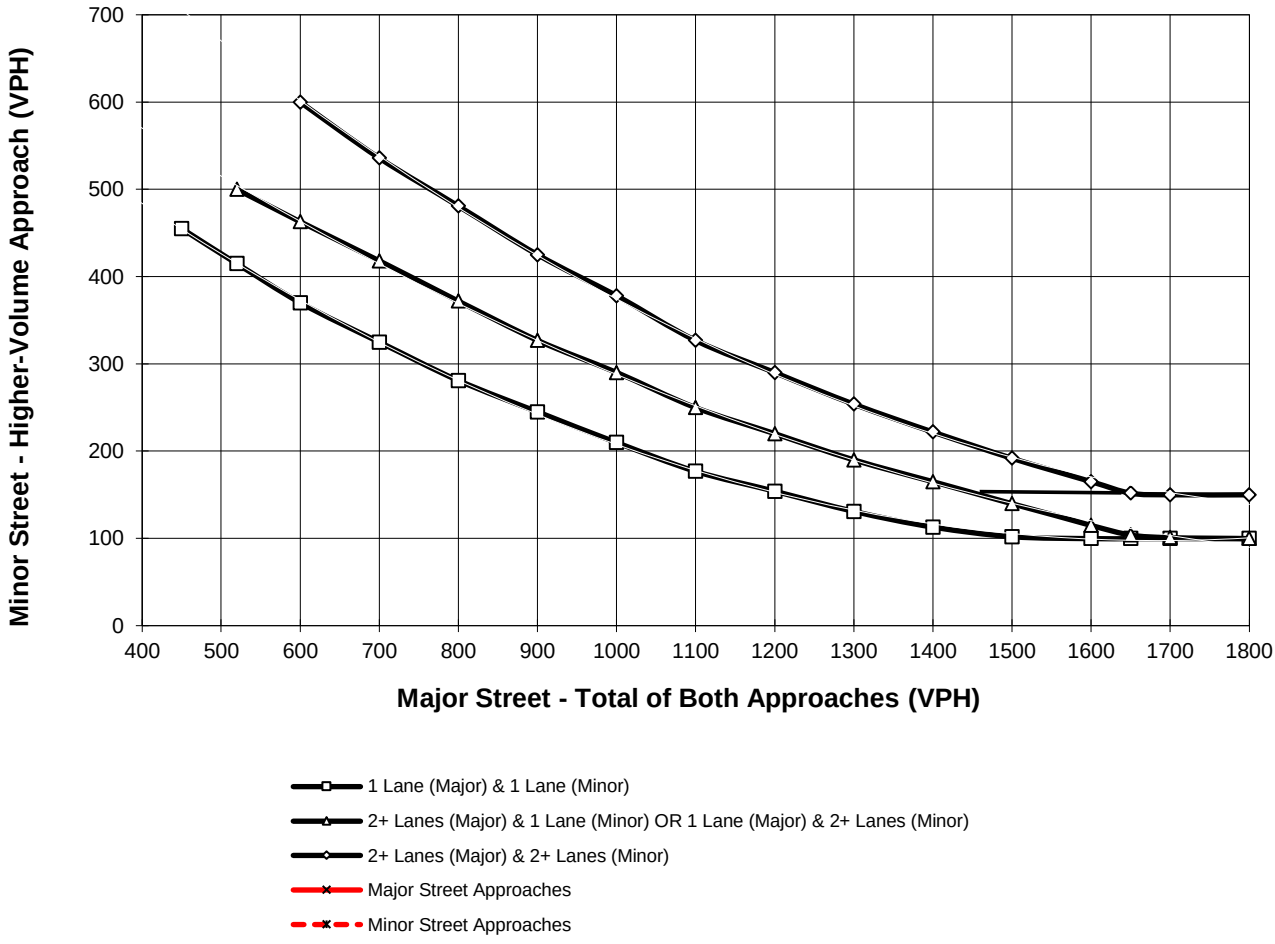
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Existing (2019) Conditions - Weekday PM Peak Hour**

Major Street Name = **Frank Sinatra Dr.**
Total of Both Approaches (VPH) = **64**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 2**
High Volume Approach (VPH) = **18**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

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# APPENDIX 3.4:

# EXISTING (2019) CONDITIONS QUEUING ANALYSIS WORKSHEETS

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## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB |
|---|---|---|
| Directions Served | LTR | LTR |
| Maximum Queue (ft) | 25 | 28 |
| Average Queue (ft) | 3 | 12 |
| 95th Queue (ft) | 17 | 34 |
| Link Distance (ft) | 353 | 358 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 15 | 40 | 280 | 59 | 389 | 38 | 768 | 94 | 288 | 1213 | 41 |
| v/c Ratio | 0.11 | 0.12 | 0.45 | 0.11 | 0.54 | 0.24 | 0.54 | 0.17 | 0.54 | 0.55 | 0.05 |
| Control Delay | 46.8 | 22.3 | 35.3 | 21.2 | 6.5 | 45.7 | 25.8 | 0.6 | 37.2 | 20.6 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 46.8 | 22.3 | 35.3 | 21.2 | 6.5 | 45.7 | 25.8 | 0.6 | 37.2 | 20.6 | 0.1 |
| Queue Length 50th (ft) | 7 | 9 | 63 | 18 | 8 | 17 | 108 | 0 | 65 | 169 | 0 |
| Queue Length 95th (ft) | 35 | 41 | 151 | 60 | 83 | 66 | 231 | 0 | 155 | 341 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 148 | 866 | 929 | 1275 | 1198 | 203 | 2587 | 873 | 929 | 3378 | 1100 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.10 | 0.05 | 0.30 | 0.05 | 0.32 | 0.19 | 0.30 | 0.11 | 0.31 | 0.36 | 0.04 |

Intersection Summary

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB | SB |
|---|---|---|---|
| Directions Served | LTR | LTR | L |
| Maximum Queue (ft) | 25 | 28 | 30 |
| Average Queue (ft) | 8 | 7 | 1 |
| 95th Queue (ft) | 27 | 28 | 10 |
| Link Distance (ft) | 353 | 358 | |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (ft) | | | 210 |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 33 | 76 | 151 | 30 | 304 | 32 | 1205 | 176 | 372 | 1184 | 19 |
| v/c Ratio | 0.26 | 0.25 | 0.37 | 0.08 | 0.53 | 0.25 | 0.68 | 0.27 | 0.65 | 0.46 | 0.02 |
| Control Delay | 50.4 | 29.3 | 43.9 | 31.3 | 7.6 | 50.3 | 27.5 | 5.4 | 41.5 | 16.7 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 50.4 | 29.3 | 43.9 | 31.3 | 7.6 | 50.3 | 27.5 | 5.4 | 41.5 | 16.7 | 0.1 |
| Queue Length 50th (ft) | 17 | 27 | 38 | 14 | 0 | 16 | 189 | 0 | 93 | 153 | 0 |
| Queue Length 95th (ft) | 60 | 74 | 94 | 40 | 65 | 59 | 363 | 51 | 193 | 292 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 146 | 732 | 444 | 843 | 882 | 144 | 2436 | 839 | 870 | 3311 | 1045 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.23 | 0.10 | 0.34 | 0.04 | 0.34 | 0.22 | 0.49 | 0.21 | 0.43 | 0.36 | 0.02 |

Intersection Summary

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | WB | SB |
|---|---|---|
| Directions Served | LTR | L |
| Maximum Queue (ft) | 48 | 30 |
| Average Queue (ft) | 21 | 1 |
| 95th Queue (ft) | 45 | 10 |
| Link Distance (ft) | 358 | |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | 210 |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 21 | 58 | 155 | 31 | 176 | 53 | 1185 | 104 | 207 | 1287 | 40 |
| v/c Ratio | 0.16 | 0.18 | 0.35 | 0.06 | 0.33 | 0.32 | 0.66 | 0.16 | 0.49 | 0.56 | 0.05 |
| Control Delay | 46.5 | 28.2 | 40.6 | 26.9 | 6.8 | 46.0 | 24.6 | 2.2 | 41.1 | 20.0 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 46.5 | 28.2 | 40.6 | 26.9 | 6.8 | 46.0 | 24.6 | 2.2 | 41.1 | 20.0 | 0.1 |
| Queue Length 50th (ft) | 9 | 20 | 35 | 10 | 0 | 24 | 165 | 0 | 46 | 173 | 0 |
| Queue Length 95th (ft) | 43 | 62 | 94 | 41 | 51 | 82 | 332 | 16 | 119 | 352 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 156 | 802 | 539 | 949 | 881 | 253 | 2992 | 979 | 633 | 3202 | 1027 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.13 | 0.07 | 0.29 | 0.03 | 0.20 | 0.21 | 0.40 | 0.11 | 0.33 | 0.40 | 0.04 |

Intersection Summary

# APPENDIX 4.1:

# POST PROCESSING WORKSHEETS

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| | | | |
|---|---|---|---|
| Project: | Ritz-Carleton Residences Project | Job #: | 12609 |
| Scenario: | Horizon Year (2040) Without Project | Analyst: | RV |
| | | Date: | 01/24/20 |

LOCATION: Hwy. 111 & Frank Sinatra Dr.
FORECAST YEAR: 2040

**INDIVIDUAL TURN VOLUME GROWTH REVIEW**

| | | AM PEAK HOUR INPUT DATA | | | | PM PEAK HOUR INPUT DATA | | | |
|---|---|---|---|---|---|---|---|---|---|
| APPROACH | TURNING MOVEMENT | EXISTING COUNT | FUTURE VOLUME | DIFF-ERENCE | % CHANGE | EXISTING COUNT | FUTURE VOLUME | DIFF-ERENCE | % CHANGE |
| NORTH BOUND | Left | 35 | 35 | 0 | 0% | 32 | 29 | -3 | -9% |
| | Through | 714 | 851 | 137 | 19% | 1,193 | 1,108 | -85 | -7% |
| | Right | 87 | 104 | 17 | 20% | 174 | 227 | 53 | 30% |
| | NB Total | 836 | 990 | 154 | 18% | 1,399 | 1,364 | -35 | -3% |
| SOUTH BOUND | Left | 268 | 287 | 19 | 7% | 368 | 481 | 113 | 31% |
| | Through | 1,128 | 1,129 | 1 | 0% | 1,172 | 1,111 | -61 | -5% |
| | Right | 38 | 34 | -4 | -11% | 19 | 17 | -2 | -11% |
| | SB Total | 1,434 | 1,450 | 16 | 1% | 1,559 | 1,609 | 50 | 3% |
| EAST BOUND | Left | 14 | 14 | 0 | 0% | 33 | 28 | -5 | -15% |
| | Through | 20 | 20 | 0 | 0% | 51 | 62 | 11 | 22% |
| | Right | 17 | 16 | -1 | -6% | 24 | 21 | -3 | -13% |
| | EB Total | 51 | 50 | -1 | -2% | 108 | 111 | 3 | 3% |
| WEST BOUND | Left | 260 | 330 | 70 | 27% | 149 | 178 | 29 | 19% |
| | Through | 55 | 62 | 7 | 13% | 30 | 34 | 4 | 13% |
| | Right | 362 | 489 | 127 | 35% | 301 | 354 | 53 | 18% |
| | WB Total | 677 | 881 | 204 | 30% | 480 | 566 | 86 | 18% |
| TOTAL ENTERING VOLUME | | 2,998 | 3,371 | 373 | 12% | 3,546 | 3,650 | 104 | 3% |

**FORECAST PEAK HOUR TO ADT COMPARISON**

| | | VOLUMES | | PERCENT OF ADT | | |
|---|---|---|---|---|---|---|
| | | AM | PM | AM | PM | ADT |
| North Leg | Inbound | 1,450 | 1,609 | | | |
| North Leg | Outbound | 1,354 | 1,490 | | | |
| **North Leg** | **TOTAL** | **2,804** | **3,099** | **7%** | **8%** | **40,509** |
| | | | | | | |
| South Leg | Inbound | 990 | 1,364 | | | |
| South Leg | Outbound | 1,475 | 1,310 | | | |
| **South Leg** | **TOTAL** | **2,465** | **2,674** | **7%** | **8%** | **35,484** |
| | | | | | | |
| East Leg | Inbound | 881 | 566 | | | |
| East Leg | Outbound | 411 | 770 | | | |
| **East Leg** | **TOTAL** | **1,292** | **1,336** | **8%** | **9%** | **15,663** |
| | | | | | | |
| West Leg | Inbound | 50 | 111 | | | |
| West Leg | Outbound | 131 | 80 | | | |
| **West Leg** | **TOTAL** | **181** | **191** | **7%** | **7%** | **2,553** |
| | | | | | | |
| ***OVERALL TOTAL*** | | ***6,742*** | ***7,300*** | ***7%*** | ***8%*** | ***94,209*** |

*U:\UcJobs_12600-13000_12600\12609\Post Processing\[03 Hwy 111_Frank Sinatra.xls]Output (3)*

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# APPENDIX 5.1:

# E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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| Intersection | |
|---|---|
| Int Delay, s/veh | 4 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 39 | 18 | 0 | 12 | 37 |
| Future Vol, veh/h | 0 | 39 | 18 | 0 | 12 | 37 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 42 | 20 | 0 | 13 | 40 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 86 | 20 | 0 | 0 | 20 | 0 |
| Stage 1 | 20 | - | - | - | - | - |
| Stage 2 | 66 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 915 | 1058 | - | - | 1596 | - |
| Stage 1 | 1003 | - | - | - | - | - |
| Stage 2 | 957 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 908 | 1058 | - | - | 1596 | - |
| Mov Cap-2 Maneuver | 908 | - | - | - | - | - |
| Stage 1 | 1003 | - | - | - | - | - |
| Stage 2 | 949 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.5 | 0 | 1.8 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1058 | 1596 | - |
| HCM Lane V/C Ratio | - | - | 0.04 | 0.008 | - |
| HCM Control Delay (s) | - | - | 8.5 | 7.3 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.1 | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.8 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 15 | 1 | 56 | 0 | 12 | 48 | 0 |
| Future Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 15 | 1 | 56 | 0 | 12 | 48 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1 | 1 | 0 | 0 | 17 | 1 | 62 | 0 | 13 | 53 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 152 | 143 | 53 | 144 | 143 | 62 | 53 | 0 | 0 | 62 | 0 | 0 |
| Stage 1 | 79 | 79 | - | 64 | 64 | - | - | - | - | - | - | - |
| Stage 2 | 73 | 64 | - | 80 | 79 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 815 | 748 | 1014 | 825 | 748 | 1003 | 1553 | - | - | 1541 | - | - |
| Stage 1 | 930 | 829 | - | 947 | 842 | - | - | - | - | - | - | - |
| Stage 2 | 937 | 842 | - | 929 | 829 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 796 | 741 | 1014 | 818 | 741 | 1003 | 1553 | - | - | 1541 | - | - |
| Mov Cap-2 Maneuver | 796 | 741 | - | 818 | 741 | - | - | - | - | - | - | - |
| Stage 1 | 929 | 822 | - | 946 | 841 | - | - | - | - | - | - | - |
| Stage 2 | 921 | 841 | - | 919 | 822 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 9.2 | 8.7 | 0.1 | 1.5 |
| HCM LOS | A | A | | |

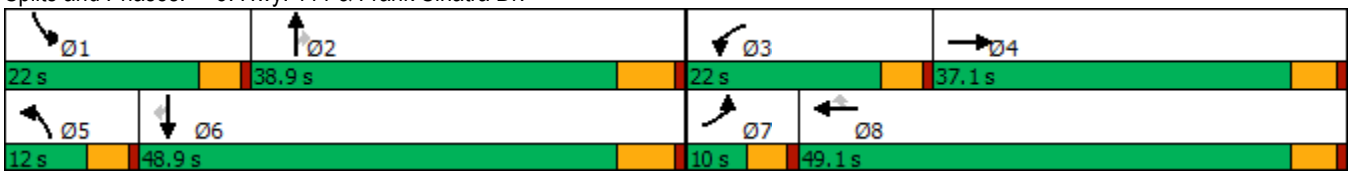
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1553 | - | - | 856 | 1003 | 1541 | - | - |
| HCM Lane V/C Ratio | 0.001 | - | - | 0.003 | 0.017 | 0.009 | - | - |
| HCM Control Delay (s) | 7.3 | - | - | 9.2 | 8.7 | 7.4 | - | - |
| HCM Lane LOS | A | - | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0 | - | - |

| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 24 | 34 | 260 | 59 | 362 | 40 | 714 | 87 | 268 | 1128 | 41 |
| Future Volume (vph) | 24 | 34 | 260 | 59 | 362 | 40 | 714 | 87 | 268 | 1128 | 41 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 10.0 | 37.1 | 22.0 | 49.1 | 49.1 | 12.0 | 38.9 | 38.9 | 22.0 | 48.9 | 48.9 |
| Total Split (%) | 8.3% | 30.9% | 18.3% | 40.9% | 40.9% | 10.0% | 32.4% | 32.4% | 18.3% | 40.8% | 40.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 77.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 24 | 34 | 33 | 260 | 59 | 362 | 40 | 714 | 87 | 268 | 1128 | 41 |
| Future Volume (veh/h) | 24 | 34 | 33 | 260 | 59 | 362 | 40 | 714 | 87 | 268 | 1128 | 41 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 26 | 37 | 29 | 280 | 63 | 0 | 43 | 768 | 0 | 288 | 1213 | 30 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 51 | 153 | 120 | 395 | 456 | | 74 | 1495 | | 402 | 1877 | 583 |
| Arrive On Green | 0.03 | 0.16 | 0.16 | 0.11 | 0.24 | 0.00 | 0.04 | 0.29 | 0.00 | 0.12 | 0.37 | 0.37 |
| Sat Flow, veh/h | 1781 | 968 | 759 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1585 |
| Grp Volume(v), veh/h | 26 | 0 | 66 | 280 | 63 | 0 | 43 | 768 | 0 | 288 | 1213 | 30 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1727 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1585 |
| Q Serve(g_s), s | 0.9 | 0.0 | 2.2 | 5.0 | 1.7 | 0.0 | 1.5 | 8.1 | 0.0 | 5.2 | 12.7 | 0.8 |
| Cycle Q Clear(g_c), s | 0.9 | 0.0 | 2.2 | 5.0 | 1.7 | 0.0 | 1.5 | 8.1 | 0.0 | 5.2 | 12.7 | 0.8 |
| Prop In Lane | 1.00 | | 0.44 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 51 | 0 | 273 | 395 | 456 | | 74 | 1495 | | 402 | 1877 | 583 |
| V/C Ratio(X) | 0.51 | 0.00 | 0.24 | 0.71 | 0.14 | | 0.58 | 0.51 | | 0.72 | 0.65 | 0.05 |
| Avail Cap(c_a), veh/h | 149 | 0 | 858 | 934 | 1278 | | 205 | 2593 | | 934 | 3385 | 1051 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 30.8 | 0.0 | 23.7 | 27.5 | 19.1 | 0.0 | 30.3 | 19.0 | 0.0 | 27.4 | 16.9 | 13.1 |
| Incr Delay (d2), s/veh | 2.8 | 0.0 | 0.5 | 0.9 | 0.1 | 0.0 | 2.6 | 0.3 | 0.0 | 0.9 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 0.0 | 0.9 | 2.0 | 0.7 | 0.0 | 0.6 | 2.7 | 0.0 | 1.9 | 4.1 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 33.7 | 0.0 | 24.2 | 28.4 | 19.2 | 0.0 | 33.0 | 19.2 | 0.0 | 28.3 | 17.3 | 13.2 |
| LnGrp LOS | C | A | C | C | B | | C | B | | C | B | B |
| Approach Vol, veh/h | | 92 | | | 343 | A | | 811 | A | | 1531 | |
| Approach Delay, s/veh | | 26.9 | | | 26.7 | | | 20.0 | | | 19.3 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.1 | 25.1 | 12.0 | 15.3 | 7.3 | 29.9 | 6.5 | 20.8 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 17.4 | 32.7 | 17.4 | 32.0 | 7.4 | 42.7 | 5.4 | 44.0 |
| Max Q Clear Time (g_c+I1), s | 7.2 | 10.1 | 7.0 | 4.2 | 3.5 | 14.7 | 2.9 | 3.7 |
| Green Ext Time (p_c), s | 0.4 | 4.8 | 0.4 | 0.3 | 0.0 | 9.0 | 0.0 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 20.6 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.4 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 31 | 20 | 0 | 55 | 18 |
| Future Vol, veh/h | 0 | 31 | 20 | 0 | 55 | 18 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 34 | 22 | 0 | 60 | 20 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 162 | 22 | 0 | 0 | 22 | 0 |
| Stage 1 | 22 | - | - | - | - | - |
| Stage 2 | 140 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 829 | 1055 | - | - | 1593 | - |
| Stage 1 | 1001 | - | - | - | - | - |
| Stage 2 | 887 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 797 | 1055 | - | - | 1593 | - |
| Mov Cap-2 Maneuver | 797 | - | - | - | - | - |
| Stage 1 | 1001 | - | - | - | - | - |
| Stage 2 | 853 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.5 | 0 | 5.5 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1055 | 1593 | - |
| HCM Lane V/C Ratio | - | - | 0.032 | 0.038 | - |
| HCM Control Delay (s) | - | - | 8.5 | 7.3 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.1 | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 16 | 2 | 0 | 0 | 4 | 8 | 0 | 51 | 0 | 25 | 73 | 1 |
| Future Vol, veh/h | 16 | 2 | 0 | 0 | 4 | 8 | 0 | 51 | 0 | 25 | 73 | 1 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 19 | 2 | 0 | 0 | 5 | 10 | 0 | 61 | 0 | 30 | 87 | 1 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 217 | 209 | 88 | 210 | 209 | 61 | 88 | 0 | 0 | 61 | 0 | 0 |
| Stage 1 | 148 | 148 | - | 61 | 61 | - | - | - | - | - | - | - |
| Stage 2 | 69 | 61 | - | 149 | 148 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 739 | 688 | 970 | 747 | 688 | 1004 | 1508 | - | - | 1542 | - | - |
| Stage 1 | 855 | 775 | - | 950 | 844 | - | - | - | - | - | - | - |
| Stage 2 | 941 | 844 | - | 854 | 775 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 718 | 675 | 970 | 734 | 675 | 1004 | 1508 | - | - | 1542 | - | - |
| Mov Cap-2 Maneuver | 718 | 675 | - | 734 | 675 | - | - | - | - | - | - | - |
| Stage 1 | 855 | 760 | - | 950 | 844 | - | - | - | - | - | - | - |
| Stage 2 | 927 | 844 | - | 835 | 760 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 10.2 | 9.2 | 0 | 1.9 |
| HCM LOS | B | A | | |

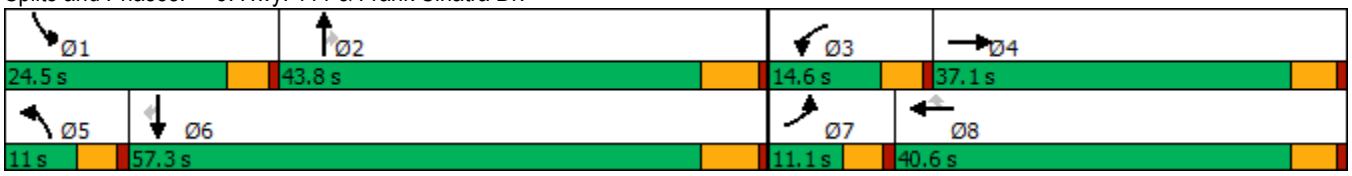
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1508 | - | - | 713 | 864 | 1542 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.03 | 0.017 | 0.019 | - | - |
| HCM Control Delay (s) | 0 | - | - | 10.2 | 9.2 | 7.4 | - | - |
| HCM Lane LOS | A | - | - | B | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0.1 | 0.1 | 0.1 | - | - |

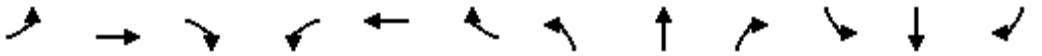
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 41 | 62 | 149 | 49 | 301 | 54 | 1193 | 174 | 368 | 1172 | 33 |
| Future Volume (vph) | 41 | 62 | 149 | 49 | 301 | 54 | 1193 | 174 | 368 | 1172 | 33 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.1 | 37.1 | 14.6 | 40.6 | 40.6 | 11.0 | 43.8 | 43.8 | 24.5 | 57.3 | 57.3 |
| Total Split (%) | 9.3% | 30.9% | 12.2% | 33.8% | 33.8% | 9.2% | 36.5% | 36.5% | 20.4% | 47.8% | 47.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 85.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 41 | 62 | 36 | 149 | 49 | 301 | 54 | 1193 | 174 | 368 | 1172 | 33 |
| Future Volume (veh/h) | 41 | 62 | 36 | 149 | 49 | 301 | 54 | 1193 | 174 | 368 | 1172 | 33 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 41 | 63 | 30 | 151 | 49 | 0 | 55 | 1205 | 0 | 372 | 1184 | 27 |
| Peak Hour Factor | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 70 | 173 | 82 | 239 | 325 | | 84 | 1774 | | 485 | 2249 | 683 |
| Arrive On Green | 0.04 | 0.14 | 0.14 | 0.07 | 0.17 | 0.00 | 0.05 | 0.35 | 0.00 | 0.14 | 0.44 | 0.44 |
| Sat Flow, veh/h | 1781 | 1197 | 570 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1552 |
| Grp Volume(v), veh/h | 41 | 0 | 93 | 151 | 49 | 0 | 55 | 1205 | 0 | 372 | 1184 | 27 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1766 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1552 |
| Q Serve(g_s), s | 1.6 | 0.0 | 3.3 | 2.9 | 1.5 | 0.0 | 2.1 | 13.8 | 0.0 | 7.1 | 11.6 | 0.7 |
| Cycle Q Clear(g_c), s | 1.6 | 0.0 | 3.3 | 2.9 | 1.5 | 0.0 | 2.1 | 13.8 | 0.0 | 7.1 | 11.6 | 0.7 |
| Prop In Lane | 1.00 | | 0.32 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 70 | 0 | 255 | 239 | 325 | | 84 | 1774 | | 485 | 2249 | 683 |
| V/C Ratio(X) | 0.58 | 0.00 | 0.36 | 0.63 | 0.15 | | 0.65 | 0.68 | | 0.77 | 0.53 | 0.04 |
| Avail Cap(c_a), veh/h | 169 | 0 | 824 | 504 | 968 | | 166 | 2798 | | 1002 | 3803 | 1156 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 32.4 | 0.0 | 26.5 | 31.1 | 24.0 | 0.0 | 32.1 | 19.1 | 0.0 | 28.4 | 14.0 | 10.9 |
| Incr Delay (d2), s/veh | 2.8 | 0.0 | 0.9 | 1.0 | 0.2 | 0.0 | 3.2 | 0.5 | 0.0 | 1.0 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.0 | 1.4 | 1.2 | 0.7 | 0.0 | 0.9 | 4.6 | 0.0 | 2.7 | 3.6 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.2 | 0.0 | 27.4 | 32.1 | 24.2 | 0.0 | 35.3 | 19.6 | 0.0 | 29.4 | 14.2 | 11.0 |
| LnGrp LOS | D | A | C | C | C | | D | B | | C | B | B |
| Approach Vol, veh/h | | 134 | | | 200 | A | | 1260 | A | | 1583 | |
| Approach Delay, s/veh | | 29.8 | | | 30.2 | | | 20.3 | | | 17.7 | |
| Approach LOS | | C | | | C | | | C | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 14.2 | 30.0 | 9.3 | 15.0 | 7.8 | 36.4 | 7.3 | 17.0 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 19.9 | 37.6 | 10.0 | 32.0 | 6.4 | 51.1 | 6.5 | 35.5 |
| Max Q Clear Time (g_c+I1), s | 9.1 | 15.8 | 4.9 | 5.3 | 4.1 | 13.6 | 3.6 | 3.5 |
| Green Ext Time (p_c), s | 0.5 | 8.0 | 0.1 | 0.5 | 0.0 | 9.4 | 0.0 | 0.2 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 20.0 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 7.4 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 62 | 20 | 0 | 354 | 19 |
| Future Vol, veh/h | 0 | 62 | 20 | 0 | 354 | 19 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 67 | 22 | 0 | 385 | 21 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 813 | 22 | 0 | 0 | 22 | 0 |
| Stage 1 | 22 | - | - | - | - | - |
| Stage 2 | 791 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 348 | 1055 | - | - | 1593 | - |
| Stage 1 | 1001 | - | - | - | - | - |
| Stage 2 | 447 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 263 | 1055 | - | - | 1593 | - |
| Mov Cap-2 Maneuver | 263 | - | - | - | - | - |
| Stage 1 | 1001 | - | - | - | - | - |
| Stage 2 | 338 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.6 | 0 | 7.6 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1055 | 1593 | - |
| HCM Lane V/C Ratio | - | - | 0.064 | 0.242 | - |
| HCM Control Delay (s) | - | - | 8.6 | 8 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.2 | 0.9 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 27 | 0 | 79 | 3 | 33 | 373 | 3 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 27 | 0 | 79 | 3 | 33 | 373 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 34 | 0 | 100 | 4 | 42 | 472 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 678 | 662 | 474 | 660 | 662 | 102 | 476 | 0 | 0 | 104 | 0 | 0 |
| Stage 1 | 558 | 558 | - | 102 | 102 | - | - | - | - | - | - | - |
| Stage 2 | 120 | 104 | - | 558 | 560 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 366 | 382 | 590 | 376 | 382 | 953 | 1086 | - | - | 1488 | - | - |
| Stage 1 | 514 | 512 | - | 904 | 811 | - | - | - | - | - | - | - |
| Stage 2 | 884 | 809 | - | 514 | 511 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 344 | 371 | 590 | 368 | 371 | 953 | 1086 | - | - | 1488 | - | - |
| Mov Cap-2 Maneuver | 344 | 371 | - | 368 | 371 | - | - | - | - | - | - | - |
| Stage 1 | 514 | 498 | - | 904 | 811 | - | - | - | - | - | - | - |
| Stage 2 | 851 | 809 | - | 499 | 497 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 15.5 | 9.2 | 0 | 0.6 |
| HCM LOS | C | A | | |

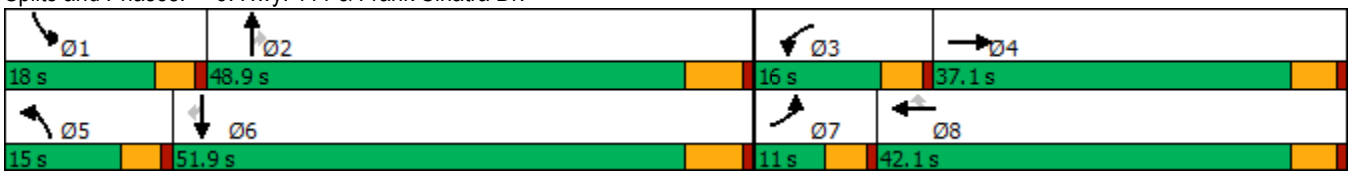
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1086 | - | - | 344 | 902 | 1488 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.004 | 0.039 | 0.028 | - | - |
| HCM Control Delay (s) | 0 | - | - | 15.5 | 9.2 | 7.5 | - | - |
| HCM Lane LOS | A | - | - | C | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0.1 | - | - |

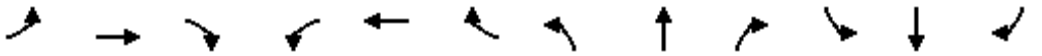
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 35 | 64 | 141 | 152 | 160 | 190 | 1078 | 95 | 188 | 1171 | 125 |
| Future Volume (vph) | 35 | 64 | 141 | 152 | 160 | 190 | 1078 | 95 | 188 | 1171 | 125 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 83.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 35 | 64 | 36 | 141 | 152 | 160 | 190 | 1078 | 95 | 188 | 1171 | 125 |
| Future Volume (veh/h) | 35 | 64 | 36 | 141 | 152 | 160 | 190 | 1078 | 95 | 188 | 1171 | 125 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 38 | 70 | 40 | 155 | 167 | 0 | 209 | 1185 | 0 | 207 | 1287 | 133 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 65 | 160 | 91 | 239 | 329 | | 248 | 2179 | | 299 | 1909 | 590 |
| Arrive On Green | 0.04 | 0.14 | 0.14 | 0.07 | 0.18 | 0.00 | 0.14 | 0.43 | 0.00 | 0.09 | 0.37 | 0.37 |
| Sat Flow, veh/h | 1781 | 1117 | 638 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1579 |
| Grp Volume(v), veh/h | 38 | 0 | 110 | 155 | 167 | 0 | 209 | 1185 | 0 | 207 | 1287 | 133 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1755 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1579 |
| Q Serve(g_s), s | 1.6 | 0.0 | 4.3 | 3.3 | 6.0 | 0.0 | 8.5 | 12.9 | 0.0 | 4.3 | 15.8 | 4.3 |
| Cycle Q Clear(g_c), s | 1.6 | 0.0 | 4.3 | 3.3 | 6.0 | 0.0 | 8.5 | 12.9 | 0.0 | 4.3 | 15.8 | 4.3 |
| Prop In Lane | 1.00 | | 0.36 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 65 | 0 | 251 | 239 | 329 | | 248 | 2179 | | 299 | 1909 | 590 |
| V/C Ratio(X) | 0.58 | 0.00 | 0.44 | 0.65 | 0.51 | | 0.84 | 0.54 | | 0.69 | 0.67 | 0.23 |
| Avail Cap(c_a), veh/h | 153 | 0 | 753 | 528 | 927 | | 248 | 2921 | | 620 | 3126 | 966 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.4 | 0.0 | 29.2 | 33.9 | 27.8 | 0.0 | 31.3 | 16.0 | 0.0 | 33.1 | 19.6 | 16.0 |
| Incr Delay (d2), s/veh | 3.1 | 0.0 | 1.2 | 1.1 | 1.2 | 0.0 | 21.2 | 0.2 | 0.0 | 1.1 | 0.4 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.0 | 1.8 | 1.3 | 2.7 | 0.0 | 4.8 | 4.2 | 0.0 | 1.7 | 5.3 | 1.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 38.5 | 0.0 | 30.5 | 35.0 | 29.1 | 0.0 | 52.5 | 16.2 | 0.0 | 34.2 | 20.0 | 16.2 |
| LnGrp LOS | D | A | C | C | C | | D | B | | C | B | B |
| Approach Vol, veh/h | | 148 | | | 322 | A | | 1394 | A | | 1627 | |
| Approach Delay, s/veh | | 32.5 | | | 31.9 | | | 21.6 | | | 21.5 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.1 | 38.1 | 9.8 | 15.8 | 15.0 | 34.1 | 7.3 | 18.2 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 6.3 | 14.9 | 5.3 | 6.3 | 10.5 | 17.8 | 3.6 | 8.0 |
| Green Ext Time (p_c), s | 0.2 | 8.6 | 0.1 | 0.6 | 0.0 | 10.2 | 0.0 | 0.9 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 23.0 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 9 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 347 | 20 | 0 | 69 | 19 |
| Future Vol, veh/h | 0 | 347 | 20 | 0 | 69 | 19 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 377 | 22 | 0 | 75 | 21 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 193 | 22 | 0 | 0 | 22 | 0 |
| Stage 1 | 22 | - | - | - | - | - |
| Stage 2 | 171 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 796 | 1055 | - | - | 1593 | - |
| Stage 1 | 1001 | - | - | - | - | - |
| Stage 2 | 859 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 758 | 1055 | - | - | 1593 | - |
| Mov Cap-2 Maneuver | 758 | - | - | - | - | - |
| Stage 1 | 1001 | - | - | - | - | - |
| Stage 2 | 818 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 10.3 | 0 | 5.8 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1055 | 1593 | - |
| HCM Lane V/C Ratio | - | - | 0.358 | 0.047 | - |
| HCM Control Delay (s) | - | - | 10.3 | 7.4 | 0 |
| HCM Lane LOS | - | - | B | A | A |
| HCM 95th %tile Q(veh) | - | - | 1.6 | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 27 | 0 | 364 | 3 | 33 | 88 | 3 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 27 | 0 | 364 | 3 | 33 | 88 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 34 | 0 | 461 | 4 | 42 | 111 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 678 | 662 | 113 | 660 | 662 | 463 | 115 | 0 | 0 | 465 | 0 | 0 |
| Stage 1 | 197 | 197 | - | 463 | 463 | - | - | - | - | - | - | - |
| Stage 2 | 481 | 465 | - | 197 | 199 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 366 | 382 | 940 | 376 | 382 | 599 | 1474 | - | - | 1096 | - | - |
| Stage 1 | 805 | 738 | - | 579 | 564 | - | - | - | - | - | - | - |
| Stage 2 | 566 | 563 | - | 805 | 736 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 334 | 367 | 940 | 365 | 367 | 599 | 1474 | - | - | 1096 | - | - |
| Mov Cap-2 Maneuver | 334 | 367 | - | 365 | 367 | - | - | - | - | - | - | - |
| Stage 1 | 805 | 710 | - | 579 | 564 | - | - | - | - | - | - | - |
| Stage 2 | 533 | 563 | - | 774 | 708 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 15.8 | 11.5 | 0 | 2.2 |
| HCM LOS | C | B | | |

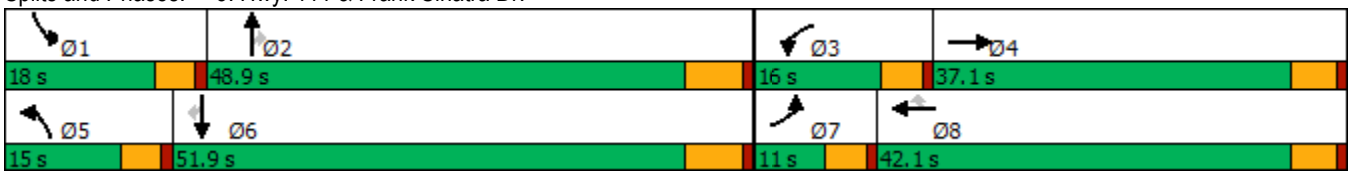
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1474 | - | - | 334 | 586 | 1096 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.004 | 0.06 | 0.038 | - | - |
| HCM Control Delay (s) | 0 | - | - | 15.8 | 11.5 | 8.4 | - | - |
| HCM Lane LOS | A | - | - | C | B | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.2 | 0.1 | - | - |

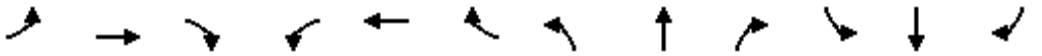
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 106 | 163 | 141 | 52 | 160 | 76 | 1078 | 95 | 188 | 1171 | 53 |
| Future Volume (vph) | 106 | 163 | 141 | 52 | 160 | 76 | 1078 | 95 | 188 | 1171 | 53 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 95
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 106 | 163 | 150 | 141 | 52 | 160 | 76 | 1078 | 95 | 188 | 1171 | 53 |
| Future Volume (veh/h) | 106 | 163 | 150 | 141 | 52 | 160 | 76 | 1078 | 95 | 188 | 1171 | 53 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 116 | 179 | 165 | 155 | 57 | 0 | 84 | 1185 | 0 | 207 | 1287 | 54 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 146 | 219 | 202 | 237 | 431 | | 108 | 1732 | | 295 | 1858 | 574 |
| Arrive On Green | 0.08 | 0.24 | 0.24 | 0.07 | 0.23 | 0.00 | 0.06 | 0.34 | 0.00 | 0.09 | 0.36 | 0.36 |
| Sat Flow, veh/h | 1781 | 896 | 826 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1579 |
| Grp Volume(v), veh/h | 116 | 0 | 344 | 155 | 57 | 0 | 84 | 1185 | 0 | 207 | 1287 | 54 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1722 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1579 |
| Q Serve(g_s), s | 5.0 | 0.0 | 14.7 | 3.4 | 1.9 | 0.0 | 3.6 | 15.6 | 0.0 | 4.5 | 16.7 | 1.8 |
| Cycle Q Clear(g_c), s | 5.0 | 0.0 | 14.7 | 3.4 | 1.9 | 0.0 | 3.6 | 15.6 | 0.0 | 4.5 | 16.7 | 1.8 |
| Prop In Lane | 1.00 | | 0.48 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 146 | 0 | 420 | 237 | 431 | | 108 | 1732 | | 295 | 1858 | 574 |
| V/C Ratio(X) | 0.79 | 0.00 | 0.82 | 0.65 | 0.13 | | 0.78 | 0.68 | | 0.70 | 0.69 | 0.09 |
| Avail Cap(c_a), veh/h | 146 | 0 | 706 | 505 | 887 | | 237 | 2794 | | 593 | 2990 | 924 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.2 | 0.0 | 27.9 | 35.4 | 23.8 | 0.0 | 36.1 | 22.2 | 0.0 | 34.7 | 21.1 | 16.3 |
| Incr Delay (d2), s/veh | 23.5 | 0.0 | 4.0 | 1.1 | 0.1 | 0.0 | 4.4 | 0.5 | 0.0 | 1.1 | 0.5 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.1 | 0.0 | 6.3 | 1.4 | 0.8 | 0.0 | 1.6 | 5.5 | 0.0 | 1.8 | 5.8 | 0.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 58.7 | 0.0 | 31.8 | 36.6 | 24.0 | 0.0 | 40.6 | 22.7 | 0.0 | 35.9 | 21.6 | 16.4 |
| LnGrp LOS | E | A | C | D | C | | D | C | | D | C | B |
| Approach Vol, veh/h | | 460 | | | 212 | A | | 1269 | A | | 1548 | |
| Approach Delay, s/veh | | 38.6 | | | 33.2 | | | 23.9 | | | 23.3 | |
| Approach LOS | | D | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.3 | 32.7 | 9.9 | 24.2 | 9.3 | 34.6 | 11.0 | 23.1 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 6.5 | 17.6 | 5.4 | 16.7 | 5.6 | 18.7 | 7.0 | 3.9 |
| Green Ext Time (p_c), s | 0.2 | 8.3 | 0.1 | 1.9 | 0.0 | 9.7 | 0.0 | 0.2 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 26.1 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

# APPENDIX 5.2:

# E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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# Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
# (Average Traffic Estimate Form)

| DIST | CO | RTE | PM | TRAFFIC CONDITIONS | | E+P |
|---|---|---|---|---|---|---|
| | | | | CALC RV | DATE | 01/09/19 |
| Jurisdiction: **City of Rancho Mirage** | | | | CHK RV | DATE | 01/09/19 |
| Major Street: **Frank Sinatra Dr.** | | | | Critical Approach Speed (Major) | | 30 mph |
| Minor Street: **Driveway 1** | | | | Critical Approach Speed (Minor) | | 25 mph |

Major Street Approach Lanes = **1** lane  Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **1,919** vpd  Minor Street Future ADT = **264** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……

**URBAN (U)**

## (Based on Estimated Average Daily Traffic - See Note)

| URBAN / RURAL | Minimum Requirements EADT | | | |
|---|---|---|---|---|
| | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| **CONDITION A - Minimum Vehicular Volume** | Urban | Rural | Urban | Rural |
| XX Satisfied / XX Not Satisfied | | | | |
| Number of lanes for moving traffic on each approach | | | | |
| Major Street / Minor Street | | | | |
| *1* **1,919** / *1* **264** | 8,000 | 5,600 | 2,400 | 1,680 |
| *2* + / *1* | 9,600 | 6,720 | 2,400 | 1,680 |
| *2* + / *2* + | 9,600 | 6,720 | 3,200 | 2,240 |
| *1* / *2* + | 8,000 | 5,600 | 3,200 | 2,240 |
| **CONDITION B - Interruption of Continuous Traffic** | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied / XX Not Satisfied | Urban | Rural | Urban | Rural |
| Number of lanes for moving traffic on each approach | | | | |
| Major Street / Minor Street | | | | |
| *1* **1,919** / *1* **264** | 12,000 | 8,400 | 1,200 | 850 |
| *2* + / *1* | 14,400 | 10,080 | 1,200 | 850 |
| *2* + / *2* + | 14,400 | 10,080 | 1,600 | 1,120 |
| *1* / *2* + | 12,000 | 8,400 | 1,600 | 1,120 |
| **Combination of CONDITIONS A + B** | | | | |
| Satisfied / XX Not Satisfied | 2 CONDITIONS 80% | | 2 CONDITIONS 80% | |
| No one condition satisfied, but following conditions fulfilled 80% of more ….. **A** 11% **B** 16% | | | | |

**Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.**

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

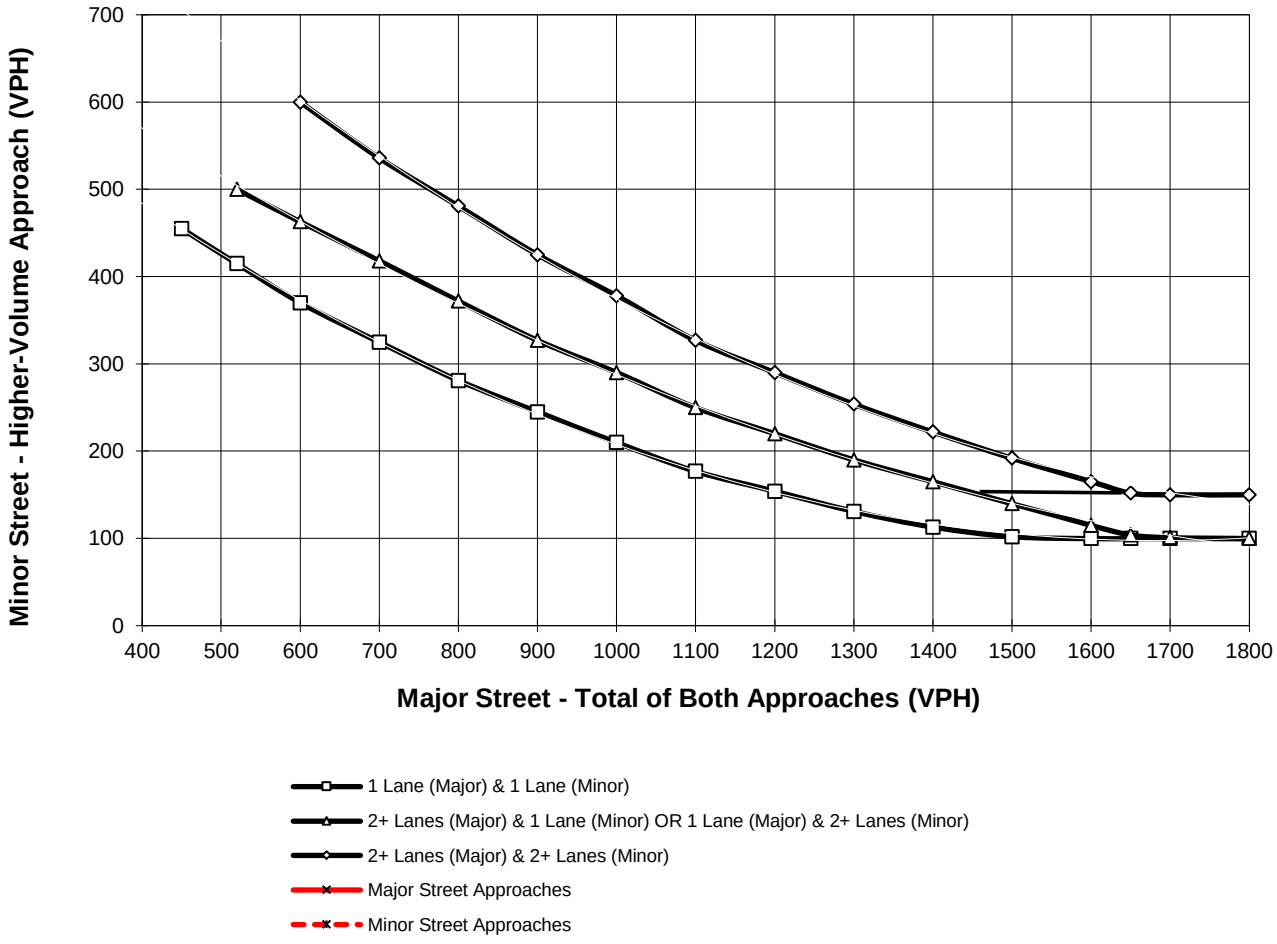
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **E+P Conditions - Weekday PM Peak Hour**

Major Street Name = **Frank Sinatra Dr.**
Total of Both Approaches (VPH) = **150**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 2**
High Volume Approach (VPH) = **18**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

# APPENDIX 5.3:

# E+P CONDITIONS QUEUING ANALYSIS WORKSHEETS

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## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB |
|---|---|
| Directions Served | LR |
| Maximum Queue (ft) | 48 |
| Average Queue (ft) | 21 |
| 95th Queue (ft) | 46 |
| Link Distance (ft) | 453 |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (ft) | |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB |
|---|---|---|
| Directions Served | LTR | LTR |
| Maximum Queue (ft) | 25 | 28 |
| Average Queue (ft) | 4 | 14 |
| 95th Queue (ft) | 19 | 37 |
| Link Distance (ft) | 353 | 358 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 26 | 72 | 280 | 63 | 389 | 43 | 768 | 94 | 288 | 1213 | 44 |
| v/c Ratio | 0.20 | 0.21 | 0.49 | 0.11 | 0.54 | 0.28 | 0.55 | 0.17 | 0.55 | 0.58 | 0.06 |
| Control Delay | 47.9 | 20.8 | 37.5 | 23.2 | 7.9 | 46.9 | 27.3 | 0.7 | 38.9 | 21.9 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 47.9 | 20.8 | 37.5 | 23.2 | 7.9 | 46.9 | 27.3 | 0.7 | 38.9 | 21.9 | 0.1 |
| Queue Length 50th (ft) | 12 | 16 | 63 | 20 | 14 | 19 | 108 | 0 | 65 | 171 | 0 |
| Queue Length 95th (ft) | 51 | 59 | 151 | 64 | 99 | 72 | 231 | 0 | 155 | 341 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 137 | 806 | 858 | 1178 | 1127 | 188 | 2390 | 821 | 858 | 3120 | 1027 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.19 | 0.09 | 0.33 | 0.05 | 0.35 | 0.23 | 0.32 | 0.11 | 0.34 | 0.39 | 0.04 |

Intersection Summary

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB |
|---|---|
| Directions Served | LR |
| Maximum Queue (ft) | 54 |
| Average Queue (ft) | 20 |
| 95th Queue (ft) | 46 |
| Link Distance (ft) | 453 |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (ft) | |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB | SB |
|---|---|---|---|
| Directions Served | LTR | LTR | L |
| Maximum Queue (ft) | 25 | 28 | 30 |
| Average Queue (ft) | 12 | 11 | 2 |
| 95th Queue (ft) | 32 | 34 | 14 |
| Link Distance (ft) | 353 | 358 | |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (ft) | | | 210 |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 41 | 99 | 151 | 49 | 304 | 55 | 1205 | 176 | 372 | 1184 | 33 |
| v/c Ratio | 0.32 | 0.32 | 0.38 | 0.12 | 0.53 | 0.42 | 0.67 | 0.27 | 0.64 | 0.49 | 0.04 |
| Control Delay | 52.1 | 30.8 | 44.2 | 31.6 | 7.5 | 55.3 | 27.5 | 5.3 | 41.6 | 18.1 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 52.1 | 30.8 | 44.2 | 31.6 | 7.5 | 55.3 | 27.5 | 5.3 | 41.6 | 18.1 | 0.1 |
| Queue Length 50th (ft) | 21 | 37 | 38 | 23 | 0 | 28 | 189 | 0 | 93 | 154 | 0 |
| Queue Length 95th (ft) | 70 | 92 | 94 | 58 | 65 | #101 | 363 | 51 | 193 | 292 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 143 | 712 | 433 | 824 | 869 | 141 | 2382 | 824 | 851 | 3237 | 1024 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.29 | 0.14 | 0.35 | 0.06 | 0.35 | 0.39 | 0.51 | 0.21 | 0.44 | 0.37 | 0.03 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB | SB |
|---|---|---|
| Directions Served | LR | LT |
| Maximum Queue (ft) | 48 | 73 |
| Average Queue (ft) | 25 | 7 |
| 95th Queue (ft) | 44 | 36 |
| Link Distance (ft) | 453 | 178 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | WB | SB |
|---|---|---|
| Directions Served | LTR | L |
| Maximum Queue (ft) | 52 | 28 |
| Average Queue (ft) | 15 | 1 |
| 95th Queue (ft) | 45 | 9 |
| Link Distance (ft) | 358 | |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | 210 |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 38 | 110 | 155 | 167 | 176 | 209 | 1185 | 104 | 207 | 1287 | 137 |
| v/c Ratio | 0.29 | 0.34 | 0.38 | 0.40 | 0.36 | 0.90 | 0.60 | 0.15 | 0.51 | 0.68 | 0.20 |
| Control Delay | 50.6 | 30.2 | 42.7 | 33.0 | 7.2 | 80.3 | 23.7 | 2.1 | 43.4 | 25.0 | 4.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 50.6 | 30.2 | 42.7 | 33.0 | 7.2 | 80.3 | 23.7 | 2.1 | 43.4 | 25.0 | 4.3 |
| Queue Length 50th (ft) | 18 | 40 | 38 | 77 | 0 | 105 | 171 | 0 | 50 | 194 | 0 |
| Queue Length 95th (ft) | 67 | 101 | 94 | 158 | 51 | #368 | 332 | 16 | 119 | 352 | 36 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 142 | 724 | 493 | 869 | 822 | 232 | 2740 | 908 | 580 | 2932 | 952 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.27 | 0.15 | 0.31 | 0.19 | 0.21 | 0.90 | 0.43 | 0.11 | 0.36 | 0.44 | 0.14 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB |
|---|---|
| Directions Served | LR |
| Maximum Queue (ft) | 121 |
| Average Queue (ft) | 59 |
| 95th Queue (ft) | 89 |
| Link Distance (ft) | 453 |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (ft) | |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB | SB |
|---|---|---|---|
| Directions Served | LTR | LTR | L |
| Maximum Queue (ft) | 24 | 28 | 52 |
| Average Queue (ft) | 1 | 14 | 13 |
| 95th Queue (ft) | 8 | 37 | 39 |
| Link Distance (ft) | 353 | 358 | |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (ft) | | | 210 |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 116 | 344 | 155 | 57 | 176 | 84 | 1185 | 104 | 207 | 1287 | 58 |
| v/c Ratio | 0.94 | 0.79 | 0.49 | 0.12 | 0.33 | 0.54 | 0.69 | 0.17 | 0.56 | 0.66 | 0.08 |
| Control Delay | 115.5 | 45.4 | 50.4 | 28.9 | 6.4 | 59.8 | 30.3 | 2.2 | 49.7 | 27.7 | 0.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 115.5 | 45.4 | 50.4 | 28.9 | 6.4 | 59.8 | 30.3 | 2.2 | 49.7 | 27.7 | 0.2 |
| Queue Length 50th (ft) | 72 | 176 | 47 | 26 | 0 | 50 | 224 | 0 | 62 | 245 | 0 |
| Queue Length 95th (ft) | #233 | 325 | 94 | 64 | 51 | 118 | 332 | 16 | 119 | 352 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 124 | 633 | 430 | 758 | 739 | 202 | 2387 | 811 | 505 | 2555 | 849 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.94 | 0.54 | 0.36 | 0.08 | 0.24 | 0.42 | 0.50 | 0.13 | 0.41 | 0.50 | 0.07 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

# APPENDIX 6.1:

# EAP (2023) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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| Intersection | |
|---|---|
| Int Delay, s/veh | 3.9 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 39 | 19 | 0 | 12 | 40 |
| Future Vol, veh/h | 0 | 39 | 19 | 0 | 12 | 40 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 42 | 21 | 0 | 13 | 43 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 90 | 21 | 0 | 0 | 21 | 0 |
| Stage 1 | 21 | - | - | - | - | - |
| Stage 2 | 69 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 910 | 1056 | - | - | 1595 | - |
| Stage 1 | 1002 | - | - | - | - | - |
| Stage 2 | 954 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 903 | 1056 | - | - | 1595 | - |
| Mov Cap-2 Maneuver | 903 | - | - | - | - | - |
| Stage 1 | 1002 | - | - | - | - | - |
| Stage 2 | 946 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.6 | 0 | 1.7 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1056 | 1595 | - |
| HCM Lane V/C Ratio | - | - | 0.04 | 0.008 | - |
| HCM Control Delay (s) | - | - | 8.6 | 7.3 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.1 | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.9 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 16 | 1 | 57 | 0 | 13 | 51 | 0 |
| Future Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 16 | 1 | 57 | 0 | 13 | 51 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1 | 1 | 0 | 0 | 18 | 1 | 63 | 0 | 14 | 57 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 159 | 150 | 57 | 151 | 150 | 63 | 57 | 0 | 0 | 63 | 0 | 0 |
| Stage 1 | 85 | 85 | - | 65 | 65 | - | - | - | - | - | - | - |
| Stage 2 | 74 | 65 | - | 86 | 85 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 807 | 742 | 1009 | 816 | 742 | 1002 | 1547 | - | - | 1540 | - | - |
| Stage 1 | 923 | 824 | - | 946 | 841 | - | - | - | - | - | - | - |
| Stage 2 | 935 | 841 | - | 922 | 824 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 787 | 735 | 1009 | 808 | 735 | 1002 | 1547 | - | - | 1540 | - | - |
| Mov Cap-2 Maneuver | 787 | 735 | - | 808 | 735 | - | - | - | - | - | - | - |
| Stage 1 | 922 | 817 | - | 945 | 840 | - | - | - | - | - | - | - |
| Stage 2 | 918 | 840 | - | 911 | 817 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 9.2 | 8.7 | 0.1 | 1.5 |
| HCM LOS | A | A | | |

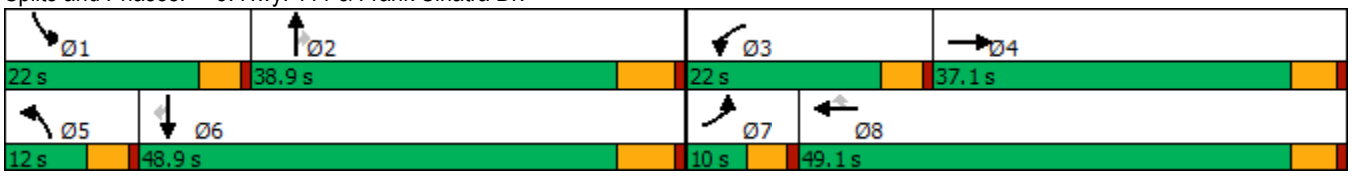
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1547 | - | - | 850 | 1002 | 1540 | - | - |
| HCM Lane V/C Ratio | 0.001 | - | - | 0.003 | 0.018 | 0.009 | - | - |
| HCM Control Delay (s) | 7.3 | - | - | 9.2 | 8.7 | 7.4 | - | - |
| HCM Lane LOS | A | - | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0 | - | - |

| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 25 | 36 | 281 | 64 | 392 | 43 | 773 | 94 | 290 | 1221 | 44 |
| Future Volume (vph) | 25 | 36 | 281 | 64 | 392 | 43 | 773 | 94 | 290 | 1221 | 44 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 10.0 | 37.1 | 22.0 | 49.1 | 49.1 | 12.0 | 38.9 | 38.9 | 22.0 | 48.9 | 48.9 |
| Total Split (%) | 8.3% | 30.9% | 18.3% | 40.9% | 40.9% | 10.0% | 32.4% | 32.4% | 18.3% | 40.8% | 40.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 80.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 25 | 36 | 34 | 281 | 64 | 392 | 43 | 773 | 94 | 290 | 1221 | 44 |
| Future Volume (veh/h) | 25 | 36 | 34 | 281 | 64 | 392 | 43 | 773 | 94 | 290 | 1221 | 44 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 27 | 39 | 31 | 302 | 69 | 0 | 46 | 831 | 0 | 312 | 1313 | 33 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 52 | 147 | 117 | 412 | 454 | | 76 | 1560 | | 421 | 1964 | 610 |
| Arrive On Green | 0.03 | 0.15 | 0.15 | 0.12 | 0.24 | 0.00 | 0.04 | 0.31 | 0.00 | 0.12 | 0.38 | 0.38 |
| Sat Flow, veh/h | 1781 | 961 | 764 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1585 |
| Grp Volume(v), veh/h | 27 | 0 | 70 | 302 | 69 | 0 | 46 | 831 | 0 | 312 | 1313 | 33 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1726 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1585 |
| Q Serve(g_s), s | 1.0 | 0.0 | 2.4 | 5.8 | 2.0 | 0.0 | 1.7 | 9.2 | 0.0 | 5.9 | 14.5 | 0.9 |
| Cycle Q Clear(g_c), s | 1.0 | 0.0 | 2.4 | 5.8 | 2.0 | 0.0 | 1.7 | 9.2 | 0.0 | 5.9 | 14.5 | 0.9 |
| Prop In Lane | 1.00 | | 0.44 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 52 | 0 | 264 | 412 | 454 | | 76 | 1560 | | 421 | 1964 | 610 |
| V/C Ratio(X) | 0.52 | 0.00 | 0.27 | 0.73 | 0.15 | | 0.61 | 0.53 | | 0.74 | 0.67 | 0.05 |
| Avail Cap(c_a), veh/h | 141 | 0 | 810 | 882 | 1207 | | 193 | 2448 | | 882 | 3197 | 992 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 32.6 | 0.0 | 25.5 | 29.0 | 20.3 | 0.0 | 32.1 | 19.6 | 0.0 | 28.9 | 17.4 | 13.2 |
| Incr Delay (d2), s/veh | 2.9 | 0.0 | 0.5 | 1.0 | 0.2 | 0.0 | 2.9 | 0.3 | 0.0 | 1.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 0.0 | 1.0 | 2.3 | 0.8 | 0.0 | 0.7 | 3.1 | 0.0 | 2.3 | 4.7 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.5 | 0.0 | 26.0 | 29.9 | 20.5 | 0.0 | 35.0 | 19.9 | 0.0 | 29.9 | 17.8 | 13.2 |
| LnGrp LOS | D | A | C | C | C | | C | B | | C | B | B |
| Approach Vol, veh/h | | 97 | | | 371 | A | | 877 | A | | 1658 | |
| Approach Delay, s/veh | | 28.7 | | | 28.2 | | | 20.7 | | | 20.0 | |
| Approach LOS | | C | | | C | | | C | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.9 | 27.0 | 12.7 | 15.5 | 7.5 | 32.4 | 6.6 | 21.7 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 17.4 | 32.7 | 17.4 | 32.0 | 7.4 | 42.7 | 5.4 | 44.0 |
| Max Q Clear Time (g_c+I1), s | 7.9 | 11.2 | 7.8 | 4.4 | 3.7 | 16.5 | 3.0 | 4.0 |
| Green Ext Time (p_c), s | 0.4 | 5.2 | 0.4 | 0.3 | 0.0 | 9.7 | 0.0 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 21.5 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.3 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 31 | 22 | 0 | 55 | 19 |
| Future Vol, veh/h | 0 | 31 | 22 | 0 | 55 | 19 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 34 | 24 | 0 | 60 | 21 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 165 | 24 | 0 | 0 | 24 | 0 |
| Stage 1 | 24 | - | - | - | - | - |
| Stage 2 | 141 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 826 | 1052 | - | - | 1591 | - |
| Stage 1 | 999 | - | - | - | - | - |
| Stage 2 | 886 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 795 | 1052 | - | - | 1591 | - |
| Mov Cap-2 Maneuver | 795 | - | - | - | - | - |
| Stage 1 | 999 | - | - | - | - | - |
| Stage 2 | 852 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.5 | 0 | 5.5 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1052 | 1591 | - |
| HCM Lane V/C Ratio | - | - | 0.032 | 0.038 | - |
| HCM Control Delay (s) | - | - | 8.5 | 7.4 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.1 | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.8 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 17 | 2 | 0 | 0 | 4 | 9 | 0 | 53 | 0 | 27 | 74 | 1 |
| Future Vol, veh/h | 17 | 2 | 0 | 0 | 4 | 9 | 0 | 53 | 0 | 27 | 74 | 1 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 20 | 2 | 0 | 0 | 5 | 11 | 0 | 63 | 0 | 32 | 88 | 1 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 224 | 216 | 89 | 217 | 216 | 63 | 89 | 0 | 0 | 63 | 0 | 0 |
| Stage 1 | 153 | 153 | - | 63 | 63 | - | - | - | - | - | - | - |
| Stage 2 | 71 | 63 | - | 154 | 153 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 732 | 682 | 969 | 739 | 682 | 1002 | 1506 | - | - | 1540 | - | - |
| Stage 1 | 849 | 771 | - | 948 | 842 | - | - | - | - | - | - | - |
| Stage 2 | 939 | 842 | - | 848 | 771 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 709 | 668 | 969 | 725 | 668 | 1002 | 1506 | - | - | 1540 | - | - |
| Mov Cap-2 Maneuver | 709 | 668 | - | 725 | 668 | - | - | - | - | - | - | - |
| Stage 1 | 849 | 755 | - | 948 | 842 | - | - | - | - | - | - | - |
| Stage 2 | 924 | 842 | - | 828 | 755 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 10.3 | 9.2 | 0 | 2 |
| HCM LOS | B | A | | |

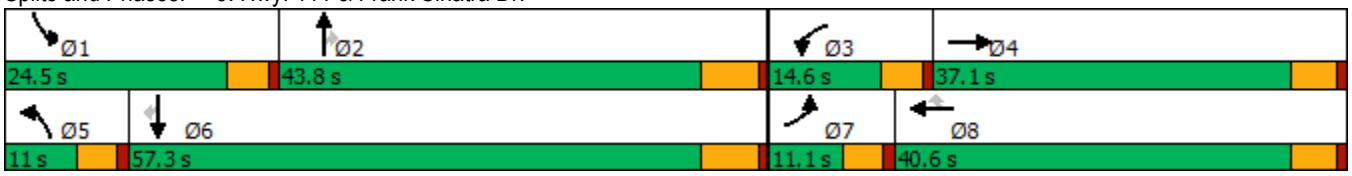
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1506 | - | - | 704 | 868 | 1540 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.032 | 0.018 | 0.021 | - | - |
| HCM Control Delay (s) | 0 | - | - | 10.3 | 9.2 | 7.4 | - | - |
| HCM Lane LOS | A | - | - | B | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0.1 | 0.1 | 0.1 | - | - |

| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 44 | 66 | 161 | 51 | 326 | 57 | 1291 | 188 | 398 | 1269 | 35 |
| Future Volume (vph) | 44 | 66 | 161 | 51 | 326 | 57 | 1291 | 188 | 398 | 1269 | 35 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.1 | 37.1 | 14.6 | 40.6 | 40.6 | 11.0 | 43.8 | 43.8 | 24.5 | 57.3 | 57.3 |
| Total Split (%) | 9.3% | 30.9% | 12.2% | 33.8% | 33.8% | 9.2% | 36.5% | 36.5% | 20.4% | 47.8% | 47.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 89
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 44 | 66 | 38 | 161 | 51 | 326 | 57 | 1291 | 188 | 398 | 1269 | 35 |
| Future Volume (veh/h) | 44 | 66 | 38 | 161 | 51 | 326 | 57 | 1291 | 188 | 398 | 1269 | 35 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 44 | 67 | 32 | 163 | 52 | 0 | 58 | 1304 | 0 | 402 | 1282 | 29 |
| Peak Hour Factor | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 72 | 165 | 79 | 249 | 317 | | 84 | 1846 | | 509 | 2355 | 716 |
| Arrive On Green | 0.04 | 0.14 | 0.14 | 0.07 | 0.17 | 0.00 | 0.05 | 0.36 | 0.00 | 0.15 | 0.46 | 0.46 |
| Sat Flow, veh/h | 1781 | 1195 | 571 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1552 |
| Grp Volume(v), veh/h | 44 | 0 | 99 | 163 | 52 | 0 | 58 | 1304 | 0 | 402 | 1282 | 29 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1766 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1552 |
| Q Serve(g_s), s | 1.8 | 0.0 | 3.7 | 3.3 | 1.7 | 0.0 | 2.3 | 16.0 | 0.0 | 8.2 | 13.2 | 0.7 |
| Cycle Q Clear(g_c), s | 1.8 | 0.0 | 3.7 | 3.3 | 1.7 | 0.0 | 2.3 | 16.0 | 0.0 | 8.2 | 13.2 | 0.7 |
| Prop In Lane | 1.00 | | 0.32 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 72 | 0 | 243 | 249 | 317 | | 84 | 1846 | | 509 | 2355 | 716 |
| V/C Ratio(X) | 0.61 | 0.00 | 0.41 | 0.65 | 0.16 | | 0.69 | 0.71 | | 0.79 | 0.54 | 0.04 |
| Avail Cap(c_a), veh/h | 159 | 0 | 776 | 474 | 912 | | 157 | 2636 | | 944 | 3582 | 1089 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 34.4 | 0.0 | 28.7 | 32.9 | 25.8 | 0.0 | 34.2 | 19.9 | 0.0 | 30.0 | 14.1 | 10.8 |
| Incr Delay (d2), s/veh | 3.1 | 0.0 | 1.1 | 1.1 | 0.2 | 0.0 | 3.7 | 0.5 | 0.0 | 1.1 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.8 | 0.0 | 1.6 | 1.4 | 0.8 | 0.0 | 1.0 | 5.4 | 0.0 | 3.1 | 4.1 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 37.5 | 0.0 | 29.8 | 34.0 | 26.1 | 0.0 | 37.8 | 20.4 | 0.0 | 31.0 | 14.3 | 10.8 |
| LnGrp LOS | D | A | C | C | C | | D | C | | C | B | B |
| Approach Vol, veh/h | | 143 | | | 215 | A | | 1362 | A | | 1713 | |
| Approach Delay, s/veh | | 32.1 | | | 32.1 | | | 21.2 | | | 18.2 | |
| Approach LOS | | C | | | C | | | C | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 15.3 | 32.5 | 9.9 | 15.1 | 8.1 | 39.8 | 7.5 | 17.4 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 19.9 | 37.6 | 10.0 | 32.0 | 6.4 | 51.1 | 6.5 | 35.5 |
| Max Q Clear Time (g_c+I1), s | 10.2 | 18.0 | 5.3 | 5.7 | 4.3 | 15.2 | 3.8 | 3.7 |
| Green Ext Time (p_c), s | 0.5 | 8.4 | 0.1 | 0.5 | 0.0 | 10.4 | 0.0 | 0.2 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 20.8 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 7.3 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 62 | 22 | 0 | 354 | 21 |
| Future Vol, veh/h | 0 | 62 | 22 | 0 | 354 | 21 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 67 | 24 | 0 | 385 | 23 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 817 | 24 | 0 | 0 | 24 | 0 |
| Stage 1 | 24 | - | - | - | - | - |
| Stage 2 | 793 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 346 | 1052 | - | - | 1591 | - |
| Stage 1 | 999 | - | - | - | - | - |
| Stage 2 | 446 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 261 | 1052 | - | - | 1591 | - |
| Mov Cap-2 Maneuver | 261 | - | - | - | - | - |
| Stage 1 | 999 | - | - | - | - | - |
| Stage 2 | 337 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.7 | 0 | 7.5 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1052 | 1591 | - |
| HCM Lane V/C Ratio | - | - | 0.064 | 0.242 | - |
| HCM Control Delay (s) | - | - | 8.7 | 8 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.2 | 1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 29 | 0 | 80 | 3 | 36 | 375 | 3 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 29 | 0 | 80 | 3 | 36 | 375 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 37 | 0 | 101 | 4 | 46 | 475 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 691 | 674 | 477 | 672 | 674 | 103 | 479 | 0 | 0 | 105 | 0 | 0 |
| Stage 1 | 569 | 569 | - | 103 | 103 | - | - | - | - | - | - | - |
| Stage 2 | 122 | 105 | - | 569 | 571 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 359 | 376 | 588 | 370 | 376 | 952 | 1083 | - | - | 1486 | - | - |
| Stage 1 | 507 | 506 | - | 903 | 810 | - | - | - | - | - | - | - |
| Stage 2 | 882 | 808 | - | 507 | 505 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 336 | 364 | 588 | 361 | 364 | 952 | 1083 | - | - | 1486 | - | - |
| Mov Cap-2 Maneuver | 336 | 364 | - | 361 | 364 | - | - | - | - | - | - | - |
| Stage 1 | 507 | 490 | - | 903 | 810 | - | - | - | - | - | - | - |
| Stage 2 | 847 | 808 | - | 491 | 489 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 15.8 | 9.2 | 0 | 0.7 |
| HCM LOS | C | A | | |

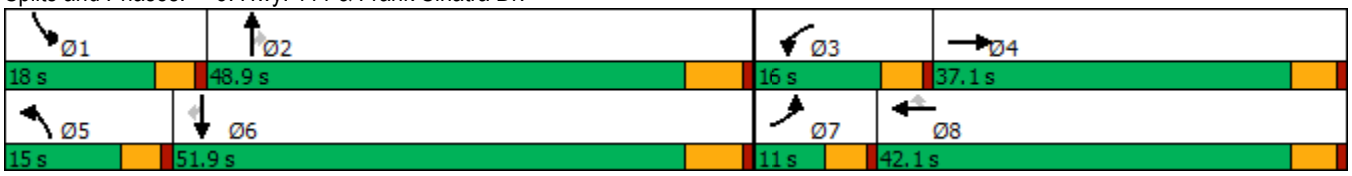
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1083 | - | - | 336 | 903 | 1486 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.004 | 0.042 | 0.031 | - | - |
| HCM Control Delay (s) | 0 | - | - | 15.8 | 9.2 | 7.5 | - | - |
| HCM Lane LOS | A | - | - | C | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0.1 | - | - |

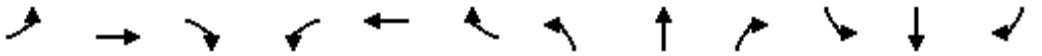
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 37 | 67 | 153 | 154 | 173 | 194 | 1167 | 103 | 203 | 1268 | 128 |
| Future Volume (vph) | 37 | 67 | 153 | 154 | 173 | 194 | 1167 | 103 | 203 | 1268 | 128 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 89.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 37 | 67 | 37 | 153 | 154 | 173 | 194 | 1167 | 103 | 203 | 1268 | 128 |
| Future Volume (veh/h) | 37 | 67 | 37 | 153 | 154 | 173 | 194 | 1167 | 103 | 203 | 1268 | 128 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 41 | 74 | 41 | 168 | 169 | 0 | 213 | 1282 | 0 | 223 | 1393 | 137 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 67 | 155 | 86 | 252 | 323 | | 238 | 2228 | | 312 | 2007 | 621 |
| Arrive On Green | 0.04 | 0.14 | 0.14 | 0.07 | 0.17 | 0.00 | 0.13 | 0.44 | 0.00 | 0.09 | 0.39 | 0.39 |
| Sat Flow, veh/h | 1781 | 1131 | 627 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1579 |
| Grp Volume(v), veh/h | 41 | 0 | 115 | 168 | 169 | 0 | 213 | 1282 | 0 | 223 | 1393 | 137 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1758 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1579 |
| Q Serve(g_s), s | 1.8 | 0.0 | 4.7 | 3.7 | 6.4 | 0.0 | 9.2 | 14.7 | 0.0 | 4.9 | 17.7 | 4.5 |
| Cycle Q Clear(g_c), s | 1.8 | 0.0 | 4.7 | 3.7 | 6.4 | 0.0 | 9.2 | 14.7 | 0.0 | 4.9 | 17.7 | 4.5 |
| Prop In Lane | 1.00 | | 0.36 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 67 | 0 | 242 | 252 | 323 | | 238 | 2228 | | 312 | 2007 | 621 |
| V/C Ratio(X) | 0.61 | 0.00 | 0.48 | 0.67 | 0.52 | | 0.90 | 0.58 | | 0.71 | 0.69 | 0.22 |
| Avail Cap(c_a), veh/h | 146 | 0 | 722 | 506 | 888 | | 238 | 2799 | | 594 | 2995 | 926 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.9 | 0.0 | 31.0 | 35.2 | 29.3 | 0.0 | 33.2 | 16.5 | 0.0 | 34.5 | 19.7 | 15.7 |
| Incr Delay (d2), s/veh | 3.3 | 0.0 | 1.5 | 1.1 | 1.3 | 0.0 | 31.5 | 0.2 | 0.0 | 1.1 | 0.4 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.8 | 0.0 | 2.0 | 1.5 | 2.9 | 0.0 | 5.7 | 4.8 | 0.0 | 1.9 | 6.0 | 1.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 40.2 | 0.0 | 32.5 | 36.3 | 30.6 | 0.0 | 64.7 | 16.8 | 0.0 | 35.6 | 20.2 | 15.9 |
| LnGrp LOS | D | A | C | D | C | | E | B | | D | C | B |
| Approach Vol, veh/h | | 156 | | | 337 | A | | 1495 | A | | 1753 | |
| Approach Delay, s/veh | | 34.5 | | | 33.5 | | | 23.6 | | | 21.8 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.6 | 40.2 | 10.3 | 15.8 | 15.0 | 36.8 | 7.5 | 18.5 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 6.9 | 16.7 | 5.7 | 6.7 | 11.2 | 19.7 | 3.8 | 8.4 |
| Green Ext Time (p_c), s | 0.2 | 9.3 | 0.1 | 0.6 | 0.0 | 10.9 | 0.0 | 0.9 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 24.1 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 8.9 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 347 | 22 | 0 | 69 | 21 |
| Future Vol, veh/h | 0 | 347 | 22 | 0 | 69 | 21 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 377 | 24 | 0 | 75 | 23 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 197 | 24 | 0 | 0 | 24 | 0 |
| Stage 1 | 24 | - | - | - | - | - |
| Stage 2 | 173 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 792 | 1052 | - | - | 1591 | - |
| Stage 1 | 999 | - | - | - | - | - |
| Stage 2 | 857 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 754 | 1052 | - | - | 1591 | - |
| Mov Cap-2 Maneuver | 754 | - | - | - | - | - |
| Stage 1 | 999 | - | - | - | - | - |
| Stage 2 | 816 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 10.3 | 0 | 5.7 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1052 | 1591 | - |
| HCM Lane V/C Ratio | - | - | 0.359 | 0.047 | - |
| HCM Control Delay (s) | - | - | 10.3 | 7.4 | 0 |
| HCM Lane LOS | - | - | B | A | A |
| HCM 95th %tile Q(veh) | - | - | 1.6 | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 29 | 0 | 365 | 3 | 36 | 90 | 3 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 29 | 0 | 365 | 3 | 36 | 90 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 37 | 0 | 462 | 4 | 46 | 114 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 691 | 674 | 116 | 672 | 674 | 464 | 118 | 0 | 0 | 466 | 0 | 0 |
| Stage 1 | 208 | 208 | - | 464 | 464 | - | - | - | - | - | - | - |
| Stage 2 | 483 | 466 | - | 208 | 210 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 359 | 376 | 936 | 370 | 376 | 598 | 1470 | - | - | 1095 | - | - |
| Stage 1 | 794 | 730 | - | 578 | 564 | - | - | - | - | - | - | - |
| Stage 2 | 565 | 562 | - | 794 | 728 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 325 | 360 | 936 | 358 | 360 | 598 | 1470 | - | - | 1095 | - | - |
| Mov Cap-2 Maneuver | 325 | 360 | - | 358 | 360 | - | - | - | - | - | - | - |
| Stage 1 | 794 | 699 | - | 578 | 564 | - | - | - | - | - | - | - |
| Stage 2 | 529 | 562 | - | 761 | 697 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 16.1 | 11.6 | 0 | 2.4 |
| HCM LOS | C | B | | |

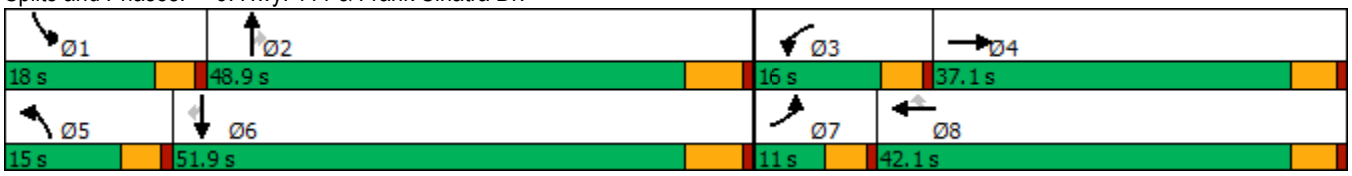
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1470 | - | - | 325 | 585 | 1095 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.004 | 0.065 | 0.042 | - | - |
| HCM Control Delay (s) | 0 | - | - | 16.1 | 11.6 | 8.4 | - | - |
| HCM Lane LOS | A | - | - | C | B | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.2 | 0.1 | - | - |

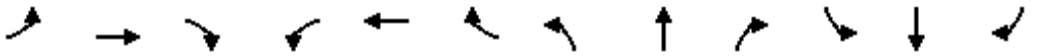
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 108 | 166 | 153 | 54 | 173 | 80 | 1167 | 103 | 203 | 1268 | 56 |
| Future Volume (vph) | 108 | 166 | 153 | 54 | 173 | 80 | 1167 | 103 | 203 | 1268 | 56 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 99.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 108 | 166 | 151 | 153 | 54 | 173 | 80 | 1167 | 103 | 203 | 1268 | 56 |
| Future Volume (veh/h) | 108 | 166 | 151 | 153 | 54 | 173 | 80 | 1167 | 103 | 203 | 1268 | 56 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 119 | 182 | 166 | 168 | 59 | 0 | 88 | 1282 | 0 | 223 | 1393 | 58 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 136 | 218 | 199 | 247 | 444 | | 113 | 1805 | | 306 | 1933 | 598 |
| Arrive On Green | 0.08 | 0.24 | 0.24 | 0.07 | 0.24 | 0.00 | 0.06 | 0.35 | 0.00 | 0.09 | 0.38 | 0.38 |
| Sat Flow, veh/h | 1781 | 901 | 822 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1579 |
| Grp Volume(v), veh/h | 119 | 0 | 348 | 168 | 59 | 0 | 88 | 1282 | 0 | 223 | 1393 | 58 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1722 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1579 |
| Q Serve(g_s), s | 5.6 | 0.0 | 16.1 | 4.0 | 2.1 | 0.0 | 4.1 | 18.2 | 0.0 | 5.3 | 19.6 | 2.0 |
| Cycle Q Clear(g_c), s | 5.6 | 0.0 | 16.1 | 4.0 | 2.1 | 0.0 | 4.1 | 18.2 | 0.0 | 5.3 | 19.6 | 2.0 |
| Prop In Lane | 1.00 | | 0.48 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 136 | 0 | 418 | 247 | 444 | | 113 | 1805 | | 306 | 1933 | 598 |
| V/C Ratio(X) | 0.88 | 0.00 | 0.83 | 0.68 | 0.13 | | 0.78 | 0.71 | | 0.73 | 0.72 | 0.10 |
| Avail Cap(c_a), veh/h | 136 | 0 | 656 | 469 | 824 | | 221 | 2597 | | 551 | 2779 | 859 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.4 | 0.0 | 30.2 | 38.1 | 25.2 | 0.0 | 38.7 | 23.4 | 0.0 | 37.3 | 22.3 | 16.8 |
| Incr Delay (d2), s/veh | 41.6 | 0.0 | 5.3 | 1.2 | 0.1 | 0.0 | 4.3 | 0.5 | 0.0 | 1.3 | 0.5 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.9 | 0.0 | 7.1 | 1.7 | 0.9 | 0.0 | 1.8 | 6.5 | 0.0 | 2.1 | 6.9 | 0.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 80.0 | 0.0 | 35.5 | 39.3 | 25.3 | 0.0 | 43.0 | 24.0 | 0.0 | 38.5 | 22.8 | 16.9 |
| LnGrp LOS | E | A | D | D | C | | D | C | | D | C | B |
| Approach Vol, veh/h | | 467 | | | 227 | A | | 1370 | A | | 1674 | |
| Approach Delay, s/veh | | 46.8 | | | 35.7 | | | 25.2 | | | 24.7 | |
| Approach LOS | | D | | | D | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.0 | 35.9 | 10.6 | 25.5 | 9.9 | 38.0 | 11.0 | 25.1 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 7.3 | 20.2 | 6.0 | 18.1 | 6.1 | 21.6 | 7.6 | 4.1 |
| Green Ext Time (p_c), s | 0.2 | 8.7 | 0.1 | 1.8 | 0.0 | 10.2 | 0.0 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 28.3 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

# APPENDIX 6.2:

# EAP (2023) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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# Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
## (Average Traffic Estimate Form)

| DIST | CO | RTE | PM | | TRAFFIC CONDITIONS | | EAP 2023 |
|---|---|---|---|---|---|---|---|
| | | | | CALC | RV | DATE | 01/09/19 |
| Jurisdiction: | City of Rancho Mirage | | | CHK | RV | DATE | 01/09/19 |
| Major Street: | Frank Sinatra Dr. | | | | Critical Approach Speed (Major) | | 30 mph |
| Minor Street: | Driveway 1 | | | | Critical Approach Speed (Minor) | | 25 mph |

Major Street Approach Lanes = **1** lane  Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **1,090** vpd  Minor Street Future ADT = **534** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

**URBAN (U)**

### (Based on Estimated Average Daily Traffic - See Note)

| URBAN | RURAL | Minimum Requirements EADT | | | |
|---|---|---|---|---|---|
| XX | | | | | |
| **CONDITION A - Minimum Vehicular Volume** | | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| Number of lanes for moving traffic on each approach | | | | | |
| Major Street | Minor Street | Urban | Rural | Urban | Rural |
| *1* **1,090** | *1* **534** | 8,000 | 5,600 | 2,400 | 1,680 |
| *2* + | *1* | 9,600 | 6,720 | 2,400 | 1,680 |
| *2* + | *2* + | 9,600 | 6,720 | 3,200 | 2,240 |
| *1* | *2* + | 8,000 | 5,600 | 3,200 | 2,240 |
| **CONDITION B - Interruption of Continuous Traffic** | | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| Number of lanes for moving traffic on each approach | | | | | |
| Major Street | Minor Street | Urban | Rural | Urban | Rural |
| *1* **1,090** | *1* **534** | 12,000 | 8,400 | 1,200 | 850 |
| *2* + | *1* | 14,400 | 10,080 | 1,200 | 850 |
| *2* + | *2* + | 14,400 | 10,080 | 1,600 | 1,120 |
| *1* | *2* + | 12,000 | 8,400 | 1,600 | 1,120 |
| **Combination of CONDITIONS A + B** | | | | | |
| Satisfied | Not Satisfied | | | | |
| | XX | 2 CONDITIONS 80% | | 2 CONDITIONS 80% | |
| No one condition satisfied, but following conditions fulfilled 80% of more ….. | **A** 14% **B** 9% | | | | |

**Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.**

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

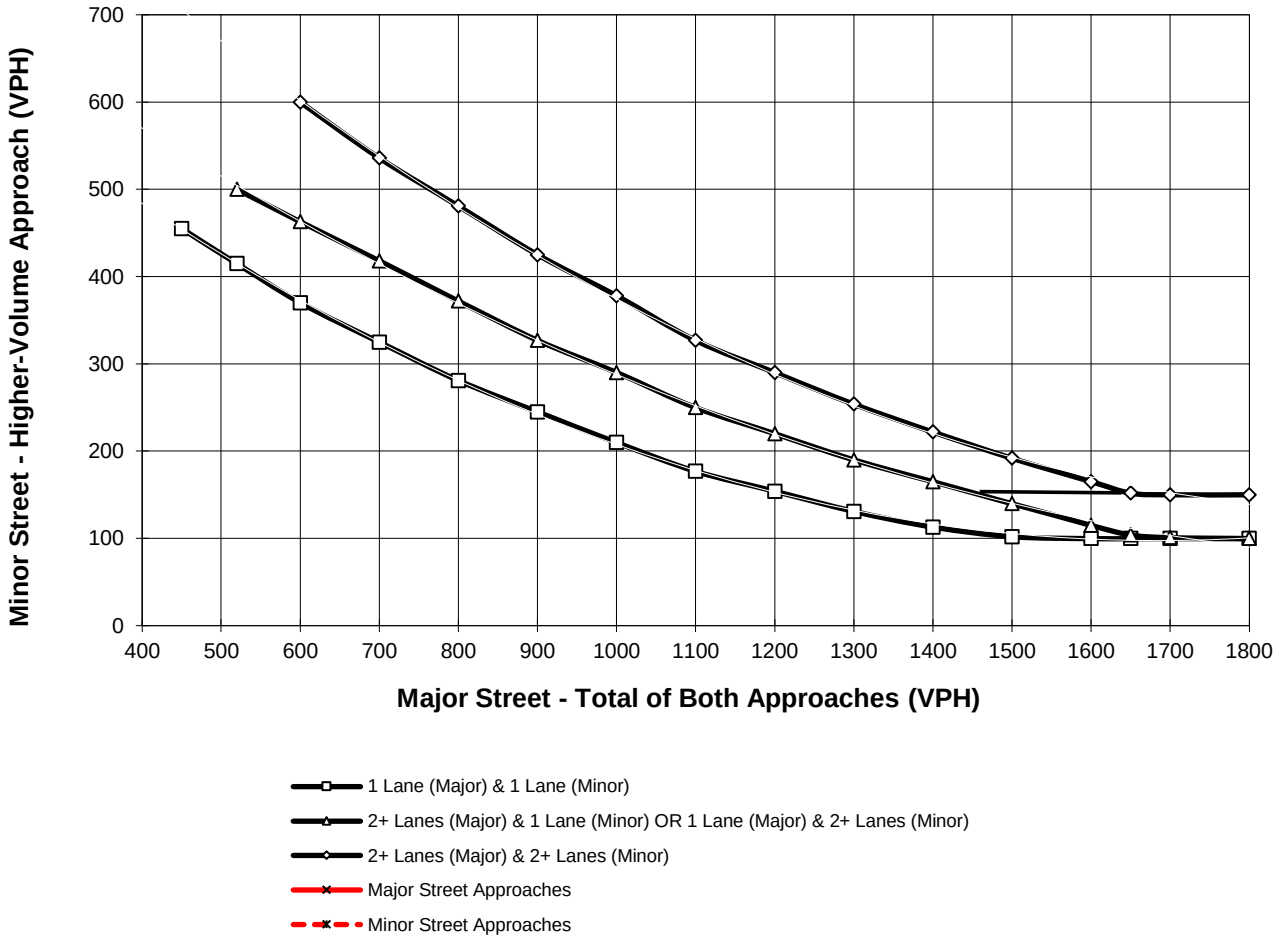
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **EAP 2023 Conditions - Weekday PM Peak Hour**

Major Street Name = **Frank Sinatra Dr.**
Total of Both Approaches (VPH) = **155**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 2**
High Volume Approach (VPH) = **19**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

# APPENDIX 6.3:

# EAP (2023) CONDITIONS QUEUING ANALYSIS WORKSHEETS

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## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB |
|---|---|
| Directions Served | LR |
| Maximum Queue (ft) | 48 |
| Average Queue (ft) | 20 |
| 95th Queue (ft) | 44 |
| Link Distance (ft) | 453 |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (ft) | |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB | SB |
|---|---|---|---|
| Directions Served | LTR | LTR | L |
| Maximum Queue (ft) | 25 | 28 | 29 |
| Average Queue (ft) | 2 | 6 | 1 |
| 95th Queue (ft) | 15 | 24 | 10 |
| Link Distance (ft) | 353 | 358 | |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (ft) | | | 210 |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 27 | 76 | 302 | 69 | 422 | 46 | 831 | 101 | 312 | 1313 | 47 |
| v/c Ratio | 0.21 | 0.23 | 0.52 | 0.12 | 0.59 | 0.31 | 0.57 | 0.18 | 0.58 | 0.60 | 0.06 |
| Control Delay | 49.5 | 21.6 | 38.9 | 24.1 | 10.1 | 48.8 | 27.9 | 0.7 | 40.3 | 22.3 | 0.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 49.5 | 21.6 | 38.9 | 24.1 | 10.1 | 48.8 | 27.9 | 0.7 | 40.3 | 22.3 | 0.2 |
| Queue Length 50th (ft) | 13 | 18 | 73 | 24 | 29 | 22 | 123 | 0 | 75 | 195 | 0 |
| Queue Length 95th (ft) | 53 | 62 | 162 | 68 | 133 | 75 | 251 | 0 | 167 | 376 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 132 | 778 | 825 | 1133 | 1095 | 181 | 2298 | 796 | 825 | 3002 | 993 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.20 | 0.10 | 0.37 | 0.06 | 0.39 | 0.25 | 0.36 | 0.13 | 0.38 | 0.44 | 0.05 |

Intersection Summary

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB | SB |
|---|---|---|
| Directions Served | LR | LT |
| Maximum Queue (ft) | 53 | 31 |
| Average Queue (ft) | 19 | 3 |
| 95th Queue (ft) | 44 | 18 |
| Link Distance (ft) | 453 | 178 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB | SB |
|---|---|---|---|
| Directions Served | LTR | LTR | L |
| Maximum Queue (ft) | 46 | 28 | 50 |
| Average Queue (ft) | 15 | 10 | 4 |
| 95th Queue (ft) | 36 | 32 | 22 |
| Link Distance (ft) | 353 | 358 | |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (ft) | | | 210 |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 44 | 105 | 163 | 52 | 329 | 58 | 1304 | 190 | 402 | 1282 | 35 |
| v/c Ratio | 0.36 | 0.35 | 0.42 | 0.13 | 0.56 | 0.46 | 0.70 | 0.27 | 0.69 | 0.51 | 0.04 |
| Control Delay | 55.1 | 32.8 | 46.1 | 32.8 | 8.2 | 59.1 | 28.3 | 5.2 | 44.0 | 18.2 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 55.1 | 32.8 | 46.1 | 32.8 | 8.2 | 59.1 | 28.3 | 5.2 | 44.0 | 18.2 | 0.1 |
| Queue Length 50th (ft) | 24 | 43 | 44 | 26 | 2 | 32 | 216 | 0 | 108 | 173 | 0 |
| Queue Length 95th (ft) | 74 | 96 | 100 | 61 | 72 | #108 | 400 | 53 | 208 | 323 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 136 | 679 | 412 | 783 | 853 | 134 | 2265 | 800 | 809 | 3078 | 979 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.32 | 0.15 | 0.40 | 0.07 | 0.39 | 0.43 | 0.58 | 0.24 | 0.50 | 0.42 | 0.04 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB | SB |
|---|---|---|
| Directions Served | LR | LT |
| Maximum Queue (ft) | 53 | 56 |
| Average Queue (ft) | 29 | 5 |
| 95th Queue (ft) | 48 | 27 |
| Link Distance (ft) | 453 | 178 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | WB |
|---|---|
| Directions Served | LTR |
| Maximum Queue (ft) | 65 |
| Average Queue (ft) | 26 |
| 95th Queue (ft) | 54 |
| Link Distance (ft) | 358 |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (ft) | |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 41 | 115 | 168 | 169 | 190 | 213 | 1282 | 113 | 223 | 1393 | 141 |
| v/c Ratio | 0.34 | 0.38 | 0.49 | 0.37 | 0.36 | 1.00 | 0.65 | 0.16 | 0.56 | 0.72 | 0.21 |
| Control Delay | 53.8 | 31.9 | 46.4 | 33.4 | 6.8 | 106.3 | 25.3 | 2.6 | 45.9 | 26.3 | 4.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 53.8 | 31.9 | 46.4 | 33.4 | 6.8 | 106.3 | 25.3 | 2.6 | 45.9 | 26.3 | 4.4 |
| Queue Length 50th (ft) | 21 | 46 | 44 | 84 | 0 | 115 | 195 | 0 | 58 | 219 | 0 |
| Queue Length 95th (ft) | 70 | 106 | 102 | 159 | 53 | #376 | 365 | 22 | 127 | 389 | 39 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 131 | 667 | 452 | 797 | 776 | 212 | 2511 | 845 | 531 | 2687 | 885 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.31 | 0.17 | 0.37 | 0.21 | 0.24 | 1.00 | 0.51 | 0.13 | 0.42 | 0.52 | 0.16 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB | SB |
|---|---|---|
| Directions Served | LR | LT |
| Maximum Queue (ft) | 115 | 29 |
| Average Queue (ft) | 59 | 1 |
| 95th Queue (ft) | 96 | 9 |
| Link Distance (ft) | 453 | 178 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB | SB |
|---|---|---|---|
| Directions Served | LTR | LTR | L |
| Maximum Queue (ft) | 24 | 47 | 30 |
| Average Queue (ft) | 1 | 18 | 10 |
| 95th Queue (ft) | 8 | 42 | 33 |
| Link Distance (ft) | 353 | 358 | |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (ft) | | | 210 |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 119 | 348 | 168 | 59 | 190 | 88 | 1282 | 113 | 223 | 1393 | 62 |
| v/c Ratio | 1.01 | 0.80 | 0.53 | 0.12 | 0.35 | 0.58 | 0.72 | 0.18 | 0.60 | 0.69 | 0.09 |
| Control Delay | 137.2 | 48.1 | 53.1 | 30.0 | 6.3 | 64.2 | 31.7 | 2.7 | 52.5 | 28.8 | 0.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 137.2 | 48.1 | 53.1 | 30.0 | 6.3 | 64.2 | 31.7 | 2.7 | 52.5 | 28.8 | 0.2 |
| Queue Length 50th (ft) | ~88 | 194 | 55 | 29 | 0 | 56 | 261 | 0 | 73 | 284 | 0 |
| Queue Length 95th (ft) | #238 | 330 | 102 | 66 | 53 | #125 | 365 | 22 | 127 | 389 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 118 | 604 | 410 | 722 | 721 | 192 | 2275 | 779 | 481 | 2435 | 815 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.01 | 0.58 | 0.41 | 0.08 | 0.26 | 0.46 | 0.56 | 0.15 | 0.46 | 0.57 | 0.08 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

# APPENDIX 7.1:

# EAPC (2023) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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| Intersection | |
|---|---|
| Int Delay, s/veh | 3.7 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 39 | 21 | 0 | 12 | 42 |
| Future Vol, veh/h | 0 | 39 | 21 | 0 | 12 | 42 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 42 | 23 | 0 | 13 | 46 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 95 | 23 | 0 | 0 | 23 | 0 |
| Stage 1 | 23 | - | - | - | - | - |
| Stage 2 | 72 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 905 | 1054 | - | - | 1592 | - |
| Stage 1 | 1000 | - | - | - | - | - |
| Stage 2 | 951 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 898 | 1054 | - | - | 1592 | - |
| Mov Cap-2 Maneuver | 898 | - | - | - | - | - |
| Stage 1 | 1000 | - | - | - | - | - |
| Stage 2 | 943 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.6 | 0 | 1.6 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1054 | 1592 | - |
| HCM Lane V/C Ratio | - | - | 0.04 | 0.008 | - |
| HCM Control Delay (s) | - | - | 8.6 | 7.3 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.1 | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.8 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 16 | 1 | 59 | 0 | 13 | 53 | 0 |
| Future Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 16 | 1 | 59 | 0 | 13 | 53 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1 | 1 | 0 | 0 | 18 | 1 | 66 | 0 | 14 | 59 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 164 | 155 | 59 | 156 | 155 | 66 | 59 | 0 | 0 | 66 | 0 | 0 |
| Stage 1 | 87 | 87 | - | 68 | 68 | - | - | - | - | - | - | - |
| Stage 2 | 77 | 68 | - | 88 | 87 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 801 | 737 | 1007 | 810 | 737 | 998 | 1545 | - | - | 1536 | - | - |
| Stage 1 | 921 | 823 | - | 942 | 838 | - | - | - | - | - | - | - |
| Stage 2 | 932 | 838 | - | 920 | 823 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 781 | 730 | 1007 | 802 | 730 | 998 | 1545 | - | - | 1536 | - | - |
| Mov Cap-2 Maneuver | 781 | 730 | - | 802 | 730 | - | - | - | - | - | - | - |
| Stage 1 | 920 | 816 | - | 941 | 837 | - | - | - | - | - | - | - |
| Stage 2 | 915 | 837 | - | 909 | 816 | - | - | - | - | - | - | - |

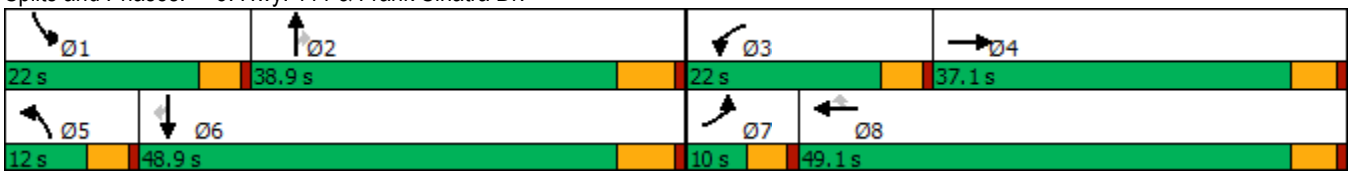
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 9.3 | 8.7 | 0.1 | 1.5 |
| HCM LOS | A | A | | |

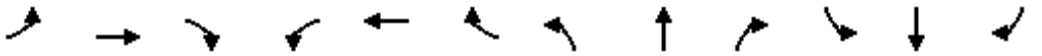
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1545 | - | - | 846 | 998 | 1536 | - | - |
| HCM Lane V/C Ratio | 0.001 | - | - | 0.003 | 0.018 | 0.009 | - | - |
| HCM Control Delay (s) | 7.3 | - | - | 9.3 | 8.7 | 7.4 | - | - |
| HCM Lane LOS | A | - | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0 | - | - |

| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 29 | 38 | 283 | 65 | 397 | 44 | 821 | 101 | 295 | 1250 | 47 |
| Future Volume (vph) | 29 | 38 | 283 | 65 | 397 | 44 | 821 | 101 | 295 | 1250 | 47 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 10.0 | 37.1 | 22.0 | 49.1 | 49.1 | 12.0 | 38.9 | 38.9 | 22.0 | 48.9 | 48.9 |
| Total Split (%) | 8.3% | 30.9% | 18.3% | 40.9% | 40.9% | 10.0% | 32.4% | 32.4% | 18.3% | 40.8% | 40.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 120 |
| Actuated Cycle Length: 80.9 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 29 | 38 | 36 | 283 | 65 | 397 | 44 | 821 | 101 | 295 | 1250 | 47 |
| Future Volume (veh/h) | 29 | 38 | 36 | 283 | 65 | 397 | 44 | 821 | 101 | 295 | 1250 | 47 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 31 | 41 | 33 | 304 | 70 | 0 | 47 | 883 | 0 | 317 | 1344 | 37 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 58 | 145 | 117 | 412 | 446 | | 77 | 1583 | | 425 | 1992 | 618 |
| Arrive On Green | 0.03 | 0.15 | 0.15 | 0.12 | 0.24 | 0.00 | 0.04 | 0.31 | 0.00 | 0.12 | 0.39 | 0.39 |
| Sat Flow, veh/h | 1781 | 956 | 769 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1585 |
| Grp Volume(v), veh/h | 31 | 0 | 74 | 304 | 70 | 0 | 47 | 883 | 0 | 317 | 1344 | 37 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1725 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1585 |
| Q Serve(g_s), s | 1.2 | 0.0 | 2.6 | 5.9 | 2.1 | 0.0 | 1.8 | 10.0 | 0.0 | 6.1 | 15.1 | 1.0 |
| Cycle Q Clear(g_c), s | 1.2 | 0.0 | 2.6 | 5.9 | 2.1 | 0.0 | 1.8 | 10.0 | 0.0 | 6.1 | 15.1 | 1.0 |
| Prop In Lane | 1.00 | | 0.45 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 58 | 0 | 262 | 412 | 446 | | 77 | 1583 | | 425 | 1992 | 618 |
| V/C Ratio(X) | 0.54 | 0.00 | 0.28 | 0.74 | 0.16 | | 0.61 | 0.56 | | 0.75 | 0.67 | 0.06 |
| Avail Cap(c_a), veh/h | 139 | 0 | 797 | 868 | 1188 | | 190 | 2410 | | 868 | 3147 | 977 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 33.0 | 0.0 | 26.0 | 29.5 | 20.9 | 0.0 | 32.6 | 19.9 | 0.0 | 29.3 | 17.5 | 13.2 |
| Incr Delay (d2), s/veh | 2.9 | 0.0 | 0.6 | 1.0 | 0.2 | 0.0 | 3.0 | 0.3 | 0.0 | 1.0 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 0.0 | 1.1 | 2.4 | 0.9 | 0.0 | 0.8 | 3.4 | 0.0 | 2.3 | 4.9 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.9 | 0.0 | 26.6 | 30.4 | 21.0 | 0.0 | 35.5 | 20.2 | 0.0 | 30.3 | 17.9 | 13.2 |
| LnGrp LOS | D | A | C | C | C | | D | C | | C | B | B |
| Approach Vol, veh/h | | 105 | | | 374 | A | | 930 | A | | 1698 | |
| Approach Delay, s/veh | | 29.4 | | | 28.7 | | | 21.0 | | | 20.1 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 13.1 | 27.7 | 12.9 | 15.6 | 7.6 | 33.2 | 6.8 | 21.6 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 17.4 | 32.7 | 17.4 | 32.0 | 7.4 | 42.7 | 5.4 | 44.0 |
| Max Q Clear Time (g_c+I1), s | 8.1 | 12.0 | 7.9 | 4.6 | 3.8 | 17.1 | 3.2 | 4.1 |
| Green Ext Time (p_c), s | 0.4 | 5.5 | 0.4 | 0.4 | 0.0 | 9.9 | 0.0 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 21.7 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.9 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 31 | 27 | 0 | 55 | 23 |
| Future Vol, veh/h | 0 | 31 | 27 | 0 | 55 | 23 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 34 | 29 | 0 | 60 | 25 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 174 | 29 | 0 | 0 | 29 | 0 |
| Stage 1 | 29 | - | - | - | - | - |
| Stage 2 | 145 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 816 | 1046 | - | - | 1584 | - |
| Stage 1 | 994 | - | - | - | - | - |
| Stage 2 | 882 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 785 | 1046 | - | - | 1584 | - |
| Mov Cap-2 Maneuver | 785 | - | - | - | - | - |
| Stage 1 | 994 | - | - | - | - | - |
| Stage 2 | 848 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.6 | 0 | 5.2 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1046 | 1584 | - |
| HCM Lane V/C Ratio | - | - | 0.032 | 0.038 | - |
| HCM Control Delay (s) | - | - | 8.6 | 7.4 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.1 | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 17 | 2 | 0 | 0 | 4 | 9 | 0 | 58 | 0 | 27 | 78 | 1 |
| Future Vol, veh/h | 17 | 2 | 0 | 0 | 4 | 9 | 0 | 58 | 0 | 27 | 78 | 1 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 20 | 2 | 0 | 0 | 5 | 11 | 0 | 69 | 0 | 32 | 93 | 1 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 235 | 227 | 94 | 228 | 227 | 69 | 94 | 0 | 0 | 69 | 0 | 0 |
| Stage 1 | 158 | 158 | - | 69 | 69 | - | - | - | - | - | - | - |
| Stage 2 | 77 | 69 | - | 159 | 158 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 720 | 672 | 963 | 727 | 672 | 994 | 1500 | - | - | 1532 | - | - |
| Stage 1 | 844 | 767 | - | 941 | 837 | - | - | - | - | - | - | - |
| Stage 2 | 932 | 837 | - | 843 | 767 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 697 | 658 | 963 | 713 | 658 | 994 | 1500 | - | - | 1532 | - | - |
| Mov Cap-2 Maneuver | 697 | 658 | - | 713 | 658 | - | - | - | - | - | - | - |
| Stage 1 | 844 | 751 | - | 941 | 837 | - | - | - | - | - | - | - |
| Stage 2 | 917 | 837 | - | 823 | 751 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 10.4 | 9.3 | 0 | 1.9 |
| HCM LOS | B | A | | |

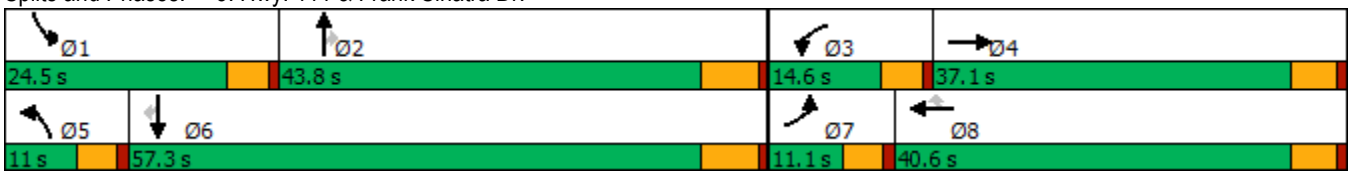
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1500 | - | - | 693 | 859 | 1532 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.033 | 0.018 | 0.021 | - | - |
| HCM Control Delay (s) | 0 | - | - | 10.4 | 9.3 | 7.4 | - | - |
| HCM Lane LOS | A | - | - | B | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0.1 | 0.1 | 0.1 | - | - |

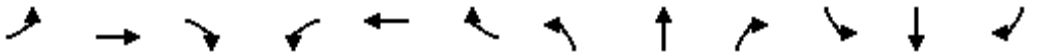
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 49 | 67 | 168 | 53 | 335 | 59 | 1346 | 192 | 406 | 1334 | 41 |
| Future Volume (vph) | 49 | 67 | 168 | 53 | 335 | 59 | 1346 | 192 | 406 | 1334 | 41 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.1 | 37.1 | 14.6 | 40.6 | 40.6 | 11.0 | 43.8 | 43.8 | 24.5 | 57.3 | 57.3 |
| Total Split (%) | 9.3% | 30.9% | 12.2% | 33.8% | 33.8% | 9.2% | 36.5% | 36.5% | 20.4% | 47.8% | 47.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 92.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 49 | 67 | 39 | 168 | 53 | 335 | 59 | 1346 | 192 | 406 | 1334 | 41 |
| Future Volume (veh/h) | 49 | 67 | 39 | 168 | 53 | 335 | 59 | 1346 | 192 | 406 | 1334 | 41 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 49 | 68 | 33 | 170 | 54 | 0 | 60 | 1360 | 0 | 410 | 1347 | 35 |
| Peak Hour Factor | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 76 | 160 | 78 | 255 | 310 | | 85 | 1885 | | 514 | 2401 | 730 |
| Arrive On Green | 0.04 | 0.13 | 0.13 | 0.07 | 0.17 | 0.00 | 0.05 | 0.37 | 0.00 | 0.15 | 0.47 | 0.47 |
| Sat Flow, veh/h | 1781 | 1188 | 577 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1552 |
| Grp Volume(v), veh/h | 49 | 0 | 101 | 170 | 54 | 0 | 60 | 1360 | 0 | 410 | 1347 | 35 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1765 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1552 |
| Q Serve(g_s), s | 2.0 | 0.0 | 3.9 | 3.6 | 1.9 | 0.0 | 2.5 | 17.2 | 0.0 | 8.6 | 14.2 | 0.9 |
| Cycle Q Clear(g_c), s | 2.0 | 0.0 | 3.9 | 3.6 | 1.9 | 0.0 | 2.5 | 17.2 | 0.0 | 8.6 | 14.2 | 0.9 |
| Prop In Lane | 1.00 | | 0.33 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 76 | 0 | 238 | 255 | 310 | | 85 | 1885 | | 514 | 2401 | 730 |
| V/C Ratio(X) | 0.64 | 0.00 | 0.42 | 0.67 | 0.17 | | 0.71 | 0.72 | | 0.80 | 0.56 | 0.05 |
| Avail Cap(c_a), veh/h | 155 | 0 | 754 | 461 | 886 | | 152 | 2562 | | 918 | 3482 | 1058 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.3 | 0.0 | 29.8 | 33.8 | 26.8 | 0.0 | 35.2 | 20.3 | 0.0 | 30.8 | 14.3 | 10.8 |
| Incr Delay (d2), s/veh | 3.4 | 0.0 | 1.2 | 1.1 | 0.3 | 0.0 | 4.0 | 0.6 | 0.0 | 1.1 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.9 | 0.0 | 1.7 | 1.5 | 0.8 | 0.0 | 1.1 | 5.9 | 0.0 | 3.3 | 4.4 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 38.7 | 0.0 | 31.0 | 34.9 | 27.1 | 0.0 | 39.2 | 21.0 | 0.0 | 31.9 | 14.5 | 10.8 |
| LnGrp LOS | D | A | C | C | C | | D | C | | C | B | B |
| Approach Vol, veh/h | | 150 | | | 224 | A | | 1420 | A | | 1792 | |
| Approach Delay, s/veh | | 33.5 | | | 33.0 | | | 21.7 | | | 18.4 | |
| Approach LOS | | C | | | C | | | C | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 15.7 | 33.9 | 10.1 | 15.2 | 8.2 | 41.4 | 7.8 | 17.5 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 19.9 | 37.6 | 10.0 | 32.0 | 6.4 | 51.1 | 6.5 | 35.5 |
| Max Q Clear Time (g_c+I1), s | 10.6 | 19.2 | 5.6 | 5.9 | 4.5 | 16.2 | 4.0 | 3.9 |
| Green Ext Time (p_c), s | 0.5 | 8.5 | 0.1 | 0.5 | 0.0 | 11.1 | 0.0 | 0.2 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 21.3 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 7.2 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 62 | 27 | 0 | 354 | 26 |
| Future Vol, veh/h | 0 | 62 | 27 | 0 | 354 | 26 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 67 | 29 | 0 | 385 | 28 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 827 | 29 | 0 | 0 | 29 | 0 |
| Stage 1 | 29 | - | - | - | - | - |
| Stage 2 | 798 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 341 | 1046 | - | - | 1584 | - |
| Stage 1 | 994 | - | - | - | - | - |
| Stage 2 | 443 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 257 | 1046 | - | - | 1584 | - |
| Mov Cap-2 Maneuver | 257 | - | - | - | - | - |
| Stage 1 | 994 | - | - | - | - | - |
| Stage 2 | 334 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.7 | 0 | 7.5 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1046 | 1584 | - |
| HCM Lane V/C Ratio | - | - | 0.064 | 0.243 | - |
| HCM Control Delay (s) | - | - | 8.7 | 8 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.2 | 1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 29 | 0 | 85 | 3 | 36 | 380 | 3 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 29 | 0 | 85 | 3 | 36 | 380 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 37 | 0 | 108 | 4 | 46 | 481 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 704 | 687 | 483 | 685 | 687 | 110 | 485 | 0 | 0 | 112 | 0 | 0 |
| Stage 1 | 575 | 575 | - | 110 | 110 | - | - | - | - | - | - | - |
| Stage 2 | 129 | 112 | - | 575 | 577 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 352 | 370 | 584 | 362 | 370 | 943 | 1078 | - | - | 1478 | - | - |
| Stage 1 | 503 | 503 | - | 895 | 804 | - | - | - | - | - | - | - |
| Stage 2 | 875 | 803 | - | 503 | 502 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 329 | 359 | 584 | 353 | 359 | 943 | 1078 | - | - | 1478 | - | - |
| Mov Cap-2 Maneuver | 329 | 359 | - | 353 | 359 | - | - | - | - | - | - | - |
| Stage 1 | 503 | 487 | - | 895 | 804 | - | - | - | - | - | - | - |
| Stage 2 | 840 | 803 | - | 487 | 486 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 16 | 9.2 | 0 | 0.6 |
| HCM LOS | C | A | | |

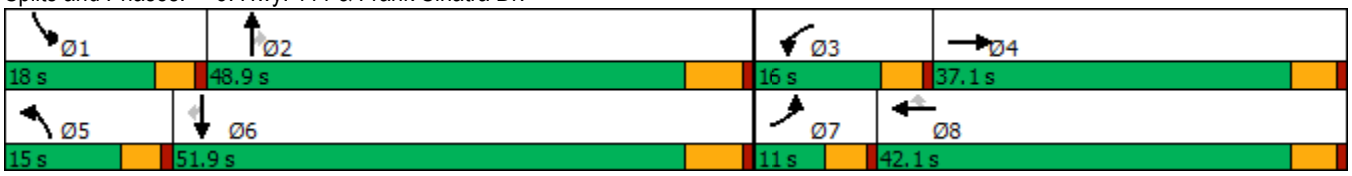
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1078 | - | - | 329 | 894 | 1478 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.004 | 0.042 | 0.031 | - | - |
| HCM Control Delay (s) | 0 | - | - | 16 | 9.2 | 7.5 | - | - |
| HCM Lane LOS | A | - | - | C | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0.1 | - | - |

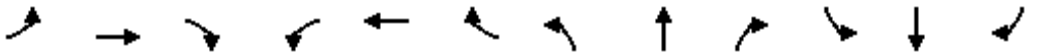
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 43 | 68 | 159 | 156 | 184 | 196 | 1233 | 108 | 212 | 1331 | 134 |
| Future Volume (vph) | 43 | 68 | 159 | 156 | 184 | 196 | 1233 | 108 | 212 | 1331 | 134 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 91.5
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 43 | 68 | 39 | 159 | 156 | 184 | 196 | 1233 | 108 | 212 | 1331 | 134 |
| Future Volume (veh/h) | 43 | 68 | 39 | 159 | 156 | 184 | 196 | 1233 | 108 | 212 | 1331 | 134 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 47 | 75 | 43 | 175 | 171 | 0 | 215 | 1355 | 0 | 233 | 1463 | 143 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 72 | 150 | 86 | 258 | 314 | | 232 | 2259 | | 320 | 2069 | 640 |
| Arrive On Green | 0.04 | 0.13 | 0.13 | 0.07 | 0.17 | 0.00 | 0.13 | 0.44 | 0.00 | 0.09 | 0.41 | 0.41 |
| Sat Flow, veh/h | 1781 | 1116 | 640 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1579 |
| Grp Volume(v), veh/h | 47 | 0 | 118 | 175 | 171 | 0 | 215 | 1355 | 0 | 233 | 1463 | 143 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1755 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1579 |
| Q Serve(g_s), s | 2.1 | 0.0 | 5.0 | 3.9 | 6.7 | 0.0 | 9.6 | 16.1 | 0.0 | 5.2 | 19.1 | 4.7 |
| Cycle Q Clear(g_c), s | 2.1 | 0.0 | 5.0 | 3.9 | 6.7 | 0.0 | 9.6 | 16.1 | 0.0 | 5.2 | 19.1 | 4.7 |
| Prop In Lane | 1.00 | | 0.36 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 72 | 0 | 235 | 258 | 314 | | 232 | 2259 | | 320 | 2069 | 640 |
| V/C Ratio(X) | 0.65 | 0.00 | 0.50 | 0.68 | 0.54 | | 0.93 | 0.60 | | 0.73 | 0.71 | 0.22 |
| Avail Cap(c_a), veh/h | 142 | 0 | 702 | 492 | 865 | | 232 | 2725 | | 579 | 2917 | 902 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 37.8 | 0.0 | 32.2 | 36.1 | 30.5 | 0.0 | 34.4 | 16.9 | 0.0 | 35.3 | 19.8 | 15.6 |
| Incr Delay (d2), s/veh | 3.7 | 0.0 | 1.6 | 1.2 | 1.5 | 0.0 | 39.4 | 0.3 | 0.0 | 1.2 | 0.5 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.0 | 0.0 | 2.2 | 1.7 | 3.0 | 0.0 | 6.3 | 5.3 | 0.0 | 2.1 | 6.5 | 1.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 41.5 | 0.0 | 33.8 | 37.3 | 31.9 | 0.0 | 73.8 | 17.2 | 0.0 | 36.5 | 20.3 | 15.7 |
| LnGrp LOS | D | A | C | D | C | | E | B | | D | C | B |
| Approach Vol, veh/h | | 165 | | | 346 | A | | 1570 | A | | 1839 | |
| Approach Delay, s/veh | | 36.0 | | | 34.6 | | | 24.9 | | | 22.0 | |
| Approach LOS | | D | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.0 | 41.6 | 10.6 | 15.8 | 15.0 | 38.6 | 7.8 | 18.6 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 7.2 | 18.1 | 5.9 | 7.0 | 11.6 | 21.1 | 4.1 | 8.7 |
| Green Ext Time (p_c), s | 0.2 | 9.7 | 0.1 | 0.6 | 0.0 | 11.3 | 0.0 | 0.9 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 24.9 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 8.8 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 347 | 27 | 0 | 69 | 26 |
| Future Vol, veh/h | 0 | 347 | 27 | 0 | 69 | 26 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 377 | 29 | 0 | 75 | 28 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 207 | 29 | 0 | 0 | 29 | 0 |
| Stage 1 | 29 | - | - | - | - | - |
| Stage 2 | 178 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 781 | 1046 | - | - | 1584 | - |
| Stage 1 | 994 | - | - | - | - | - |
| Stage 2 | 853 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 744 | 1046 | - | - | 1584 | - |
| Mov Cap-2 Maneuver | 744 | - | - | - | - | - |
| Stage 1 | 994 | - | - | - | - | - |
| Stage 2 | 812 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 10.4 | 0 | 5.4 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1046 | 1584 | - |
| HCM Lane V/C Ratio | - | - | 0.361 | 0.047 | - |
| HCM Control Delay (s) | - | - | 10.4 | 7.4 | 0 |
| HCM Lane LOS | - | - | B | A | A |
| HCM 95th %tile Q(veh) | - | - | 1.7 | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 29 | 0 | 370 | 3 | 36 | 95 | 3 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 29 | 0 | 370 | 3 | 36 | 95 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 37 | 0 | 468 | 4 | 46 | 120 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 703 | 686 | 122 | 684 | 686 | 470 | 124 | 0 | 0 | 472 | 0 | 0 |
| Stage 1 | 214 | 214 | - | 470 | 470 | - | - | - | - | - | - | - |
| Stage 2 | 489 | 472 | - | 214 | 216 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 352 | 370 | 929 | 363 | 370 | 594 | 1463 | - | - | 1090 | - | - |
| Stage 1 | 788 | 725 | - | 574 | 560 | - | - | - | - | - | - | - |
| Stage 2 | 561 | 559 | - | 788 | 724 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 319 | 354 | 929 | 351 | 354 | 594 | 1463 | - | - | 1090 | - | - |
| Mov Cap-2 Maneuver | 319 | 354 | - | 351 | 354 | - | - | - | - | - | - | - |
| Stage 1 | 788 | 695 | - | 574 | 560 | - | - | - | - | - | - | - |
| Stage 2 | 525 | 559 | - | 755 | 694 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 16.3 | 11.6 | 0 | 2.3 |
| HCM LOS | C | B | | |

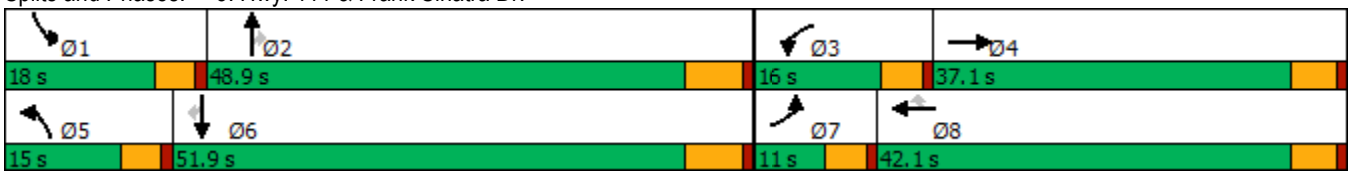
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1463 | - | - | 319 | 581 | 1090 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.004 | 0.065 | 0.042 | - | - |
| HCM Control Delay (s) | 0 | - | - | 16.3 | 11.6 | 8.4 | - | - |
| HCM Lane LOS | A | - | - | C | B | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.2 | 0.1 | - | - |

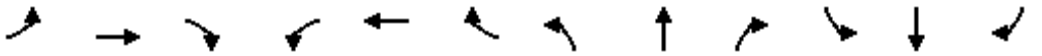
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 114 | 167 | 159 | 56 | 184 | 82 | 1233 | 108 | 212 | 1331 | 62 |
| Future Volume (vph) | 114 | 167 | 159 | 56 | 184 | 82 | 1233 | 108 | 212 | 1331 | 62 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 102.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 114 | 167 | 153 | 159 | 56 | 184 | 82 | 1233 | 108 | 212 | 1331 | 62 |
| Future Volume (veh/h) | 114 | 167 | 153 | 159 | 56 | 184 | 82 | 1233 | 108 | 212 | 1331 | 62 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 125 | 184 | 168 | 175 | 62 | 0 | 90 | 1355 | 0 | 233 | 1463 | 64 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 130 | 218 | 199 | 251 | 453 | | 115 | 1845 | | 313 | 1976 | 611 |
| Arrive On Green | 0.07 | 0.24 | 0.24 | 0.07 | 0.24 | 0.00 | 0.06 | 0.36 | 0.00 | 0.09 | 0.39 | 0.39 |
| Sat Flow, veh/h | 1781 | 900 | 822 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1579 |
| Grp Volume(v), veh/h | 125 | 0 | 352 | 175 | 62 | 0 | 90 | 1355 | 0 | 233 | 1463 | 64 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1722 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1579 |
| Q Serve(g_s), s | 6.2 | 0.0 | 17.1 | 4.3 | 2.3 | 0.0 | 4.4 | 20.3 | 0.0 | 5.8 | 21.6 | 2.3 |
| Cycle Q Clear(g_c), s | 6.2 | 0.0 | 17.1 | 4.3 | 2.3 | 0.0 | 4.4 | 20.3 | 0.0 | 5.8 | 21.6 | 2.3 |
| Prop In Lane | 1.00 | | 0.48 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 130 | 0 | 417 | 251 | 453 | | 115 | 1845 | | 313 | 1976 | 611 |
| V/C Ratio(X) | 0.96 | 0.00 | 0.84 | 0.70 | 0.14 | | 0.78 | 0.73 | | 0.75 | 0.74 | 0.10 |
| Avail Cap(c_a), veh/h | 130 | 0 | 627 | 448 | 787 | | 211 | 2480 | | 527 | 2654 | 821 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 40.6 | 0.0 | 31.7 | 39.8 | 26.1 | 0.0 | 40.5 | 24.4 | 0.0 | 39.0 | 23.1 | 17.2 |
| Incr Delay (d2), s/veh | 67.3 | 0.0 | 6.6 | 1.3 | 0.1 | 0.0 | 4.3 | 0.8 | 0.0 | 1.3 | 0.8 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.1 | 0.0 | 7.7 | 1.8 | 1.0 | 0.0 | 1.9 | 7.4 | 0.0 | 2.4 | 7.8 | 0.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 108.0 | 0.0 | 38.3 | 41.1 | 26.2 | 0.0 | 44.8 | 25.2 | 0.0 | 40.3 | 23.9 | 17.3 |
| LnGrp LOS | F | A | D | D | C | | D | C | | D | C | B |
| Approach Vol, veh/h | | 477 | | | 237 | A | | 1445 | A | | 1760 | |
| Approach Delay, s/veh | | 56.6 | | | 37.2 | | | 26.4 | | | 25.8 | |
| Approach LOS | | E | | | D | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.6 | 38.0 | 11.0 | 26.4 | 10.3 | 40.2 | 11.0 | 26.4 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 7.8 | 22.3 | 6.3 | 19.1 | 6.4 | 23.6 | 8.2 | 4.3 |
| Green Ext Time (p_c), s | 0.2 | 8.9 | 0.1 | 1.8 | 0.0 | 10.4 | 0.0 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 30.5 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

# APPENDIX 7.2:

# EAPC (2023) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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# Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
## (Average Traffic Estimate Form)

| DIST | CO | RTE | PM | | TRAFFIC CONDITIONS | | EAPC 2023 |
|---|---|---|---|---|---|---|---|
| | | | | CALC | RV | DATE | 01/09/19 |
| Jurisdiction: | City of Rancho Mirage | | | CHK | RV | DATE | 01/09/19 |
| Major Street: | Frank Sinatra Dr. | | | | Critical Approach Speed (Major) | | 30 mph |
| Minor Street: | Driveway 1 | | | | Critical Approach Speed (Minor) | | 25 mph |

Major Street Approach Lanes = **1** lane  Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **1,186** vpd  Minor Street Future ADT = **534** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

**URBAN (U)**

### (Based on Estimated Average Daily Traffic - See Note)

| URBAN | RURAL | Minimum Requirements EADT | | | |
|---|---|---|---|---|---|
| XX | | | | | |
| **CONDITION A - Minimum Vehicular Volume** | | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| Number of lanes for moving traffic on each approach | | | | | |
| Major Street | Minor Street | Urban | Rural | Urban | Rural |
| *1* **1,186** | *1* **534** | 8,000 | 5,600 | 2,400 | 1,680 |
| *2* + | *1* | 9,600 | 6,720 | 2,400 | 1,680 |
| *2* + | *2* + | 9,600 | 6,720 | 3,200 | 2,240 |
| *1* | *2* + | 8,000 | 5,600 | 3,200 | 2,240 |
| **CONDITION B - Interruption of Continuous Traffic** | | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| Number of lanes for moving traffic on each approach | | | | | |
| Major Street | Minor Street | Urban | Rural | Urban | Rural |
| *1* **1,186** | *1* **534** | 12,000 | 8,400 | 1,200 | 850 |
| *2* + | *1* | 14,400 | 10,080 | 1,200 | 850 |
| *2* + | *2* + | 14,400 | 10,080 | 1,600 | 1,120 |
| *1* | *2* + | 12,000 | 8,400 | 1,600 | 1,120 |
| **Combination of CONDITIONS A + B** | | | | | |
| Satisfied | Not Satisfied | | | | |
| | XX | 2 CONDITIONS 80% | | 2 CONDITIONS 80% | |
| No one condition satisfied, but following conditions fulfilled 80% of more ….. | **A** 15% **B** 10% | | | | |

**Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.**

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

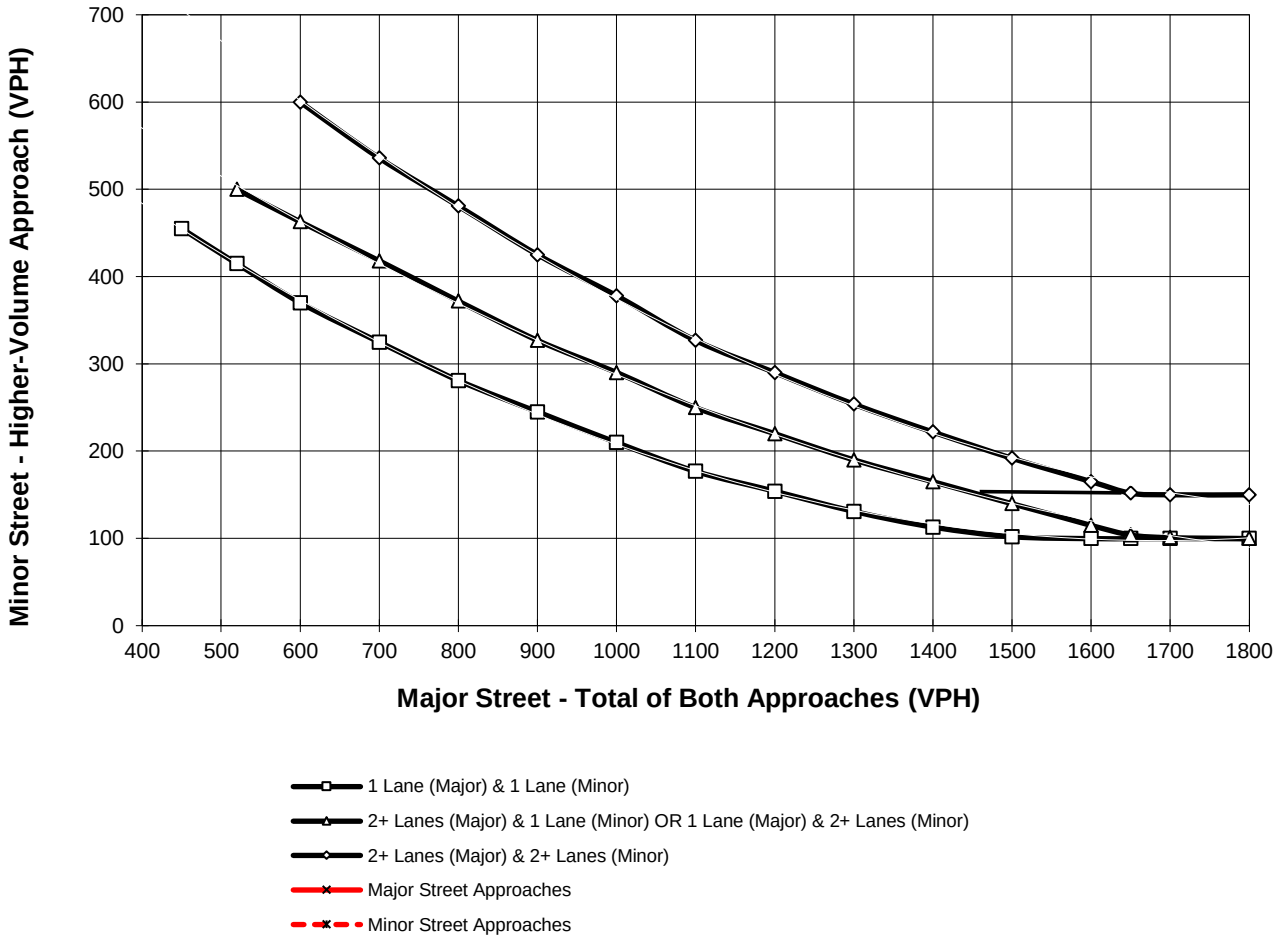
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **EAPC 2023 Conditions - Weekday PM Peak Hour**

Major Street Name = **Frank Sinatra Dr.**
Total of Both Approaches (VPH) = **164**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 2**
High Volume Approach (VPH) = **19**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

# APPENDIX 7.3:

# EAPC (2023) CONDITIONS QUEUING ANALYSIS WORKSHEETS

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## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB | SB |
|---|---|---|
| Directions Served | LR | LT |
| Maximum Queue (ft) | 53 | 29 |
| Average Queue (ft) | 20 | 1 |
| 95th Queue (ft) | 44 | 9 |
| Link Distance (ft) | 453 | 178 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB |
|---|---|---|
| Directions Served | LTR | LTR |
| Maximum Queue (ft) | 25 | 28 |
| Average Queue (ft) | 4 | 7 |
| 95th Queue (ft) | 19 | 28 |
| Link Distance (ft) | 353 | 358 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 31 | 80 | 304 | 70 | 427 | 47 | 883 | 109 | 317 | 1344 | 51 |
| v/c Ratio | 0.25 | 0.24 | 0.53 | 0.14 | 0.64 | 0.32 | 0.60 | 0.19 | 0.59 | 0.61 | 0.07 |
| Control Delay | 50.5 | 21.9 | 39.4 | 26.1 | 12.2 | 49.5 | 28.3 | 0.7 | 40.8 | 22.4 | 0.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 50.5 | 21.9 | 39.4 | 26.1 | 12.2 | 49.5 | 28.3 | 0.7 | 40.8 | 22.4 | 0.2 |
| Queue Length 50th (ft) | 15 | 19 | 74 | 29 | 42 | 23 | 134 | 0 | 77 | 202 | 0 |
| Queue Length 95th (ft) | 57 | 64 | 163 | 69 | 145 | 77 | 269 | 0 | 169 | 388 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 130 | 770 | 815 | 1118 | 1082 | 178 | 2269 | 789 | 815 | 2963 | 982 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.24 | 0.10 | 0.37 | 0.06 | 0.39 | 0.26 | 0.39 | 0.14 | 0.39 | 0.45 | 0.05 |

Intersection Summary

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB |
|---|---|
| Directions Served | LR |
| Maximum Queue (ft) | 53 |
| Average Queue (ft) | 20 |
| 95th Queue (ft) | 45 |
| Link Distance (ft) | 453 |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (ft) | |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB |
|---|---|---|
| Directions Served | LTR | LTR |
| Maximum Queue (ft) | 25 | 28 |
| Average Queue (ft) | 11 | 8 |
| 95th Queue (ft) | 31 | 29 |
| Link Distance (ft) | 353 | 358 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 49 | 107 | 170 | 54 | 338 | 60 | 1360 | 194 | 410 | 1347 | 41 |
| v/c Ratio | 0.42 | 0.38 | 0.53 | 0.14 | 0.58 | 0.50 | 0.74 | 0.28 | 0.72 | 0.55 | 0.05 |
| Control Delay | 58.1 | 33.2 | 49.6 | 34.2 | 9.5 | 62.2 | 30.0 | 5.6 | 46.4 | 19.1 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 58.1 | 33.2 | 49.6 | 34.2 | 9.5 | 62.2 | 30.0 | 5.6 | 46.4 | 19.1 | 0.1 |
| Queue Length 50th (ft) | 28 | 46 | 48 | 28 | 10 | 34 | 231 | 2 | 115 | 186 | 0 |
| Queue Length 95th (ft) | #86 | 99 | 104 | 63 | 85 | #113 | 422 | 57 | 212 | 343 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 128 | 638 | 381 | 735 | 818 | 126 | 2127 | 761 | 760 | 2891 | 925 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.38 | 0.17 | 0.45 | 0.07 | 0.41 | 0.48 | 0.64 | 0.25 | 0.54 | 0.47 | 0.04 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB | SB |
|---|---|---|
| Directions Served | LR | LT |
| Maximum Queue (ft) | 48 | 53 |
| Average Queue (ft) | 27 | 6 |
| 95th Queue (ft) | 43 | 30 |
| Link Distance (ft) | 453 | 178 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB | SB |
|---|---|---|---|
| Directions Served | LTR | LTR | L |
| Maximum Queue (ft) | 24 | 28 | 30 |
| Average Queue (ft) | 1 | 19 | 4 |
| 95th Queue (ft) | 8 | 40 | 21 |
| Link Distance (ft) | 353 | 358 | |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (ft) | | | 210 |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 47 | 118 | 175 | 171 | 202 | 215 | 1355 | 119 | 233 | 1463 | 147 |
| v/c Ratio | 0.40 | 0.40 | 0.52 | 0.38 | 0.38 | 1.04 | 0.67 | 0.17 | 0.59 | 0.73 | 0.21 |
| Control Delay | 57.0 | 33.0 | 47.7 | 34.3 | 6.8 | 117.0 | 25.8 | 3.1 | 47.4 | 26.5 | 4.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 57.0 | 33.0 | 47.7 | 34.3 | 6.8 | 117.0 | 25.8 | 3.1 | 47.4 | 26.5 | 4.5 |
| Queue Length 50th (ft) | 25 | 49 | 47 | 89 | 0 | ~125 | 215 | 0 | 63 | 237 | 0 |
| Queue Length 95th (ft) | #82 | 109 | 105 | 162 | 54 | #379 | 392 | 26 | 133 | 415 | 42 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 127 | 648 | 440 | 775 | 767 | 207 | 2442 | 826 | 517 | 2613 | 866 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.37 | 0.18 | 0.40 | 0.22 | 0.26 | 1.04 | 0.55 | 0.14 | 0.45 | 0.56 | 0.17 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB |
|---|---|
| Directions Served | LR |
| Maximum Queue (ft) | 79 |
| Average Queue (ft) | 57 |
| 95th Queue (ft) | 79 |
| Link Distance (ft) | 453 |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (ft) | |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB | SB |
|---|---|---|---|
| Directions Served | LTR | LTR | L |
| Maximum Queue (ft) | 25 | 52 | 30 |
| Average Queue (ft) | 2 | 20 | 11 |
| 95th Queue (ft) | 12 | 48 | 34 |
| Link Distance (ft) | 353 | 358 | |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (ft) | | | 210 |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 125 | 352 | 175 | 62 | 202 | 90 | 1355 | 119 | 233 | 1463 | 68 |
| v/c Ratio | 1.10 | 0.81 | 0.55 | 0.13 | 0.36 | 0.59 | 0.75 | 0.18 | 0.62 | 0.71 | 0.10 |
| Control Delay | 160.1 | 49.6 | 54.6 | 30.4 | 6.5 | 65.8 | 32.7 | 3.2 | 54.2 | 29.5 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 160.1 | 49.6 | 54.6 | 30.4 | 6.5 | 65.8 | 32.7 | 3.2 | 54.2 | 29.5 | 0.3 |
| Queue Length 50th (ft) | ~105 | 208 | 60 | 32 | 1 | 60 | 291 | 0 | 80 | 314 | 0 |
| Queue Length 95th (ft) | #251 | 336 | 105 | 69 | 55 | #131 | 392 | 26 | 133 | 415 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 114 | 586 | 396 | 698 | 710 | 186 | 2201 | 759 | 466 | 2356 | 794 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.10 | 0.60 | 0.44 | 0.09 | 0.28 | 0.48 | 0.62 | 0.16 | 0.50 | 0.62 | 0.09 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

# APPENDIX 8.1:

# HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS INTERSECTION ANALYSIS WORKSHEETS

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| Intersection | |
|---|---|
| Int Delay, s/veh | 2.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 18 | 1 | 22 | 0 | 14 | 45 | 0 |
| Future Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 18 | 1 | 22 | 0 | 14 | 45 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1 | 1 | 0 | 0 | 20 | 1 | 24 | 0 | 16 | 50 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 118 | 108 | 50 | 109 | 108 | 24 | 50 | 0 | 0 | 24 | 0 | 0 |
| Stage 1 | 82 | 82 | - | 26 | 26 | - | - | - | - | - | - | - |
| Stage 2 | 36 | 26 | - | 83 | 82 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 858 | 782 | 1018 | 870 | 782 | 1052 | 1557 | - | - | 1591 | - | - |
| Stage 1 | 926 | 827 | - | 992 | 874 | - | - | - | - | - | - | - |
| Stage 2 | 980 | 874 | - | 925 | 827 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 835 | 773 | 1018 | 861 | 773 | 1052 | 1557 | - | - | 1591 | - | - |
| Mov Cap-2 Maneuver | 835 | 773 | - | 861 | 773 | - | - | - | - | - | - | - |
| Stage 1 | 925 | 819 | - | 991 | 873 | - | - | - | - | - | - | - |
| Stage 2 | 961 | 873 | - | 913 | 819 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 9.1 | 8.5 | 0.3 | 1.7 |
| HCM LOS | A | A | | |

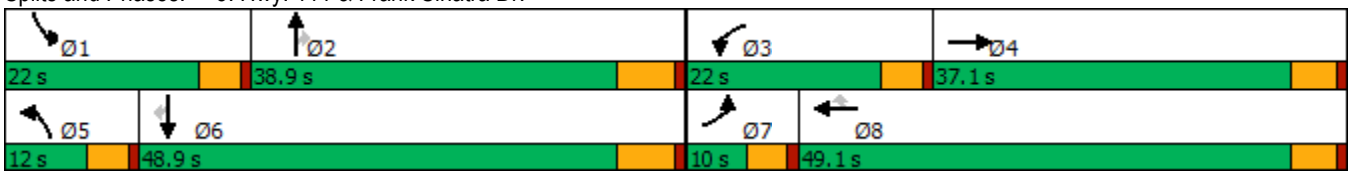
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1557 | - | - | 879 | 1052 | 1591 | - | - |
| HCM Lane V/C Ratio | 0.001 | - | - | 0.003 | 0.019 | 0.01 | - | - |
| HCM Control Delay (s) | 7.3 | - | - | 9.1 | 8.5 | 7.3 | - | - |
| HCM Lane LOS | A | - | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0 | - | - |

| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 21 | 26 | 330 | 62 | 489 | 43 | 851 | 104 | 325 | 1375 | 49 |
| Future Volume (vph) | 21 | 26 | 330 | 62 | 489 | 43 | 851 | 104 | 325 | 1375 | 49 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 10.0 | 37.1 | 22.0 | 49.1 | 49.1 | 12.0 | 38.9 | 38.9 | 22.0 | 48.9 | 48.9 |
| Total Split (%) | 8.3% | 30.9% | 18.3% | 40.9% | 40.9% | 10.0% | 32.4% | 32.4% | 18.3% | 40.8% | 40.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 86.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 21 | 26 | 22 | 330 | 62 | 489 | 43 | 851 | 104 | 325 | 1375 | 49 |
| Future Volume (veh/h) | 21 | 26 | 22 | 330 | 62 | 489 | 43 | 851 | 104 | 325 | 1375 | 49 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 23 | 28 | 18 | 355 | 67 | 0 | 46 | 915 | 0 | 349 | 1478 | 39 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 45 | 148 | 95 | 458 | 461 | | 74 | 1641 | | 450 | 2096 | 651 |
| Arrive On Green | 0.03 | 0.14 | 0.14 | 0.13 | 0.25 | 0.00 | 0.04 | 0.32 | 0.00 | 0.13 | 0.41 | 0.41 |
| Sat Flow, veh/h | 1781 | 1060 | 681 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1585 |
| Grp Volume(v), veh/h | 23 | 0 | 46 | 355 | 67 | 0 | 46 | 915 | 0 | 349 | 1478 | 39 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1741 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1585 |
| Q Serve(g_s), s | 0.9 | 0.0 | 1.7 | 7.4 | 2.1 | 0.0 | 1.9 | 11.0 | 0.0 | 7.2 | 17.8 | 1.1 |
| Cycle Q Clear(g_c), s | 0.9 | 0.0 | 1.7 | 7.4 | 2.1 | 0.0 | 1.9 | 11.0 | 0.0 | 7.2 | 17.8 | 1.1 |
| Prop In Lane | 1.00 | | 0.39 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 45 | 0 | 242 | 458 | 461 | | 74 | 1641 | | 450 | 2096 | 651 |
| V/C Ratio(X) | 0.51 | 0.00 | 0.19 | 0.78 | 0.15 | | 0.63 | 0.56 | | 0.78 | 0.71 | 0.06 |
| Avail Cap(c_a), veh/h | 130 | 0 | 752 | 811 | 1110 | | 178 | 2253 | | 811 | 2942 | 913 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.7 | 0.0 | 28.2 | 31.1 | 21.8 | 0.0 | 35.0 | 20.8 | 0.0 | 31.2 | 18.1 | 13.2 |
| Incr Delay (d2), s/veh | 3.2 | 0.0 | 0.4 | 1.1 | 0.1 | 0.0 | 3.2 | 0.3 | 0.0 | 1.1 | 0.5 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 0.0 | 0.7 | 3.0 | 0.9 | 0.0 | 0.8 | 3.8 | 0.0 | 2.8 | 5.9 | 0.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 38.9 | 0.0 | 28.6 | 32.2 | 22.0 | 0.0 | 38.2 | 21.1 | 0.0 | 32.3 | 18.6 | 13.2 |
| LnGrp LOS | D | A | C | C | C | | D | C | | C | B | B |
| Approach Vol, veh/h | | 69 | | | 422 | A | | 961 | A | | 1866 | |
| Approach Delay, s/veh | | 32.0 | | | 30.5 | | | 21.9 | | | 21.0 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 14.3 | 30.0 | 14.4 | 15.4 | 7.7 | 36.6 | 6.5 | 23.3 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 17.4 | 32.7 | 17.4 | 32.0 | 7.4 | 42.7 | 5.4 | 44.0 |
| Max Q Clear Time (g_c+I1), s | 9.2 | 13.0 | 9.4 | 3.7 | 3.9 | 19.8 | 2.9 | 4.1 |
| Green Ext Time (p_c), s | 0.4 | 5.6 | 0.5 | 0.2 | 0.0 | 10.6 | 0.0 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 22.7 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.6 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 19 | 2 | 0 | 0 | 5 | 10 | 0 | 29 | 0 | 30 | 26 | 1 |
| Future Vol, veh/h | 19 | 2 | 0 | 0 | 5 | 10 | 0 | 29 | 0 | 30 | 26 | 1 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 23 | 2 | 0 | 0 | 6 | 12 | 0 | 35 | 0 | 36 | 31 | 1 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 148 | 139 | 32 | 140 | 139 | 35 | 32 | 0 | 0 | 35 | 0 | 0 |
| Stage 1 | 104 | 104 | - | 35 | 35 | - | - | - | - | - | - | - |
| Stage 2 | 44 | 35 | - | 105 | 104 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 820 | 752 | 1042 | 830 | 752 | 1038 | 1580 | - | - | 1576 | - | - |
| Stage 1 | 902 | 809 | - | 981 | 866 | - | - | - | - | - | - | - |
| Stage 2 | 970 | 866 | - | 901 | 809 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 791 | 735 | 1042 | 813 | 735 | 1038 | 1580 | - | - | 1576 | - | - |
| Mov Cap-2 Maneuver | 791 | 735 | - | 813 | 735 | - | - | - | - | - | - | - |
| Stage 1 | 902 | 790 | - | 981 | 866 | - | - | - | - | - | - | - |
| Stage 2 | 952 | 866 | - | 878 | 790 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 9.7 | 9 | 0 | 3.9 |
| HCM LOS | A | A | | |

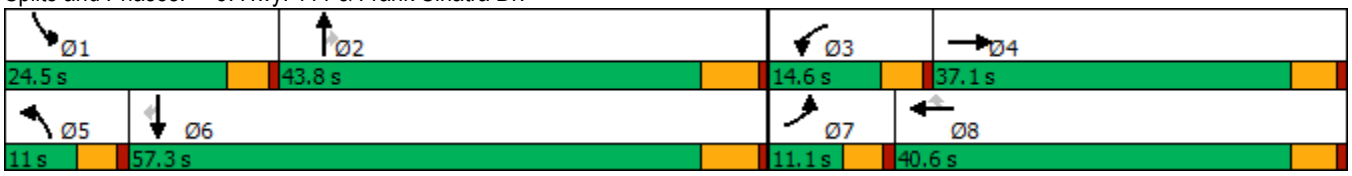
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1580 | - | - | 785 | 913 | 1576 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.032 | 0.02 | 0.023 | - | - |
| HCM Control Delay (s) | 0 | - | - | 9.7 | 9 | 7.3 | - | - |
| HCM Lane LOS | A | - | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0.1 | 0.1 | 0.1 | - | - |

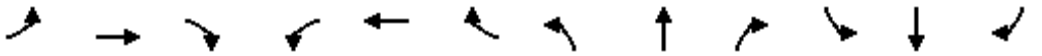
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 45 | 62 | 178 | 38 | 354 | 40 | 1481 | 227 | 481 | 1467 | 29 |
| Future Volume (vph) | 45 | 62 | 178 | 38 | 354 | 40 | 1481 | 227 | 481 | 1467 | 29 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.1 | 37.1 | 14.6 | 40.6 | 40.6 | 11.0 | 43.8 | 43.8 | 24.5 | 57.3 | 57.3 |
| Total Split (%) | 9.3% | 30.9% | 12.2% | 33.8% | 33.8% | 9.2% | 36.5% | 36.5% | 20.4% | 47.8% | 47.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 94.7
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 45 | 62 | 30 | 178 | 38 | 354 | 40 | 1481 | 227 | 481 | 1467 | 29 |
| Future Volume (veh/h) | 45 | 62 | 30 | 178 | 38 | 354 | 40 | 1481 | 227 | 481 | 1467 | 29 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 45 | 63 | 24 | 180 | 38 | 0 | 40 | 1496 | 0 | 486 | 1482 | 23 |
| Peak Hour Factor | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 70 | 159 | 61 | 261 | 298 | | 65 | 1950 | | 580 | 2620 | 797 |
| Arrive On Green | 0.04 | 0.12 | 0.12 | 0.08 | 0.16 | 0.00 | 0.04 | 0.38 | 0.00 | 0.17 | 0.51 | 0.51 |
| Sat Flow, veh/h | 1781 | 1289 | 491 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1552 |
| Grp Volume(v), veh/h | 45 | 0 | 87 | 180 | 38 | 0 | 40 | 1496 | 0 | 486 | 1482 | 23 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1781 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1552 |
| Q Serve(g_s), s | 2.0 | 0.0 | 3.7 | 4.1 | 1.4 | 0.0 | 1.8 | 20.9 | 0.0 | 11.1 | 16.2 | 0.6 |
| Cycle Q Clear(g_c), s | 2.0 | 0.0 | 3.7 | 4.1 | 1.4 | 0.0 | 1.8 | 20.9 | 0.0 | 11.1 | 16.2 | 0.6 |
| Prop In Lane | 1.00 | | 0.28 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 70 | 0 | 219 | 261 | 298 | | 65 | 1950 | | 580 | 2620 | 797 |
| V/C Ratio(X) | 0.64 | 0.00 | 0.40 | 0.69 | 0.13 | | 0.61 | 0.77 | | 0.84 | 0.57 | 0.03 |
| Avail Cap(c_a), veh/h | 142 | 0 | 699 | 424 | 815 | | 140 | 2357 | | 844 | 3203 | 974 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.6 | 0.0 | 32.9 | 36.7 | 29.4 | 0.0 | 38.7 | 22.0 | 0.0 | 32.8 | 13.6 | 9.8 |
| Incr Delay (d2), s/veh | 3.7 | 0.0 | 1.2 | 1.2 | 0.2 | 0.0 | 3.5 | 1.3 | 0.0 | 3.4 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.9 | 0.0 | 1.6 | 1.7 | 0.6 | 0.0 | 0.8 | 7.4 | 0.0 | 4.5 | 5.1 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 42.2 | 0.0 | 34.1 | 38.0 | 29.6 | 0.0 | 42.1 | 23.3 | 0.0 | 36.2 | 13.8 | 9.8 |
| LnGrp LOS | D | A | C | D | C | | D | C | | D | B | A |
| Approach Vol, veh/h | | 132 | | | 218 | A | | 1536 | A | | 1991 | |
| Approach Delay, s/veh | | 36.9 | | | 36.5 | | | 23.8 | | | 19.2 | |
| Approach LOS | | D | | | D | | | C | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 18.3 | 37.3 | 10.7 | 15.1 | 7.6 | 48.0 | 7.8 | 18.1 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 19.9 | 37.6 | 10.0 | 32.0 | 6.4 | 51.1 | 6.5 | 35.5 |
| Max Q Clear Time (g_c+I1), s | 13.1 | 22.9 | 6.1 | 5.7 | 3.8 | 18.2 | 4.0 | 3.4 |
| Green Ext Time (p_c), s | 0.6 | 8.2 | 0.1 | 0.4 | 0.0 | 12.3 | 0.0 | 0.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 22.6 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 32 | 0 | 26 | 4 | 39 | 28 | 4 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 32 | 0 | 26 | 4 | 39 | 28 | 4 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 41 | 0 | 33 | 5 | 49 | 35 | 5 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 193 | 174 | 38 | 172 | 174 | 36 | 40 | 0 | 0 | 38 | 0 | 0 |
| Stage 1 | 136 | 136 | - | 36 | 36 | - | - | - | - | - | - | - |
| Stage 2 | 57 | 38 | - | 136 | 138 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 767 | 719 | 1034 | 791 | 719 | 1037 | 1570 | - | - | 1572 | - | - |
| Stage 1 | 867 | 784 | - | 980 | 865 | - | - | - | - | - | - | - |
| Stage 2 | 955 | 863 | - | 867 | 782 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 719 | 697 | 1034 | 772 | 697 | 1037 | 1570 | - | - | 1572 | - | - |
| Mov Cap-2 Maneuver | 719 | 697 | - | 772 | 697 | - | - | - | - | - | - | - |
| Stage 1 | 867 | 760 | - | 980 | 865 | - | - | - | - | - | - | - |
| Stage 2 | 916 | 863 | - | 840 | 758 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 10 | 8.7 | 0 | 4 |
| HCM LOS | B | A | | |

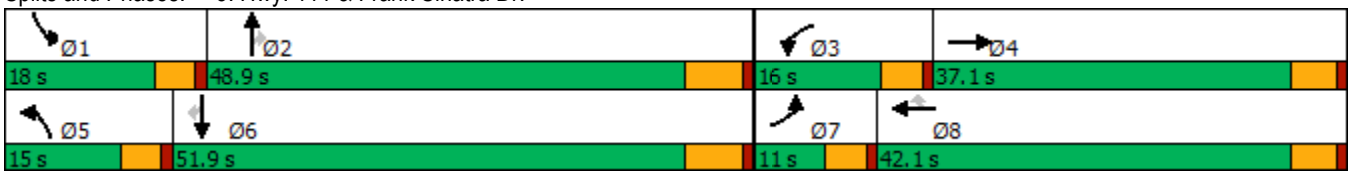
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1570 | - | - | 719 | 1022 | 1572 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.002 | 0.041 | 0.031 | - | - |
| HCM Control Delay (s) | 0 | - | - | 10 | 8.7 | 7.4 | - | - |
| HCM Lane LOS | A | - | - | B | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0.1 | - | - |

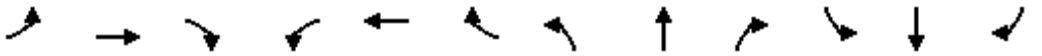
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 24 | 52 | 176 | 35 | 200 | 60 | 1347 | 119 | 235 | 1464 | 45 |
| Future Volume (vph) | 24 | 52 | 176 | 35 | 200 | 60 | 1347 | 119 | 235 | 1464 | 45 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 88.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 24 | 52 | 14 | 176 | 35 | 200 | 60 | 1347 | 119 | 235 | 1464 | 45 |
| Future Volume (veh/h) | 24 | 52 | 14 | 176 | 35 | 200 | 60 | 1347 | 119 | 235 | 1464 | 45 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 26 | 57 | 15 | 193 | 38 | 0 | 66 | 1480 | 0 | 258 | 1609 | 45 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 50 | 193 | 51 | 282 | 353 | | 89 | 2081 | | 352 | 2347 | 726 |
| Arrive On Green | 0.03 | 0.14 | 0.14 | 0.08 | 0.19 | 0.00 | 0.05 | 0.41 | 0.00 | 0.10 | 0.46 | 0.46 |
| Sat Flow, veh/h | 1781 | 1427 | 376 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1580 |
| Grp Volume(v), veh/h | 26 | 0 | 72 | 193 | 38 | 0 | 66 | 1480 | 0 | 258 | 1609 | 45 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1803 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1580 |
| Q Serve(g_s), s | 1.1 | 0.0 | 2.7 | 4.1 | 1.3 | 0.0 | 2.7 | 18.1 | 0.0 | 5.4 | 18.6 | 1.2 |
| Cycle Q Clear(g_c), s | 1.1 | 0.0 | 2.7 | 4.1 | 1.3 | 0.0 | 2.7 | 18.1 | 0.0 | 5.4 | 18.6 | 1.2 |
| Prop In Lane | 1.00 | | 0.21 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 50 | 0 | 244 | 282 | 353 | | 89 | 2081 | | 352 | 2347 | 726 |
| V/C Ratio(X) | 0.52 | 0.00 | 0.30 | 0.68 | 0.11 | | 0.74 | 0.71 | | 0.73 | 0.69 | 0.06 |
| Avail Cap(c_a), veh/h | 152 | 0 | 771 | 526 | 924 | | 247 | 2912 | | 619 | 3117 | 964 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.9 | 0.0 | 29.2 | 33.4 | 25.1 | 0.0 | 35.1 | 18.5 | 0.0 | 32.6 | 16.0 | 11.3 |
| Incr Delay (d2), s/veh | 3.1 | 0.0 | 0.7 | 1.1 | 0.1 | 0.0 | 4.5 | 0.5 | 0.0 | 1.1 | 0.4 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 0.0 | 1.2 | 1.7 | 0.5 | 0.0 | 1.2 | 6.0 | 0.0 | 2.1 | 5.9 | 0.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 39.0 | 0.0 | 29.8 | 34.5 | 25.3 | 0.0 | 39.6 | 19.0 | 0.0 | 33.7 | 16.4 | 11.3 |
| LnGrp LOS | D | A | C | C | C | | D | B | | C | B | B |
| Approach Vol, veh/h | | 98 | | | 231 | A | | 1546 | A | | 1912 | |
| Approach Delay, s/veh | | 32.3 | | | 33.0 | | | 19.9 | | | 18.6 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.2 | 36.7 | 10.7 | 15.2 | 8.3 | 40.6 | 6.7 | 19.2 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 7.4 | 20.1 | 6.1 | 4.7 | 4.7 | 20.6 | 3.1 | 3.3 |
| Green Ext Time (p_c), s | 0.2 | 10.4 | 0.2 | 0.3 | 0.0 | 12.3 | 0.0 | 0.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 20.3 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

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# APPENDIX 8.2:

# HORIZON YEAR (2040) WITH PROJECT CONDITIONS INTERSECTION ANALYSIS WORKSHEETS

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| Intersection | |
|---|---|
| Int Delay, s/veh | 3.5 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 39 | 24 | 0 | 12 | 46 |
| Future Vol, veh/h | 0 | 39 | 24 | 0 | 12 | 46 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 42 | 26 | 0 | 13 | 50 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 102 | 26 | 0 | 0 | 26 | 0 |
| Stage 1 | 26 | - | - | - | - | - |
| Stage 2 | 76 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 896 | 1050 | - | - | 1588 | - |
| Stage 1 | 997 | - | - | - | - | - |
| Stage 2 | 947 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 889 | 1050 | - | - | 1588 | - |
| Mov Cap-2 Maneuver | 889 | - | - | - | - | - |
| Stage 1 | 997 | - | - | - | - | - |
| Stage 2 | 939 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.6 | 0 | 1.5 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1050 | 1588 | - |
| HCM Lane V/C Ratio | - | - | 0.04 | 0.008 | - |
| HCM Control Delay (s) | - | - | 8.6 | 7.3 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.1 | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.9 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 18 | 1 | 61 | 0 | 14 | 57 | 0 |
| Future Vol, veh/h | 0 | 1 | 1 | 0 | 0 | 18 | 1 | 61 | 0 | 14 | 57 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1 | 1 | 0 | 0 | 20 | 1 | 68 | 0 | 16 | 63 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 175 | 165 | 63 | 166 | 165 | 68 | 63 | 0 | 0 | 68 | 0 | 0 |
| Stage 1 | 95 | 95 | - | 70 | 70 | - | - | - | - | - | - | - |
| Stage 2 | 80 | 70 | - | 96 | 95 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 788 | 728 | 1002 | 798 | 728 | 995 | 1540 | - | - | 1533 | - | - |
| Stage 1 | 912 | 816 | - | 940 | 837 | - | - | - | - | - | - | - |
| Stage 2 | 929 | 837 | - | 911 | 816 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 766 | 720 | 1002 | 789 | 720 | 995 | 1540 | - | - | 1533 | - | - |
| Mov Cap-2 Maneuver | 766 | 720 | - | 789 | 720 | - | - | - | - | - | - | - |
| Stage 1 | 911 | 808 | - | 939 | 836 | - | - | - | - | - | - | - |
| Stage 2 | 910 | 836 | - | 899 | 808 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 9.3 | 8.7 | 0.1 | 1.5 |
| HCM LOS | A | A | | |

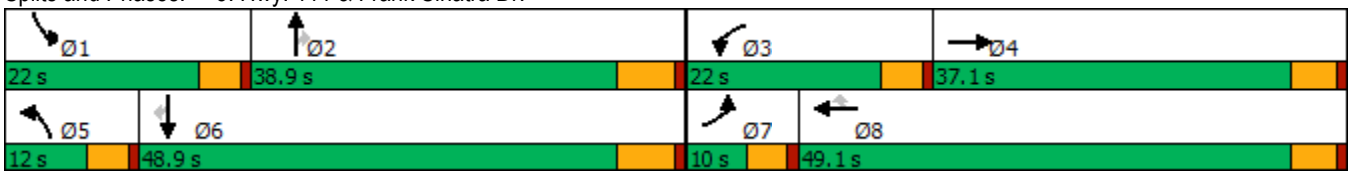
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1540 | - | - | 838 | 995 | 1533 | - | - |
| HCM Lane V/C Ratio | 0.001 | - | - | 0.003 | 0.02 | 0.01 | - | - |
| HCM Control Delay (s) | 7.3 | - | - | 9.3 | 8.7 | 7.4 | - | - |
| HCM Lane LOS | A | - | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0 | - | - |

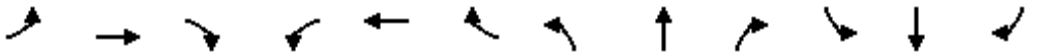
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 31 | 40 | 330 | 66 | 489 | 48 | 851 | 104 | 325 | 1375 | 52 |
| Future Volume (vph) | 31 | 40 | 330 | 66 | 489 | 48 | 851 | 104 | 325 | 1375 | 52 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 10.0 | 37.1 | 22.0 | 49.1 | 49.1 | 12.0 | 38.9 | 38.9 | 22.0 | 48.9 | 48.9 |
| Total Split (%) | 8.3% | 30.9% | 18.3% | 40.9% | 40.9% | 10.0% | 32.4% | 32.4% | 18.3% | 40.8% | 40.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 88.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 31 | 40 | 38 | 330 | 66 | 489 | 48 | 851 | 104 | 325 | 1375 | 52 |
| Future Volume (veh/h) | 31 | 40 | 38 | 330 | 66 | 489 | 48 | 851 | 104 | 325 | 1375 | 52 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 33 | 43 | 35 | 355 | 71 | 0 | 52 | 915 | 0 | 349 | 1478 | 42 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 59 | 135 | 110 | 456 | 451 | | 79 | 1647 | | 449 | 2085 | 647 |
| Arrive On Green | 0.03 | 0.14 | 0.14 | 0.13 | 0.24 | 0.00 | 0.04 | 0.32 | 0.00 | 0.13 | 0.41 | 0.41 |
| Sat Flow, veh/h | 1781 | 950 | 773 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1585 |
| Grp Volume(v), veh/h | 33 | 0 | 78 | 355 | 71 | 0 | 52 | 915 | 0 | 349 | 1478 | 42 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1723 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1585 |
| Q Serve(g_s), s | 1.4 | 0.0 | 3.1 | 7.5 | 2.2 | 0.0 | 2.2 | 11.1 | 0.0 | 7.3 | 18.1 | 1.2 |
| Cycle Q Clear(g_c), s | 1.4 | 0.0 | 3.1 | 7.5 | 2.2 | 0.0 | 2.2 | 11.1 | 0.0 | 7.3 | 18.1 | 1.2 |
| Prop In Lane | 1.00 | | 0.45 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 59 | 0 | 246 | 456 | 451 | | 79 | 1647 | | 449 | 2085 | 647 |
| V/C Ratio(X) | 0.56 | 0.00 | 0.32 | 0.78 | 0.16 | | 0.66 | 0.56 | | 0.78 | 0.71 | 0.06 |
| Avail Cap(c_a), veh/h | 128 | 0 | 735 | 801 | 1096 | | 176 | 2224 | | 801 | 2904 | 902 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.8 | 0.0 | 28.9 | 31.5 | 22.5 | 0.0 | 35.3 | 21.0 | 0.0 | 31.6 | 18.5 | 13.5 |
| Incr Delay (d2), s/veh | 3.1 | 0.0 | 0.7 | 1.1 | 0.2 | 0.0 | 3.5 | 0.3 | 0.0 | 1.1 | 0.5 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.0 | 1.3 | 3.0 | 1.0 | 0.0 | 0.9 | 3.9 | 0.0 | 2.9 | 6.0 | 0.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 38.8 | 0.0 | 29.6 | 32.6 | 22.6 | 0.0 | 38.9 | 21.3 | 0.0 | 32.7 | 19.0 | 13.5 |
| LnGrp LOS | D | A | C | C | C | | D | C | | C | B | B |
| Approach Vol, veh/h | | 111 | | | 426 | A | | 967 | A | | 1869 | |
| Approach Delay, s/veh | | 32.4 | | | 31.0 | | | 22.2 | | | 21.4 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 14.4 | 30.4 | 14.5 | 15.8 | 7.9 | 36.9 | 7.1 | 23.2 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 17.4 | 32.7 | 17.4 | 32.0 | 7.4 | 42.7 | 5.4 | 44.0 |
| Max Q Clear Time (g_c+I1), s | 9.3 | 13.1 | 9.5 | 5.1 | 4.2 | 20.1 | 3.4 | 4.2 |
| Green Ext Time (p_c), s | 0.4 | 5.6 | 0.5 | 0.4 | 0.0 | 10.6 | 0.0 | 0.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 23.2 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.8 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 31 | 29 | 0 | 55 | 26 |
| Future Vol, veh/h | 0 | 31 | 29 | 0 | 55 | 26 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 34 | 32 | 0 | 60 | 28 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 180 | 32 | 0 | 0 | 32 | 0 |
| Stage 1 | 32 | - | - | - | - | - |
| Stage 2 | 148 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 810 | 1042 | - | - | 1580 | - |
| Stage 1 | 991 | - | - | - | - | - |
| Stage 2 | 880 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 778 | 1042 | - | - | 1580 | - |
| Mov Cap-2 Maneuver | 778 | - | - | - | - | - |
| Stage 1 | 991 | - | - | - | - | - |
| Stage 2 | 846 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.6 | 0 | 5 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1042 | 1580 | - |
| HCM Lane V/C Ratio | - | - | 0.032 | 0.038 | - |
| HCM Control Delay (s) | - | - | 8.6 | 7.4 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.1 | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.8 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 19 | 2 | 0 | 0 | 5 | 10 | 0 | 60 | 0 | 30 | 81 | 1 |
| Future Vol, veh/h | 19 | 2 | 0 | 0 | 5 | 10 | 0 | 60 | 0 | 30 | 81 | 1 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 23 | 2 | 0 | 0 | 6 | 12 | 0 | 71 | 0 | 36 | 96 | 1 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 249 | 240 | 97 | 241 | 240 | 71 | 97 | 0 | 0 | 71 | 0 | 0 |
| Stage 1 | 169 | 169 | - | 71 | 71 | - | - | - | - | - | - | - |
| Stage 2 | 80 | 71 | - | 170 | 169 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 705 | 661 | 959 | 713 | 661 | 991 | 1496 | - | - | 1529 | - | - |
| Stage 1 | 833 | 759 | - | 939 | 836 | - | - | - | - | - | - | - |
| Stage 2 | 929 | 836 | - | 832 | 759 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 679 | 645 | 959 | 698 | 645 | 991 | 1496 | - | - | 1529 | - | - |
| Mov Cap-2 Maneuver | 679 | 645 | - | 698 | 645 | - | - | - | - | - | - | - |
| Stage 1 | 833 | 741 | - | 939 | 836 | - | - | - | - | - | - | - |
| Stage 2 | 911 | 836 | - | 810 | 741 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 10.5 | 9.4 | 0 | 2 |
| HCM LOS | B | A | | |

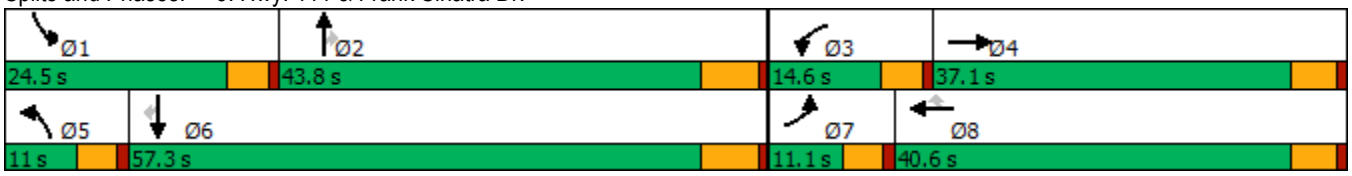
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1496 | - | - | 676 | 841 | 1529 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.037 | 0.021 | 0.023 | - | - |
| HCM Control Delay (s) | 0 | - | - | 10.5 | 9.4 | 7.4 | - | - |
| HCM Lane LOS | A | - | - | B | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0.1 | 0.1 | 0.1 | - | - |

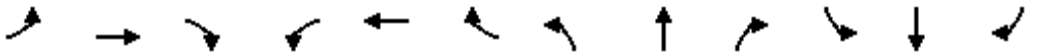
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 53 | 73 | 178 | 57 | 354 | 62 | 1481 | 227 | 481 | 1467 | 43 |
| Future Volume (vph) | 53 | 73 | 178 | 57 | 354 | 62 | 1481 | 227 | 481 | 1467 | 43 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.1 | 37.1 | 14.6 | 40.6 | 40.6 | 11.0 | 43.8 | 43.8 | 24.5 | 57.3 | 57.3 |
| Total Split (%) | 9.3% | 30.9% | 12.2% | 33.8% | 33.8% | 9.2% | 36.5% | 36.5% | 20.4% | 47.8% | 47.8% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 98.4
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 53 | 73 | 42 | 178 | 57 | 354 | 62 | 1481 | 227 | 481 | 1467 | 43 |
| Future Volume (veh/h) | 53 | 73 | 42 | 178 | 57 | 354 | 62 | 1481 | 227 | 481 | 1467 | 43 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 54 | 74 | 36 | 180 | 58 | 0 | 63 | 1496 | 0 | 486 | 1482 | 37 |
| Peak Hour Factor | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 77 | 148 | 72 | 260 | 293 | | 83 | 1947 | | 580 | 2566 | 780 |
| Arrive On Green | 0.04 | 0.12 | 0.12 | 0.08 | 0.16 | 0.00 | 0.05 | 0.38 | 0.00 | 0.17 | 0.50 | 0.50 |
| Sat Flow, veh/h | 1781 | 1187 | 578 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1552 |
| Grp Volume(v), veh/h | 54 | 0 | 110 | 180 | 58 | 0 | 63 | 1496 | 0 | 486 | 1482 | 37 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1765 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1552 |
| Q Serve(g_s), s | 2.4 | 0.0 | 4.8 | 4.2 | 2.2 | 0.0 | 2.9 | 20.9 | 0.0 | 11.1 | 16.6 | 1.0 |
| Cycle Q Clear(g_c), s | 2.4 | 0.0 | 4.8 | 4.2 | 2.2 | 0.0 | 2.9 | 20.9 | 0.0 | 11.1 | 16.6 | 1.0 |
| Prop In Lane | 1.00 | | 0.33 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 77 | 0 | 220 | 260 | 293 | | 83 | 1947 | | 580 | 2566 | 780 |
| V/C Ratio(X) | 0.70 | 0.00 | 0.50 | 0.69 | 0.20 | | 0.76 | 0.77 | | 0.84 | 0.58 | 0.05 |
| Avail Cap(c_a), veh/h | 142 | 0 | 691 | 423 | 813 | | 140 | 2349 | | 842 | 3193 | 971 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.6 | 0.0 | 33.4 | 36.9 | 30.0 | 0.0 | 38.5 | 22.1 | 0.0 | 32.9 | 14.2 | 10.4 |
| Incr Delay (d2), s/veh | 4.3 | 0.0 | 1.8 | 1.2 | 0.3 | 0.0 | 5.3 | 1.3 | 0.0 | 3.4 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.1 | 0.0 | 2.1 | 1.7 | 1.0 | 0.0 | 1.3 | 7.5 | 0.0 | 4.5 | 5.3 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 42.8 | 0.0 | 35.1 | 38.1 | 30.3 | 0.0 | 43.8 | 23.4 | 0.0 | 36.4 | 14.5 | 10.4 |
| LnGrp LOS | D | A | D | D | C | | D | C | | D | B | B |
| Approach Vol, veh/h | | 164 | | | 238 | A | | 1559 | A | | 2005 | |
| Approach Delay, s/veh | | 37.7 | | | 36.2 | | | 24.2 | | | 19.7 | |
| Approach LOS | | D | | | D | | | C | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 18.3 | 37.4 | 10.8 | 15.3 | 8.4 | 47.3 | 8.1 | 17.9 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 19.9 | 37.6 | 10.0 | 32.0 | 6.4 | 51.1 | 6.5 | 35.5 |
| Max Q Clear Time (g_c+I1), s | 13.1 | 22.9 | 6.2 | 6.8 | 4.9 | 18.6 | 4.4 | 4.2 |
| Green Ext Time (p_c), s | 0.6 | 8.2 | 0.1 | 0.6 | 0.0 | 12.4 | 0.0 | 0.2 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 23.2 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 7.1 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 62 | 29 | 0 | 354 | 28 |
| Future Vol, veh/h | 0 | 62 | 29 | 0 | 354 | 28 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 67 | 32 | 0 | 385 | 30 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 832 | 32 | 0 | 0 | 32 | 0 |
| Stage 1 | 32 | - | - | - | - | - |
| Stage 2 | 800 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 339 | 1042 | - | - | 1580 | - |
| Stage 1 | 991 | - | - | - | - | - |
| Stage 2 | 442 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 255 | 1042 | - | - | 1580 | - |
| Mov Cap-2 Maneuver | 255 | - | - | - | - | - |
| Stage 1 | 991 | - | - | - | - | - |
| Stage 2 | 332 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.7 | 0 | 7.4 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1042 | 1580 | - |
| HCM Lane V/C Ratio | - | - | 0.065 | 0.244 | - |
| HCM Control Delay (s) | - | - | 8.7 | 8 | 0 |
| HCM Lane LOS | - | - | A | A | A |
| HCM 95th %tile Q(veh) | - | - | 0.2 | 1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 32 | 0 | 88 | 4 | 39 | 382 | 4 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 32 | 0 | 88 | 4 | 39 | 382 | 4 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 41 | 0 | 111 | 5 | 49 | 484 | 5 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 720 | 701 | 487 | 699 | 701 | 114 | 489 | 0 | 0 | 116 | 0 | 0 |
| Stage 1 | 585 | 585 | - | 114 | 114 | - | - | - | - | - | - | - |
| Stage 2 | 135 | 116 | - | 585 | 587 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 343 | 363 | 581 | 354 | 363 | 939 | 1074 | - | - | 1473 | - | - |
| Stage 1 | 497 | 498 | - | 891 | 801 | - | - | - | - | - | - | - |
| Stage 2 | 868 | 800 | - | 497 | 497 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 319 | 351 | 581 | 345 | 351 | 939 | 1074 | - | - | 1473 | - | - |
| Mov Cap-2 Maneuver | 319 | 351 | - | 345 | 351 | - | - | - | - | - | - | - |
| Stage 1 | 497 | 482 | - | 891 | 801 | - | - | - | - | - | - | - |
| Stage 2 | 829 | 800 | - | 480 | 481 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 16.3 | 9.2 | 0 | 0.7 |
| HCM LOS | C | A | | |

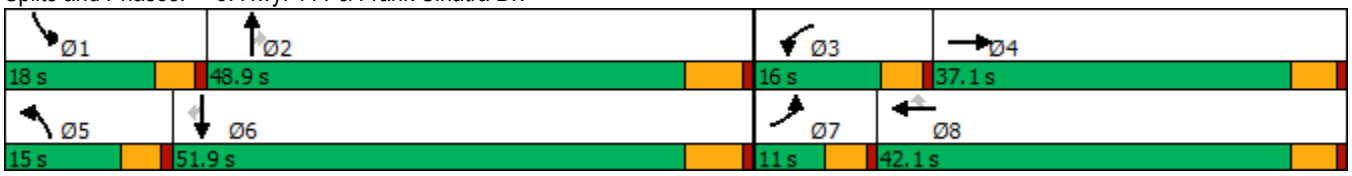
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1074 | - | - | 319 | 894 | 1473 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.004 | 0.047 | 0.034 | - | - |
| HCM Control Delay (s) | 0 | - | - | 16.3 | 9.2 | 7.5 | - | - |
| HCM Lane LOS | A | - | - | C | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.1 | 0.1 | - | - |

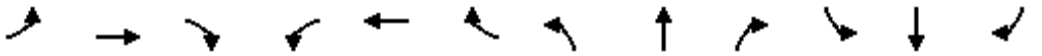
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 40 | 74 | 176 | 159 | 200 | 202 | 1347 | 119 | 235 | 1464 | 134 |
| Future Volume (vph) | 40 | 74 | 176 | 159 | 200 | 202 | 1347 | 119 | 235 | 1464 | 134 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 95.6
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 40 | 74 | 39 | 176 | 159 | 200 | 202 | 1347 | 119 | 235 | 1464 | 134 |
| Future Volume (veh/h) | 40 | 74 | 39 | 176 | 159 | 200 | 202 | 1347 | 119 | 235 | 1464 | 134 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 44 | 81 | 43 | 193 | 175 | 0 | 222 | 1480 | 0 | 258 | 1609 | 143 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 68 | 147 | 78 | 273 | 316 | | 220 | 2304 | | 341 | 2178 | 674 |
| Arrive On Green | 0.04 | 0.13 | 0.13 | 0.08 | 0.17 | 0.00 | 0.12 | 0.45 | 0.00 | 0.10 | 0.43 | 0.43 |
| Sat Flow, veh/h | 1781 | 1150 | 610 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1579 |
| Grp Volume(v), veh/h | 44 | 0 | 124 | 193 | 175 | 0 | 222 | 1480 | 0 | 258 | 1609 | 143 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1760 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1579 |
| Q Serve(g_s), s | 2.1 | 0.0 | 5.6 | 4.6 | 7.2 | 0.0 | 10.4 | 18.9 | 0.0 | 6.1 | 22.2 | 4.8 |
| Cycle Q Clear(g_c), s | 2.1 | 0.0 | 5.6 | 4.6 | 7.2 | 0.0 | 10.4 | 18.9 | 0.0 | 6.1 | 22.2 | 4.8 |
| Prop In Lane | 1.00 | | 0.35 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 68 | 0 | 225 | 273 | 316 | | 220 | 2304 | | 341 | 2178 | 674 |
| V/C Ratio(X) | 0.65 | 0.00 | 0.55 | 0.71 | 0.55 | | 1.01 | 0.64 | | 0.76 | 0.74 | 0.21 |
| Avail Cap(c_a), veh/h | 135 | 0 | 668 | 467 | 821 | | 220 | 2587 | | 549 | 2769 | 856 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 40.0 | 0.0 | 34.5 | 37.9 | 32.1 | 0.0 | 36.9 | 17.9 | 0.0 | 37.0 | 20.2 | 15.2 |
| Incr Delay (d2), s/veh | 3.8 | 0.0 | 2.1 | 1.3 | 1.5 | 0.0 | 63.3 | 0.5 | 0.0 | 1.3 | 0.8 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.0 | 0.0 | 2.5 | 1.9 | 3.3 | 0.0 | 8.1 | 6.4 | 0.0 | 2.5 | 7.7 | 1.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 43.8 | 0.0 | 36.6 | 39.1 | 33.7 | 0.0 | 100.2 | 18.3 | 0.0 | 38.3 | 21.0 | 15.4 |
| LnGrp LOS | D | A | D | D | C | | F | B | | D | C | B |
| Approach Vol, veh/h | | 168 | | | 368 | A | | 1702 | A | | 2010 | |
| Approach Delay, s/veh | | 38.5 | | | 36.5 | | | 29.0 | | | 22.8 | |
| Approach LOS | | D | | | D | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.9 | 44.2 | 11.3 | 15.9 | 15.0 | 42.2 | 7.8 | 19.3 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 8.1 | 20.9 | 6.6 | 7.6 | 12.4 | 24.2 | 4.1 | 9.2 |
| Green Ext Time (p_c), s | 0.2 | 10.2 | 0.1 | 0.6 | 0.0 | 11.7 | 0.0 | 0.9 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 27.1 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 8.7 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 347 | 29 | 0 | 69 | 28 |
| Future Vol, veh/h | 0 | 347 | 29 | 0 | 69 | 28 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 377 | 32 | 0 | 75 | 30 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 212 | 32 | 0 | 0 | 32 | 0 |
| Stage 1 | 32 | - | - | - | - | - |
| Stage 2 | 180 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 776 | 1042 | - | - | 1580 | - |
| Stage 1 | 991 | - | - | - | - | - |
| Stage 2 | 851 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 739 | 1042 | - | - | 1580 | - |
| Mov Cap-2 Maneuver | 739 | - | - | - | - | - |
| Stage 1 | 991 | - | - | - | - | - |
| Stage 2 | 810 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 10.4 | 0 | 5.3 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1042 | 1580 | - |
| HCM Lane V/C Ratio | - | - | 0.362 | 0.047 | - |
| HCM Control Delay (s) | - | - | 10.4 | 7.4 | 0 |
| HCM Lane LOS | - | - | B | A | A |
| HCM 95th %tile Q(veh) | - | - | 1.7 | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↱ | | ↰ | ↱ | |
| Traffic Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 32 | 0 | 373 | 4 | 39 | 97 | 4 |
| Future Vol, veh/h | 1 | 0 | 0 | 0 | 1 | 32 | 0 | 373 | 4 | 39 | 97 | 4 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 60 | - | - | 210 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1 | 0 | 0 | 0 | 1 | 41 | 0 | 472 | 5 | 49 | 123 | 5 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 720 | 701 | 126 | 699 | 701 | 475 | 128 | 0 | 0 | 477 | 0 | 0 |
| Stage 1 | 224 | 224 | - | 475 | 475 | - | - | - | - | - | - | - |
| Stage 2 | 496 | 477 | - | 224 | 226 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 343 | 363 | 924 | 354 | 363 | 590 | 1458 | - | - | 1085 | - | - |
| Stage 1 | 779 | 718 | - | 570 | 557 | - | - | - | - | - | - | - |
| Stage 2 | 556 | 556 | - | 779 | 717 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 308 | 347 | 924 | 342 | 347 | 590 | 1458 | - | - | 1085 | - | - |
| Mov Cap-2 Maneuver | 308 | 347 | - | 342 | 347 | - | - | - | - | - | - | - |
| Stage 1 | 779 | 686 | - | 570 | 557 | - | - | - | - | - | - | - |
| Stage 2 | 517 | 556 | - | 744 | 685 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 16.7 | 11.7 | 0 | 2.4 |
| HCM LOS | C | B | | |

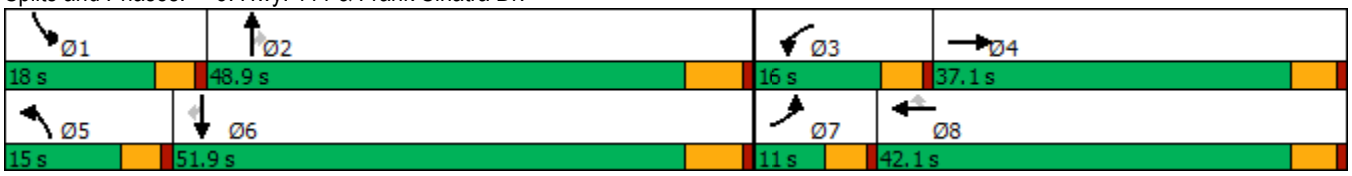
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1458 | - | - | 308 | 578 | 1085 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.004 | 0.072 | 0.045 | - | - |
| HCM Control Delay (s) | 0 | - | - | 16.7 | 11.7 | 8.5 | - | - |
| HCM Lane LOS | A | - | - | C | B | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.2 | 0.1 | - | - |

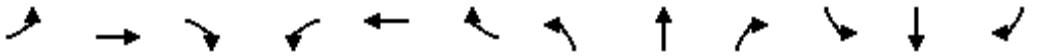
| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 111 | 173 | 176 | 59 | 200 | 88 | 1347 | 119 | 235 | 1464 | 62 |
| Future Volume (vph) | 111 | 173 | 176 | 59 | 200 | 88 | 1347 | 119 | 235 | 1464 | 62 |
| Turn Type | Prot | NA | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | 8 | | | 2 | | | 6 |
| Detector Phase | 7 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 37.1 | 9.6 | 15.1 | 15.1 | 9.6 | 23.2 | 23.2 | 9.6 | 16.2 | 16.2 |
| Total Split (s) | 11.0 | 37.1 | 16.0 | 42.1 | 42.1 | 15.0 | 48.9 | 48.9 | 18.0 | 51.9 | 51.9 |
| Total Split (%) | 9.2% | 30.9% | 13.3% | 35.1% | 35.1% | 12.5% | 40.8% | 40.8% | 15.0% | 43.3% | 43.3% |
| Yellow Time (s) | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.6 | 5.2 | 5.2 | 3.6 | 5.2 | 5.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.1 | 4.6 | 5.1 | 5.1 | 4.6 | 6.2 | 6.2 | 4.6 | 6.2 | 6.2 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 106.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Hwy. 111 & Frank Sinatra Dr.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 111 | 173 | 153 | 176 | 59 | 200 | 88 | 1347 | 119 | 235 | 1464 | 62 |
| Future Volume (veh/h) | 111 | 173 | 153 | 176 | 59 | 200 | 88 | 1347 | 119 | 235 | 1464 | 62 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 122 | 190 | 168 | 193 | 65 | 0 | 97 | 1480 | 0 | 258 | 1609 | 64 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 119 | 220 | 195 | 264 | 469 | | 123 | 1909 | | 331 | 2045 | 632 |
| Arrive On Green | 0.07 | 0.24 | 0.24 | 0.08 | 0.25 | 0.00 | 0.07 | 0.37 | 0.00 | 0.10 | 0.40 | 0.40 |
| Sat Flow, veh/h | 1781 | 915 | 809 | 3456 | 1870 | 1585 | 1781 | 5106 | 1585 | 3456 | 5106 | 1579 |
| Grp Volume(v), veh/h | 122 | 0 | 358 | 193 | 65 | 0 | 97 | 1480 | 0 | 258 | 1609 | 64 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1725 | 1728 | 1870 | 1585 | 1781 | 1702 | 1585 | 1728 | 1702 | 1579 |
| Q Serve(g_s), s | 6.4 | 0.0 | 19.1 | 5.3 | 2.6 | 0.0 | 5.2 | 24.6 | 0.0 | 7.0 | 26.5 | 2.4 |
| Cycle Q Clear(g_c), s | 6.4 | 0.0 | 19.1 | 5.3 | 2.6 | 0.0 | 5.2 | 24.6 | 0.0 | 7.0 | 26.5 | 2.4 |
| Prop In Lane | 1.00 | | 0.47 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 119 | 0 | 415 | 264 | 469 | | 123 | 1909 | | 331 | 2045 | 632 |
| V/C Ratio(X) | 1.03 | 0.00 | 0.86 | 0.73 | 0.14 | | 0.79 | 0.78 | | 0.78 | 0.79 | 0.10 |
| Avail Cap(c_a), veh/h | 119 | 0 | 574 | 410 | 720 | | 193 | 2268 | | 482 | 2428 | 751 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 44.9 | 0.0 | 35.0 | 43.4 | 28.0 | 0.0 | 44.0 | 26.5 | 0.0 | 42.5 | 25.2 | 18.0 |
| Incr Delay (d2), s/veh | 90.5 | 0.0 | 9.6 | 1.5 | 0.1 | 0.0 | 4.5 | 1.5 | 0.0 | 2.7 | 1.5 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.8 | 0.0 | 9.0 | 2.3 | 1.2 | 0.0 | 2.3 | 9.2 | 0.0 | 3.0 | 9.9 | 0.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 135.3 | 0.0 | 44.6 | 44.9 | 28.1 | 0.0 | 48.5 | 28.0 | 0.0 | 45.2 | 26.7 | 18.1 |
| LnGrp LOS | F | A | D | D | C | | D | C | | D | C | B |
| Approach Vol, veh/h | | 480 | | | 258 | A | | 1577 | A | | 1931 | |
| Approach Delay, s/veh | | 67.6 | | | 40.7 | | | 29.2 | | | 28.9 | |
| Approach LOS | | E | | | D | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 13.8 | 42.1 | 11.9 | 28.2 | 11.2 | 44.7 | 11.0 | 29.2 |
| Change Period (Y+Rc), s | 4.6 | 6.2 | 4.6 | 5.1 | 4.6 | 6.2 | 4.6 | 5.1 |
| Max Green Setting (Gmax), s | 13.4 | 42.7 | 11.4 | 32.0 | 10.4 | 45.7 | 6.4 | 37.0 |
| Max Q Clear Time (g_c+I1), s | 9.0 | 26.6 | 7.3 | 21.1 | 7.2 | 28.5 | 8.4 | 4.6 |
| Green Ext Time (p_c), s | 0.2 | 8.6 | 0.1 | 1.7 | 0.0 | 10.0 | 0.0 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 34.1 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

# APPENDIX 8.3:

# HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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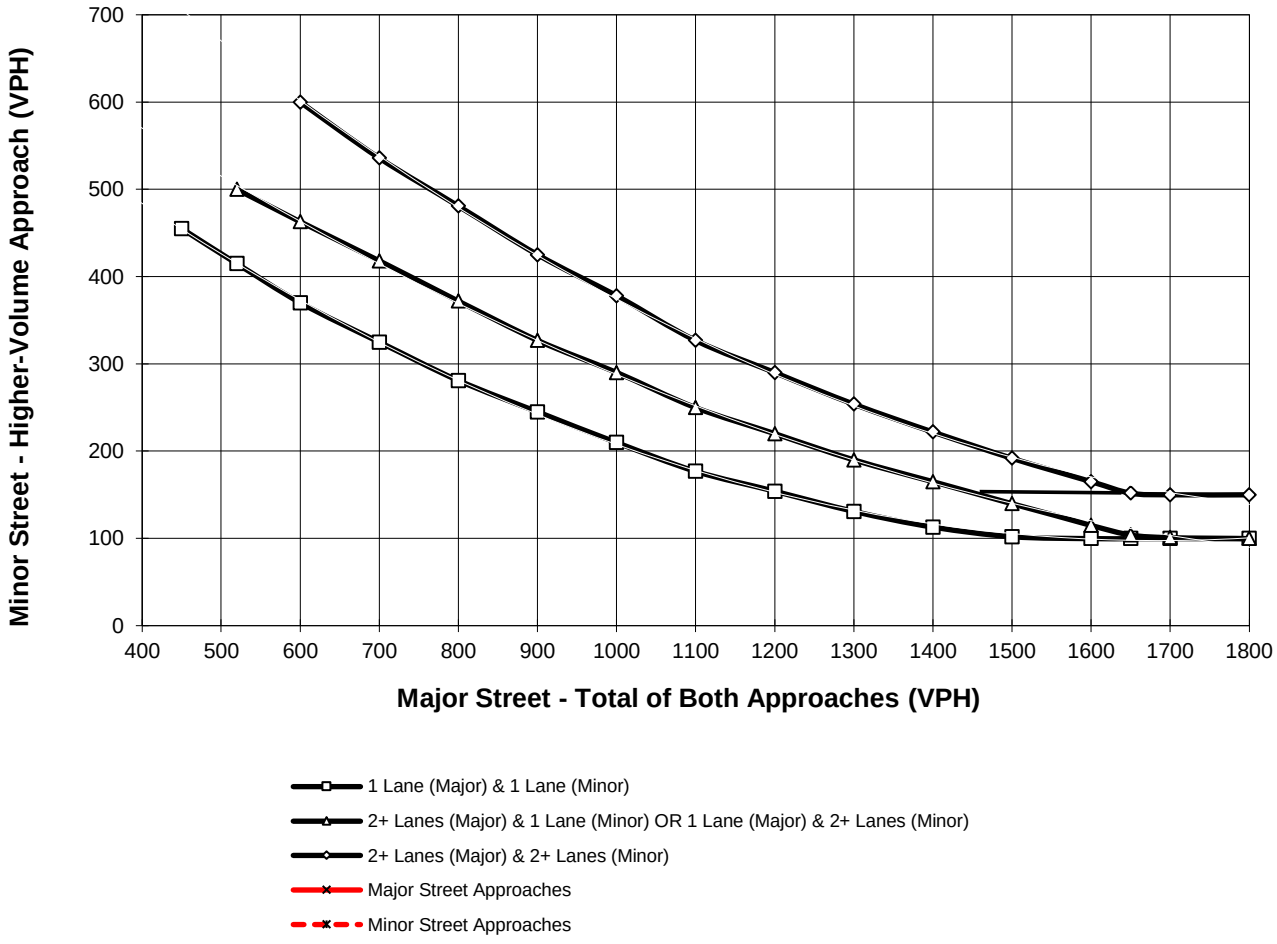
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Horizon Year (2040) Without Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Frank Sinatra Dr.**
Total of Both Approaches (VPH) = **166**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 2**
High Volume Approach (VPH) = **19**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

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# APPENDIX 8.4:

# HORIZON YEAR (2040) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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# Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
## (Average Traffic Estimate Form)

| DIST | CO | RTE | PM | | TRAFFIC CONDITIONS | | 2040 WP |
|---|---|---|---|---|---|---|---|
| | | | | CALC | RV | DATE | 01/09/19 |
| Jurisdiction: | City of Rancho Mirage | | | CHK | RV | DATE | 01/09/19 |
| Major Street: | Frank Sinatra Dr. | | | | Critical Approach Speed (Major) | | 30 mph |
| Minor Street: | Driveway 1 | | | | Critical Approach Speed (Minor) | | 25 mph |

Major Street Approach Lanes = **1** lane  Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **1,251** vpd  Minor Street Future ADT = **534** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

**URBAN (U)**

### (Based on Estimated Average Daily Traffic - See Note)

| URBAN | RURAL | Minimum Requirements EADT | | | |
|---|---|---|---|---|---|
| XX | | | | | |
| **CONDITION A - Minimum Vehicular Volume** | | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| Number of lanes for moving traffic on each approach | | | | | |
| Major Street | Minor Street | Urban | Rural | Urban | Rural |
| *1* **1,251** | *1* **534** | 8,000 | 5,600 | 2,400 | 1,680 |
| *2* + | *1* | 9,600 | 6,720 | 2,400 | 1,680 |
| *2* + | *2* + | 9,600 | 6,720 | 3,200 | 2,240 |
| *1* | *2* + | 8,000 | 5,600 | 3,200 | 2,240 |
| **CONDITION B - Interruption of Continuous Traffic** | | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| Number of lanes for moving traffic on each approach | | | | | |
| Major Street | Minor Street | Urban | Rural | Urban | Rural |
| *1* **1,251** | *1* **534** | 12,000 | 8,400 | 1,200 | 850 |
| *2* + | *1* | 14,400 | 10,080 | 1,200 | 850 |
| *2* + | *2* + | 14,400 | 10,080 | 1,600 | 1,120 |
| *1* | *2* + | 12,000 | 8,400 | 1,600 | 1,120 |
| **Combination of CONDITIONS A + B** | | | | | |
| Satisfied | Not Satisfied | | | | |
| | XX | 2 CONDITIONS 80% | | 2 CONDITIONS 80% | |
| No one condition satisfied, but following conditions fulfilled 80% of more ….. | **A** 16% **B** 10% | | | | |

**Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.**

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

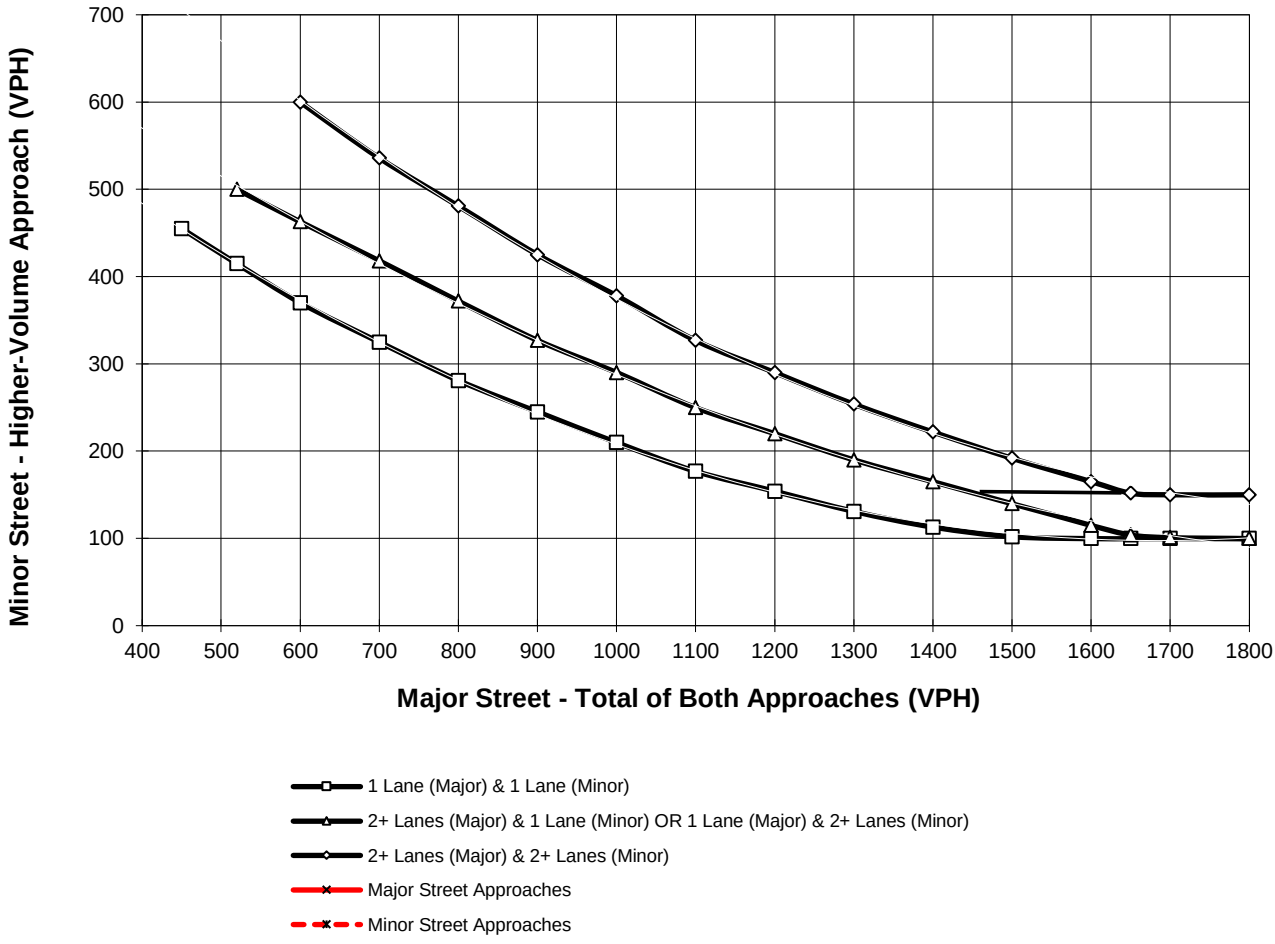
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Horizon Year (2040) With Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Frank Sinatra Dr.**
Total of Both Approaches (VPH) = **172**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 2**
High Volume Approach (VPH) = **19**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

# APPENDIX 8.5:

# HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS QUEUING ANALYSIS WORKSHEETS

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## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB |
|---|---|---|
| Directions Served | LTR | LTR |
| Maximum Queue (ft) | 25 | 28 |
| Average Queue (ft) | 2 | 9 |
| 95th Queue (ft) | 15 | 31 |
| Link Distance (ft) | 353 | 358 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 23 | 52 | 355 | 67 | 526 | 46 | 915 | 112 | 349 | 1478 | 53 |
| v/c Ratio | 0.20 | 0.16 | 0.61 | 0.12 | 0.73 | 0.33 | 0.61 | 0.19 | 0.64 | 0.65 | 0.07 |
| Control Delay | 53.0 | 23.1 | 42.9 | 25.1 | 17.1 | 53.3 | 29.6 | 0.7 | 44.2 | 24.0 | 0.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 53.0 | 23.1 | 42.9 | 25.1 | 17.1 | 53.3 | 29.6 | 0.7 | 44.2 | 24.0 | 0.2 |
| Queue Length 50th (ft) | 12 | 14 | 96 | 26 | 82 | 25 | 148 | 0 | 94 | 240 | 0 |
| Queue Length 95th (ft) | 46 | 48 | 189 | 66 | 242 | 75 | 279 | 0 | 186 | 439 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 122 | 721 | 767 | 1053 | 1043 | 168 | 2150 | 757 | 767 | 2790 | 934 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.19 | 0.07 | 0.46 | 0.06 | 0.50 | 0.27 | 0.43 | 0.15 | 0.46 | 0.53 | 0.06 |

Intersection Summary

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB |
|---|---|---|
| Directions Served | LTR | LTR |
| Maximum Queue (ft) | 25 | 28 |
| Average Queue (ft) | 11 | 13 |
| 95th Queue (ft) | 32 | 36 |
| Link Distance (ft) | 353 | 358 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 45 | 93 | 180 | 38 | 358 | 40 | 1496 | 229 | 486 | 1482 | 29 |
| v/c Ratio | 0.39 | 0.33 | 0.49 | 0.10 | 0.63 | 0.35 | 0.77 | 0.32 | 0.77 | 0.53 | 0.03 |
| Control Delay | 58.6 | 34.8 | 49.3 | 34.1 | 11.5 | 57.4 | 30.9 | 6.8 | 47.8 | 17.1 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 58.6 | 34.8 | 49.3 | 34.1 | 11.5 | 57.4 | 30.9 | 6.8 | 47.8 | 17.1 | 0.1 |
| Queue Length 50th (ft) | 27 | 43 | 54 | 21 | 20 | 24 | 282 | 10 | 144 | 215 | 0 |
| Queue Length 95th (ft) | 75 | 89 | 109 | 49 | 100 | 68 | #509 | 75 | #276 | 389 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 126 | 632 | 381 | 725 | 813 | 124 | 2097 | 762 | 749 | 2932 | 937 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.36 | 0.15 | 0.47 | 0.05 | 0.44 | 0.32 | 0.71 | 0.30 | 0.65 | 0.51 | 0.03 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | WB | SB |
|---|---|---|
| Directions Served | LTR | L |
| Maximum Queue (ft) | 29 | 30 |
| Average Queue (ft) | 19 | 2 |
| 95th Queue (ft) | 40 | 14 |
| Link Distance (ft) | 358 | |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | 210 |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 26 | 72 | 193 | 38 | 220 | 66 | 1480 | 131 | 258 | 1609 | 49 |
| v/c Ratio | 0.22 | 0.25 | 0.46 | 0.09 | 0.41 | 0.42 | 0.72 | 0.18 | 0.60 | 0.67 | 0.06 |
| Control Delay | 52.0 | 33.9 | 45.7 | 30.4 | 7.0 | 53.1 | 26.2 | 3.9 | 46.9 | 22.7 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 52.0 | 33.9 | 45.7 | 30.4 | 7.0 | 53.1 | 26.2 | 3.9 | 46.9 | 22.7 | 0.1 |
| Queue Length 50th (ft) | 14 | 32 | 54 | 16 | 0 | 36 | 243 | 0 | 72 | 253 | 0 |
| Queue Length 95th (ft) | 51 | 75 | 114 | 48 | 57 | 97 | 441 | 34 | 146 | 472 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 136 | 701 | 470 | 828 | 816 | 221 | 2610 | 872 | 553 | 2801 | 916 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.19 | 0.10 | 0.41 | 0.05 | 0.27 | 0.30 | 0.57 | 0.15 | 0.47 | 0.57 | 0.05 |

Intersection Summary

# APPENDIX 8.6:

# HORIZON YEAR (2040) WITH PROJECT CONDITIONS QUEUING ANALYSIS WORKSHEETS

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## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB | SB |
|---|---|---|
| Directions Served | LR | LT |
| Maximum Queue (ft) | 52 | 31 |
| Average Queue (ft) | 22 | 1 |
| 95th Queue (ft) | 47 | 10 |
| Link Distance (ft) | 453 | 178 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB |
|---|---|---|
| Directions Served | LTR | LTR |
| Maximum Queue (ft) | 24 | 29 |
| Average Queue (ft) | 2 | 14 |
| 95th Queue (ft) | 15 | 37 |
| Link Distance (ft) | 353 | 358 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 33 | 84 | 355 | 71 | 526 | 52 | 915 | 112 | 349 | 1478 | 56 |
| v/c Ratio | 0.28 | 0.25 | 0.62 | 0.13 | 0.77 | 0.37 | 0.59 | 0.19 | 0.66 | 0.69 | 0.07 |
| Control Delay | 55.6 | 23.2 | 44.2 | 26.9 | 20.5 | 55.4 | 29.7 | 0.7 | 45.8 | 26.1 | 0.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 55.6 | 23.2 | 44.2 | 26.9 | 20.5 | 55.4 | 29.7 | 0.7 | 45.8 | 26.1 | 0.2 |
| Queue Length 50th (ft) | 19 | 23 | 101 | 33 | 114 | 29 | 156 | 0 | 99 | 257 | 0 |
| Queue Length 95th (ft) | 61 | 68 | 189 | 69 | 256 | 83 | 279 | 0 | 186 | 439 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 119 | 711 | 749 | 1028 | 1019 | 164 | 2098 | 743 | 749 | 2724 | 915 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.28 | 0.12 | 0.47 | 0.07 | 0.52 | 0.32 | 0.44 | 0.15 | 0.47 | 0.54 | 0.06 |

Intersection Summary

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB | SB |
|---|---|---|
| Directions Served | LR | LT |
| Maximum Queue (ft) | 66 | 31 |
| Average Queue (ft) | 20 | 5 |
| 95th Queue (ft) | 49 | 24 |
| Link Distance (ft) | 453 | 178 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB | SB |
|---|---|---|---|
| Directions Served | LTR | LTR | L |
| Maximum Queue (ft) | 25 | 28 | 30 |
| Average Queue (ft) | 15 | 9 | 1 |
| 95th Queue (ft) | 34 | 31 | 10 |
| Link Distance (ft) | 353 | 358 | |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (ft) | | | 210 |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 54 | 116 | 180 | 58 | 358 | 63 | 1496 | 229 | 486 | 1482 | 43 |
| v/c Ratio | 0.49 | 0.42 | 0.58 | 0.16 | 0.64 | 0.57 | 0.79 | 0.32 | 0.79 | 0.57 | 0.05 |
| Control Delay | 63.6 | 35.5 | 53.2 | 35.7 | 12.1 | 68.6 | 32.5 | 6.8 | 50.1 | 19.3 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 63.6 | 35.5 | 53.2 | 35.7 | 12.1 | 68.6 | 32.5 | 6.8 | 50.1 | 19.3 | 0.1 |
| Queue Length 50th (ft) | 33 | 55 | 55 | 32 | 24 | 38 | 286 | 11 | 146 | 218 | 0 |
| Queue Length 95th (ft) | #97 | 107 | 109 | 66 | 107 | #121 | #509 | 75 | #276 | 389 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 118 | 594 | 354 | 682 | 778 | 117 | 1973 | 728 | 705 | 2681 | 865 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.46 | 0.20 | 0.51 | 0.09 | 0.46 | 0.54 | 0.76 | 0.31 | 0.69 | 0.55 | 0.05 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB | SB |
|---|---|---|
| Directions Served | LR | LT |
| Maximum Queue (ft) | 48 | 55 |
| Average Queue (ft) | 26 | 10 |
| 95th Queue (ft) | 46 | 37 |
| Link Distance (ft) | 453 | 178 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | WB | SB |
|---|---|---|
| Directions Served | LTR | L |
| Maximum Queue (ft) | 47 | 30 |
| Average Queue (ft) | 25 | 2 |
| 95th Queue (ft) | 44 | 14 |
| Link Distance (ft) | 358 | |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | 210 |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 44 | 124 | 193 | 175 | 220 | 222 | 1480 | 131 | 258 | 1609 | 147 |
| v/c Ratio | 0.39 | 0.43 | 0.56 | 0.40 | 0.41 | 1.13 | 0.71 | 0.18 | 0.64 | 0.76 | 0.20 |
| Control Delay | 58.8 | 35.6 | 50.4 | 36.0 | 6.9 | 145.5 | 26.9 | 3.9 | 50.2 | 27.2 | 4.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 58.8 | 35.6 | 50.4 | 36.0 | 6.9 | 145.5 | 26.9 | 3.9 | 50.2 | 27.2 | 4.5 |
| Queue Length 50th (ft) | 26 | 58 | 57 | 99 | 0 | ~155 | 249 | 0 | 76 | 274 | 1 |
| Queue Length 95th (ft) | 74 | 115 | 114 | 165 | 57 | #392 | 441 | 34 | 146 | 472 | 43 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 121 | 618 | 418 | 737 | 750 | 196 | 2324 | 793 | 491 | 2485 | 829 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.36 | 0.20 | 0.46 | 0.24 | 0.29 | 1.13 | 0.64 | 0.17 | 0.53 | 0.65 | 0.18 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

## Intersection: 1: Frank Sinatra Dr. & Driveway 1

| Movement | WB | SB |
|---|---|---|
| Directions Served | LR | LT |
| Maximum Queue (ft) | 108 | 32 |
| Average Queue (ft) | 62 | 2 |
| 95th Queue (ft) | 89 | 15 |
| Link Distance (ft) | 453 | 178 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 2: Frank Sinatra Dr. & Driveway/Driveway 2

| Movement | EB | WB | SB |
|---|---|---|---|
| Directions Served | LTR | LTR | L |
| Maximum Queue (ft) | 24 | 50 | 52 |
| Average Queue (ft) | 1 | 23 | 20 |
| 95th Queue (ft) | 8 | 46 | 51 |
| Link Distance (ft) | 353 | 358 | |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (ft) | | | 210 |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |

## Zone Summary

Zone wide Queuing Penalty: 0



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 122 | 358 | 193 | 65 | 220 | 97 | 1480 | 131 | 258 | 1609 | 68 |
| v/c Ratio | 1.13 | 0.83 | 0.61 | 0.13 | 0.39 | 0.64 | 0.79 | 0.20 | 0.69 | 0.81 | 0.10 |
| Control Delay | 172.8 | 52.5 | 57.7 | 31.1 | 8.3 | 70.3 | 34.9 | 4.1 | 57.9 | 33.8 | 0.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 172.8 | 52.5 | 57.7 | 31.1 | 8.3 | 70.3 | 34.9 | 4.1 | 57.9 | 33.8 | 0.3 |
| Queue Length 50th (ft) | ~111 | 227 | 71 | 36 | 12 | 70 | 345 | 0 | 94 | 373 | 0 |
| Queue Length 95th (ft) | #246 | 343 | 114 | 71 | 71 | #146 | 441 | 34 | 146 | 472 | 0 |
| Internal Link Dist (ft) | | 282 | | 711 | | | 925 | | | 922 | |
| Turn Bay Length (ft) | 100 | | 220 | | | 170 | | | 330 | | 260 |
| Base Capacity (vph) | 108 | 557 | 376 | 662 | 682 | 177 | 2092 | 728 | 442 | 2234 | 760 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.13 | 0.64 | 0.51 | 0.10 | 0.32 | 0.55 | 0.71 | 0.18 | 0.58 | 0.72 | 0.09 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

# Appendix F2
Vehicle Miles Travelled Analysis

August 19, 2020

Mr. Michael Kao
Kam Sang Company, Inc.
411 E. Huntington Dr., #305
Arcadia, CA 91006

**SUBJECT: RITZ-CARLTON RESIDENCES VEHICLE MILES TRAVELED (VMT) ANALYSIS**

Dear Mr. Michael Kao:

The following vehicle miles traveled (VMT) analysis has been prepared for the proposed Ritz-Carlton (**Project**), which is located north of Mirada Circle and east of Frank Sinatra Drive in the City of Rancho Mirage.

## PROJECT OVERVIEW

The Project proposes to expand the existing Ritz-Carlton hotel by 106 residential dwelling units, a 6,966 square foot restaurant, and an outdoor venue that includes an additional pool and open grass area. Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, 2017. (1) Consistent with the Project traffic study findings, the expanded uses are anticipated to generate a total of 1,068 vehicle trip-ends per day (see Attachment A). (2)

## BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which require all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate took effect July 1, 2020. To aid in this transition, the Governor's Office of Planning and Research (OPR) released a Technical Advisory on Evaluating Transportation Impacts in CEQA (December of 2018) (**Technical Advisory**). (3) Based on OPR's Technical Advisory, the Western Riverside Council of Governments (WRCOG) prepared a WRCOG SB 743 Implementation Pathway Document Package (March 2019) to assist its member agencies with implementation tools necessary to adopt analysis methodology, impact thresholds and mitigation approaches for VMT. To add to the previous work effort, WRCOG in February 2020 released its Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (**WRCOG Guidelines**), which provides specific procedures for complying with the new CEQA requirements for VMT analysis. (4)

At the time of study preparation, the Riverside County Transportation Division was still in development of Countywide VMT guidelines, screening maps and thresholds that would be applicable to

unincorporated areas Riverside County, and provide additional guidance to local agencies in the Coachella Valley. As a result, the City of Rancho Mirage adopted its own set of VMT thresholds and guidelines as described in the Transportation Analysis Policy for the City or Rancho Mirage dated June 18, 2020 (**City Guidelines**).

## PROJECT SCREENING

The City Guidelines Section I.A *Project Screening* provides details on appropriate screening thresholds that can be used to identify when a proposed land use project is anticipated to result in a less than significant impact without conducting a more detailed VMT analysis. Screening thresholds are broken into three types:

- Project Type Screening
- Low VMT Area Screening
- Transit Priority Area (TPA) Screening

A land use project need only meet one of the above screening thresholds to result in a less-than-significant impact.

### PROJECT TYPE SCREENING

The following projects may be presumed to have a less-than-significant impact on VMT – barring substantial evidence to the contrary:

- Local Serving Retail project less than 50,000 square feet
- Day Care Centers
- Local Parks
- Local-Serving Public Facilities
- Ministerial Projects
- Small Infill Projects
- Restricted Affordable, Transit Supportive Residential Projects in
- Planned Growth Areas with High-Quality Transit
- Transit Supportive Projects in Planned Growth Areas with Low VMT and High-Quality Transit
- Transportation Projects that do not increase VMT
- Projects that generate less than 110 daily vehicle trips

The proposed 6,966 square foot restaurant component of the Project is well within the 50,000 square foot threshold for local serving retail and anticipated to provide an additional dining option to hotel guests and the local community. The swimming pool and adjacent open space area are also expected to

be complementary components to hotel guests and would therefore also meet the intent of the local serving screening criteria.

The 106 new residential units would not be deemed as a local serving use, and would generate daily vehicle trips in excess of the 110 trips per day threshold for project type screening as described in the City Guidelines.

**The Project Type screening threshold is met for the restaurant and pool/open space components of the Project only.**

## LOW VMT AREA SCREENING

As described in the City Guidelines, "Residential and office projects located in low VMT areas may be considered to have a less than significant impact unless substantial evidence is submitted to the contrary. Other employment-related and/or mixed-use projects may qualify for similar screening if it can be reasonably concluded that the Project is expected to generate VMT outputs that are similar to the existing land uses in the low VMT area." [1] The City of Rancho Mirage does not currently have Citywide low VMT area screening maps indicating areas of low VMT based on current RIVTAM model data. In addition, for this screening criteria to be applicable, a project must demonstrate consistency with the underlying land use assumptions contained within the travel demand model used to create low VMT area screening maps.

**The Low VMT Area screening threshold is not met.**

## TPA SCREENING

Consistent with guidance identified in the Technical Advisory, projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[2] or an existing stop along a "high-quality transit corridor"[3]) may be presumed to have a less than significant impact absent substantial evidence to the contrary.

However, the presumption may not be appropriate if a project:

- Has a Floor Area Ratio (FAR) of less than 0.75;
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);

[1] Transportation Analysis Policy for the City of Rancho Mirage.
[2] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[3] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").

- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

Based on the current transit in the study area, the Project site is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

**The TPA screening threshold is not met.**

## PROJECT GENERATED VMT

City Guidelines Section I.B. *VMT Analysis for Non-Screened Projects* states "projects that are not screened out based on the foregoing sections will be required to complete a VMT analysis using the RIVTAM/RIVCOM travel forecasting model." The Riverside Transportation Analysis Model (RIVTAM) is a useful tool to estimate VMT as it considers interaction between different land uses based on socio-economic data such as population, households, and employment. The City Guidelines state that both project generated VMT and project effect on VMT should be calculated for the traffic analysis zone (TAZ) in which the project is located.

Project generated VMT has been calculated using the City of Rancho Mirage General Plan Update version of RIVTAM, which was updated in 2017 as part of the City's General Plan update. Adjustments to socio-economic data (SED) (i.e., population and households) have been made to a separate TAZ to reflect the Project's proposed 106 residential dwelling units. Table 1 summarizes the land use to SED conversion factor and resulting SED used to reflect the Project in the RIVTAM model.

**TABLE 1: SED CONVERSION FACTORS**

| Land Use | Quantity | Units | Conversion Factor | Estimated Population |
|---|---|---|---|---|
| Residential | 106 | dwelling units | 2.06 population per household[4] | + 218 population |

Adjustments to population and households for the Project's TAZ were made to both the base year model (2012) and the cumulative year model (2040). Project-generated VMT was then calculated for both the base year (2012) and cumulative year (2040) conditions and linear interpolation was used to determine the Project generated VMT for baseline (2019) conditions. The Project generated VMT total is then divided by the number residents to obtain the Project generated VMT per resident value. As shown in Table 2, the Project generated VMT per resident is 8.60 for baseline (2019) conditions.

[4] State of California Department of Finance**.** *E-5 Population and Housing Estimates for Cities, Counties, and the State.* January 2019

**TABLE 2: PROJECT VMT PER RESIDENT**

| | Baseline 2012 | Cumulative 2040 | Baseline 2019 |
|---|---|---|---|
| VMT | 1,909 | 1,775 | 1,876 |
| Residents | 218 | 218 | 218 |
| VMT per resident | 8.76 | 8.14 | **8.60** |

## PROJECT VMT IMPACT ASSESSMENT

The thresholds of significance used to measure a potential VMT impact are described by project type in Section I.B. *Thresholds of Significance* of the City Guidelines. Thresholds for determination of significant transportation impact for residential uses are described as VMT per resident which is:

- 15 percent below the Citywide per resident VMT, OR
- 15 percent below the regional[5] VMT per resident.

As the City is currently still in development of their Citywide per resident VMT value for purposes of determining a project generated VMT impact, the regional VMT per resident value was utilized instead. As shown in Table 3, the Project generated VMT per resident would not exceed the City's threshold of 15 percent below the regional VMT per resident. Project generated VMT is less than significant.

**TABLE 3: PROJECT VMT PER RESIDENT COMPARISON TO THRESHOLD**

| | Baseline (2019) | Cumulative (2040) |
|---|---|---|
| Regional VMT per resident[6] | 15.2 | 15.2 |
| Project Generated VMT per resident | 8.60 | 8.14 |
| Percent Change | -43% | -46% |

## PROJECT EFFECT ON VMT

Consistent with City Guidelines Section I.B. *VMT Analysis for Non-Screened Projects*, in addition to project generated VMT, there is also a requirement to evaluate a project's effect on VMT. A project's effect on VMT is calculated using the "boundary method", which includes all vehicle trips with one or both trip-ends within the designated boundary of interest (e.g., the City of Rancho Mirage). Once the total link-level VMT within the boundary area is calculated, VMT is then normalized by dividing by the boundary area's service population (i.e., residents + employees), which allows VMT values to be easily compared between two different land use alternatives (e.g., "without project" and "with project" conditions). Citywide link-level VMT was extracted from the RIVTAM cumulative (2040) traffic model for both "without Project" and "with Project" model runs. In other words, the only changes made within the

[5] City Guidelines state that for the purposes of this Policy, the region is the County of Riverside boundaries.

[6] Regional VMT per resident for unincorporated areas of the Coachella Valley was obtained from the County of Riverside.

model was the addition of the Project's 106 residential units being evaluated.

Table 4 presents a comparison of total link-level VMT calculated for the City of Rancho Mirage for cumulative (2040) "without project" and "with project" conditions. As illustrated in Table 4, the proposed Project is not forecast to cause in an increase in citywide VMT per service population as compared to the "without project" condition. The Project's effect on VMT is less than significant.

**TABLE 4: RANCHO MIRAGE CITYWIDE VMT PER SERVICE POPULATION**

| | Cumulative 2040 Without Project | Cumulative 2040 With Project |
|---|---|---|
| Population | 26,821 | 27,049 |
| Employment | 21,694 | 21,694 |
| Service Population | 48,515 | 48,733 |
| VMT | 838,759 | 840,179 |
| VMT per Service Population | 17.29 | 17.22 |

## CONCLUSION

In summary, the Project's local serving land use components such as the restaurant and swimming pool with open space area meet applicable project screening criteria as identified in the City Guidelines and are presumed to result in a less than significant impact. The residential component of the Project did not meet applicable screening criteria and was therefore evaluated based on the procedures described in City Guidelines. The residential component of the Project was found to be less than significant for both project generated VMT per resident and project effect on VMT evaluations, therefore, the Project residential component's impact to VMT is also considered less than significant.

If you have any questions, please contact me directly at (949) 336-5978.

Respectfully submitted,

URBAN CROSSROADS, INC.

Aric Evatt, PTP
President

Robert Vu, PE
Transportation Engineer

## REFERENCES

1. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.
2. **Urban Crossroads, Inc.** *Ritz-Carlton Residences Traffic Impact Analysis.* July 2020.
3. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.
4. **Western Riverside Council of Governments (WRCOG).** *Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment.* February 13, 2020.

# ATTACHMENT A
# PROJECT TRIP GENERATION

**Project Trip Generation Summary - Typical Operations**

| Land Use | ITE LU Code | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Project Trip Generation Rates:[1]** | | | | | | | | | |
| Multifamily Housing (Low-Rise) | 220 | DU | 0.11 | 0.35 | 0.46 | 0.35 | 0.21 | 0.56 | 7.32 |
| Quality Restaurant | 931 | TSF | 0.49 | 0.24 | 0.73 | 5.23 | 2.57 | 7.80 | 83.84 |

| Land Use | Quantity | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Project Trip Generation Summary:** | | | | | | | | | |
| Ritz-Carlton Residences | 106 | DU | 11 | 38 | 49 | 37 | 22 | 59 | 776 |
| Sky Mesa Restaurant | 6.966 | TSF | 3 | 2 | 5 | 36 | 18 | 54 | 586 |
| Internal Capture (50%)[3] | | | -2 | -1 | -3 | -18 | -9 | -27 | -294 |
| **Total** | | | **12** | **39** | **51** | **55** | **31** | **86** | **1,068** |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).

[2] DU = Dwelling Units; TSF = Thousand Square Feet

[3] Internal capture reduction of 50% has been applied as a significant portion of the patrons would be internal to the existing hotel.

# **Appendix G**
Parking Evaluation

URBAN CROSSROADS
260 E. Baker St. | Suite 200 | Costa Mesa, CA 92626 | (949) 660-1994
urbanxroads.com

January 31, 2020

Mr. Michael Kao
Kan Sang Company
411 E. Huntington Dr., #305
Arcadia, CA 91006

**SUBJECT: RITZ-CARLTON RESIDENCES PARKING EVALUATION**

Dear Mr. Michael Kao:

We are pleased to submit the following Parking Evaluation for the proposed Ritz-Carlton Residences development(referred to as "Project"). The Project is located at north of Mirada Circle and east of Frank Sinatra Drive in the City of Rancho Mirage as shown on Exhibit A. This Parking Evaluation was developed to ensure that the proposed Project provides adequate parking supply to support the planned uses.

**EXHIBIT A: LOCATION MAP**



## INTRODUCTION

The proposed project is to expand the existing Ritz-Carlton hotel by 106 residential dwelling units, a 6,966 restaurant, and a 23,843 square foot venue, as shown on Exhibit B.

**EXHIBIT B: PROPOSED SITE PLAN**




## PARKING REQUIREMENTS

To demonstrate that adequate parking supply exists for the proposed Ritz-Carlton Residences, this parking assessment provides a review of the City of Rancho Mirage Municipal Code parking requirements and an estimate of the peak parking demands. Section 17.26 of the City of Rancho Mirage Municipal Code describes the Parking Requirements by Land Use. Section 17.26.040 identifies the parking stalls required for the land uses with the Ritz-Carlton Residences. According the Municipal Code use descriptions, the proposed Project is best described under residential developments, membership organization facilities, and restaurants as shown on Table 1.

**TABLE 1: CITY OF RANCHO MIRAGE MUNICIPAL CODE PARKING REQUIREMENTS**

| Land Use Type | Vehicle Spaces Required |
|---|---|
| Multifamily housing and other attached dwellings | 1 bedroom unit – 1 covered for each unit and 1 off-street guest space for every two units |
| | 2 bedrooms or more – 2 covered for each unit and 1 off-street guest space for every two units |
| Membership organization facilities, meeting halls, performance theaters, including auditoriums | 1 space for each 3 seats, or 1 space for every 50 sq. ft. of gross assembly or viewing area, plus ancillary uses (e.g., bar restaurant) |
| Restaurants, cafes, cafeterias, nightclubs, bars, taverns, lounges, or similar establishments for the consumption of food and beverages on the premises | 1 space for each 80 sq. ft. of gross floor area |

Using the City of Rancho Mirage Municipal Code parking rates, it is possible to calculate the parking requirements for the proposed Project. As shown on Table 2, the proposed Project requires 829 spaces.

**TABLE 2: RITZ-CARLTON RESIDENCES MUNICIPAL CODE PARKING SPACE REQUIREMENTS**

| Land Use | Quantity | Unit | Parking Rate[1] | Required Parking |
|---|---|---|---|---|
| 2+ Bedrooms | 106 | DU | 2 spaces within an enclosed garage and 1 off-street guest parking space for every 2 units | 265 |
| Meeting Halls | 23.843 | TSF | 1 space for each 3 seats, or 1 space for every 50 sq. ft. of gross assembly or viewing area, plus ancillary uses (e.g., bar restaurant) | 477 |
| Restaurants | 6.966 | TSF | 1 space for each 80 sq. ft. of gross floor area | 87 |
| | | | **Total** | **829** |

[1] Based on the City of Rancho Mirage Municipal Code §17.26.040 Number of parking spaces required

The proposed Project plan prepared on September 28, 2018 indicates that the available parking supply will be 510 spaces. The parking spaces provided will include 381 subterranean parking and 129 residential parking.

## PARKING ANALYSIS

Urban Crossroads, Inc. collected two parking count surveys to assess actual parking demands based on existing conditions at this location. The parking survey counts included in Appendix A, suggest a parking supply of 403 spaces with no fewer than 28% parking occupancy and no more than 78% parking occupancy. Peak parking demands ranged from 211 vehicles at 10:00 am on Wednesday, December 11, 2019 to 314 vehicles at 5:00 pm on Saturday, December 7, 2019. While this analysis is based on the peak parking demands, it is important to recognize that the average parking demands are much lower.

The typical average daily parking demands range from 163 spaces on the weekday to 237 spaces on the

weekend. Table 4 presents a summary of the parking count surveys. As shown on Table 4, peak parking demands at the existing Ritz-Carlton represent no more than 78% of the available parking supply. The existing parking survey counts show an average peak parking utilization rate of 65%. Parking utilization represents the number of parking stalls required (parking demand) expressed as a percentage of the number of parking stalls provided.

**TABLE 4: EXISTING ON-SITE PEAK PARKING DEMANDS**

| Parking Count Date[1] | Peak Parking Demand | Peak Hour | Available Parking | Parking Surplus | Parking Utilization |
|---|---|---|---|---|---|
| Saturday, December 7, 2019 | 314 | 5:00 PM | 403 | 89 | 78% |
| Wednesday, December 11, 2019 | 211 | 10:00 AM | 403 | 192 | 52% |
| Average | 263 | | 403 | 58 | 65% |

The parking counts clearly show an excess of available parking supply.

Based on a review of the occupied use and the actual parking demand counts, it is possible to calculate the actual parking demand rate at existing Ritz-Carlton. This parking rate accounts for all the existing land uses including 244 rooms, two ballrooms, a conference and events center with extensive meeting rooms, a gourmet restaurant, a gift shop, and a small spa treatment facility. Table 5 suggests that the calculated shared parking demand represents an average of 1.08 spaces per room. The observed parking demand using the calculated parking demand rate of 1.08 spaces per room is lower than the typical parking rate of approximately 2.5 spaces per dwelling unit.

**TABLE 5: ACTUAL PARKING DEMAND RATES**

| Count Date | Total Use[1] | Parking Demand[2] | Calculated Parking Demand Rate[3] |
|---|---|---|---|
| Saturday, December 7, 2019 | 244 Rooms | 314 spaces | 1.29 space per room |
| Wednesday, December 11, 2019 | 244 Rooms | 211 spaces | 0.86 space per room |
| | | Average: | 1.08 space per room |

[1] Amount of rooms available at the Ritz-Carlton
[2] Observed parking demand (actual number of vehicles parked on-site) at the Ritz-Carlton
[3] Calculated parking demand rate based total rooms and actual parking demand

Using the calculated parking demand rate of 1.08 spaces per room, it is possible to estimate the estimated parking demand. Table 6 suggests that the actual parking demand at Ritz-Carlton Residences is 378 spaces with 535 spaces of surplus.

**TABLE 6: RITZ-CARLTON RESIDENCES PARKING DEMAND**

| Use | Quantity[1] | Parking Rate[2] | Parking Demand[3] | Parking Supply[4] | Parking Surplus[5] |
|---|---|---|---|---|---|
| Ritz-Carlton Expansion | 106 DU | 1.08 spaces per room | 115 | 510 | +395 |
| | | Observed Parking: | 263 | 403 | +140 |
| | | Totals: | 378 | 913 | +535 |

[1] DU: dwelling unit
[2] Calculated Parking Rate (Table 5).
[3] Estimated parking park requirements based on existing parking rates (Total Rooms x Parking Rates).
[4] Total parking supply proposed.
[5] Parking surplus based on the difference between parking supply and estimated parking demand.

## PARKING STRATEGIES

Changing economic and demographic conditions will continue to influence future parking needs. Self-driving cars, parking guidance, peer-to-peer vehicle sharing, telecommuting, transportation network companies such as such as Uber and Lyft and other forward-looking technologies will continue to shape future parking demands. Other parking technologies such as smart vehicle detection sensors, smart parking management systems are also available and provide opportunities to actively manage parking resources real-time.

In addition, on-demand transportation increases the need to promote accessible drop-off and pick-up areas. Convenient and accessible drop-off and pick-up areas should be provided to promote ride-sharing and reduce parking demands. This can be accomplished with short-term parking time restrictions and/or staging areas for ridesharing vehicles.

Implementation of valet parking during peak parking demands (i.e., special events) can also substantially increase the available on-site parking capacity. In addition, valet parking services provide for convenient accessible parking even during peak parking demands at Ritz-Carlton Residences.

## PARKING RESTRICTIONS

Per Section 17.26.070 Development Standards, driveways providing ingress and egress to off-street parking spaces in residential zoning districts shall be a minimum width of fourteen feet for a one-way driveway and twenty feet for a two-way driveway. A residential driveway providing direct access to a garage shall be maintained free and clear of all obstructions for its entire width. As such, parking will be restricted to off-street parking only (i.e., garage parking). Minimum parking dimensions for parking spaces are identified in Table 7.

**TABLE 7: MINIMUM PARKING DIMENSIONS**

| Stall Dimensions | | | Aisle Widths | |
|---|---|---|---|---|
| **Parking Angle** | **Width** | **Depth** | **One-Way** | **Two-Way** |
| Parallel | 9 | 26 | 12 | 20 |
| 30° | 9 | 17 | 14 | 20 |
| 45° | 9 | 19 | 16 | 20 |
| 60° | 9 | 20 | 17 | 20 |
| 90° | 9 | 18 | 24 | 24 |

[1] Based on the City of Rancho Mirage Municipal Code §17.26.070 Development Standards

Per Section 17.08.020 Residential Districts General Development Standards, driveway approaches must have a 28-foot minimum turning radius.

## CONCLUSIONS

Our evaluation indicates that the proposed parking will provide sufficient capacity to accommodate the parking demands for the proposed Ritz-Carlton Residences development. A parking survey at the existing Ritz-Carlton Residences shows a surplus of parking spaces during peak demand. Based on actual observed average parking demand rate of 1.08 space per room, and accounting for shared parking between complementary uses, the estimated parking demand at Ritz-Carlton Residences is 378 spaces, resulting in a surplus of 535 spaces.

This Parking Evaluation suggests that Ritz-Carlton Residences can accommodate parking demands at full occupancy with additional parking strategies recommended in the Parking Management Plan. Additional parking strategies can be applied to increase the parking supply.

If you have any questions, please contact me directly at (949) 336-5992.

URBAN CROSSROADS, INC.



Pranesh Tarikere, PE
Senior Engineer



Robert Vu, PE
Transportation Engineer

# APPENDIX A:

# EXISTING SURVEY (RITZ-CARLTON)

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**Rancho Mirage, CA**
Ritz Carlton
68900 Frank Sinatra Dr

Saturday, December 7th, 2019

| | | Inventory | 6:00 AM | 7:00 AM | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM | 12:00 PM | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM | 7:00 PM | 8:00 PM | 9:00 PM | 10:00 PM | 11:00 PM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st Floor | Regular | 115 | 29 | 43 | 72 | 95 | 98 | 104 | 115 | 115 | 111 | 115 | 113 | 99 | 78 | 76 | 73 | 62 | 56 | 36 |
| | Handicap | 2 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 |
| | **Subtotal** | **117** | **29** | **43** | **73** | **96** | **100** | **106** | **117** | **117** | **113** | **117** | **114** | **101** | **79** | **77** | **73** | **62** | **56** | **36** |
| | Total Occupancy | 117 | 29 | 43 | 73 | 96 | 100 | 106 | 117 | 117 | 113 | 117 | 114 | 101 | 79 | 77 | 73 | 62 | 56 | 36 |
| | Total Percent | | **25%** | **37%** | **62%** | **82%** | **85%** | **91%** | **100%** | **100%** | **97%** | **100%** | **97%** | **86%** | **68%** | **66%** | **62%** | **53%** | **48%** | **31%** |

| | | Inventory | 6:00 AM | 7:00 AM | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM | 12:00 PM | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM | 7:00 PM | 8:00 PM | 9:00 PM | 10:00 PM | 11:00 PM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2nd Floor | Regular | 112 | 43 | 40 | 39 | 39 | 35 | 26 | 25 | 28 | 40 | 54 | 69 | 75 | 89 | 89 | 89 | 92 | 93 | 91 |
| | Handicap | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| | Reserved | 11 | 3 | 3 | 3 | 3 | 3 | 1 | 6 | 6 | 3 | 5 | 4 | 4 | 4 | 6 | 6 | 7 | 6 | 5 |
| | Electric Vehicle | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| | **Subtotal** | **127** | **48** | **45** | **44** | **45** | **41** | **30** | **33** | **37** | **46** | **61** | **75** | **82** | **96** | **98** | **99** | **103** | **103** | **100** |
| | Total Occupancy | 127 | 48 | 45 | 44 | 45 | 41 | 30 | 33 | 37 | 46 | 61 | 75 | 82 | 96 | 98 | 99 | 103 | 103 | 100 |
| | Total Percent | | **38%** | **35%** | **35%** | **35%** | **32%** | **24%** | **26%** | **29%** | **36%** | **48%** | **59%** | **65%** | **76%** | **77%** | **78%** | **81%** | **81%** | **79%** |

| | | Inventory | 6:00 AM | 7:00 AM | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM | 12:00 PM | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM | 7:00 PM | 8:00 PM | 9:00 PM | 10:00 PM | 11:00 PM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3rd Floor | Regular | 83 | 66 | 62 | 58 | 56 | 45 | 36 | 29 | 31 | 35 | 52 | 73 | 80 | 78 | 78 | 79 | 83 | 83 | 83 |
| | Electric Vehicle | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 1 |
| | **Subtotal** | **86** | **66** | **62** | **58** | **56** | **45** | **36** | **29** | **31** | **35** | **53** | **74** | **81** | **81** | **80** | **80** | **84** | **84** | **84** |
| | Total Occupancy | 86 | 66 | 62 | 58 | 56 | 45 | 36 | 29 | 31 | 35 | 53 | 74 | 81 | 81 | 80 | 80 | 84 | 84 | 84 |
| | Total Percent | | **77%** | **72%** | **67%** | **65%** | **52%** | **42%** | **34%** | **36%** | **41%** | **62%** | **86%** | **94%** | **94%** | **93%** | **93%** | **98%** | **98%** | **98%** |

| | | Inventory | 6:00 AM | 7:00 AM | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM | 12:00 PM | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM | 7:00 PM | 8:00 PM | 9:00 PM | 10:00 PM | 11:00 PM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trail Parking Lot | Trail Lot Pavement | 73 | 1 | 2 | 10 | 13 | 18 | 21 | 21 | 17 | 20 | 33 | 33 | 36 | 27 | 24 | 21 | 16 | 13 | 17 |
| | Dirt Overflow | - | 0 | 0 | 0 | 0 | 2 | 3 | 5 | 6 | 6 | 10 | 11 | 14 | 12 | 10 | 10 | 10 | 9 | 7 |
| | **Subtotal** | **73** | **1** | **2** | **10** | **13** | **20** | **24** | **26** | **23** | **26** | **43** | **44** | **50** | **39** | **34** | **31** | **26** | **22** | **24** |
| | Total Occupancy | 73 | 1 | 2 | 10 | 13 | 20 | 24 | 26 | 23 | 26 | 43 | 44 | 50 | 39 | 34 | 31 | 26 | 22 | 24 |
| | Total Percent | | **1%** | **3%** | **14%** | **18%** | **27%** | **33%** | **36%** | **32%** | **36%** | **59%** | **60%** | **68%** | **53%** | **47%** | **42%** | **36%** | **30%** | **33%** |
| | Grand Total Occupancy | 403 | 144 | 152 | 185 | 210 | 206 | 196 | 205 | 208 | 220 | 274 | 307 | 314 | 295 | 289 | 283 | 275 | 265 | 244 |
| | Grand Total Percent | | **36%** | **38%** | **46%** | **52%** | **51%** | **49%** | **51%** | **52%** | **55%** | **68%** | **76%** | **78%** | **73%** | **72%** | **70%** | **68%** | **66%** | **61%** |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-6268

**Rancho Mirage, CA**
Ritz Carlton
68900 Frank Sinatra Dr

Wednesday, December 11th, 2019

| | | Inventory | 6:00 AM | 7:00 AM | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM | 12:00 PM | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM | 7:00 PM | 8:00 PM | 9:00 PM | 10:00 PM | 11:00 PM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st Floor | Regular | 115 | 44 | 59 | 90 | 111 | 114 | 110 | 112 | 110 | 98 | 100 | 98 | 79 | 68 | 50 | 48 | 45 | 36 | 28 |
| | Handicap | 2 | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Subtotal** | **117** | **44** | **59** | **91** | **113** | **116** | **112** | **114** | **112** | **99** | **101** | **99** | **79** | **68** | **50** | **48** | **45** | **36** | **28** |
| | Total Occupancy | 117 | 44 | 59 | 91 | 113 | 116 | 112 | 114 | 112 | 99 | 101 | 99 | 79 | 68 | 50 | 48 | 45 | 36 | 28 |
| | Total Percent | | **38%** | **50%** | **78%** | **97%** | **99%** | **96%** | **97%** | **96%** | **85%** | **86%** | **85%** | **68%** | **58%** | **43%** | **41%** | **38%** | **31%** | **24%** |

| | | Inventory | 6:00 AM | 7:00 AM | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM | 12:00 PM | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM | 7:00 PM | 8:00 PM | 9:00 PM | 10:00 PM | 11:00 PM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2nd Floor | Regular | 112 | 35 | 36 | 32 | 35 | 28 | 22 | 28 | 26 | 22 | 24 | 22 | 23 | 23 | 18 | 17 | 18 | 18 | 18 |
| | Handicap | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 |
| | Reserved | 11 | 4 | 1 | 0 | 1 | 4 | 4 | 2 | 3 | 4 | 3 | 4 | 6 | 5 | 10 | 9 | 9 | 9 | 9 |
| | Electric Vehicle | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | **Subtotal** | **127** | **42** | **40** | **35** | **39** | **34** | **28** | **33** | **31** | **26** | **28** | **27** | **30** | **31** | **30** | **28** | **30** | **29** | **29** |
| | Total Occupancy | 127 | 42 | 40 | 35 | 39 | 34 | 28 | 33 | 31 | 26 | 28 | 27 | 30 | 31 | 30 | 28 | 30 | 29 | 29 |
| | Total Percent | | **33%** | **31%** | **28%** | **31%** | **27%** | **22%** | **26%** | **24%** | **20%** | **22%** | **21%** | **24%** | **24%** | **24%** | **22%** | **24%** | **23%** | **23%** |

| | | Inventory | 6:00 AM | 7:00 AM | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM | 12:00 PM | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM | 7:00 PM | 8:00 PM | 9:00 PM | 10:00 PM | 11:00 PM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3rd Floor | Regular | 83 | 39 | 37 | 36 | 35 | 30 | 28 | 24 | 18 | 17 | 20 | 23 | 30 | 37 | 31 | 33 | 41 | 45 | 45 |
| | Electric Vehicle | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Subtotal** | **86** | **42** | **40** | **39** | **38** | **33** | **31** | **27** | **21** | **17** | **20** | **23** | **30** | **37** | **31** | **33** | **41** | **45** | **45** |
| | Total Occupancy | 86 | 42 | 40 | 39 | 38 | 33 | 31 | 27 | 21 | 17 | 20 | 23 | 30 | 37 | 31 | 33 | 41 | 45 | 45 |
| | Total Percent | | **49%** | **47%** | **45%** | **44%** | **38%** | **36%** | **31%** | **24%** | **20%** | **23%** | **27%** | **35%** | **43%** | **36%** | **38%** | **48%** | **52%** | **52%** |

| | | Inventory | 6:00 AM | 7:00 AM | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM | 12:00 PM | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM | 7:00 PM | 8:00 PM | 9:00 PM | 10:00 PM | 11:00 PM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trail Parking Lot | Trail Lot Pavement | 73 | 2 | 3 | 15 | 15 | 22 | 24 | 24 | 21 | 23 | 23 | 22 | 15 | 8 | 6 | 6 | 5 | 7 | 5 |
| | Dirt Overflow | - | 0 | 2 | 6 | 6 | 6 | 8 | 7 | 7 | 10 | 11 | 11 | 6 | 6 | 4 | 4 | 6 | 3 | 4 |
| | **Subtotal** | **73** | **2** | **5** | **21** | **21** | **28** | **32** | **31** | **28** | **33** | **34** | **33** | **21** | **14** | **10** | **10** | **11** | **10** | **9** |
| | Total Occupancy | 73 | 2 | 5 | 21 | 21 | 28 | 32 | 31 | 28 | 33 | 34 | 33 | 21 | 14 | 10 | 10 | 11 | 10 | 9 |
| | Total Percent | | **3%** | **7%** | **29%** | **29%** | **38%** | **44%** | **42%** | **38%** | **45%** | **47%** | **45%** | **29%** | **19%** | **14%** | **14%** | **15%** | **14%** | **12%** |
| | Grand Total Occupancy | 403 | 130 | 144 | 186 | 211 | 211 | 203 | 205 | 192 | 175 | 183 | 182 | 160 | 150 | 121 | 119 | 127 | 120 | 111 |
| | Grand Total Percent | | **32%** | **36%** | **46%** | **52%** | **52%** | **50%** | **51%** | **48%** | **43%** | **45%** | **45%** | **40%** | **37%** | **30%** | **30%** | **32%** | **30%** | **28%** |

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# **Appendix H**
Geotechnical Report

TERRA NOVA PLANNING AND RESEARCH, INC.
400 SOUTH FARRELL DRIVE, SUITE B-205
PALM SPRINGS, CALIFORNIA 92262

# PLANNING-LEVEL
# GEOTECHNICAL FEASIBILITY REPORT
# PROPOSED EXPANSION PROJECT
# THE LODGE AT RANCHO MIRAGE
# FRANK SINATRA DRIVE
# RANCHO MIRAGE, CALIFORNIA

March 15, 2006

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File No.: 10530-01
06-03-804

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March 15, 2006

File No.: 10530-01
06-03-804

Terra Nova Planning and Research, Inc.
400 South Farrell Drive, Suite B-205
Palm Springs, California 92262

Attention: Mr. John Criste

Subject: **Planning-Level Geotechnical Feasibility Report**

Project: **Proposed Expansion Project**
The Lodge at Rancho Mirage
Frank Sinatra Drive
Rancho Mirage, California

Dear Mr. Criste:

We take pleasure in presenting this planning-level geotechnical feasibility report prepared for the proposed hotel and facilities expansion project of The Lodge at Rancho Mirage located at the western terminus of Frank Sinatra Dive in the City of Rancho Mirage, California.

This report presents our preliminary findings and recommendations regarding various geotechnical and geologic constraints that will affect the proposed project, incorporating the information provided to our office. The site is suitable for the proposed development, provided the recommendations in this report and subsequent design-level geotechnical investigations are followed in design and construction. This report should stand as a whole and no part of the report should be excerpted or used to the exclusion of any other part.

This report completes our scope of services in accordance with our agreement, dated January 30, 2006. Other services that may be required, such as plan review and grading observation, are additional services and will be billed according to our Fee Schedule in effect at the time services are provided. Unless requested in writing, the client is responsible for distributing this report to the appropriate governing agency or other members of the design team.

We appreciate the opportunity to provide our professional services. Please contact our office if there are any questions or comments concerning this report or its recommendations.

Respectfully submitted,
**EARTH SYSTEMS SOUTHWEST**

KAH

Karl A. Harmon
EG 2243

Reviewed by:

CSH

Craig S. Hill
CE 38234

REGISTERED PROFESSIONAL ENGINEER
CRAIG S. HILL
3.26.06
CE 38234
Exp. 03/31/07
CIVIL
STATE OF CALIFORNIA

SER/kah/csh/reh

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PLANNING-LEVEL
GEOTECHNICAL FEASIBILITY REPORT
PROPOSED EXPANSION PROJECT
THE LODGE AT RANCHO MIRAGE
FRANK SINATRA DRIVE
RANCHO MIRAGE, CALIFORNIA

## Section 1
## INTRODUCTION

### 1.1 Project Description

This planning-level geotechnical feasibility report has been prepared for the proposed expansion project of the existing hotel and facilities of The Lodge at Rancho Mirage. New developments are proposed for several portions of the approximately 37.5-acre planning area. The site is located at the western terminus of Frank Sinatra Drive in the City of Rancho Mirage, California.

The existing hotel will be renovated and expanded, and will also include a free-standing addition of rooms and suites, including new spa suites and facilities. The proposed expansion plans include the conversion of the existing tennis facilities to tennis villas. The project will result in the construction of an additional four hotel rooms and include up to 154 hotel/condominium units of primarily one- and two-story construction.

### 1.2 Site Description

The project site consists of approximately 37.5 acres of developed and undeveloped land surrounding the existing resort located at 68-900 Frank Sinatra Dive in the City of Rancho Mirage, California. The site location is shown on Figure 1 in Appendix A.

The project is situated in an area of rugged foothills and canyons near the base of the Santa Rosa Mountains. The area's site topography is generally dominated by northeast to southwest trending ridges and canyons. Total relief at the project site is on the order of approximately 60 feet.

The proposed expansion project is divided into five sub-areas as described below:

- The **Hotel Renovation** sub-area consists of approximately 15.55 acres of mostly developed land and is the current location of the hotel. Landscaping exists over much of the undeveloped portions and a grass-covered retention basin is present on the eastern side of the hotel. Steep, naturally vegetated slopes are present on the northwestern and northeastern sides of the hotel.

- The **Tennis Villas** sub-area consists of approximately 6.42 acres of mostly developed land and is currently the location of the tennis courts and clubhouse. A grass lawn, a concrete patio, and a sand volleyball court are also present in this sub-area. Two steep, naturally vegetated hills are present on the northern and southern sides of the tennis courts and the ground surface slopes steeply away on the northeastern side of the sub-area.

- The **Spa & Suites** sub-area is adjacent to the eastern boundary of the Hotel Renovation sub-area. It consists of approximately 2.28 acres of naturally vegetated hills.

- The **T-Wing** sub-area consists of approximately 2.28 acres south of the existing hotel. A portion of this sub-area has been cleared and graded and the rest is undeveloped, naturally vegetated hills.

- The **Hotel Villas** sub-area consists of approximately 10.95 acres along the southern boundary of the site. A paved road has been cut into the hills on the eastern side of the sub-area and a portion in the northeast corner has been cleared and graded flat. A northeast-southwest trending, unpaved road divides the sub-area approximately in half and a portion near the center of the sub-area has been cleared and lightly graded. The rest of the sub-area consists of naturally vegetated rolling hills. A paved road of the adjacent Mirada residential development defines the southern boundary of this sub-area.

The history of past use and development of the property was not investigated as part of our scope of services. Indications of buried utilities were not observed during the site visit, but may be expected around the existing structures.

### 1.3 Purpose and Scope of Work

The purpose for our services was to evaluate the site soil and bedrock conditions and to provide professional opinions and preliminary recommendations regarding the proposed development of the site. The scope of work included the following:

- A review of relevant geotechnical and geological literature and maps, including maps from the United States Geological Survey, the California Division of Mines and Geology, United States Department of Agriculture – Soil Conservation Service (USDA-SCS), previous Earth Systems reports in the site vicinity, and other relevant information.
- Examination and interpretation of selected vertical stereo aerial photographs.
- Site reconnaissance of the subject property based on our literature and photo reviews.
- A review of the referenced seismic refraction survey prepared by Terra Geosciences by our in-house geophysicist to evaluate the subsurface bedrock conditions and correlate these results to similar survey lines performed by ESSW on adjacent sites.
- An evaluation of surface drainage conditions and flooding potential by our in-house geologist based on literature and photo reviews as well as field investigation.
- Field infiltration testing for storm water retention using a double-ring infiltrometer.
- An engineering analysis and evaluation of the acquired data from our reconnaissance.
- A summary of our findings and recommendations in this written report.

This report contains the following:

- Discussions on subsurface soil/bedrock and groundwater conditions.
- Discussions on regional and local geologic conditions.
- Discussions on geologic and seismic hazards.
- Preliminary recommendations regarding:
  - Site development and grading criteria.
  - Excavation conditions and buried utility installations.
  - Seismic design parameters.

Not Contained in This Report: Although available through Earth Systems Southwest, the current scope of our services does not include:

- A site-specific design-level geotechnical investigation.
- A corrosive study to determine cathodic protection of concrete or buried pipes.
- An environmental assessment.
- An investigation for the presence or absence of wetlands, hazardous or toxic materials in the soil, surface water, groundwater, or air on, below, or adjacent to the subject property.
- A geologic fault-rupture hazard evaluation.

The client did not direct ESSW to provide any service to investigate or detect the presence of moisture, mold, or other biological contaminates in or around any structure, or any service that was designed or intended to prevent or lower the risk or the occurrence of the amplification of the same. Client acknowledges that mold is ubiquitous to the environment, with mold amplification occurring when building materials are impacted by moisture. Client further acknowledges that site conditions are outside of ESSW's control and that mold amplification will likely occur or continue to occur in the presence of moisture. As such, ESSW cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

## Section 2
## METHODS OF INVESTIGATION

### 2.1 Field Reconnaissance

Because of shallow bedrock conditions over the entire project site, as well as the abundance of large cobbles and boulders, subsurface exploration of the site with the use of conventional soil boring equipment is not feasible.

As an alternative to soil borings, a surface geologic reconnaissance was performed by an ESSW geologist on February 23 and March 9, 2006, as well as a review of geotechnical reports performed by ESSW on nearby projects and seismic refraction surveys conducted by Terra Geosciences in October 2004 and by ESSW on February 23, 2006.

### 2.2 Infiltration Testing

We conducted an open, double-ring infiltrometer test on March 1, 2006. The test was conducted at about 13 to 15 inches below existing grade and in general accordance with ASTM D3385. The purpose of the testing was to determine the appropriate infiltration rate to be used in design of the storm water retention basins. Several attempts were made to set the infiltrometer rings at various sites. Most attempts failed due to shallow bedrock and/or rocky soil conditions. The sites were chosen based on the cut/fill map dated February 10, 2006 and produced by MSA Consulting, Inc. We attempted to locate the test sites in areas that would remain at existing grade. Ultimately, only one of five sites was amenable to double-ring infiltrometer testing. The infiltration test location is shown on the attached location map (Figure 2).

An outer steel ring (24-inch diameter) and an inner steel ring (12-inch diameter) were driven about 13 to 15 centimeters into undisturbed soil. The purpose of the outer ring is to create a hydraulic barrier so that the recorded drop in water level of the inner ring measures the vertical infiltration without lateral spreading. Both rings were filled with water to a depth of about 6 inches and maintained with a float control valve or periodic refilling. Successive readings of infiltration flow were made over 15- to 60-minute periods until a stabilized flow was recorded. A plot of infiltration rates over time is presented on the attached test results.

The infiltration rate measured is presented in the following table in metric and equivalent English units.

| Test ID | Depth (cm) | Infiltration Rate | | |
|---|---|---|---|---|
| | | (cm/hr) | (in/hr) | (gal/sf/day) |
| P-1 | 13-15 | 8.2 | 3.2 | 49 |

The designer of the storm water retention basin should decide on an appropriate factor of safety to apply to reported infiltration rates. Infiltration of storm water through the bottom of the basin may be significantly less than the values given over time because of siltation of the basin bottom and development of a film from road oils from paved streets. Maintenance of the retention basin is crucial if no factor of safety is applied. Maintenance may include periodically scarifying the bottom of basin to open soil pores clogged by siltation, oils, or vegetation growth. A silt and oil

trap placed at influent points may be considered to reduce the potential for reduction in the infiltration rate of soils.

## 2.3 Seismic Refraction

A seismic refraction survey was performed by Terra Geosciences in the proposed Hotel Villas area in November 2004. The seismic P-wave velocities reported from this survey agreed with other similar surveys performed by ESSW in February 2006 on adjacent sites in the same rock units.

The results indicate a thin (approximately 2- to 4-foot) soil layer underlain by a 5- to 15-foot thick weathered bedrock zone that is, in turn, underlain by bedrock. The soil layer should excavate with no difficulty. The weathered bedrock zone should excavate with moderate difficulty to difficulty, with some zones requiring drilling and blasting. Lateral variations in rippability will occur due to variations in fracture density. The bedrock unit will require drilling and blasting.

## Section 3
## DISCUSSION

### 3.1 Earth Materials

The field exploration indicates that site materials consist generally of outcropping pre-Cretaceous metasedimentary rocks overlain in the T-Wing and Hotel Villas areas by an approximately 1- to 5-foot layer of gravelly sand with silt to silty sand with gravel (Unified Soils Classification System symbols SW-SM and SM).

The soil matrix is visually classified to be in the very low expansion (EI < 20) category in accordance with Table 18A-I-B of the California (Uniform) Building Code.

Fine particulate matter ($PM_{10}$) can create an air quality hazard if dust is blowing. Watering the surface, planting grass or landscaping, or placing hardscape normally mitigates this hazard.

### 3.2 Groundwater

The depth to groundwater in the vicinity of the project site is believed to be greater than 200 feet. Groundwater levels may fluctuate with precipitation, irrigation, drainage, regional pumping from wells, and site grading. The absence of shallow groundwater levels may not represent an accurate or permanent condition; minor localized and seasonal perched groundwater conditions may occur within and adjacent to well defined drainages on the site.

The bedrock that underlies the site is considered to be essentially non-water-bearing and does not form a continuous aquifer. However, some groundwater is likely to be contained at depth within intermittent joints and fractures of the bedrock. No seeps or springs were observed at the site during our field reconnaissance. However, after periods of heavy rainfall, seeps may form where bedrock discontinuities containing groundwater intersect the ground surface or in canyon bottoms where water flows within the alluvial deposits.

The potential for seeps may increase where fill soils are placed over canyons and drainages. Sub-drains placed at the bottoms of canyon fills may be required in order to reduce the potential for saturation of the fill soils and possible settlement or other ground failures that could result.

### 3.3 Geologic Setting

#### 3.3.1 Regional Geology

The site is located at the northern edge of the Santa Rosa Mountains, which border the southwest part of the Coachella Valley. The site is located within the Peninsular Ranges geomorphic province, at the boundary of the Colorado Desert geomorphic province. The Peninsular Ranges are characterized by fault-controlled, elongated northwest-trending valleys and ranges. These ranges and valleys extend from the southern end of Baja California to the Los Angeles basin. The rocks underlying this province consist of ancient sedimentary and metasedimentary (partially metamorphosed sedimentary rocks) that mantle a core of granitic rocks that comprise the Southern California Batholith.

The dominant feature of the Colorado Desert province is the Salton Trough, a large northwest-trending structural depression that extends approximately 180 miles from San Gorgonio Pass, near Palm Springs, to the head of the Gulf of California. Much of this depression in the area of the Salton Sea is below sea level.

The Coachella Valley forms the northerly portion of the Salton Sea basin. The valley contains a thick sequence of sedimentary rocks that are Miocene to Holocene in age. Mountains surrounding the Coachella Valley include the Little San Bernardino Mountains on the northeast, foothills of the San Bernardino Mountains on the west, and the San Jacinto and Santa Rosa Mountains on the southwest.

The San Andreas fault zone is the most significant potential seismic source in the site vicinity. In the upper portion of the Coachella Valley, the San Andreas fault zone is comprised of the Garnet Hill, the Banning, and the Mission Creek faults, which are located 5, 7.5, and 9.5 miles to the northeast of the site, respectively. These faults trend northwest to southeast. The San Andreas fault in the Coachella Valley is believed to be capable of generating a magnitude 7.5 to 8 earthquake. The larger value would be expected if the Coachella Valley segment ruptured concurrently with the San Bernardino Mountains segment (WGCEP, 1995). The San Jacinto fault is located approximately 17 miles to the southwest of the site and is believed to be capable of producing a magnitude 7 earthquake.

### 3.3.2 Local Geology

The on-site geology reflects a typical contact metamorphic zone along an igneous/sedimentary contact. The metamorphic contact zone contains pegmatitic marble and various calc-silicates. These rocks were formed by the modification of previously existing sediments by the intense heat associated with the intrusion of the igneous rocks. Several baked zones and feldspar and quartz rich gneiss mark the contact zone. Minor quartzite and schist are found; however, marble and marbleized limestone dominate the area. These metamorphic rocks are designated "ms" on Figure 4 in the appendix. In the vicinity of the proposed Tennis Villas, the predominant rocks are strongly folded metasediments. Toward the east, the metamorphism grades into foliated migmatites. This is the predominant rock type in the vicinity of the proposed Spa and Suites.

Several inactive faults were observed in outcroppings and on cut-slopes in the vicinity of the proposed Spa and Suites and Tennis Villas areas. Large (1m) gouge zones are typical, as are abundant auxiliary faults. Folds ranging from isoclinal to chevron in structure were also observed across the site. The following observations were made regarding these faults:

- There are fault gouge and slickensides, but the gouge and adjacent zones on some faults are deeply weathered and oxidized, as evidenced by the orange color. This deep weathering implies antiquity.

- They are not shown on the Santa Ana Sheet of the California Geologic Map.

- They are neither in a California State designated Alquist-Priolo fault study zone nor in a Riverside County fault study zone.

- There is evidence for 6 to 10 centimeters of offset in Pre-Cretaceous metasediments – very little movement for faults that are millions of years old.
- There are no surface topographic expressions of the structures.
- They are probably related to orogenic deformation during the creation of the San Jacinto and Santa Rosa Mountains.

Based on the above evidence, it is our professional opinion that the faults are pre-Holocene and inactive. They are probably older than one million years.

Many of the bedrock areas are highly fractured. The predominant fracture orientation dips about 50 degrees to the northeast with a less predominate orientation dipping 45 degrees to the northwest. Fractures range is size from 1 cm to 1m.

Veins consisting of quartz and calcite are scattered throughout the area, following the orientation of the fractures described above. Veins range from 1cm to 1m thick.

Surface drainage in the Tennis Villas area is generally to the west and into one of two deep canyons. In the southeastern portion of this area, runoff is to the east and into gutters along Frank Sinatra Drive.

In the T-Wing and Hotel Villas areas, runoff is mostly to the west and into gutters along Frank Sinatra Drive. Runoff at the extreme east end of this area is into a deep canyon to the east. This area is characterized by an approximately 15- to 20-foot high plateau with a thin (2- to 5-foot) veneer of soil/regolith. The plateau is dissected by numerous shallow drainages flowing mostly toward the west.

In the proposed Spa and Suites area, drainage off the hillside is toward the west and into a grass-covered retention basin. This basin drains into a deep canyon to the north, which then flows past two CVWD water tanks.

### 3.3.3 Descriptive Geology

Site geology is presented in Figure 4. Geology was mapped from existing geologic maps, aerial and satellite photographs, and field verification. Contacts shown are approximate. A more detailed geologic map is beyond the scope of this preliminary report. Geologic units encountered during our site reconnaissance include the following:

Pre-Cenozoic Metamorphic Rocks (ms): Palm Canyon Complex – interbedded crystalline limestone, quartzite, quartz-mica schist, and granitic gneiss; in many places intruded lit-par-lit by granitic rocks. These rocks underlie the entire project site. Metamorphism grades from folded metasediments to the west to strongly foliated migmatites to the east.

Artificial Fill (af): Man-made fill deposits.

## 3.4 Geologic Hazards

Geologic hazards that may affect the region include seismic hazards (ground shaking, surface fault rupture, soil liquefaction, and other secondary earthquake-related hazards), slope instability, flooding, ground subsidence, and erosion. A discussion follows on the specific hazards to this site.

### 3.4.1 Seismic Hazards

Seismic Sources: Several active faults or seismic zones lie within 62 miles (100 kilometers) of the project site as shown on Table 1 in Appendix A. The primary seismic hazard to the site is strong ground shaking from earthquakes along the San Andreas and San Jacinto faults. The Maximum Magnitude Earthquake ($M_{max}$) listed is from published geologic information available for each fault (Cao et al., CGS, 2003). The $M_{max}$ corresponds to the maximum earthquake believed to be tectonically possible.

Surface Fault Rupture: The project site does not lie within a currently delineated State of California, *Alquist-Priolo* Earthquake Fault Zone (Hart, 1997). Well-delineated fault lines cross through this region as shown on California Geological Survey (CGS) maps (Jennings, 1994).

No active or potentially active faults are known to exist on or immediately adjacent to the site. Regional maps (Rogers, 1965 and Jennings, 1994) do indicate a bedrock fault crossing approximately ½ mile south of the site. Jennings (1994) shows this fault as being without recognized Quaternary movement and is apparently an inactive fault within the ancient bedrock complex. Several small faults can be observed within the bedrock units in the area, but do not disrupt overlying Pleistocene terrace deposits and do not otherwise display features that would suggest recent movement. No evidence exists that would suggest that active faulting exists along the southern margins of the Coachella Valley.

While fault rupture would most likely occur along previously established fault traces, future fault rupture could occur at other locations. The nearest known active fault to the site is the San Andreas fault, as discussed previously in the Regional Geology section of this report. Active fault rupture is therefore unlikely to occur at the project site.

Historic Seismicity: Six historic seismic events (5.9 M or greater) have significantly affected the Coachella Valley in the last 100 years. They are as follows:

- *Desert Hot Springs Earthquake* – On December 4, 1948, a magnitude 6.5 $M_L$ (6.0$M_W$) earthquake occurred east of Desert Hot Springs. This event was strongly felt in the Palm Springs area.
- *Palm Springs Earthquake* – A magnitude 5.9 $M_L$ (6.2$M_W$) earthquake occurred on July 8, 1986 in the Painted Hills, causing minor surface creep of the Banning segment of the San Andreas fault. This event was strongly felt in the Palm Springs area and caused structural damage, as well as injuries.
- *Joshua Tree Earthquake* – On April 22, 1992, a magnitude 6.1 $M_L$ (6.1$M_W$) earthquake occurred in the mountains 9 miles east of Desert Hot Springs. Structural damage and minor injuries occurred in the Palm Springs area as a result of this earthquake.

- *Landers and Big Bear Earthquakes* – Early on June 28, 1992, a magnitude 7.5 $M_S$ (7.3$M_W$) earthquake occurred near Landers, the largest seismic event in Southern California for 40 years. Surface rupture occurred just south of the town of Yucca Valley and extended some 43 miles toward Barstow. About three hours later, a magnitude 6.6 $M_S$ (6.4$M_W$) earthquake occurred near Big Bear Lake. No significant structural damage from these earthquakes was reported in the Palm Springs area.
- *Hector Mine Earthquake* – On October 16, 1999, a magnitude 7.1$M_W$ earthquake occurred on the Lavic Lake and Bullion Mountain faults north of Twentynine Palms. While this event was widely felt, no significant structural damage has been reported in the Coachella Valley.

Seismic Risk: While accurate earthquake predictions are not possible, various agencies have conducted statistical risk analyses. In 2002, the California Geological Survey (CGS) and the United States Geological Survey (USGS) completed the latest generation of probabilistic seismic hazard maps. We have used these maps in our evaluation of the seismic risk at the site. The Working Group of California Earthquake Probabilities (WGCEP, 1995) estimated a 22% conditional probability that a magnitude 7 or greater earthquake may occur between 1994 and 2024 along the Coachella segment of the San Andreas fault.

The primary seismic risk at the site is a potential earthquake along the San Andreas fault. Geologists believe that the San Andreas fault has characteristic earthquakes that result from rupture of each fault segment. The estimated characteristic earthquake is magnitude 7.7 for the Southern Segment of the fault (USGS, 2002). This segment has the longest elapsed time since rupture of any part of the San Andreas fault. The last rupture occurred about 1690 AD, based on dating by the USGS near Indio (WGCEP, 1995). This segment has also ruptured on about 1020, 1300, and 1450 AD, with an average recurrence interval of about 220 years. The San Andreas fault may rupture in multiple segments, producing a higher magnitude earthquake. Recent paleoseismic studies suggest that the San Bernardino Mountain Segment to the north and the Coachella Segment may have ruptured together in 1450 and 1690 AD (WGCEP, 1995).

### 3.4.2 Secondary Hazards

Secondary seismic hazards related to ground shaking include soil liquefaction, ground subsidence, tsunamis, and seiches. The site is far inland, so the hazard from tsunamis is non-existent. At the present time, no water storage reservoirs are located in the immediate vicinity of the site. Therefore, hazards from seiches are considered negligible at this time.

Soil Liquefaction: Liquefaction is the loss of soil strength from sudden shock (usually earthquake shaking), causing the soil to become a fluid mass. In general, for the effects of liquefaction to be manifested at the surface, groundwater levels must be within 50 feet of the ground surface and the soils within the saturated zone must also be susceptible to liquefaction. The potential for liquefaction to occur at this site is considered essentially nil because the site is underlain by non-water-bearing crystalline bedrock. In addition, the project does not lie within a County or State liquefaction hazard zone.

Ground Subsidence: Non-tectonic ground deformation consists of cracking of the ground with little to no displacement. This type of deformation is generally associated with differential shaking of two or more geologic units with differing engineering characteristics. Ground

deformation may also be caused by liquefaction. The potential for this type of ground deformation is considered to be low because the site is not vulnerable to liquefaction and is underlain by relatively uniform bedrock.

The potential for seismically induced ground subsidence is considered low at the site because of the underlying dense bedrock. Uncompacted fill areas may be susceptible to seismically induced settlement.

Slope Instability: Cut and fill slopes are proposed at the site. Cut slopes in the on-site bedrock at a maximum inclination of 2:1 (horizontal:vertical) are expected to be grossly stable. However, discontinuities present in the rock, such as bedding planes, joints, or faults, may affect the slope's stability. The potentially adverse effect of these discontinuities would depend on their orientation in relation to the orientation of the slope face.

Properly constructed fill slopes are expected to be grossly stable, using the recommendations contained within this report and a subsequent design-level geotechnical engineering report. Surficial stability will be dependent on proper drainage design and erosion protection.

Flooding and Erosion: The project site does not lie within a designated FEMA 100- or 500-year flood plain. The project site is situated in an area where sheet flooding, flash flooding, and erosion may occur.

The need for and design of flood control devices and erosion protection is within the purview of the design civil engineer. In general, erosion should be mitigated by proper drainage design including collecting and disposal (conveyance) of water to approved points of discharge. Appropriate project design, construction, and maintenance will be necessary to mitigate the site flooding hazards.

### 3.4.3 Site Acceleration and Seismic Coefficients

Site Acceleration: The potential intensity of ground motion may be estimated by the horizontal peak ground acceleration (PGA), measured in "g" forces. Included in Table 1 are deterministic estimates of site acceleration from possible earthquakes at nearby faults. Ground motions are dependent primarily on the earthquake magnitude and distance to the seismogenic (rupture) zone. Accelerations are also dependent upon attenuation by rock and soil deposits, direction of rupture, and type of fault. For these reasons, ground motions may vary considerably in the same general area. This variability can be expressed statistically by a standard deviation about a mean relationship.

The PGA alone is an inconsistent scaling factor to compare to the CBC Z factor and is generally a poor indicator of potential structural damage during an earthquake. Important factors influencing the structural performance are the duration and frequency of strong ground motion, local subsurface conditions, soil-structure interaction, and structural details.

The following table provides the probabilistic estimate of the PGA taken from the 2002 CGS/USGS seismic hazard maps.

**Estimate of PGA from 2002 CGS/USGS Probabilistic Seismic Hazard Maps**

| Risk | Equivalent Return Period (years) | PGA (g) [1] |
|---|---|---|
| 10% exceedance in 50 years | 475 | 0.48 |

Notes:
1. Based on a soft rock site, $S_{B/C}$, and soil amplification factor of 1.0 for Soil Profile Type $S_B$.

2001 CBC Seismic Coefficients: The California Building Code (CBC) seismic design criteria are based on a Design Basis Earthquake (DBE) that has an earthquake ground motion with a 10% probability of occurrence in 50 years. The PGA estimate given above is provided for information on the seismic risk inherent in the CBC design. The seismic and site coefficients given in Chapter 16 of the 2001 California Building Code are provided in Section 5.5 of this report and below.

**2001 CBC Seismic Coefficients for Chapter 16 Seismic Provisions**

| | | | Reference |
|---|---|---|---|
| Seismic Zone: | 4 | | Figure 16-2 |
| Seismic Zone Factor, Z: | 0.4 | | Table 16-I |
| Soil Profile Type: | $S_B$ | | Table 16-J |
| Seismic Source Type: | A | | Table 16-U |
| Closest Distance to Known Seismic Source: | 11.7 km = 7.3 miles | | (San Andreas fault) |
| Near Source Factor, Na: | 1.00 | | Table 16-S |
| Near Source Factor, Nv: | 1.13 | | Table 16-T |
| Seismic Coefficient, Ca: | 0.40 | = 0.40Na | Table 16-Q |
| Seismic Coefficient, Cv: | 0.45 | = 0.40Nv | Table 16-R |

Seismic Hazard Zones: The site does not lie within a liquefaction, landslide, or fault rupture hazard area or zone established by the 2003 Riverside County Integrated Project. This part of Riverside County has not yet been mapped by the California Seismic Hazard Mapping Act (Ca. PRC 2690 to 2699).

**Section 4**
**CONCLUSIONS**

The following is a summary of our conclusions and professional opinions based on the data obtained from a review of selected technical literature and the site evaluation.

General:

- From a geotechnical perspective, the site is suitable for the proposed development, provided the recommendations in this report and subsequent design-level geotechnical investigations are followed in the design and construction of this project.

Geotechnical Constraints and Mitigation:

- The primary geologic hazard is severe ground shaking from earthquakes originating on nearby faults. A major earthquake above magnitude 7 originating on the local segment of the San Andreas fault zone would be the critical seismic event that may affect the site within the design life of the proposed development. Engineered design and earthquake-resistant construction increase safety and allow development of seismic areas.

- The project site is in seismic Zone 4, is of soil profile Type $S_B$, and is about 11.7 km from a Type A seismic source as defined in the California Building Code. A qualified professional should design any permanent structure constructed on the site. The *minimum* seismic design should comply with the 2001 edition of the California Building Code.

- The project site is situated in an area where sheet flooding, flash flooding, and erosion may occur. Preventative measures to reduce seasonal flooding and erosion should be incorporated into site grading plans.

- Other geologic hazards, including fault rupture, liquefaction, seismically induced flooding, and landslides, are considered low or negligible on this site.

- The project site does not lie within a currently delineated State of California, *Alquist-Priolo* Earthquake Fault Zone; active fault rupture is unlikely to occur at the project site.

- Groundwater-related issues should not be a factor in design or construction at this site, with the exception of possible need for sub-drains in deep canyon fills.

- The potential for undesirable differential settlements may exist at the site resulting from variable depths to bedrock across proposed building pads. This potential hazard can be reduced by either grading uniform mats of compacted fill or by deepening foundations to bear completely on competent bedrock. Deepening the foundation to bedrock will result in a variable depth foundation to mirror the irregular depth to bedrock. Foundations founded on a structural mats of recompacted soil will require moisture conditioning, verification compaction testing, and possible over-excavation and recompaction in the building area and, in particular, bedrock areas.

- Excavation in shallow bedrock will likely require special grading equipment. Although preliminary rippability studies indicate heavy-duty grading equipment may be feasible, blasting could be necessary for deeper cuts. Difficulty may also be experienced in areas of deeper excavation such as utility trenches, swimming pools, and spas.

## Section 5
## PRELIMINARY RECOMMENDATIONS

### 5.1 Summary of Preliminary Recommendations

Based upon the data collected to date, the following preliminary recommendations are provided relative to the proposed development and noted geologic and geotechnical constraints.

- All proposed structures should be designed in accordance with at least minimum building code standards for Seismic Zone 4 as described in the 2001 California Building Code Vol. 2. The minimum seismic design should comply with the 2001 edition of the California Building Code.

- Measures to minimize sheet flooding and erosion should be incorporated into the overall project design. The need for and design of flood control devices and erosion protection is within the purview of the design civil engineer. In general, erosion should be mitigated by proper drainage design, including collecting and disposal (conveyance) of water to approved points of discharge.

- The entire project area consists essentially of shallow or exposed bedrock with deep proposed cuts that will significantly impact the grading and subsequent construction of the proposed site improvements. Site grading will require specialized equipment to properly handle the large anticipated volume of oversized rock and rock fragments.

- Construction proposed within or adjacent to hillside areas of the site may require site-specific detailed geotechnical studies incorporated with specific design parameters to evaluate slope stability of existing and planned slopes and to provide additional mitigation measures, if necessary. Appropriate structure setbacks from ascending and descending slopes, per code requirements, should be incorporated into site design.

- Additional geotechnical engineering studies are recommended to evaluate design-level engineering properties of the subsurface earth materials and to develop recommendations for remedial site grading and foundation design. Site-specific geotechnical issues, including slope instability, collapse potentials, corrosion potentials, and differential settlement due to unlike bearing materials, should be addressed.

### 5.2 Site Development – Grading

The following preliminary recommendations are for planning and feasibility purposes only; actual grading recommendation should be based on site-specific geotechnical constraints obtained during a design-level evaluation of the site tailored to the final proposed site development.

Clearing and Grubbing: At the start of site grading, existing vegetation, trees, large roots, pavements, foundations, non-engineered fill, construction debris, trash, and abandoned underground utilities should be removed from the proposed building, structural, and pavement areas. The surface should be stripped of organic growth and removed from the construction area.

Areas disturbed during demolition and clearing should be properly backfilled and compacted as described below.

Dust control should also be implemented during construction. Site grading should be in strict compliance with the requirements of the South Coast Air Quality Management District (SCAQMD).

Mass Grading: Because of the shallow depth to bedrock and resulting accumulation of cobbles and boulder-sized rock fragments, conventional earthmoving equipment such as scrapers and other light equipment may not be suitable for grading portions of the site. Heavy equipment such as large bulldozers and loaders equipped with a rock "bucket" will likely be necessary.

Disposal of Oversize Rock: Rock greater than 6 inches in maximum dimension should not be placed within the upper 3 feet of finish grade within building areas, where they may interfere with footing trenches, or in areas where they may interfere with the installation of underground utilities. Rock up to 12 inches in size may be incorporated in deeper structural fill or non-structural areas. A portable crusher could be brought to the job site to break down the boulders for use in fill areas. Crushed materials no greater than 6 inches in maximum dimension may be used for structural fill.

It may also be feasible to dispose of boulders (>12-inch size) within the deeper portions of nonstructural fill and passive use areas to be landscaped. Boulders that are buried below nonstructural fills should be placed in neat windrows and in a manner to avoid nesting and then covered with on-site or imported granular soils. The soil cover should then be thoroughly watered and wheel-rolled to fill voids between the boulders. These rock disposal areas should be designated on the grading plans.

Building Pad Preparation: In order to limit the potential for differential settlement between adjacent load-bearing members, proposed structures should be founded on either a uniformly thick structural mat of recompacted soil or deepened foundations bearing on competent bedrock.

In areas where proposed building pads result in transitional lots of cut into bedrock and fill, footings should bear on a mat of soil at least 4 feet thick. Additional over-excavation and replacement of soil may be required beneath footings where shallow rock is encountered. This is particularly true where proposed structures encroach on the existing rock outcrops.

Subgrade Preparation: In areas to receive pavements or hardscape, the ground surface should be scarified, moisture conditioned, and compacted to at least 90% relative compaction (ASTM D 1557) for a depth of 12 inches below finished subgrades.

Engineered Fill Soils: The native soil (after processing to remove rocks greater than 6 inches in size) is suitable for use as engineered fill and utility trench backfill. The native soil should be placed in maximum 8-inch lifts (loose) and compacted to at least 90% relative compaction (ASTM D1557) near its optimum moisture content.

Imported fill soils (if required) should be non-expansive, granular soils meeting the USCS classifications of SM, SP-SM, or SW-SM with a maximum rock size of 3 inches and 5 to 35%

passing the No. 200 sieve. The geotechnical engineer should evaluate the import fill soils before hauling to the site. However, because of the potential variations within the borrow source, import soil will not be prequalified by ESSW. The imported fill should be placed in lifts no greater than 8 inches in loose thickness and compacted to at least 90% relative compaction (ASTM D1557) near optimum moisture content.

Shrinkage/Bulking and Loss: The shrinkage factor of the soil (additional to the loss of oversize rocks) is expected to range from 10 to 20 percent for the upper excavated or scarified site soils. This estimate is based on compactive effort to achieve an average relative compaction of about 92% and may vary with contractor methods. Subsidence is estimated to be less than 0.2 foot. Losses from site clearing and removal of oversize rock will affect earthwork quantity calculations and should be considered.

An accurate estimation of the shrinkage/bulking of materials generated in bedrock excavations is extremely difficult. This fact, combined with the volume of proposed grading, could result in the job being out of balance. Because most of the excavated materials will be dense bedrock, it is more likely that bulking will occur, rather than shrinkage. Careful monitoring of cut/fill quantities during grading will be necessary so that adjustments to final design grades can be made relatively early in the grading operation.

Site Drainage: Positive drainage should be maintained away from the structures (5% for 5 feet minimum) to prevent ponding and subsequent saturation of the foundation soils. Gutters and downspouts should be considered as a means to convey water away from foundations if adequate drainage is not provided. Drainage should be maintained for paved areas. Water should not pond on or near paved areas.

### 5.3 Excavations and Utility Trenches

Excavations should be made in accordance with CalOSHA requirements. Our site exploration and knowledge of the general area indicates there is a potential for caving of site excavations (utilities, footings, etc.). Excavations within sandy soil should be kept moist, but not saturated, to reduce the potential of caving or sloughing. Where excavations over 4 feet deep are planned, lateral bracing or appropriate cut slopes should be provided. No surcharge loads from stockpiled soils or construction materials should be allowed within a horizontal distance measured from the top of the excavation slope and equal to the depth of the excavation.

Utility Trenches: Backfill of utilities within roads or public right-of-ways should be placed in conformance with the requirements of the governing agency (water district, public works department, etc.). Utility trench backfill within private property should be placed in conformance with the provisions of this report. In general, service lines extending inside of property may be backfilled with native soils compacted to a minimum of 90% relative compaction. Backfill operations should be observed and tested to monitor compliance with these recommendations.

Some blasting may be necessary in the deeper cut areas of the site, and may be desirable from an efficiency standpoint even where ripping with heavy equipment is feasible. Excavation of on-site bedrock materials will most likely generate a significant quantity of oversize material (rocks over 12 inches in average diameter). These materials are unsuitable for use in compacted fill near

final street or pad grades because of the difficulty in achieving uniform compaction and difficulties in subsequent excavations for utilities and foundations. Recommendations for disposal of oversized rock in deep fill areas are provided in Section 5.2; however, it should be recognized that oversized rock disposal will result in inefficiencies during grading.

### 5.4 Slope Stability of Graded Slopes

Unprotected, permanent graded slopes should not be steeper than 3:1 (horizontal:vertical) to reduce wind and rain erosion. Protected slopes with ground cover may be as steep as 2:1. However, maintenance with motorized equipment may not be possible at this inclination. Fill slopes should be overfilled and trimmed back to competent material.

### 5.5 Seismic Design Criteria

This site is subject to strong ground shaking due to potential fault movements along the San Andreas and San Jacinto faults. Engineered design and earthquake-resistant construction increase safety and allow development of seismic areas. The *minimum* seismic design should comply with the 2001 edition of the California Building Code using the seismic coefficients given in the table below.

**2001 CBC Seismic Coefficients for Chapter 16 Seismic Provisions**

| | | | Reference |
|---|---|---|---|
| Seismic Zone: | 4 | | Figure 16-2 |
| Seismic Zone Factor, Z: | 0.4 | | Table 16-I |
| Soil Profile Type: | $S_B$ | | Table 16-J |
| Seismic Source Type: | A | | Table 16-U |
| Closest Distance to Known Seismic Source: 11.7 km = 7.3 miles | | | (San Andreas fault) |
| Near Source Factor, Na: | 1.00 | | Table 16-S |
| Near Source Factor, Nv: | 1.13 | | Table 16-T |
| Seismic Coefficient, Ca: | 0.40 | = 0.40Na | Table 16-Q |
| Seismic Coefficient, Cv: | 0.45 | = 0.40Nv | Table 16-R |

The CBC seismic coefficients are based on scientific knowledge, engineering judgment, and compromise. If further information on seismic design is needed, a site-specific probabilistic seismic analysis should be conducted.

The intent of the CBC lateral force requirements is to provide a structural design that will resist collapse to provide reasonable life safety from a major earthquake, but may experience some structural and nonstructural damage. A fundamental tenet of seismic design is that inelastic yielding is allowed to adapt to the seismic demand on the structure. In other words, *damage is allowed.* The CBC lateral force requirements should be considered a *minimum* design. The owner and the designer should evaluate the level of risk and performance that is acceptable. Performance based criteria could be set in the design. The design engineer should exercise special care so that all components of the design are fully met with attention to providing a continuous load path. An adequate quality assurance and control program is urged during project

construction to verify that the design plans and good construction practices are followed. This is especially important for sites lying close to the major seismic sources.

### 5.6 Mitigation of Soil Corrosivity on Concrete

Chemical analyses for corrosivity were *not* conducted during this preliminary study. The native soils should have a negligible to moderate sulfate ion concentration, but a moderate to high chloride ion concentration. Sulfate ions can attack the cementitious material in concrete, causing weakening of the cement matrix and eventual deterioration by raveling. Chloride ions can cause corrosion of reinforcing steel.

A minimum concrete cover of three (3) inches should be provided around steel reinforcing or embedded components exposed to native soil or landscape water. Additionally, the concrete should be thoroughly vibrated during placement.

The site soils may present a moderate to high potential for metal loss from electrochemical corrosion processes. Corrosion protection of steel can be achieved by using epoxy corrosion inhibitors, asphalt coatings, cathodic protection, or encapsulating with densely consolidated concrete.

Testing of site soils for corrosivity should be performed for the design-level geotechnical engineering report.

Earth Systems does not practice corrosion engineering. We recommend that a qualified corrosion engineer evaluate the corrosion potential on metal construction materials and concrete at the site to provide mitigation of corrosive effects, if further guidance is desired.

or toxic materials in the soil, surface water, groundwater, or air on, below, or adjacent to the subject property.

### 6.2 Additional Services

This report is based on the assumption that an adequate program of client consultation, construction monitoring, and testing will be performed during the final design and construction phases to check compliance with these recommendations. Maintaining ESSW as the geotechnical consultant from beginning to end of the project will provide continuity of services. *The geotechnical engineering firm providing tests and observations shall assume the responsibility of Geotechnical Engineer of Record.*

Construction monitoring and testing would be additional services provided by our firm. The costs of these services are not included in our present fee arrangements, but can be obtained from our office. The recommended review, tests, and observations include, but are not necessarily limited to, the following:

- Consultation during the final design stages of the project.
- A review of the building and grading plans to observe that recommendations of our report have been properly implemented into the design.
- Observation and testing during site preparation, grading, and placement of engineered fill as required by CBC Sections 1701 and 3317 or local grading ordinances.
- Consultation as needed during construction.

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Appendices as cited are attached and complete this report.

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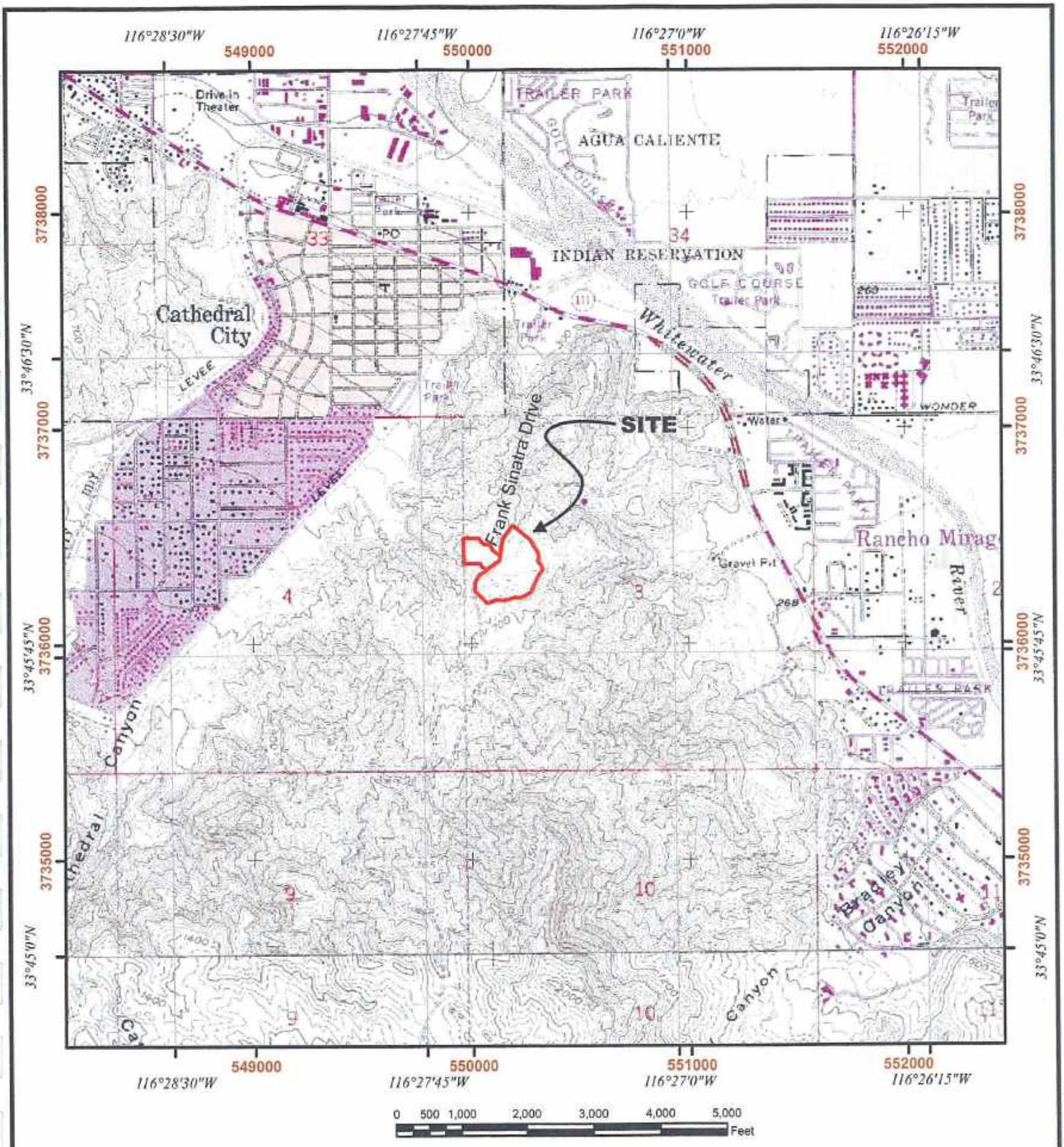
## APPENDIX A

Figure 1 – Site Location Map
Figure 2 – Percolation Test and Seismic Refraction Line Location Map
Figure 3 – Regional Fault Map
Figure 4 – Geologic Map
Figure 5 – Conceptual Site Plan
Double Ring Infiltration Test Data
Table 1 – Fault Parameters




**LEGEND**

Site Boundary

N

**Figure 1**
**Site Location Map**

The Lodge at Rancho Mirage - Expansion
Frank Sinatra Drive
Rancho Mirage, California

**Earth Systems Southwest**

03/15/06 | File No.: 10530-01




**LEGEND**

- Infiltration Test
- Site Boundary
- Seismic Refraction Line
- Seismic Line, Terra Geosciences

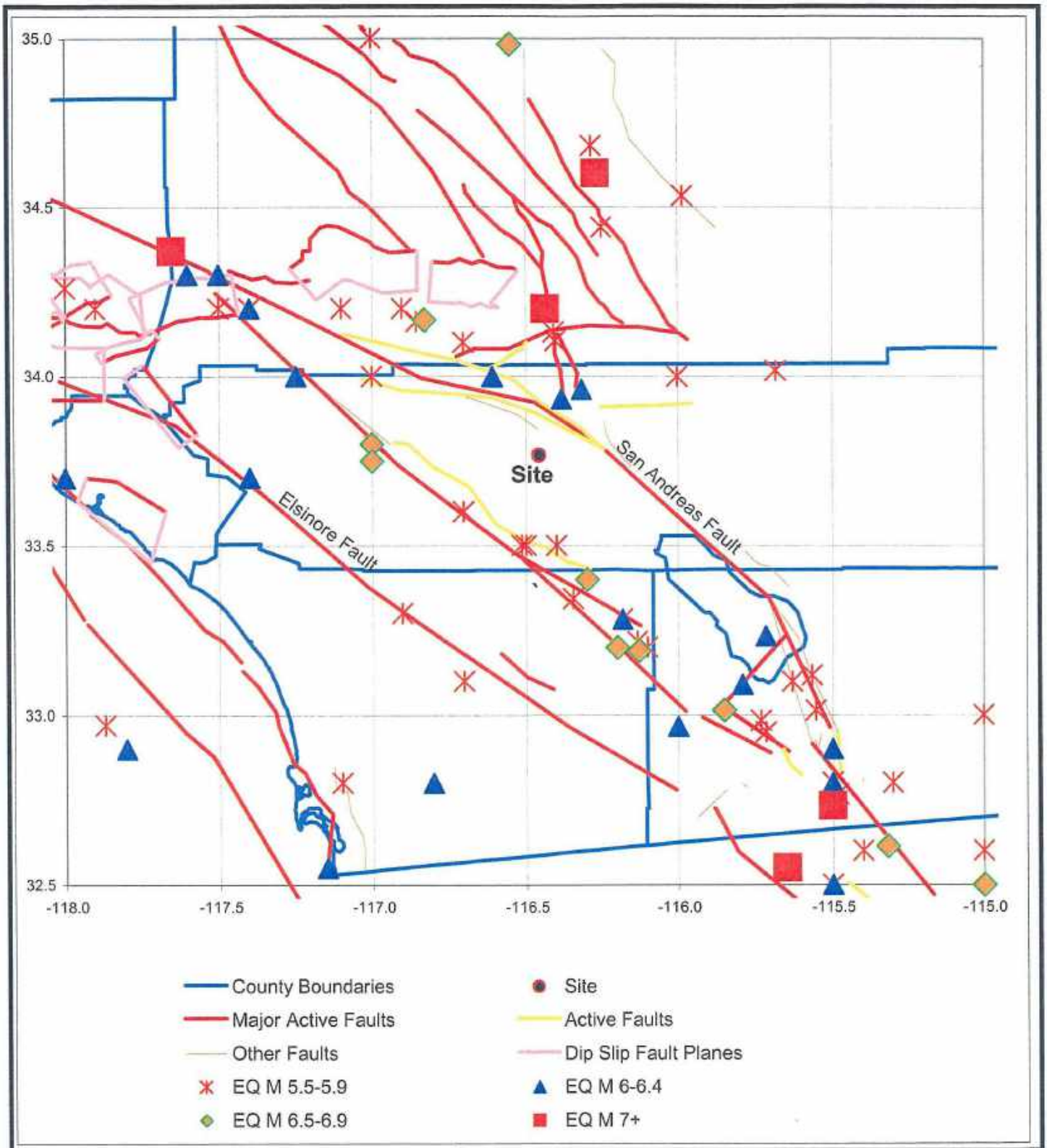
N

**Figure 2 - Percolation Test & Seismic Refraction Line Location Map**

The Lodge at Rancho Mirage - Expansion
Frank Sinatra Drive
Rancho Mirage, California

Earth Systems Southwest

03/15/06 | File No.: 10530-01

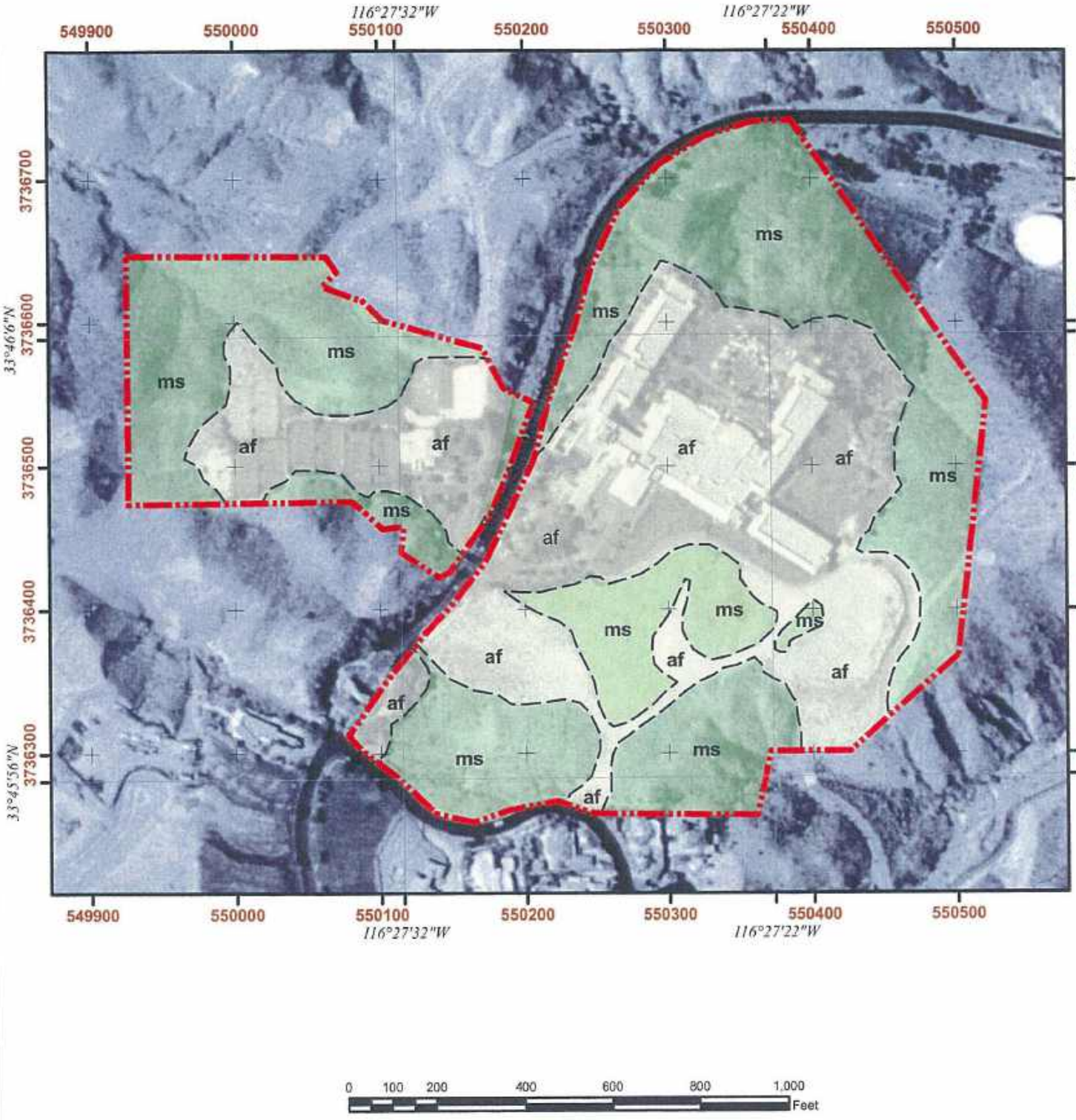



Magnitude 5.5 or greater since 1800 are plotted based on CGS database

## Figure 3 - Regional Fault Map

Project: The Lodge Renovation Project, Rancho Mirage, CA
File No.: 10530-01

**Earth Systems**
**Southwest**




**LEGEND**

- Site Boundary
- Contact (Dashed Where Approximate)
- af — Artificial Fill
- ms — Pre-Cretaceous Metasedimentary Rocks

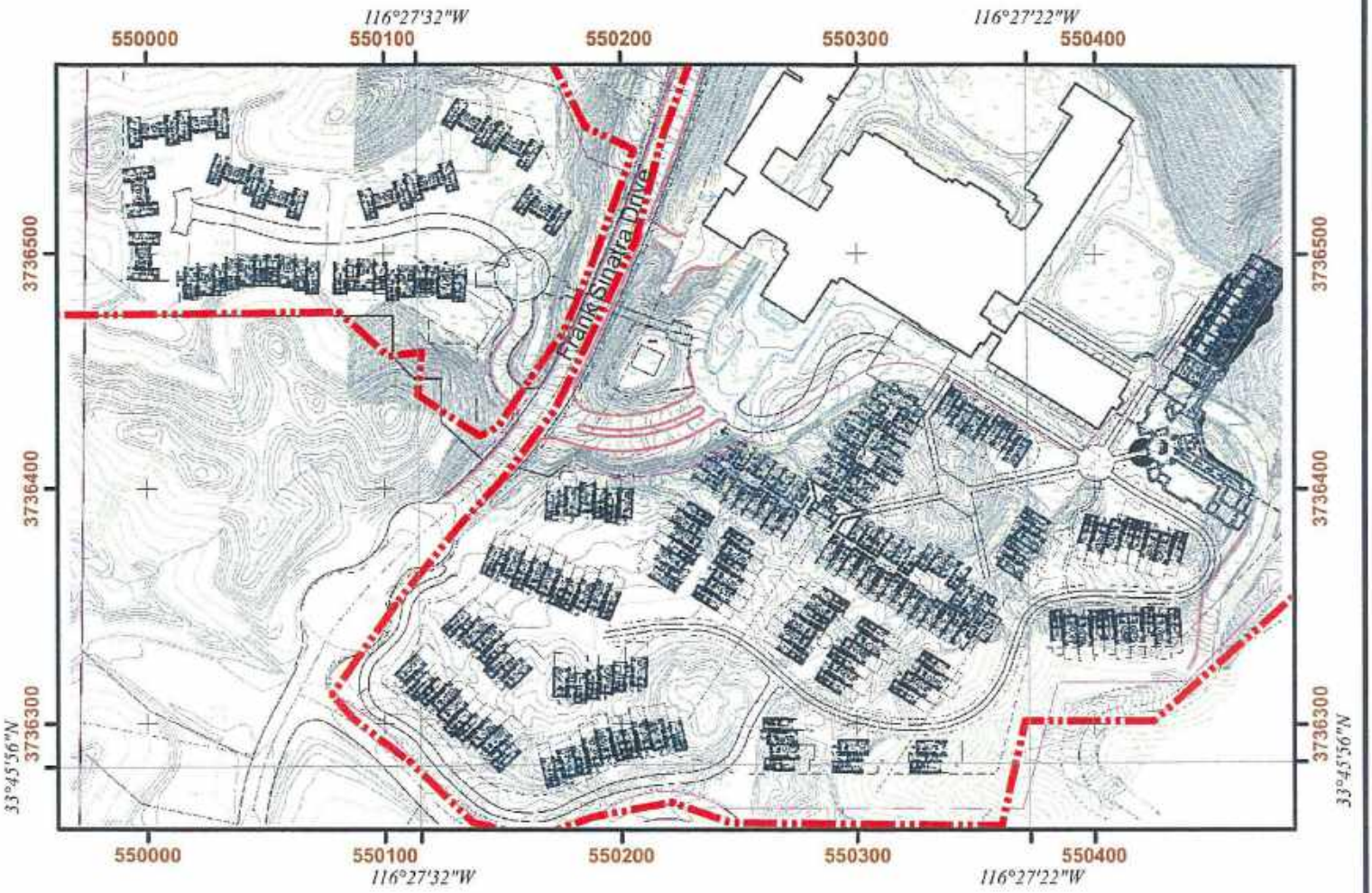
N

**Figure 4**
**Geologic Map**

The Lodge at Rancho Mirage - Expansion
Frank Sinatra Drive
Rancho Mirage, California

Earth Systems Southwest

03/15/06 | File No.: 10530-01




0 80 160 320 480 640 800 Feet

**LEGEND**

Site Boundary

N

**Figure 5**
**Conceptual Site Plan**

The Lodge at Rancho Mirage - Expansion
Frank Sinatra Drive
Rancho Mirage, California

**Earth Systems Southwest**

03/15/06 | File No.: 10530-01

## EARTH SYSTEMS SOUTHWEST
## DOUBLE RING INFILTRATION TEST DATA (ASTM D3385)

PROJECT: **The Lodge**
JOB NO: 10530-01
LOCATION: **P-1**

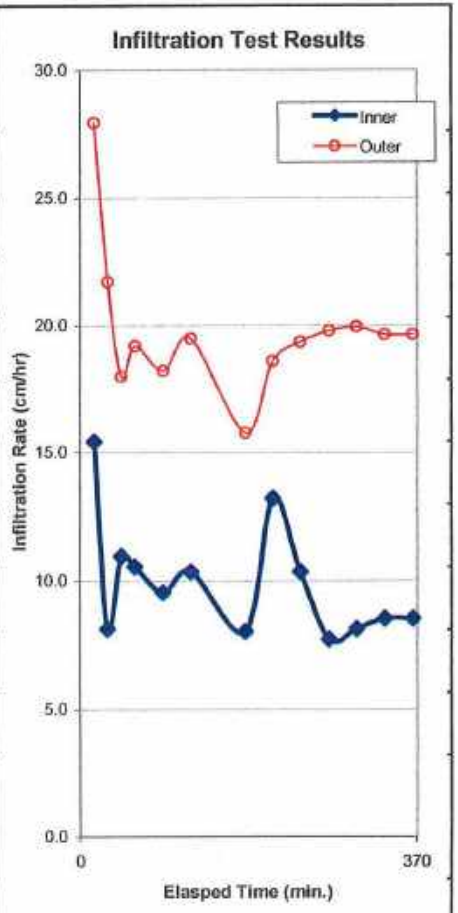
| Constants | O.D. (in.) | I.D. (in.) | Area (sq cm) | Depth of Liquid (cm) | Volume Constant (cc/cm) |
|---|---|---|---|---|---|
| Inner Ring | 12.4 | 12.0 | 730 | 15 | 740 |
| Outer Ring | 23.8 | 23.4 | 1993 | 13 | 740 |

Conversions:
1 in/hr = 2.54 cm/hr
5.89 gal/sf/day = 1 cm/hr

Infiltration Rate (cm/hr): [Flow (cc) x (60 min/hr)]/[Area (sq cm) x Incr Time (min)]

Test By: JS  Penetration of rings (cm): Inner: 13  Outer: 15

| Trial No. | | Date | Time | Elapsed Time Incr. (min) | Elapsed Time Total (min) | Flow Readings Inner Reading (cm) | Flow Readings Inner Flow (cc) | Flow Readings Outer Reading (cm) | Flow Readings Outer Flow (cc) | Liquid Temp (F) | Incr. Infiltr. Rate Inner (cm/hr) | Incr. Infiltr. Rate Outer (cm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | S | 3/1/05 | 8:55 AM | | | 45.2 | | 48.3 | | | | |
| | E | | 9:10 AM | 15 | 15 | 41.4 | 2812 | 29.5 | 13912 | | 15.4 | 27.9 |
| 2 | S | | 9:10 AM | | | 41.4 | | 48.0 | | | | |
| | E | | 9:25 AM | 15 | 30 | 39.4 | 1480 | 33.4 | 10804 | | 8.1 | 21.7 |
| 3 | S | | 9:25 AM | | | 39.4 | | 33.4 | | | | |
| | E | | 9:40 AM | 15 | 45 | 36.7 | 1998 | 21.3 | 8954 | | 11.0 | 18.0 |
| 4 | S | | 9:40 AM | | | 36.7 | | 36.6 | | | | |
| | E | | 9:55 AM | 15 | 60 | 34.1 | 1924 | 23.7 | 9546 | | 10.5 | 19.2 |
| 5 | S | | 9:56 AM | | | 34.1 | | 44.7 | | | | |
| | E | | 10:26 AM | 30 | 91 | 29.4 | 3478 | 20.2 | 18130 | | 9.5 | 18.2 |
| 6 | S | | 10:26 AM | | | 46.9 | | 48.2 | | | | |
| | E | | 10:56 AM | 30 | 121 | 41.8 | 3774 | 22.0 | 19388 | | 10.3 | 19.5 |
| 7 | S | | 10:56 AM | | | 41.8 | | 48.1 | | | | |
| | E | | 11:56 AM | 60 | 181 | 33.9 | 5846 | 5.7 | 31376 | | 8.0 | 15.7 |
| 8 | S | | 11:56 AM | | | 48.7 | | 44.9 | | | | |
| | E | | 12:26 PM | 30 | 211 | 42.2 | 4810 | 19.9 | 18500 | | 13.2 | 18.6 |
| 9 | S | | 12:26 PM | | | 42.2 | | 49.0 | | | | |
| | E | | 12:56 PM | 30 | 241 | 37.1 | 3774 | 23.0 | 19240 | | 10.3 | 19.3 |
| 10 | S | | 12:58 PM | | | 45.7 | | 49.2 | | | | |
| | E | | 1:28 PM | 30 | 273 | 41.9 | 2812 | 22.6 | 19684 | | 7.7 | 19.8 |
| 11 | S | | 1:28 PM | | | 41.9 | | 49.2 | | | | |
| | E | | 1:58 PM | 30 | 303 | 37.9 | 2960 | 22.4 | 19832 | | 8.1 | 19.9 |
| 12 | S | | 1:59 PM | | | 48.6 | | 48.2 | | | | |
| | E | | 2:29 PM | 30 | 334 | 44.6 | 2960 | 21.5 | 19758 | | 8.1 | 19.8 |
| 13 | S | | 2:30 PM | | | 44.6 | | 47.7 | | | | |
| | E | | 3:00 PM | 30 | 365 | 40.4 | 3108 | 21.3 | 19536 | | 8.5 | 19.6 |




**Stabilized Infiltration Rate:** **8.2 cm/hr** = **3.2 in/hr** = **49 gal/sf/day**

## Table 1
## Fault Parameters
### & Deterministic Estimates of Mean Peak Ground Acceleration (PGA)

| Fault Name or Seismic Zone | Distance from Site (mi) | (km) | Fault Type | | Maximum Magnitude Mmax (Mw) | Avg Slip Rate (mm/yr) | Avg Return Period (yrs) | Fault Length (km) | Mean Site PGA (g) |
|---|---|---|---|---|---|---|---|---|---|
| Reference Notes: (1) | | | (2) | (3) | (4) | (2) | (2) | (2) | (5) |
| San Andreas - Banning Branch | **7.3** | 11.7 | SS | A | **7.2** | 10 | 220 | 98 | **0.31** |
| San Andreas - Southern | **8.4** | 13.5 | SS | A | **7.7** | 24 | 220 | 199 | **0.35** |
| San Andreas - Mission Crk. Branch | **9.1** | 14.7 | SS | A | **7.2** | 25 | 220 | 95 | **0.26** |
| Burnt Mtn. | **13.1** | 21.2 | SS | B | **6.5** | 0.6 | 5000 | 21 | **0.13** |
| San Jacinto (Hot Spgs - Buck Ridge) | **14.4** | 23.2 | SS | C | **6.5** | 2 | 354 | 70 | **0.12** |
| Blue Cut | **15.2** | 24.5 | SS | C | **6.8** | 1 | 760 | 30 | **0.13** |
| Eureka Peak | **15.5** | 25.0 | SS | B | **6.4** | 0.6 | 5000 | 19 | **0.10** |
| San Jacinto-Anza | **18.6** | 29.9 | SS | A | **7.2** | 12 | 250 | 91 | **0.14** |
| Morongo | **20.1** | 32.4 | SS | C | **6.5** | 0.6 | 1170 | 23 | **0.08** |
| San Jacinto-Coyote Creek | **21.6** | 34.8 | SS | B | **6.8** | 4 | 175 | 41 | **0.09** |
| Pinto Mountain | **22.4** | 36.1 | SS | B | **7.2** | 2.5 | 499 | 74 | **0.11** |
| San Jacinto-San Jacinto Valley | **26.5** | 42.6 | SS | B | **6.9** | 12 | 83 | 43 | **0.08** |
| Landers | **27.5** | 44.2 | SS | B | **7.3** | 0.6 | 5000 | 83 | **0.10** |
| North Frontal Fault Zone (East) | **31.1** | 50.1 | RV | B | **6.7** | 0.5 | 1727 | 27 | **0.08** |
| Emerson So. - Copper Mtn. | **31.5** | 50.7 | SS | B | **7.0** | 0.6 | 5000 | 54 | **0.07** |
| Pisgah-Bullion Mtn.-Mesquite Lk | **36.3** | 58.4 | SS | B | **7.3** | 0.6 | 5000 | 89 | **0.07** |
| Johnson Valley (Northern) | **38.0** | 61.2 | SS | B | **6.7** | 0.6 | 5000 | 35 | **0.05** |
| North Frontal Fault Zone (West) | **40.3** | 64.9 | RV | B | **7.2** | 1 | 1314 | 50 | **0.08** |
| Earthquake Valley | **41.0** | 66.0 | SS | B | **6.5** | 2 | 351 | 20 | **0.04** |
| Elsinore-Julian | **41.4** | 66.6 | SS | A | **7.1** | 5 | 340 | 76 | **0.06** |
| Lenwood-Lockhart-Old Woman Sprgs | **41.8** | 67.2 | SS | B | **7.5** | 0.6 | 5000 | 145 | **0.07** |
| Elsinore-Temecula | **41.8** | 67.3 | SS | B | **6.8** | 5 | 240 | 43 | **0.05** |
| San Jacinto - Borrego | **42.0** | 67.5 | SS | B | **6.6** | 4 | 175 | 29 | **0.04** |
| Calico - Hidalgo | **42.3** | 68.1 | SS | B | **7.3** | 0.6 | 5000 | 95 | **0.06** |
| Helendale - S. Lockhardt | **47.9** | 77.1 | SS | B | **7.3** | 0.6 | 5000 | 97 | **0.05** |
| San Jacinto-San Bernardino | **47.9** | 77.1 | SS | B | **6.7** | 12 | 100 | 36 | **0.04** |
| Elsinore-Glen Ivy | **51.9** | 83.5 | SS | B | **6.8** | 5 | 340 | 36 | **0.04** |
| Brawley Seismic Zone | **52.0** | 83.7 | SS | B | **6.4** | 25 | 24 | 42 | **0.03** |
| Elsinore-Coyote Mountain | **55.6** | 89.5 | SS | B | **6.8** | 4 | 625 | 39 | **0.03** |
| Cleghorn | **55.7** | 89.6 | SS | B | **6.5** | 3 | 216 | 25 | **0.03** |
| Elmore Ranch | **60.1** | 96.8 | SS | B | **6.6** | 1 | 225 | 29 | **0.03** |
| Superstition Mtn. (San Jacinto) | **61.7** | 99.3 | SS | B | **6.6** | 5 | 500 | 24 | **0.03** |

Notes:

1. Jennings (1994) and California Geologic Survey (CGS) (2003)
2. CGS (2003), SS = Strike-Slip, RV = Reverse, DS = Dip Slip (normal), BT = Blind Thrust
3. 2001 CBC, where Type A faults: Mmax > 7 & slip rate >5 mm/yr & Type C faults: Mmax <6.5 & slip rate < 2 mm/yr
4. CGS (2003)
5. The estimates of the mean Site PGA are based on the following attenuation relationships:
   Average of: (1) 1997 Boore, Joyner & Fumal; (2) 1997 Sadigh et al; (3) 1997 Campbell , (4) 1997 Abrahamson & Silva
   (mean plus sigma values are about 1.5 to 1.6 times higher)
   Based on Site Coordinates: 33.767 N Latitude, 116.457 W Longtude and Site Soil Type B

# **Appendix I**
Phase I ESA



# ENVIRONMENTAL
## ASSESSMENT

**Ladder Capital Finance LLC**
345 Park Avenue, 8th Floor
New York, New York 10154
**Matt Jacobs**



## PHASE I ENVIRONMENTAL SITE ASSESSMENT
## of
## The Ritz-Carlton Rancho Mirage
68-900 Frank Sinatra Drive
Rancho Mirage, California 92270

---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**LaNeicia Stone**
Senior Environmental Technical Advisor
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**EMG Project #:** 100132.11R - 001.135
**Date of Report:** January 10, 2012
**On Site Date:** November 28, 2011



EMG
DECISION INTELLIGENCE
25th ANNIVERSARY

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# PROJECT SUMMARY TABLE

| Report Section | Acceptable | Routine Solution | Phase II | REC | Estimated Cost |
|---|---|---|---|---|---|
| **Historical Review** | Yes | | | | |
| **Operational Activities** | Yes | | | No | N/A (1) |
| **Hazardous Materials / Petroleum Products** | Yes | | | | |
| **Wastes** | Yes | | | | |
| **Polychlorinated Biphenyls (PCBs)** | Yes | | | | |
| **Asbestos-Containing Materials (ACM)** | No | Yes (2) | | No | $495 for O&M (2) |
| **Radon Gas** | Yes | | | | |
| **Lead-Based Paint (LBP)** | Yes | | | | |
| **Lead in Drinking Water** | Yes | | | | |
| **Storage Tanks / Pipelines** | Yes | | | | |
| **Surface Areas** | Yes | | | | |
| **Mold** | No | | Yes (3) | No | N/A (3) |
| **Vapor Encroachment** | Yes | | | | |
| **Regulatory Review** | Yes | | | | |
| **Adjacent Properties** | Yes | | | | |

*Conditions noted in the Project Summary Table are representative of the overall conditions of the property. There may be more detail on specific assessment components in the report text, therefore the Project Summary Table should not be used as a stand alone document. Costs depicted are for investigation/program development activities. Remediation costs, if required, will be identified as a result of the activities.*

## Footnotes:

(1) An inactive dry cleaning machine is located in the commercial laundry at the Project. The dry cleaning machine is identified as an Aero-Tech Green Jet Dry-Wetcleaning Machine, Model #DWC-45. The dry cleaning machine uses DWX-44 Dry-Cleaning Solution, a water-based, non-toxic solution, instead of perchloroethylene (PCE). Currently available information indicates the use of DWX-44 Dry-Cleaning Solution is highly unlikely to impact the Project when properly used. DWX-44 Dry-Cleaning Solution does not contain chlorinated hydrocarbons (such as PCE) and wastes generated in the process would not be classified as hazardous. Material Safety Data Sheet (MSDS) information for DWX-44 confirms that this substance contains no ingredients identified as Hazardous Substances according to SARA Hazard Title III, Section 313 - CFR-355. The existing dry cleaning machine is associated with the ongoing renovation, is new equipment which has never been used, and appeared to be empty at the time of EMG's site visit. In addition, the laundry facility is underlain by two levels of parking garage and the concrete floor beneath the unit is not underlain by the earth. No information was identified to confirm whether dry cleaning was previously conducted on-site between 1988 and the time of closure in 2006. Based on the historical use as a full-service Ritz Carlton, it is somewhat likely that a dry cleaning plant, which possibly operated an older PCE machine, was formerly located on-site. By its chemical nature, PCE has the potential to penetrate through concrete and impact subsurface conditions. However, any such dry cleaning facility would have operated since the promulgation of RCRA in 1986, the legislation that regulates the handling and disposal of hazardous materials and wastes. As such, waste handling and disposal practices would have been regulated since the facility's inception. Furthermore, because the laundry is underlain by two levels of parking garage (as previously noted) and not the earth, it is unlikely that subsurface conditions would have been impacted as a result of any historical dry cleaning plant operations in this area. Therefore, no further action or assessment is recommended regarding the inactive dry cleaning machine or potential former on-site dry cleaning operations at this time.

(2) Presumed ACM identified as part of the assessment were not sampled. The wallboard/joint compound in the Main Hotel Building (which was constructed in 1988) suffered widespread water damage as the result of a roof leak, is undergoing removal/replacement, and is in poor condition. A Water Damage Remediation Report for the Project was prepared by ET&T in June 2011. A comprehensive asbestos survey was not conducted as part of ET&T's scope of work. However, ET&T conducted limited asbestos sampling as part of its own Job Hazard Analysis. Two samples each were collected from drywall material, surface dust and fire proofing materials. EMG was also provided with a copy of the laboratory report for this asbestos sampling conducted at the Project, prepared by Micron Environmental Labs and dated July 19, 2011. This report states that the samples, collected on May 26, 2011, were submitted to their laboratory for asbestos analysis on May 27, 2011. The materials sampled and analyzed included fireproofing, drywall/ceiling, joint compound/ceiling, drywall/wall and joint compound/wall. All of the samples were negative for asbestos.

The remaining materials are in good condition and can be maintained in place, if an Operations and Maintenance (O&M) Program is developed and implemented. A properly designed O&M Program is sufficient to maintain the Project in accordance with current regulatory standards.

(3) Suspect mold and evidence of water damage were observed throughout the Main Hotel Building. It should be noted that according to the POC, a mold survey and remediation recommendations were previously prepared for the Project. Furthermore, identified areas of concern were observed to have been marked with paint and were undergoing removal at the time of EMG's site visit. Additional information about the source of the moisture and cost to correct the issue is included in EMG's Property Condition Assessment (PCA) report (EMG Project Number 100132.11R-001.042).

# 1 CERTIFICATION

EMG has completed a Phase I Environmental Site Assessment of The Ritz-Carlton Rancho Mirage (the "Project"), located at 68-900 Frank Sinatra Drive in Rancho Mirage, California 92270. The assessment was performed at the Client's request, using the methods and procedures consistent with good commercial and customary practice designed to conform with acceptable industry standards.

The independent conclusions represent our professional judgment based on information and data available to us during the course of this assignment. Factual information regarding operations, conditions, and test data provided by the Client, or their representative, has been assumed to be correct and complete. The conclusions presented are based on the data provided, observations, and conditions that existed on the date of the on-site visit.

In expressing the opinions stated in this report, EMG has exercised the degree of skill and care ordinarily exercised by a reasonable prudent environmental professional in the same community and in the same time-frame, given the same or similar facts and circumstances. Documentation and data provided by the Client, designated representatives of the Client, or other interested third parties, or from the public domain, and referred to in the preparation of this assessment, have been used and referenced with the understanding that EMG assumes no responsibility or liability for their accuracy.

If you have any questions regarding this report, please contact the Senior Environmental Consultant listed on the Cover Page of this Report.

**Surveyed By:** Tina French, Project Manager

**Written By:** Tina French, Project Manager

**Reviewed By:** Sarah C. Sweeney *On Behalf Of LaNeicia Stone - Senior Environmental Technical Advisor*

Sarah Sweeney
Technical Report Reviewer

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the Project. I have developed and performed the all appropriate inquiries in conformance with the standard and practices set forth in 40 CFR Part 312.

LaNeicia A. Stone

LaNeicia A. Stone - Senior Environmental Technical Advisor

## 1.1 RELIANCE

This report has been prepared to assist in the determination of whether to make a loan or loans evidenced by a note or notes (the "Notes") secured by the property referred to in the report or by a pledge of the equity interests in the borrower. With no prior approval, this report may be relied upon by (i) Ladder Capital Finance LLC, its employees, agents, servicers, legal counsel, successors and/or assigns and affiliates, (ii) the trustee of the trust created in connection with a securitization which includes any of the Notes of an interest therein, (iii) any purchaser or assignee of the Notes or an interest therein in determining whether to acquire the Notes or an interest therein, (iv) any rating agency involved in rating securities which represent a beneficial ownership interest in a trust fund that consists of mortgage loans or mezzanine loans including any of the Notes or an interest therein, (v) any investors purchasing securities issued by a trust or otherwise purchasing a loan with an ownership interest, either directly or indirectly, in the Notes, and (vi) any bank, financial institution or other company or firm providing any financing for which the Notes, or any interest therein, are the collateral for such financing, and their respective successors and/or assigns. This report may be used in connection with the offering materials for sale of the Notes, or an interest in the Notes, and in presentations to any rating agency, investors or lenders and EMG agrees to cooperate in answering questions by any of the above parties in connection with a securitization, sale or other transaction involving the Notes, or any portion thereof, and/or such securities. EXCEPT AS DESCRIBED ABOVE, NO OTHER PERSON OR ENTITY MAY RELY ON THE REPORT WITHOUT THE PRIOR WRITTEN CONSENT OF EMG, AND NO OTHER THIRD PARTY BENEFICIARIES ARE INTENDED. ANY UNAUTHORIZED REUSE OR REDISTRIBUTION OF CONSULTANT'S WORK PRODUCTS OR REPORTS SHALL RESULT IN NO ADDITIONAL LIABILITY OF EMG.

This report is not for the use or benefit of, nor may it be relied upon by any other person or entity, for any purpose without the advance written consent of EMG.

# 2.0 EXECUTIVE SUMMARY

EMG performed a Phase I Environmental Site Assessment, that included on-site observations of the accessible areas of The Ritz-Carlton Rancho Mirage (the "Project"), on November 28, 2011. The Project is located at 68-900 Frank Sinatra Drive in Rancho Mirage, California 92270, and consists of approximately 40.40 acres.

The Project, originally constructed in phases between 1988 and 2007 and currently undergoing additional construction, is a full-service hospitality property. No environmentally significant operations are currently conducted at the Project. Prior to the current use, the Project was undeveloped land (dating back to at least 1944). Properties in the general vicinity of the Project include undeveloped land as well as residential land uses.

The following statements summarize the independent conclusions representing EMG's best professional judgment based on information and data available to us during the course of this assignment. Factual information regarding operations, conditions, and test data provided by the Client, owner, or their representatives, has been assumed to be correct and complete. Additionally, the conclusions presented are based on the conditions that existed at the time of the assessment.

The assessment was conducted utilizing generally accepted Phase I industry standards, using the American Society for Testing and Materials (ASTM) Practice E 1527-05 and the Ladder Capital Scope of Work.

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-05 of 68-900 Frank Sinatra Drive in Rancho Mirage, Riverside County, California 92270. Any exceptions to, or deletions from, this practice are described in Section 3 of this report. This assessment has revealed no evidence of Recognized Environmental Conditions (RECs) or Historic Recognized Environmental Conditions (HRECs) in connection with the Project.

However, the following on-site environmental items of note were identified:

**Operational Activities (Section 7.1)**

- Review of the operational activities at the Project identified an inactive dry cleaning machine in the commercial laundry facility. Refer to the Operational Activities heading in Section 2.1 for further discussion.

**Asbestos-Containing Materials (Section 7.5)**

- Suspect ACM was identified. Refer to the **Asbestos-Containing Materials** heading in Section 2.1 for further discussion.

**Mold (Section 7.11)**

- Suspect mold and water damage were observed at the Project. Refer to the **Mold** heading in Section 2.1 for further discussion.

## 2.1 Findings and Conclusions

**Historical Review**

The review of the historical data available for the Project and surrounding area revealed no evidence that may have led to an environmental impact to the Project. No further action or investigation is recommended regarding historical uses.

**Operational Activities**

An inactive dry cleaning machine is located in the commercial laundry at the Project. The dry cleaning machine is identified as an Aero-Tech Green Jet Dry-Wetcleaning Machine, Model #DWC-45. The dry cleaning machine uses DWX-44 Dry-Cleaning Solution, a water-based, non-toxic solution, instead of perchloroethylene (PCE). Currently available information indicates the use of DWX-44 Dry-Cleaning Solution is highly unlikely to impact the Project when properly used. DWX-44 Dry-Cleaning Solution does not contain chlorinated hydrocarbons (such as PCE) and wastes generated in the process would not be classified as hazardous. Material Safety Data Sheet (MSDS) information for DWX-44 confirms that this substance contains no ingredients identified as Hazardous Substances according to SARA Hazard Title III, Section 313 - CFR-355. The existing dry cleaning machine is associated with the ongoing renovation, is new equipment which has never been used, and appeared to be empty at the time of EMG's site visit. Based on the above information, the presence of this equipment is not anticipated to have adversely impacted the environmental integrity of the Project and no further action or investigation regarding the dry cleaning machine is recommended.

No information was identified to confirm whether dry cleaning was previously conducted on-site between 1988 and the time of hotel closure in 2006. Based on the historical use as a full-service Ritz Carlton, the potential exists for a dry cleaning plant, which possibly operated an older PCE machine, to have been located on-site. By its chemical nature, PCE has the potential to penetrate through concrete and impact subsurface conditions. However, any such dry cleaning facility would have operated since the promulgation of RCRA in 1986, the legislation that regulates the handling and disposal of hazardous materials and wastes. As such, waste handling and disposal practices would have been regulated since the facility's inception. In addition, the Project is connected to the municipal sewer system. Furthermore, because the laundry is underlain by two levels of parking garage and not the earth, it is unlikely that subsurface conditions would have been impacted as a result of any historical dry cleaning plant operations in this area. Therefore, no further action or assessment is recommended regarding potential former on-site dry cleaning operations at this time.

**Hazardous Materials / Petroleum Products**

The Project is involved in the use of hazardous materials and petroleum products in the form of construction supplies (i.e. adhesives, sealants, etc), diesel fuel, and cooling system water treatment chemicals. The identified materials appear to be properly stored. The materials observed do not appear to pose a hazard to the Project, provided they continue to be used as designed, are properly handled, and all regulations regarding their use are followed. To note, the existing dry cleaning machine is associated with the ongoing renovation, is new equipment which has never been used, and appeared to be empty at the time of EMG's site visit. No further action or investigation is recommended regarding the use of the identified materials.

**Wastes**

The Project generates non-hazardous solid and liquid wastes. These materials appear to be stored and disposed of properly. The existing dry cleaning machine is associated with the ongoing renovation, is new equipment which has never been used, and appeared to be empty at the time of EMG's site visit. No associated wastes were observed. No further action or investigation is recommended regarding the identified materials.

**Polychlorinated Biphenyls (PCBs)**

EMG identified utility-owned electrical transformer equipment at the Project. This equipment appeared to be in good condition with no evidence of leaks. The transformers are designated as the property of the public utility and are classified as "Non-PCB". The utility is the financially responsible party for maintenance of this equipment. No further action or investigation is recommended regarding the transformer equipment.

The Project contains hydraulic elevator equipment. No indication of leakage was observed in the area of this equipment. This equipment should be periodically inspected for leakage. If leakage is identified, the unit should

be repaired, and any fluid or fluid-soaked waste disposed of in accordance with applicable federal, state, and local regulations. No further action or investigation is recommended regarding this equipment.

The Project contains hydraulic trash compactor and cardboard baler equipment. No indication of leakage was observed in the area of this equipment. This equipment should be periodically inspected for leakage. If leakage is identified, the unit should be repaired and any fluid or fluid-soaked waste disposed of in accordance with applicable federal, state, and local regulations. No further action or investigation is recommended regarding this equipment.

**Asbestos-Containing Materials (ACM)**

Presumed ACM identified as part of the assessment were not sampled. The wallboard/joint compound in the Main Hotel Building (which was constructed in 1988) suffered widespread water damage as the result of a roof leak, is undergoing removal/replacement, and is in poor condition. A Water Damage Remediation Report for the Project was prepared by ET&T in June 2011. A comprehensive asbestos survey was not conducted as part of ET&T's scope of work. However, ET&T conducted limited asbestos sampling as part of its own Job Hazard Analysis. Two samples each were collected from drywall material, surface dust and fire proofing materials. EMG was also provided with a copy of the laboratory report for this asbestos sampling conducted at the Project, prepared by Micron Environmental Labs and dated July 19, 2011. This report states that the samples, collected on May 26, 2011, were submitted to their laboratory for asbestos analysis on May 27, 2011. The materials sampled and analyzed included fireproofing, drywall/ceiling, joint compound/ceiling, drywall/wall and joint compound/wall. All of the samples were negative for asbestos.

The remaining materials are in good condition and can be maintained in place, if an Operations and Maintenance (O&M) Program is developed and implemented. A properly designed O&M Program is sufficient to maintain the Project in accordance with current regulatory standards.

**Radon Gas**

Review of the USEPA's Radon Map, indicated that the Project is located in Zone 2, areas with a predicted average indoor radon screening level between 2 and 4 pCi/L (picoCuries per liter of air). In addition, based on the type of construction, the presence of commercial HVAC systems, and the non-residential use of the Project, there is reduced potential for the build-up of radon gas at the Project. No further action or investigation is recommended with regard to radon gas levels at the Project.

**Lead-Based Paint (LBP)**

Considering the dates of construction (1988-2007 and ongoing), LBP is unlikely to have been used at the Project. No further action or investigation is recommended regarding LBP at the Project.

**Lead in Drinking Water**

Based on information from the water utility company, the water at the Project is not expected to contain elevated levels of lead. No further action or investigation is recommended regarding lead in drinking water at the Project.

**Storage Tanks / Pipelines**

No evidence of underground storage tanks or pipelines was identified. However, one aboveground storage tank (AST) is located at the Project. Review of available information indicates that the AST is used for storage of diesel fuel for the backup generator installation. There was no visual indication of releases from the AST. The AST appears to be operated in accordance with current regulatory requirements and is not anticipated to adversely impact the Project. No further action or investigation is recommended regarding the AST.

### Surface Areas

No issues associated with surface areas were identified. No further action or investigation is recommended regarding surface areas at the Project.

Visual observation of the storm water system did not identify any abnormal accumulation of petroleum run-off or foreign material. No unusual blockages of the storm water control system were observed. No unusual ponding of storm waters was observed. No further action or investigation is recommended regarding storm water systems at the Project.

### Mold

EMG performed a limited visual and olfactory assessment for the presence of mold, conditions conducive to mold, and evidence of moisture in readily accessible interior areas of the Project. Suspect mold and evidence of water damage was observed in the following areas:

- Guest room closets in wing B of the Main Hotel Building. The area affected by the suspect mold was approximately 200 square feet in size.
- Widespread evidence of prior moisture intrusion at drywall and masonry surfaces throughout the Main Hotel Building. Most areas have been marked and drywall has been removed.

It should be noted that according to the POC, a mold survey and remediation recommendations were previously prepared for the Project. Furthermore, identified areas of concern were observed to have been marked with paint and were undergoing removal at the time of EMG's site visit. Additional information about the source of the moisture and costs to correct the issues are included in EMG's Property Condition Assessment (PCA) report (EMG Project Number 100132.11R-001.042).

### Vapor Encroachment

No potential vapor encroachment issues were identified. No further action or assessment is recommended regarding potential vapor issues.

### Regulatory Review

Based on review of the regulatory database report, the Project is listed on the CHMIRS and RCRA-SQG databases. Information contained in the CHMIRS database indicates that the California Office of Emergency Services (OES) was notified of a release at the Project on November 10, 2003 (Incident #03-5821). Based on review of the information provided, the Riverside County Fire Department responded to a solo vehicle accident on the road in front of the Project that resulted in the release of approximately one gallon of diesel fuel from a truck's saddle tank. Based on the small-scale nature of the incident, the time passed, and the fact that emergency responders were alerted to and handled the release, the CHMIRS listing does not constitute a Recognized Environmental Condition (REC). Information in the RCRA-Generators database indicates that the Project was identified as a Small Quantity Generator of hazardous wastes in 1992; likely related to wastes generated from construction/renovation. The database indicates that there are no violations associated with the RCRA-Generator listing. The RCRA-Generator database is a listing of facilities that are required to register for tracking purposes due to the amount of hazardous waste generated and are not necessarily sites with reported contamination incidents. Based on the above information, no further action or investigation is recommended regarding the on-site regulatory review.

In addition, there are no off-site facilities anticipated to have negatively impacted the environmental integrity of the Project. No further action or investigation is recommended regarding the off-site regulatory review.

**Adjacent Properties**

EMG identified no current adjacent property uses that are anticipated to have a negative impact on the environmental integrity of the Project. No further action or investigation is recommended regarding the adjacent properties.

## 2.2 Recommendations

The development and implementation of an Asbestos O&M Program. Costs indicated are for O&M Program Document development only. Comprehensive survey costs, if required, will be identified as a result of O&M Program implementation.

- **Associated cost estimate to develop the O&M Program only:** $495

According to the POC, a mold survey and remediation recommendations were previously prepared for the Project. Furthermore, identified areas of concern were observed to have been marked with paint and were undergoing removal at the time of EMG's site visit. Additional information about the source of the moisture and costs to correct the issues are included in EMG's Property Condition Assessment (PCA) report (EMG Project Number 100132.11R-001.042).

# 3 SURVEY APPROACH/PURPOSE

EMG conducted a Phase I Environmental Site Assessment of the Project that consisted of a walk-through observation of the accessible areas and interviews with facility personnel and local agency representatives.

The user informed EMG that the reason for the assessment is for financing purposes.

On-site activities and/or interviews were conducted by Tina French, EMG Project Manager, with:

- Jake Cormier, Director of Engineering, On-site Point of Contact (POC) and Property Manager

A completed copy of the Key Site Manager Questionnaire had not been returned to EMG as of the time this assessment was prepared.

Areas accessed included:
- Approximately 10% of the hotel guest rooms (Unit #s B120; B131; B201; B204; B205; B302; B303; B304; B305; B315; B332; A360; A354; C382; C383; C389; C273; C284; Spa Suite 103; Spa Suite 101; Spa Suite 203; Spa Suite 201; Spa Suite 305; and Spa Suite 307)
- All common areas
- The roofs
- The Project boundaries
- Pipe chases in the mechanical room

Specific areas to which access was limited include the following:
- Behind walls

According to the POC, the areas not assessed were similar in construction and conditions to the areas assessed. The POC also stated that he is unaware of any practices in the unaccessed areas (such as the improper handling of hazardous materials or the generation of hazardous, medical, or regulated wastes) that would constitute a material threat or release to the environment, or a hazard to human health. Based on a review of tenant activities and interviews with knowledgeable personnel, it is unlikely that the operations in the unaccessed areas have had an adverse impact on the environmental integrity of the Project.

Weather conditions at the time of the Project assessment were partly cloudy, with temperatures in the 70s (F) and light winds.

EMG reviewed available federal, state, and local records in an effort to identify sites of known or suspected hazardous waste activity located at or near the Project that could have an adverse impact on the Project. In an attempt to determine whether historical uses of the Project and the surrounding area have had an environmental impact on the Project, EMG interviewed individuals knowledgeable about the Project and reviewed available pertinent records and documents. This assessment is based on the evaluation of the information gathered, laboratory analyses of samples collected (when required), and accessibility at the time of the assessment.

The purpose of this report is to provide the Client an assessment concerning environmental conditions (limited to those issues identified in the report), as they existed at the Project. The assessment was conducted utilizing generally accepted Phase I industry standards, set forth in the American Society for Testing and Materials (ASTM) Standard Practice E 1527-05 and the Ladder Capital Scope of Work. The Scope of Work included an evaluation of:

- The Project history in an attempt to identify any possible ownership(s) and/or uses that would suggest an impact to the environmental integrity of the Project, as identified through review of reasonably ascertainable standard historical sources.

- The physical characteristics of the Project, as identified through review of reasonably ascertainable topographic data.

- Current Project conditions (as applicable), including compliance with appropriate regulations, as they pertain to the presence or absence of: facility storage tanks, drums, containers (above or below ground), etc., transformers and other electrical equipment which utilize fluid which may potentially contain PCBs, the use of hazardous materials/chemicals and petroleum products, and/or the generation, treatment, storage, or disposal of hazardous, regulated, or medical wastes.

- An evaluation of information contained in programs such as the NPL, CERCLIS, SHWS, RCRIS, SWF, LUST, and other governmental information systems within specific search distances of the Project. This evaluation was performed to identify sites that would have the potential to impact the environmental integrity of the Project. The regulatory agency report provided is based on an evaluation of the data collected and compiled by a contracted data research company. The report is based on a radius search that focuses on both the Project and neighboring sites that might impact the Project. Neighboring sites listed in governmental environmental records are identified within a specific search distance. The search distance varies depending upon the particular government record being checked. The search is designed to meet the requirements of ASTM Standard E 1527-05. The information provided is assumed to be correct and complete.

- Visual observation of the adjacent properties to identify high-risk neighbors and the potential for known or suspected contamination to migrate onto the Project.

In addition, at the Client's request, the assessment included a screening approach for the potential existence of:

- The physical characteristics of the Project, as identified through review of reasonably ascertainable topographic, wetlands, flood plain, soils, geology, and groundwater data.

- Mold, including the visual and olfactory identification of mold growth, conditions conducive for mold growth, and evidence of moisture in accessible areas of the Project. In addition, EMG interviewed Project personnel regarding any known or suspected mold contamination, water intrusion, or mildew like odor problems. Sampling was not performed as a part of this assessment. EMG notes that this assessment does not constitute a comprehensive mold survey of the Project, and the conclusions made are based solely on observable conditions in readily accessible interior areas of the Project on the assessment date.

- Asbestos, including the identification of all suspect materials in accessible areas (interior and exterior). These materials are considered suspect, until tested and proven otherwise. Friable materials are those that can be easily crumbled or pulverized by hand pressure.

  This screening approach is not a comprehensive (i.e., AHERA-Style) asbestos survey, nor is it intended to fulfill the NESHAP requirements for demolition/renovation purposes, but it is intended to identify the potential for an asbestos hazard in accessible areas. This screening is not intended to be used for demolition, abatement, renovation, or repair work.

  The basis for "suspect" determination is taken from the materials listed in Appendix G of the United States Environmental Protection Agency (USEPA) publication *Managing Asbestos in Plac*e (the "Green Book"). Therefore, all materials listed in the Green Book are considered suspect regardless of installation date. Unless presented with satisfactory documentation in the form of comprehensive asbestos survey demonstrating that no ACM is present or an asbestos abatement report showing that all identified ACM has been abated in compliance with environmental laws, buildings constructed prior to 1989 are presumed to contain ACM.

- Radon gas propensity, through the review of the USEPA's Map of Radon Zones for all properties.

- Lead-based paint for all properties constructed prior to 1978. The basis for this determination is taken from the Lead Paint Poisoning Act passed by the Congress of the United States that banned the use of lead paint starting January 1, 1978. Therefore, all paint applied prior to 1978 is considered suspect.

- Lead in water, based on information provided by the municipal water provider.

## 3.1 DATA GAPS

Data gaps in information exist and are addressed in the appropriate sections of this report. However, because the data gaps were not determined to be material in identifying Recognized Environmental Conditions (RECs), they are not considered by ASTM standards to be *significant* and, therefore, are not individually addressed in this section.

# 4 USER PROVIDED INFORMATION

This Section documents whether the user reported to EMG information pursuant to the responsibilities described in Section 6 of the ASTM Standard E 1527-05.

EMG submitted a User Questionnaire to the user to assist the user and EMG in gathering information from the user that may be material to identifying RECs. A copy of the User Questionnaire is appended (Section 11).

## Litigation

**Question:** *Are you aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the property?*

**Response:** The user indicated that he/she is not aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the property.

## Administrative Proceedings

**Question:** *Are you aware of any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on or from the property?*

**Response:** The user indicated that he/she is not aware of any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on or from the property.

## Notices From Governmental Entities

**Question:** *Are you aware of any notices from any governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products?*

**Response:** The user indicated that he/she is not aware of any notices regarding possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

## Environmental Cleanup Liens

**Question:** *Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law?*

**Response:** The user indicated that he/she is not aware of any environmental cleanup liens against the property.

## Activity and Use Limitations

**Question:** *Are you aware of any Activity and Use Limitations, such as engineering controls, land use restrictions or institutional controls, that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law?*

**Response:** The user did not provide a response to this question or responded "Unknown/No Response". The lack of, or inability to obtain, this information represents a data gap. However, based on the findings of this report, the absence of this information is not considered a *significant* data gap.

## Specialized Knowledge

**Question:** *As the user of this ESA, do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or of an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?*

**Response:** The user indicated that he/she does not have any specialized knowledge or experience related to the property or nearby properties.

## Relationship of Purchase Price

**Question:** *Does the purchase price being paid for this property reasonably reflect the fair market value of the property? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property?*

**Response:** The user did not provide a response to this question or responded "Unknown/No Response". The lack of, or inability to obtain, this information represents a data gap. However, based on the findings of this report, the absence of this information is not considered a *significant* data gap.

## Commonly Known Information

**Question:** *Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example, as user:*

- *Do you know the past uses of the property?*
- *Do you know of specific chemicals that are present, or once were present, at the property?*
- *Do you know of spills or other chemical releases that have taken place at the property?*
- *Do you know of any environmental cleanups that have taken place at the property?*

**Response:** The user provided the following information regarding commonly known or reasonably ascertainable information:

- The User indicated that they are aware of past uses of the Property. Specifically, that User indicated that the Project was an operating hotel resort prior to closure in 2006.
- The User indicated that they are aware of specific chemicals that are present or once were present at the Project. Specifically, the User indicated that the HVAC systems (chillers) require the use of chemicals which are biodegradable and environmentally friendly. The User indicated that there are currently no combustible materials stored on site.

## Obvious Indicators of Contamination

**Question:** *As the user of this ESA, based on your knowledge and experience related to the property, are there any obvious indicators that point to the presence or likely presence of contamination at the property?*

**Response:** The user indicated that he/she is not aware of any obvious indicators that point to the presence or likely presence of contamination at the Project.

## Environmental Lien and AUL Review

The user did not engage EMG to review title and judicial records for environmental liens or Activity and Use Limitations (AULs) recorded against the Project. Furthermore, these documents were not provided to EMG for review. The lack of or inability to obtain this information represents a data gap. However, based on the findings of this report, the absence of this information is not considered a *significant* data gap.

# 5 PROJECT LOCATION/DESCRIPTION

The Project is located at 68-900 Frank Sinatra Drive in Rancho Mirage, Riverside County, California 92270. The Project lands consist of approximately 40.40 acres.

## 5.1 Project Description

The Project is currently a full-service hospitality property and contains 261 guest rooms. The Project was constructed in phases between 1988 and 2007, and is currently undergoing additional construction. The Project improvements include three two and three-story buildings containing a total of 455,009 square feet, landscaping, and surface-level asphalt paved parking/drive areas. The Main Hotel Building (previously known as the Lodge at Rancho Mirage) was built in 1988, and closed in 2006 for the renovation and conversion into the proposed Ritz-Carlton. The renovation encompasses 100% of the existing 371,873 square foot building with 37,873 additional square feet of space for a total of 409,746 square feet. The Residential Suite Building (23,147 square feet) and the Spa Services Building (22,116 square feet) were under construction at the time of EMG's site visit. On-site amenities consist of four swimming pools, two spa pools, a luxury spa facility, a fitness center, a business center, two restaurants, two bar/lounges, meeting rooms, ballrooms, two retail shops, and guest laundry facilities.

The Project is serviced by public water and sanitary sewer systems. The Project is supplied with water from the Coachella Valley Water District. Domestic hot water for the common areas and guest rooms is generated by six rooftop, natural gas-fired boilers.

HVAC systems observed consisted of the following:

- Heat and air-conditioning are supplied to the Project from a central plant with recirculating heated and chilled water system. Hot water for the central heating system is supplied by natural gas-fired hot water boilers located on the roof of the main hotel and the spa building. Chilled water for the central cooling system at the Main Hotel Building is supplied by three water-cooled chillers located at grade in an exterior enclosure. The chillers are cooled by a two-cell stainless steel cooling tower. The chilled water for the central cooling system at the Spa and Spa Suites Buildings is supplied by two water-cooled chillers located at an interior mechanical room in the spa building. The chillers are cooled by two roof mounted stainless steel cooling towers.

- Circulating pumps provide hot and chilled water to each temperature-controlled space by a four-pipe distribution system. The hot and chilled water supplies the fan coil units and the air handling units located in the ceiling plenum spaces and on the roof of the buildings.

- Heated and cooled air in each guest room are provided by fan coil units located in mechanical closets. The fan coil units are supplied with hot and chilled water by the central system. Air distribution is provided to supply air registers by ducts concealed above the ceilings. Return air grilles are located adjacent to the fan coil units.

- The stair wells, bathrooms, and other areas are ventilated by large capacity ventilation fans mounted on the roof and connected by ducts to each ventilated space.

Based on an interview with Mr. Cormier, (POC), there have been no air-quality complaints, odors, or any other problems reports that are typically associated with Chinese drywall. Furthermore, no visual evidence of common indications of Chinese drywall such as black discoloration of metallic surfaces, or olfactory evidence such as sulfur-like (rotten egg) odors, were noted at the Project during EMG's site visit. As such, Chinese drywall is not likely to have been installed at the Project.

## 5.2 Miscellaneous Systems

- **Emergency Generator** - One emergency generator is located at the Project. Diesel fuel is stored in an aboveground tank. See Section 7.9 for a further discussion of the aboveground tank associated with the emergency generator.
- **Hydraulic Elevators** - Thirteen hydraulic elevators are located at the Project. See Section 7.4 for a further discussion.
- **Hydraulic Trash Compactor** - One hydraulic trash compactor is located at the Project. See Section 7.4 for a further discussion.
- **Hydraulic Cardboard Baler** - One hydraulic cardboard baler is located at the Project. See Section 7.4 for a further discussion.
- **Grease Traps and Interceptor** - Two grease traps and one sand-oil interceptor are located at the Project. See Section 7.3 for a further discussion.
- **Dry Cleaning Equipment** - Dry cleaning equipment is located at the Project. See Sections 7.1, 7.2 and 7.3 for a further discussion.

## 5.3 Environmental Setting

### 5.3.1 Topography

Review of the Cathedral City, California Topographic Quadrangle, published by the United States Geological Survey (USGS) and dated 1958 (photorevised in 1981), indicated the following:

- The Project has an average elevation of approximately 600 feet above mean sea level. Elevations range from approximately 660 feet in the southwestern portions of the Project to approximately 500 feet in the northeastern portion of the Project. The slope of the Project is estimated between 5 and 15 percent in a northeasterly direction.
- Slope in the general area of the Project trends to the northeast, towards the Whitewater River. The nearest surface water feature, an unidentified intermittent drainage, is located approximately 250 feet southeast of the Project and drains to the northeast.
- The Project is shown as unimproved land with a road crossing through the Project from north to south.

A copy of the topographic map is included in Appendix C.

### 5.3.2 Wetlands

Review of National Wetlands Inventory (NWI) data provided by the United States Fish and Wildlife Service, indicated the following:

- No wetland areas are indicated at the Project or adjacent properties.

A copy of the wetland map is included in Appendix C.

### 5.3.3 Floodplain

Review of the Flood Insurance Rate Map (Community/Panel No. 06065C1589G), published by the Federal Emergency Management Agency (FEMA) and dated August 28, 2008 indicated the following:

- The Project is located in Zone X (unshaded), areas of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level.

A copy of the flood zone map is included in Appendix C.

### 5.3.4 Soils/Geology

Review of the United States Natural Resources Conservation Service's Web Soil Survey website indicated the following:

- The Project is located in an area comprised of two soil types known as Rock Outcrop and Rock Outcrop-Lithic Torripsamments complex.
- Rock Outcrop is described as unweathered bedrock with estimated slopes between 15 and 75 percent. Depth to lithic bedrock is "zero". Capacity to transmit water is low to very high.
- Lithic Torripsamments are described as somewhat excessively drained, with depths of four inches. General characteristics of the Lithic Torripsamments include a moderately high to very high capacity to transmit water. Depth to the seasonal high water table is greater than 80 inches. The Lithic Torripsamments occur on mountain flanks and are derived from residuum weathered from metasedimentary rock.

Review of the Ground Water Atlas of the United States - Segment I, published by the US Geological Survey and dated 1995, indicated the following:

- The Project is located in the Coachella Valley Basin of the Basin & Range Physiographic Providence. The Basin & Range physiographic province of southwestern California. The Basin & Range province is characterized by elongated mountain ranges trending northwest to southeast and separated by broad alluvial valleys. The Coachella Valley in the northwestern part of the Salton Trough extends from the east end of San Gorgonio Pass southeastward to the Salton Sea. It is bordered on the north and east by the Little San Bernardino Mountains and on the southwest by the San Jacinto and the Santa Rosa Mountains. The Whitewater River is the main drainage in the valley.

### 5.3.5 Groundwater Hydrology

Review of the Ground Water Atlas of the United States - Segment I, published by the US Geological Survey and dated 1995 in addition to the Coachella Valley Water District Engineer's Report on the Water Supply and Replenishment Assessment of the Lower Whitewater River Sub-Basin Area of Benefit, published by the Coachella Valley Water District's Environmental Services Division and dated 2010-2011, indicated the following:

- The Project is situated within the boundaries of Palm Springs subarea of the Coachella Valley Groundwater Basin. Estimated depth to groundwater is approximately 400 to 500 feet below ground surface (bgs).

Shallow groundwater flow is expected to follow the ground level slope of surface elevations towards the nearest open body of water or intermittent stream. The direction of this flow at the Project is anticipated to be toward the northeast.

Estimated groundwater levels may vary due to seasonal fluctuations in precipitation, local usage demands, geology, underground structures, or dewatering operations.

# 6 HISTORICAL REVIEW

Review of online information from the Riverside County Tax Assessor's website indicated that the Project is shown as Assessor Parcel Numbers (APNs) 689-330-011, 689-330-018, 689-330-019, 689-330-023, 689-330-024, and 689-330-025.

A copy of the tax map is included in Appendix C.

## 6.1 Chain of Title

Based on an interview by telephone with a representative of the Riverside County Tax Assessor's Office, the current owner is identified as Rancho California Inv.

No prior ownership information was available via telephone.

## 6.2 Prior Use Interviews

EMG met with Jake Cormier, Director of Engineering, On-site Point of Contact (POC) and Director of Engineering with Ritz-Carlton Rancho Mirage, who was cooperative and provided information that appeared to be accurate, based upon our subsequent site observations. It is EMG's opinion that the POC was knowledgeable about the Project and about questions EMG posed during the interview process. According to the POC, the Project was developed in phases between 1988 and 2007, and is currently undergoing renovation and new construction. The Main Hotel Building was originally built in 1988 and closed in 2006. The POC has been associated with the Project since 2007.

## 6.3 Local and/or State Government Agency Record Review/Interviews

The following information was identified at the Rancho Mirage Building Department:

- This review indicated that the present Main Hotel Building at the Project was originally completed as a Ritz-Carlton Hotel in 1988. General building permits for the Project were on file, but they did not reveal any information or condition that could impact the environmental integrity of the Project. A copy of the original Certificate of Occupancy has been appended as a supporting document (Appendix G).

- No permits for previous uses were found in the file for the Project address. The absence of permits for previous uses suggests no official development of the Project took place prior to the current use.

- No environmentally significant information was identified.

EMG contacted the Riverside County Fire Department. However, based on a conversation with Mr. James Aldridge, Rancho Mirage Specialist, records are not reasonably ascertainable, as defined by ASTM 1527. Furthermore, based on the historical and current research already performed, the files at this department are not anticipated to yield any additional information not already obtained through other resources. Therefore, these records were not reviewed, and a FOIA request was not submitted to this department.

The following information was identified at the City of Rancho Mirage Planning Department:

- Review of the available zoning records indicates that the Project is currently zoned Resort Hotel (RSH).

- No environmentally significant information was identified.

Based on the research completed at the local agencies, no institutional controls or engineering controls were identified for the Project.

## 6.4 Historical Maps

**Historical Sanborn Maps:**

Historical Sanborn maps are detailed scale drawings that show the location and use of buildings and structures that occupied a given area. EMG contacted Environmental Data Resources (EDR) in an attempt to determine if there were any historical Sanborn maps in the EDR Historic Map Collection. However, there was no historical Sanborn map coverage for the Project in the EDR Historical Sanborn Map Collection for the period covering the years 1867 to present.

**Historical Topographic Maps:**

Historical topographic maps show the location of buildings and structures that occupied a given area, as well as other physical features. EMG reviewed historical topographic maps as available from online historical topographic map repositories, such as the Perry-Castaneda Map Library and the University of Alabama Map Library. EMG's historical topographic map search results are discussed below.

Review of the 1944 historical topographic map indicated the following:

- **Project:** The scale of the map prevents the specific Project location from being identified; however, the general vicinity of the Project appears to be undeveloped land.
- **Off-site:** The surrounding areas appear to be generally undeveloped.

A copy of the historical topographic map is included in Appendix C.

## 6.5 City Directories

EMG attempted to review historical city directories at the City of Rancho Mirage Library. However, no historic city directories were identified.

## 6.6 Aerial Photography

EMG contacted EDR in an attempt to determine if there were any historical aerial photographs available for the area of the Project. EMG also reviewed a current aerial photograph provided by Google Earth. EMG's historical aerial search results are discussed below.

Review of the 1953 historical aerial photograph indicated the following:

- **Project:** The Project is shown as undeveloped. Vehicular access is not available.
- **Off-site:** The adjoining areas to the north, east, south and west are shown as undeveloped.

The 1967 historical aerial photograph differs from the previous aerial photograph in that:

- **Project:** Vehicular access is available from unpaved jeep trails.

The 1978 historical aerial photographs differ from the previous aerial photograph in that:

- **Off-site:** One of two water tanks observed near the Project during EMG's current site visit is shown a short distance to the northeast of the Project.

The 1984 historical aerial photograph differs from the previous aerial photograph in that:

- **Off-site:** Both of the water tanks observed near the Project during EMG's current site visit are shown a short distance to the northeast of the Project.

The 1996 historical aerial photograph differs from the previous aerial photograph in that:

- **Project:** The Project is shown as developed with the existing Main Hotel Building, a large swimming pool area, landscaping, and associated parking/drive areas. Vehicular access is available via improved roads to the west and southeast. Apparent tennis courts, a small building, and associated parking/drive areas and landscaping are shown on the western portion of the Project.

- **Off-site:** New single-family residential development is shown to the south.

The 2002 historical aerial photograph differs from the previous aerial photograph in that:

- **Off-site:** Additional single-family residential development is shown to the south of the Project.

The 2005 historical aerial photograph differs from the previous aerial photograph in that:

- **Off-site:** Grading and new construction activities are apparent to the northwest of the Project.

The 2011 historical aerial photograph differs from the previous aerial photograph in that:

- **Project:** The existing Residential Suite and Spa Services Buildings are shown on the eastern portion of the Project. The tennis courts and associated building formerly shown on the western portion of the Project are no longer apparent and the area is shown as a cleared, vacant lot. The southern portion of the Project is shown as cleared for development.

- **Off-site:** New single-family residences are shown to the northwest of the Project.

Copies of representative historical aerial photographs are included in Appendix C.

## 6.7 Previous Investigations

EMG was provided a copy of a previous Water Damage Remediation Report for the Project, prepared by ET&T Indoor Environmental Surveys and dated June 14, 2011. Pertinent information identified in that report is as follows:

- The Project was occupied by the current improvements at the time of the previous assessment.

- In 2008-2009, a new wing was under construction when hotel operations shut down and the hotel has been vacant since that time. Water intrusion into the building and HVAC system occurred during this vacant period. Heavy rains caused roof leaks and window leaks. On-site personnel have been cutting out wet drywall and removing water damaged ceiling materials in order to prevent subsequent mold growth and to determine water intrusion areas and pathways.

- ET&T conducted a visual inspection for mold growth and water damaged materials. ET&T was then to develop a remediation protocol for the remediation contractor and to perform post remediation verification once the repairs are completed. ET&T surveyed the building between May 26, 2011 and June 3, 2011.

- According to ET&T, all sources of the moisture intrusion have to be identified and repaired, which reportedly included openings in the roof assembly of The Suites Building, roofs in general, sliding doors, windows, plumbing and drainage issues.

- A comprehensive asbestos survey was not conducted as part of ET&T's scope of work. However, ET&T conducted limited asbestos sampling as part of its own Job Hazard Analysis. Two samples each were collected from drywall material, surface dust and fire proofing materials. No asbestos was detected in any of the six samples.

EMG was provided with a copy of the laboratory report for the asbestos sampling conducted at the Project for ET&T, prepared by Micron Environmental Labs and dated July 19, 2011. This report states that 10 samples, collected on May 26, 2011, were submitted to their laboratory for asbestos analysis on May 27, 2011. The materials sampled and analyzed included fireproofing, drywall/ceiling, joint compound/ceiling, drywall/wall and joint compound/wall. EMG notes that the drywall and joint compound samples discussed in the laboratory report were submitted to the laboratory as one sample each, with a total of six samples submitted. The laboratory separated the drywall from the joint compound and reported results for a total of 10 samples.

EMG was also provided with an Air Sample Analysis Summary for the Project prepared by Micron Environmental Labs and dated July 5, 2011. The two air samples were collected from the B-Wing's second and third floors on May 26, 2011 and analyzed on May 27, 2011. The results for both air samples were 0.002 fibers/cubic centimeter (f/cc), which is below the regulatory (AHERA and NESHAP) clearance level of <0.01 f/cc.

## 6.8 Plans and Specifications

As-built/renovation-site plans, drawings, and specifications were reviewed at the Project. Documents reviewed included:

- Building plans prepared by SB Architects and dated January 13, 2006, and amended in October 4, 2010
- Site plan
- Floor plans

Environmentally significant improvements identified during this review included a diesel-fired backup generator with an integral AST (Section 7.9); a dry cleaning machine (Section 7.1); and two grease interceptors as well as a sand-oil interceptor (Section 7.3).

## 6.9 Historical Summary

Based upon historical review, the previous Project use includes undeveloped land (dating back to at least 1944) prior to the development of the current Project improvements in phases between 1988 and 2007. In addition, the western portion of the Project was occupied by multiple tennis courts and an apparent clubhouse from approximately 1993 to 2005.

EMG was not able to obtain standard historical sources that document the Project history in five year intervals. Furthermore, EMG was also not able to document the use of the Project back to the first developed use, or back to 1940, whichever is earlier. This data failure represents a data gap; however, this data gap is not considered a *significant* data gap, and therefore, it is not addressed in Section 3.1.

# 7 PROJECT RECONNAISSANCE

## 7.1 Operational Activities/Noteworthy Tenants

The Project is currently a vacant full service hospitality facility and is undergoing renovation and new construction activities. No noteworthy tenants occupy the Project and no environmentally significant operations are conducted at the Project.

Considering the current operations assessed at the Project, no environmental permits, registrations, or notifications appear to be required.

An inactive dry cleaning machine is located in the commercial laundry at the Project. The dry cleaning machine is identified as an Aero-Tech Green Jet Dry-Wetcleaning Machine, Model #DWC-45. The dry cleaning machine uses DWX-44 Dry-Cleaning Solution, a water-based, non-toxic solution, instead of perchloroethylene (PCE). Currently available information indicates the use of DWX-44 Dry-Cleaning Solution is highly unlikely to impact the Project when properly used. DWX-44 Dry-Cleaning Solution does not contain chlorinated hydrocarbons (such as PCE) and wastes generated in the process would not be classified as hazardous. Material Safety Data Sheet (MSDS) information for DWX-44 confirms that this substance contains no ingredients identified as Hazardous Substances according to SARA Hazard Title III, Section 313 - CFR-355. The existing dry cleaning machine is associated with the ongoing renovation, is new equipment which has never been used, and appeared to be empty at the time of EMG's site visit. Copies of a specification sheet and brochure for the Green jet Dry-Wetcleaning Machine, as well as the MSDS sheet for DWX-44 and a Laundry Plan showing the location of the dry cleaning machine, have been appended as supporting documents (Appendix G).

No information was identified to confirm whether dry cleaning was previously conducted on-site between 1988 and the time of closure in 2006. Based on the historical use as a full-service Ritz Carlton, it is somewhat likely that a dry cleaning plant, which possibly operated an older PCE machine, was formerly located on-site. By its chemical nature, PCE has the potential to penetrate through concrete and impact subsurface conditions. However, any such dry cleaning facility would have operated since the promulgation of RCRA in 1986, the legislation that regulates the handling and disposal of hazardous materials and wastes. As such, waste handling and disposal practices would have been regulated since the facility's inception. Furthermore, because the laundry is underlain by two levels of parking garage (as previously noted) and not the earth, it is unlikely that subsurface conditions would have been impacted as a result of any historical dry cleaning plant operations in this area.

## 7.2 Hazardous Materials/Petroleum Products Storage and Handling

Visual observation for the use and/or storage of hazardous materials and petroleum products was performed. The following hazardous materials and petroleum products were identified:

- Routine construction and maintenance supplies (i.e. adhesives, sealants, paints, etc. were observed at the Project in retail-sized containers.
- Diesel fuel is stored in an integral belly tank associated with the backup generator. Refer to Section 7.9 for further discussion of the diesel tank.
- Cooling system water treatment chemicals are maintained in poly drums located in the central plant and cooling tower areas in association with routine operation and upkeep of the cooling equipment.

The identified chemicals, materials, and products were observed in their sealed, original containers and in designated storage areas. Materials appeared to be properly stored. No evidence of spills or staining was observed. In addition, the concrete surfaces appeared intact, and no cracks were observed in the areas of product storage/usage.

The swimming pools and spas were dry at the time of EMG's site visit; no swimming pool chemicals were observed.

## 7.3 Waste Generation, Treatment, Storage and Disposal

Visual observation for the generation, treatment, storage, and disposal of wastes was performed. The following wastes were identified:

- Municipal trash is stored in the compactor or roll-off debris boxes (when appropriate) and disposed of by contracted waste haulers.
- Domestic sewage is disposed of to the municipal sanitary sewer system.

No evidence of spills or staining was observed in the area of waste generation or pre-disposal storage. In addition, the concrete surfaces appeared intact, and no cracks were observed in the areas of waste generation or pre-disposal storage.

Review of information available at the Project indicated that the waste disposal operations appear to be appropriate.

No excessive odors or overflowing/excessive ground trash were noted in the vicinity of the compactor or debris boxes. No hazardous, regulated, or medical wastes were noted in the compactor or debris boxes.

One empty 55-gallon drum labeled "Salvage Drum" and apparently used for recycling was observed in the service area.

Two grease traps were identified at the Project, including one 15,000-gallon grease trap located in the service area near the southwest corner of the Main Hotel Building and one 8,000-gallon grease trap located near the northeast corner of the Main Hotel Building. In addition, a 320-gallon sand interceptor was identified adjacent to the 15,000-gallon grease trap. Because the Project is currently inactive, the grease traps and interceptor are maintained on an as-needed basis. No bulk waste grease recycling drums or bins were observed.

No wastewater discharge that would require permitting though local or state regulatory agencies was identified at the Project.

No current or former septic systems or drywells were identified at the Project.

## 7.4 Polychlorinated Biphenyls (PCBs)

The Project is supplied with underground secondary electrical service from pad-mounted electrical transformers. The transformers are designated as the property of Southern California Edison (SCE), the public utility. The transformers at the Project are not labeled as to PCB content. However, based on the dates of installation (post-1977) in addition to information provided by SCE, the units are considered highly unlikely to contain PCBs. The units should be periodically inspected for leakage. If leakage is visible, the Project owner/manager should contact the public utility, which will remediate the situation. Should the units have to be replaced, the utility is responsible, provided the cause is equipment failure, not customer misuse. No leakage of the transformers was observed at the time of the assessment.

The Project also obtains secondary electrical service from privately owned, "dry type," step-down, transformers. Dry type transformers do not use oils for cooling purposes; therefore, these transformer are not expected to contain PCBs.

Thirteen hydraulic lift elevators are located at the Project. PCB-containing hydraulic fluid has not been manufactured since 1977. Therefore, based on the dates of installations, PCB-containing hydraulic fluid is not likely to be found in the elevator operating systems. No visual indication of leakage was observed in the areas of the elevator operating equipment. The hydraulic elevator units at the Project should be inspected periodically for leakage. If leakage is identified, the unit should be repaired, and any fluid or fluid-soaked waste should be disposed of in accordance with applicable federal, state, and local regulations.

A hydraulic trash compactor is located at the Project. PCB-containing hydraulic fluid has not been manufactured since 1977. Therefore, based on the date of installation (post-1977), PCB-containing hydraulic fluid is not likely to be found in the trash compactor operating system. No visual indication of leakage was observed in the area of the hydraulic trash compactor equipment.

A hydraulic cardboard baler is located at the Project. PCB-containing hydraulic fluid has not been manufactured since 1977. Therefore, based on the date of installation (post-1977), PCB-containing hydraulic fluid is not likely to be found in the cardboard baler operating system. No visual indication of leakage was observed in the area of the hydraulic baler equipment.

Visual observation of the Project did not identify any areas of patched concrete that might suggest locations of former lift equipment.

## 7.5 Asbestos-Containing Materials (ACM)

As-built/renovation-site plans, drawings, and specifications were reviewed at the Project. Documents reviewed included Building plans prepared by SB Architects and dated January 13, 2006, and amended in October 4, 2010, a site plan, and floor plans. Review of these documents did not identify building material specifications requiring the use of ACM. However, this does not preclude or prevent the potential use of ACM.

Suspect friable and non-friable ACM in the form of wallboard/joint compound (in the Spa Services Building and Residential Suite Building) and roofing materials (on all three buildings) were identified at the Project. The wallboard/joint compound materials were observed to be friable in some areas due to cutting/replacement activities.

Roofing materials at the Main Hotel Building were reportedly replaced in 2008 and are thus considered suspect and not presumed ACM.

Presumed ACM in the form of wallboard/joint compound were identified in the Main Hotel Building. The wallboard/joint compound materials were observed to be in poor condition due to cutting/replacement activities associated with ongoing replacement of water damaged and moldy materials. As previously discussed in Section 6.7, a Water Damage Remediation Report for the Project was prepared by ET&T in June 2011. A comprehensive asbestos survey was not conducted as part of ET&T's scope of work. However, ET&T conducted limited asbestos sampling as part of its own Job Hazard Analysis. Two samples each were collected from drywall material, surface dust and fire proofing materials. No asbestos was detected in any of the six samples. EMG was also provided with a copy of the laboratory report for this asbestos sampling conducted at the Project, prepared by Micron Environmental Labs and dated July 19, 2011. This report states that 10 samples, collected on May 26, 2011, were submitted to their laboratory for asbestos analysis on May 27, 2011. The materials sampled and analyzed included fireproofing, drywall/ceiling, joint compound/ceiling, drywall/wall and joint compound/wall. EMG notes that the drywall and joint compound samples discussed in the laboratory report were submitted to the laboratory as one sample each, with a total of six samples submitted. The laboratory separated the drywall from the joint compound and reported results for a total of 10 samples. All of the samples were negative for asbestos.

Where observed, floor tile and suspended ceiling tile consisted of stone and fiberglass, respectively. These materials were not considered suspect for the purposes of this assessment.

| Asbestos Screening Sampling Table | | | | | | |
|---|---|---|---|---|---|---|
| Sample No. | Material | Location | Friable | Condition | Analytical Results | Estimated Quantity |
| N/A | Drywall/Joint Compound | Throughout interior of Main Hotel Building | Yes | Poor | Not Sampled | 615,000 SF |
| N/A | Drywall/Joint Compound | Throughout interior of Spa Services and Residential Suite Buildings | No | Fair | Not Sampled | 68,000 SF |
| N/A | Roofing materials | Roof areas of all three buildings | No | Good | Not Sampled | 158,000 SF |

## 7.6 Radon Gas

Review of the USEPA's Radon Map for Riverside County, California indicated that the Project is located in Zone 2, areas with a predicted average indoor radon screening level between 2 and 4 pCi/L (picoCuries per liter of air).

In addition, based on the type of construction, the presence of commercial HVAC systems, and the commercial use of the buildings, there is reduced potential for the build-up of radon gas in the buildings at the Project

## 7.7 Lead-Based Paint (LBP)

The buildings at the Project were originally constructed in stages (1988-2007 and ongoing). Generally, due to the date of construction (post-1977), the potential use of LBP was minimized due to regulatory requirements and sound business practice. Based on the date of construction, no suspect LBP was observed, and no samples were collected.

## 7.8 Lead in Drinking Water

Based on review of the Coachella Valley Water District's most recent Drinking Water Quality Report, the water supplied to the Project is within federal, state, and local drinking water quality standards. In addition, the building was constructed after the 1986 ban on lead drinking water piping, lead solder, and flux on copper drinking water piping.

The City main water pipes leading to the Project were not visible. EMG is not aware of any issues or conditions that would lead to a concern that there might be lead pipes or lead in the water.

## 7.9 Facility Storage Tanks and Pipelines (above or below ground)

Visual observations for manways, vent pipes, fill connections, concrete pads, and saw cuts in paved areas did not identify any surface connections or disturbances that would indicate the potential for an underground storage tank (UST) installation at the Project.

The Project contains the aboveground storage tank (AST) listed in the table below.

The AST is an integral belly tank associated with a backup generator installation, and contains a maximum of approximately 750 gallons of diesel fuel. Current California regulations do not require registration of this type of tank. Mr. Cormier was unaware of any releases from the AST. The AST appeared to be in good condition, with no evidence of releases such as staining. Secondary containment was observed around the AST in the form of integral double-walled construction.

The manways and surface caps observed at the Project were for site services (i.e., domestic water, storm water, and sanitary sewer system).

Review of currently installed mechanical equipment identified the use of alternate fuel sources (i.e., electric, natural gas), thereby eliminating the need for additional on-site fuel storage at the Project.

Based on the review of the state list of registered UST's, no UST's are registered for the Project.

Interviews with persons knowledgeable of the Project did not identify evidence of additional current or historic storage tanks (above or below ground) at the Project.

Visual observations did not identify surface markings indicating the existence of subsurface product pipelines at the Project.

| Storage Tank Table | |
|---|---|
| **Tank Number** | 1 |
| **Type** | AST |
| **Location** | Service area near southwest corner of Main Hotel Building |
| **Construction Material** | Steel |
| **Year Installed** | Not identified |
| **Tank Size/Capacity** | Approximately 750-gallons |
| **Contents** | Diesel |
| **Use of Contents** | Fuel for backup generator |
| **Tank Status** | Active |
| **Registered** | N/R |
| **LUST List** | N/A |

## 7.10 Surface Areas

Observations during EMG's assessment identified that the Project lands are graded to provide slope and swale to direct storm water away from the on-site buildings.

Visual observation of the Project and adjacent properties did not identify evidence of distressed vegetation, staining, or surface migration of petroleum releases or hazardous materials onto or off the Project.

Visual observations did not identify evidence of on-site surface impoundment facilities, pits, dry wells, or dumping of apparent hazardous substances at the Project.

Visual observations did not identify surface water features, including lagoons, ponds, or other bodies of water at the Project.

Minor oil discharges were observed on the parking areas; however, the discharges are incidental in nature, and corrective action is neither practical nor warranted.

Storm water from the roofs flows to the ground surface via internal and external drains. Storm water from landscaped areas and paved areas flows across the surface into an on-site stormwater management detention basin located just southwest of the Main Hotel Building's front entrance, or to the adjacent public right of way. Storm water from vegetated surface areas generally infiltrates into the subsurface.

Visual observation of the Project identified a stormwater detention basin located just southwest of the Main Hotel Building's front entrance. The detention area was dry at the time of the assessment. Visual observations performed in the area of this pond did not identify any stained or stressed vegetation, sheens on the water, or apparent dumping of hazardous wastes.

No groundwater monitoring wells were identified at the Project.

## 7.11 Mold

EMG performed a limited visual and olfactory assessment for the presence of mold, conditions conducive to mold, and evidence of moisture in readily accessible interior areas of the Project. Suspect mold and evidence of water damage was observed in the following areas:

- Guest room closets in wing B of the Main Hotel Building. The area affected by the suspect mold was approximately 200 square feet in size.
- Widespread evidence of prior moisture intrusion at drywall and masonry surfaces throughout the Main Hotel Building. Most areas have been marked and drywall has been removed.

It should be noted that according to the POC, a mold survey and remediation recommendations were previously prepared for the Project. Furthermore, identified areas of concern were observed to have been marked with paint and were undergoing removal at the time of EMG's site visit. Refer to Section 6.7 for additional information.

This assessment does not constitute a comprehensive mold survey of the Project. The reported observations and conclusions are based solely on interviews with Project personnel and on conditions as observed in readily accessible interior areas of the Project on the assessment date.

## 7.13 Vapor Encroachment

The following list of questions was used to assess potential vapor encroachment issues at the Project:

- Are known or suspect contamination sources in the area of concern?
- Is there a hydraulic/physical barrier?
- Are contaminants of concern likely present?
- Is the source up-gradient, down gradient, or cross gradient from the Project?
- Is the source beyond the critical distance?

No potential vapor encroachment issues were identified during preparation of this assessment.

# 8 INTERVIEWS

## 8.1 Key Site Manager

EMG had not been provided with a completed copy of the Key Site Manager Questionnaire as of the time this assessment was completed.

The lack of, or inability to obtain, this information represents a data gap. However, based on the findings of this report, the absence of this information is not considered a significant data gap.

## 8.2 Owner

EMG submitted an Owner Questionnaire to the user in an effort to identify the owner of the Project who could be interviewed to provide information regarding proceedings involving the Project. The Owner Questionnaire was completed by Mr. Blythe Edwards, designated representative of the owner. Mr. Edwards indicated that he was not aware of any pending, threatened, or past litigation or administrative proceedings, relevant to hazardous substances or petroleum products, or notices from any governmental entity regarding possible violation of environmental laws, or possible liability related to hazardous substances or petroleum products.

## 8.3 User

EMG submitted a User Questionnaire in an effort to obtain information regarding proceedings involving the Project. Refer to Section 4, for discussion of the User Questionnaire.

## 8.4 Occupants

No occupants of the Project were available or would agree to an interview.

The lack, of or inability to obtain, this information represents a data gap. However, based on the findings of this report, the absence of this information is not considered a significant data gap.

## 8.5 Past Owners, Operators, and Occupants

No past owners, operators, or occupants of the Project, who likely would have material information regarding the potential for contamination at the Project, were identified.

## 8.6 Owners or Occupants of Adjacent or Nearby Properties

The Project was not an abandoned property with evidence of unauthorized uses or uncontrolled access; therefore, interviews were not conducted with adjacent or nearby property owners or occupants.

## 8.7 Interviews with Others

The following individuals were interviewed as part of this assessment:

| Name and Title | Organization | Phone Number |
|---|---|---|
| Jake Cormier, Director of Engineering | Ritz Carlton Rancho Mirage | 760.321.8282 |
| Steven Buchanan, Building Official | Rancho Mirage Building Department | 760.202.9253 |
| Greg Trousdell, Associate Planner | Rancho Mirage Planning Department | 760.328.2266 |
| James Aldridge, Rancho Mirage Specialist | Riverside County Fire Department | 760.250.0856 |

# 9 REGULATORY DATABASE REVIEW

EMG obtained a regulatory database report from Environmental Data Resources, Inc. (EDR) in an effort to determine if the Project is a listed regulatory site and whether there are any mappable regulatory database sites. The regulatory database search was run in accordance with the Scope of Work for this assessment. In addition, EMG reviewed the unmappable sites in the database report, cross-referencing addresses and site names. Unmappable sites are environmental risk sites that cannot be plotted with confidence, but can be located by zip code or city name. In general, a site cannot be geocoded because of inaccurate or missing location information in the record provided by the agency. A copy of the regulatory database report is included in Appendix F.

Based on review of the regulatory database report, and by cross-referencing name, address, and zip code, EMG concludes that the Project is a listed site. Details regarding any listings for the Project are discussed in Section 9.1.

The search for sites listed on regulatory databases in the area surrounding the Project identified various sites within the specified search radii, which are discussed in Section 9.2. In order to accommodate the Project's size and irregular shape, the database search radius was extended by 0.25 mile. The sites discussed in Section 9.2 are based on the actual corrected distance from the Project.

The following are some of the databases which were reviewed for this assessment. See the appended regulatory database report for a complete listing of databases reviewed for this assessment:

- **NPL** - The National Priority List (NPL) is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program.

- **Proposed NPL** - A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

- **NPL LIENS** - Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability.

- **Delisted NPL** - In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

- **CERCLIS** - The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) contains sites that are either proposed to or on the National Priorities List (NPL) and sites that are in the screening and assessment phase for possible inclusion on the NPL.

- **CERCLIS-NFRAP** - CERCLIS No Further Remedial Action Planned (NFRAP) sites are sites that the EPA has determined that no further steps will be taken to list the sites on the National Priorities List (NPL). This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

- **CORRACTS** - Corrective Action Report (CORRACTS) identifies hazardous waste handlers with RCRA corrective action activity.

- **RCRA-TSDF** - Resource Conservation and Recovery Act (RCRA) - Transporters, Storage and Disposal (TSDF) database includes information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by the RCRA.

- **RCRA-LQG** - The RCRA - Large Quantity Generators (LQG) database includes information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by RCRA. Large quantity generators generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

- **RCRA-SQG** - The RCRA - Small Quantity Generators (SQG) database includes information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by RCRA. Small quantity generators generate between 100 kg and 1,000 kg of hazardous waste per month.

- **RCRA-CESQG** - The RCRA - Conditionally Exempt Small Quantity Generators (CESQG) database includes information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by RCRA. Conditionally exempt small quantity generators generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

- **US ENG CONTROLS** - A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

- **US INST CONTROL** - A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

- **ERNS** - The Emergency Response Notification System records and stores information on reported releases of oil and hazardous substances.

- **FINDS** - The Facility Index System (FINDS) contains both facility information and 'pointers' to other sources that contain more detail.

- **SWF** - The Solid Waste Facilities (SWF) database contains an inventory of solid waste disposal facilities or landfills. These may be active or inactive facilities or open dumps.

- **LUST** - Leaking underground storage tank (LUST) records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

- **INDIAN LUST** - The Indian LUST database contains information about leaking underground storage tanks on Indian land.

- **UST** - Registered Underground Storage Tank (UST) facilities.

- **AST** - Registered Aboveground Storage Tank (AST) facilities.

- **US BROWNFIELDS** - This database contains information on brownfield sites.

- **ENVIROSTOR** - The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

- **SLIC** - The California Spill, Leak, Investigation, and Cleanup (SLIC) database is maintained by the individual California Regional California Water Quality Control Boards (RWQCB) to track sites where releases have been reported outside of the Leaking Underground Storage Tank program. These sites typically include miscellaneous releases, not necessarily related to underground storage tanks.

- **RESPONSE** - State Response Sites are confirmed release sites where the DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

- **VCP** - The Voluntary Cleanup Program (VCP) database contains low threat level properties with either confirmed or unconfirmed releases, and where the project proponents have requested that the DTSC oversee investigation and/or cleanup activities and also have agreed to provide coverage for DTSC's costs.

- **HIST CAL-SITES** - The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. This database is no longer updated by the state agency. It has been replaced by ENVIROSTOR.

- **TOXIC PITS** - The Toxic Pits database identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

- **Notify 65** - The Notify 65 database contains listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is not longer updated by the reporting agency.

- **Indian Reserv** - This database portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

| Database List | Target Property | Search Distance (Miles) | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| NPL | | 1.25 | 0 | 0 | 0 | 0 | 0 | 0 |
| DELISTED NPL | | 1.25 | 0 | 0 | 0 | 0 | 0 | 0 |
| CERCLIS | | 0.75 | 0 | 0 | 0 | NR | NR | 0 |
| CERCLIS-NFRAP | | 0.75 | 0 | 0 | 0 | NR | NR | 0 |
| CORRACTS | | 1.25 | 0 | 0 | 0 | 0 | 0 | 0 |
| RCRA-TSDF | | 0.75 | 0 | 0 | 0 | NR | NR | 0 |
| RCRA-LQG | | 0.375 | 0 | 0 | NR | NR | NR | 0 |
| RCRA-SQG | X | 0.375 | 1 | 0 | NR | NR | NR | 1 |
| US ENG CONTROLS | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| US INST CONTROL | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| US BROWNFIELDS | | 0.75 | 0 | 0 | 0 | NR | NR | 0 |
| ERNS | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| LUST | | 0.75 | 0 | 0 | 0 | 7 | NR | 7 |
| UST | | 0.375 | 0 | 0 | NR | NR | NR | 0 |
| AST | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| VCP | | 0.75 | 0 | 0 | 0 | NR | NR | 0 |
| CHMIRS | X | 0.25 | 1 | 0 | NR | NR | NR | 1 |
| NOTIFY 65 | | 1.25 | 0 | 0 | 0 | 1 | 0 | 1 |
| HAZNET | | TP | NR | NR | NR | NR | NR | 0 |
| INDIAN LUST | | 0.75 | 0 | 0 | 0 | 1 | NR | 1 |
| INDIAN UST | | 0.375 | 0 | 0 | NR | NR | NR | 0 |
| INDIAN VCP | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| INDIAN RESERV | | 1 | 0 | 0 | 0 | 1 | NR | 1 |

## 9.1 Project Regulatory Database Discussion

Regulatory database listings for the Project are discussed below.

**Hospitality Dental Group Ranch Mirage**
**68-730 Highway 111, Suite 105**
**Database Listed On:** HAZNET

This facility was identified as the "Target Property" in the EDR Radius Map Report. However, based on review of available information and observations made during EMG's site visit, this facility is actually located more than 2,500 feet to the northeast of the Project and is situated down-gradient of the Project with respect to estimated direction of groundwater flow. Furthermore, this facility was not identified on any listing, such as the CERCLIS, LUST or SHWS listings, that reports spills, incidents or releases. Based on distance from the Project, estimated direction of groundwater flow, and the absence of reported releases, this facility is not anticipated to have adversely impacted the environmental integrity of the Project.

**68900 Frank Sinatra Drive**
**Database Listed On:** CHMIRS

**Ritz Carlton**
**68900 Frank Sinatra Drive**
**Database Listed On:** RCRA-SQG

Based on review of the regulatory database report, the Project is listed on the CHMIRS and RCRA-SQG databases. Information contained in the CHMIRS database indicates that the California Office of Emergency Services (OES) was notified of a release at the Project on November 10, 2003 (Incident #03-5821). Based on review of the information provided, the Riverside County Fire Department responded to a solo vehicle accident on the road in front of the Project that resulted in the release of approximately one gallon of diesel fuel from a truck's saddle tank. Based on the small-scale nature of the incident, the time elapsed, and the fact that emergency responders were alerted to and handled the release, the CHMIRS listing does not constitute a Recognized Environmental Condition (REC). Information in the RCRA-Generators database indicates that the Project was identified as a Small Quantity Generator of hazardous wastes in 1992; likely related to wastes generated during construction or renovation activities. The type of hazardous waste generated was not identified in the database listing. The database indicates that there are no violations associated with the RCRA-Generator listing. The RCRA-Generator database is a listing of facilities that are required to register for tracking purposes due to the amount of hazardous waste generated and are not necessarily sites with reported contamination incidents.

## 9.2 Off-Site Regulatory Database Discussion

**Palm Springs Motor/Palm Springs Ford Motors**
**69200 Highway 111**
**Distance:** Approximately 2,600 feet (corrected)
**Direction:** North-northeast
**Database Listed On:** LUST

Based on review of the USGS Topographic Map, this site is located topographically down-gradient from the Project, and the estimated groundwater flow in the area of the site is to the southeast, which is away from the Project. Information in the LUST listing indicates that regulatory authorities granted this facility case closure for a "soil-only" gasoline release on June 9, 1994. The regulatory agency awards a case-closed status only when contamination, if any, has been investigated and/or remediated in accordance with the regulatory standards accepted at the time closure was granted. Based on distance from the Project, topographic relations, estimated direction of groundwater flow, the absence of reported impact to groundwater, and the reported "case-closed" regulatory status, this facility is not anticipated to have adversely impacted the environmental integrity of the Project.

All of the remaining off-site listed properties are located over 2,700 feet from the Project. In addition, there are no open release cases located within the specified search radii and all of the identified off-site listed properties are situated down-gradient of the Project with respect to estimated direction of groundwater flow. Based on various factors such as distance, topographic relations, estimated groundwater flow direction, and/or regulatory status, the remaining off-site listed properties are not anticipated to have adversely impacted the environmental integrity of the Project.

# 10 ADJACENT PROPERTIES

The general vicinity of the Project consists of undeveloped land and residential land uses. The following adjacent properties were identified:

- The Project is bordered to the north undeveloped land and the Villas of Mirada Luxury Homes (single-family residences). Two municipal water tanks are situated farther northeast, beyond the adjoining undeveloped land.
- The Project is bordered to the south by the Mirada Estates (single-family residences).
- The Project is bordered to the east by undeveloped land.
- The Project is bordered to the west by undeveloped land.

Based on observations and available regulatory information, the adjacent property uses are not anticipated to adversely impact the environmental integrity of the Project.

# Appendix A:

# Photographic Documentation



1 : Main entrance drive and front of Main Hotel Building



2 : North side of Project



3 : East side of Project



4 : South side of Project



5 : West side of hotel



6 : Residential Suite Building



7 : Spa Services Building



8 : Representative utility-owned, pad-mounted transformer



9 : Diesel-fired backup generator



10 : Commercial laundry and "Green Jet" dry cleaning machine



11 : Grease trap and interceptor to southwest of Main Hotel Building



12 : Cooling tower



13 : Cooling system water treatment chemicals




14 : Empty salvage drum



15 : Loading dock



16 : Hydraulic trash compactor



17 : Hydraulic cardboard baler



18 : Lobby



19 : Restaurant



20 : Kitchen



21 : Representative guest room



22 : Residential Suite Building - Interior



23 : Ballroom



24 : Spa Building - Interior



25 : Parking garage



26 : Maintenance shop



27 : Construction material storage in garage



28 : Pool equipment



29 : Chillers




30 : Representative hydraulic elevator equipment



31 : Suspect mold growth (orange paint indicates materials have been identified for removal)



32 : Suspect mold



33 : Water damage



34 : Water damaged wallboard



35 : Adjacent property to the north - Villas of Miranda Luxury Homes (single-family residences) beyond Frank Sinatra Drive



36 : Adjacent property to the north - undeveloped land and water tanks



37 : Adjacent property to the east - Undeveloped land

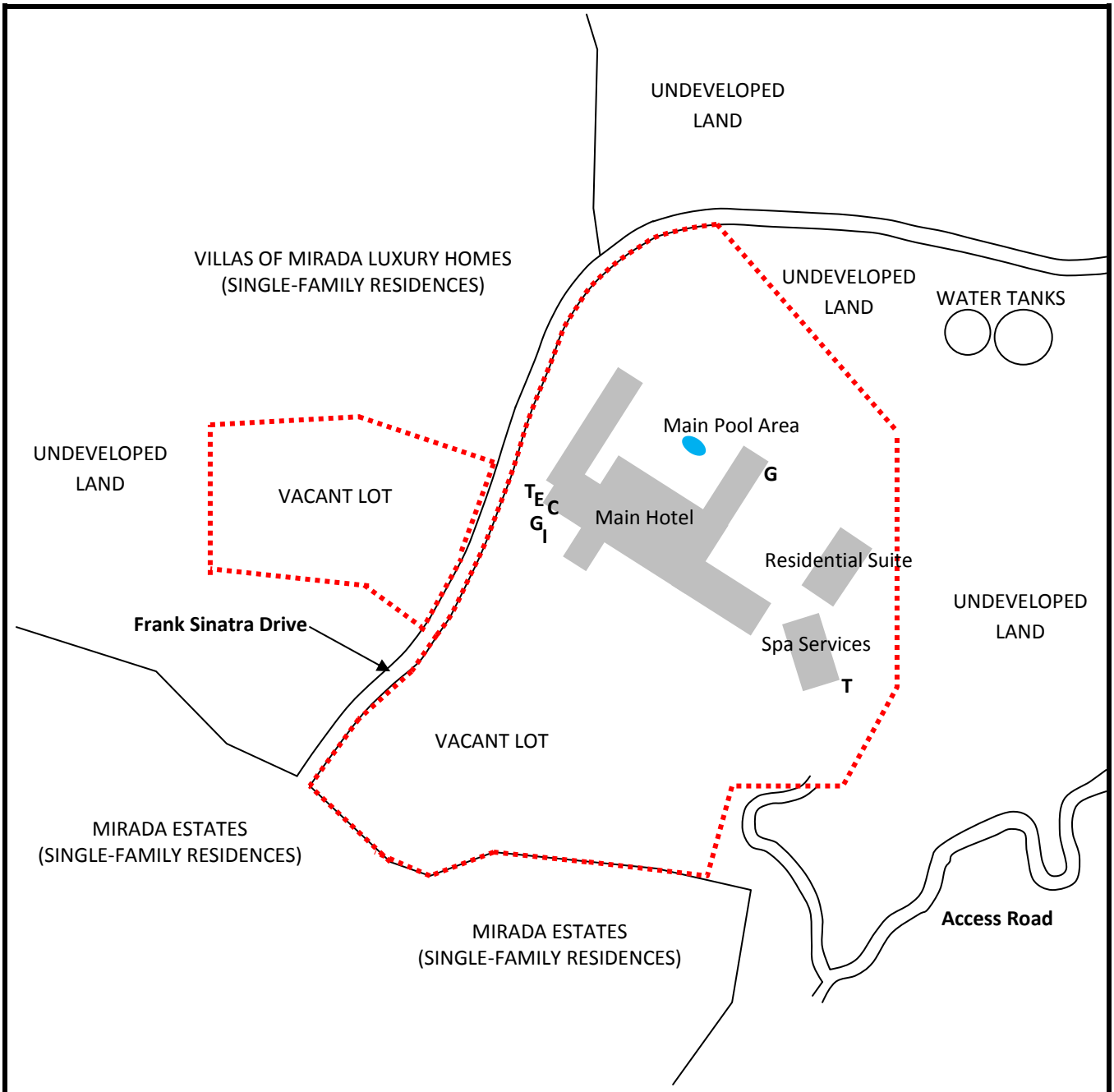


38 : Adjacent property to the south - Miranda Estates (single family residences)

# Appendix B:

# Field Sketch

# Field Sketch




EMG

**Key:**

**– - Project Boundary**
**T – Electrical Transformer**
**C - Trash Compactor**
**E – Emergency Generator**
**G – Grease Trap**
**I – Sand Interceptor**

**Not drawn to scale. The north arrow indicator is an approximation of 0° North.**

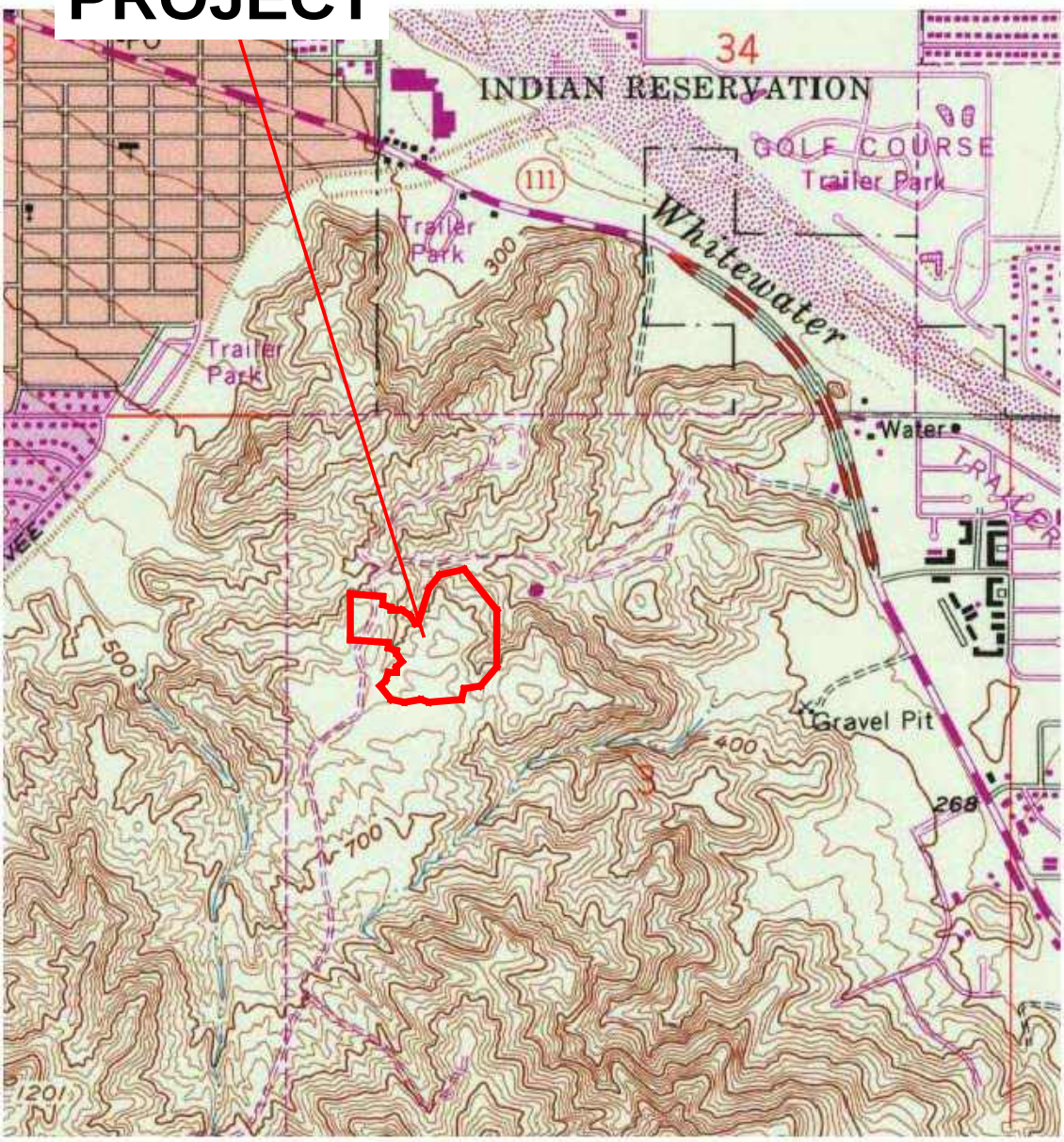
**Project Number:**
**100132.11R-001.135**

**Project Name:**
**The Ritz-Carlton Rancho Mirage**

**On-Site Date:**
**November 28, 2011**

# Appendix C:

# Maps and Aerial Photographs

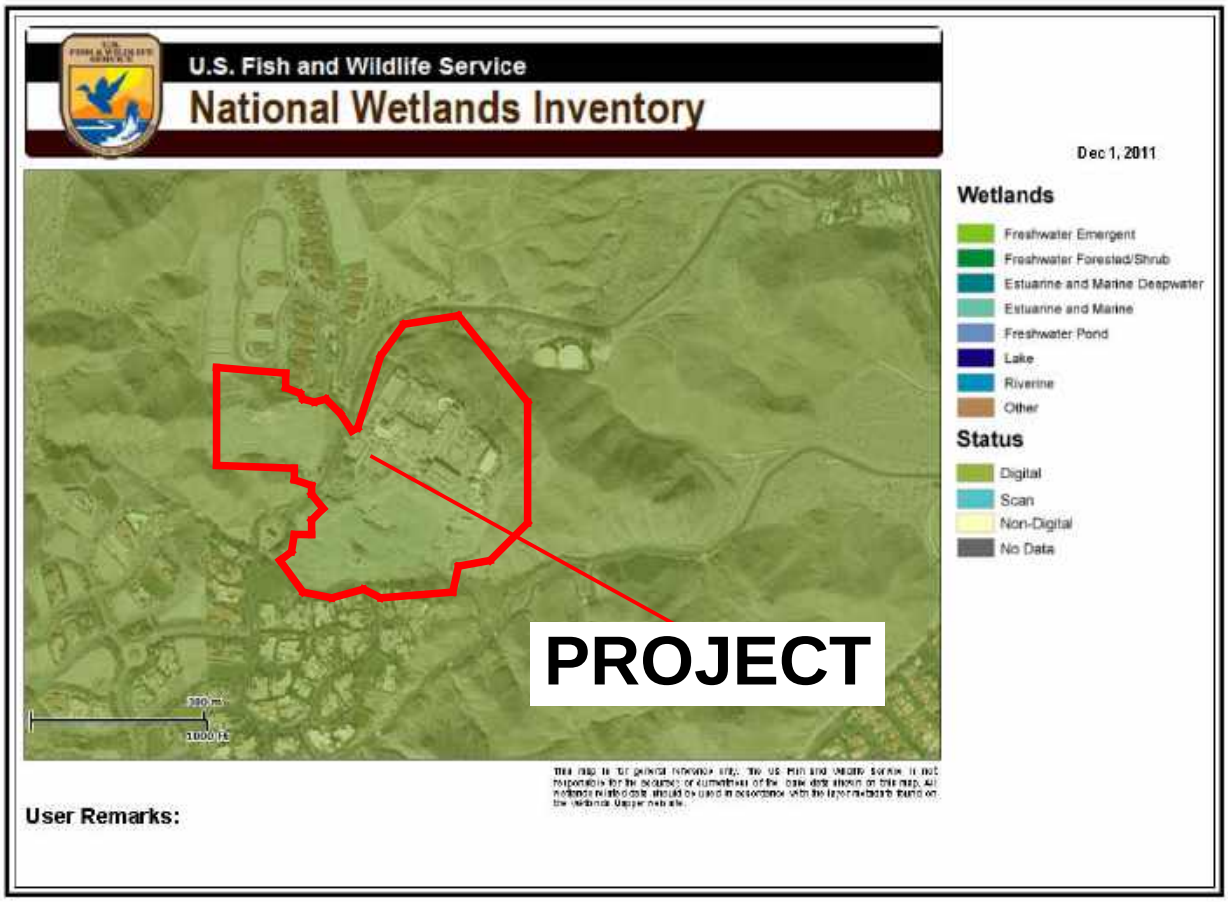



N

EMG

**1958 Topographic Map**
**The Ritz-Carlton Rancho Mirage**
**68-900 Frank Sinatra Drive, Rancho Mirage, California**

| | |
|---|---|
| **DRAWN BY:** | **Clarissa Lobaugh** |
| **DATE:** | **12/30/2011** |
| **PROJ. #:** | **100132.11R-001.135** |

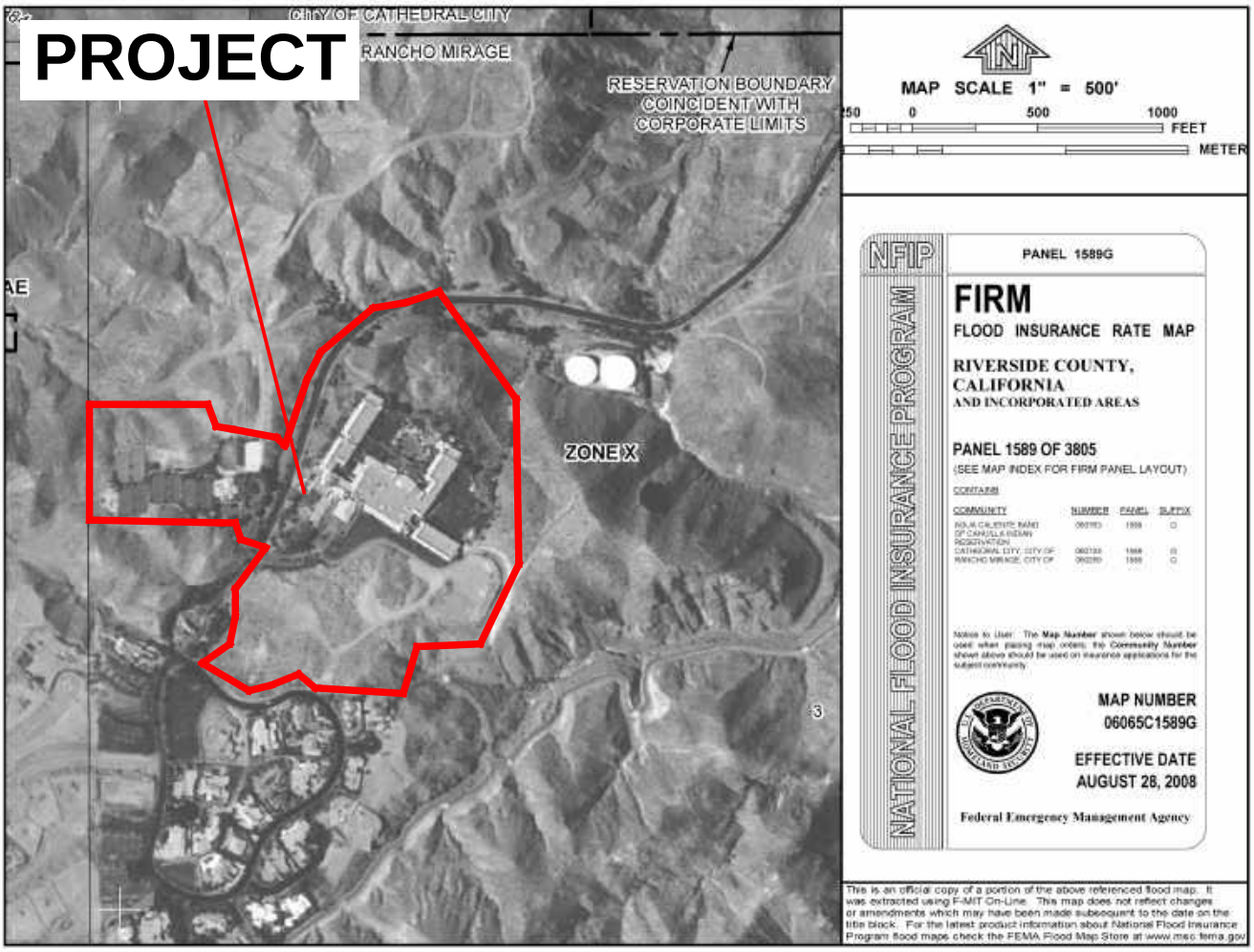



N

EMG

**Wetlands Map**
**The Ritz-Carlton Rancho Mirage**
**68-900 Frank Sinatra Drive, Rancho Mirage, California**

| | |
|---|---|
| **DRAWN BY:** | **Clarissa Lobaugh** |
| **DATE:** | **12/30/2011** |
| **PROJ. #:** | **100132.11R-001.135** |





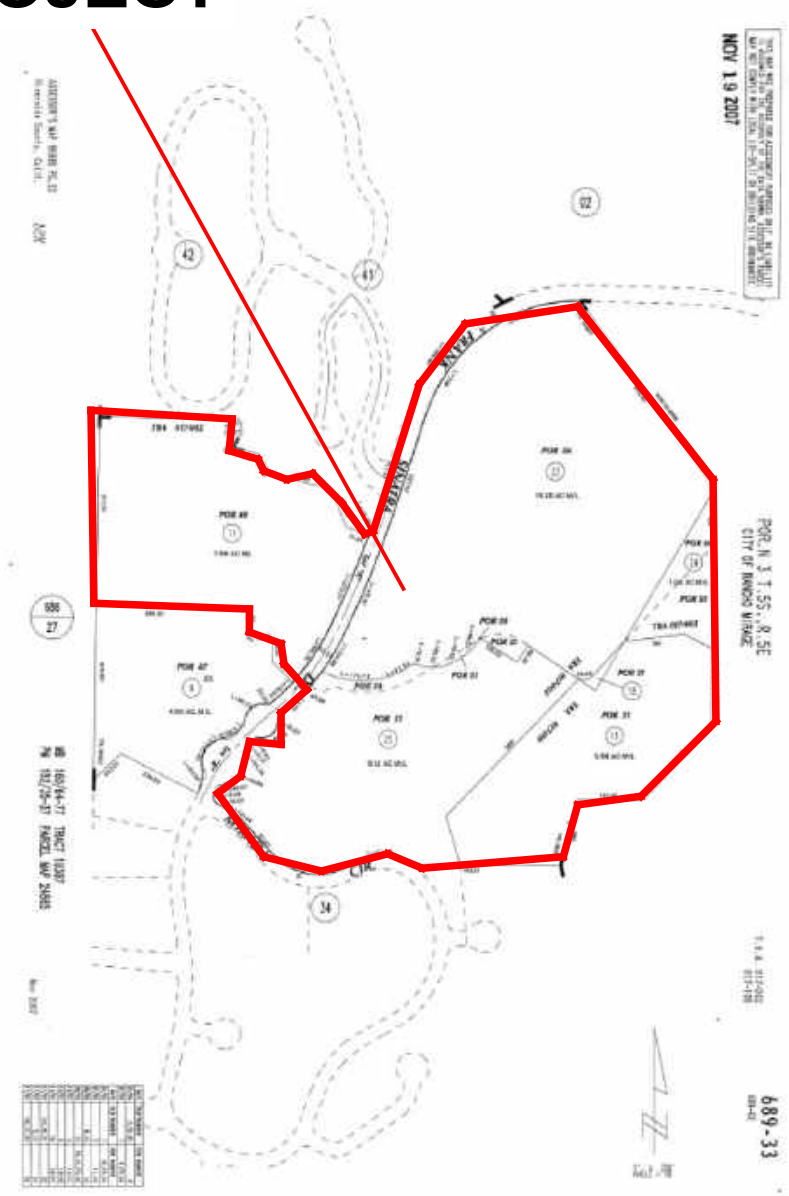


EMG

**Flood Map**
**The Ritz-Carlton Rancho Mirage**
**68-900 Frank Sinatra Drive, Rancho Mirage, California**

| | |
|---|---|
| **DRAWN BY:** | **Clarissa Lobaugh** |
| **DATE:** | **12/30/2011** |
| **PROJ. #:** | **100132.11R-001.135** |

# PROJECT

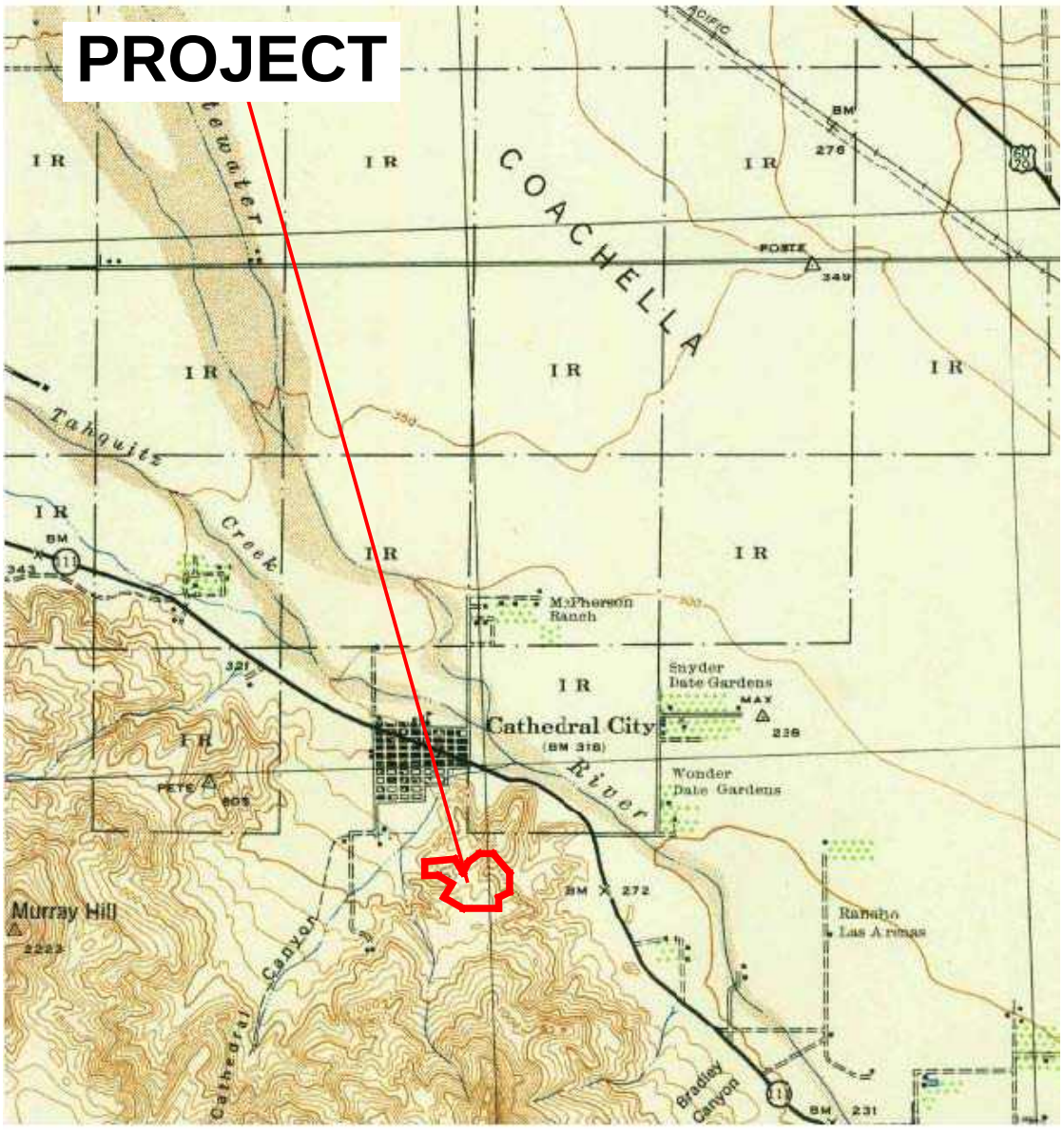



N

EMG

**Parcel Map**
**The Ritz-Carlton Rancho Mirage**
**68-900 Frank Sinatra Drive, Rancho Mirage, California**

| | |
|---|---|
| **DRAWN BY:** | **Clarissa Lobaugh** |
| **DATE:** | **12/30/2011** |
| **PROJ. #:** | **100132.11R-001.135** |

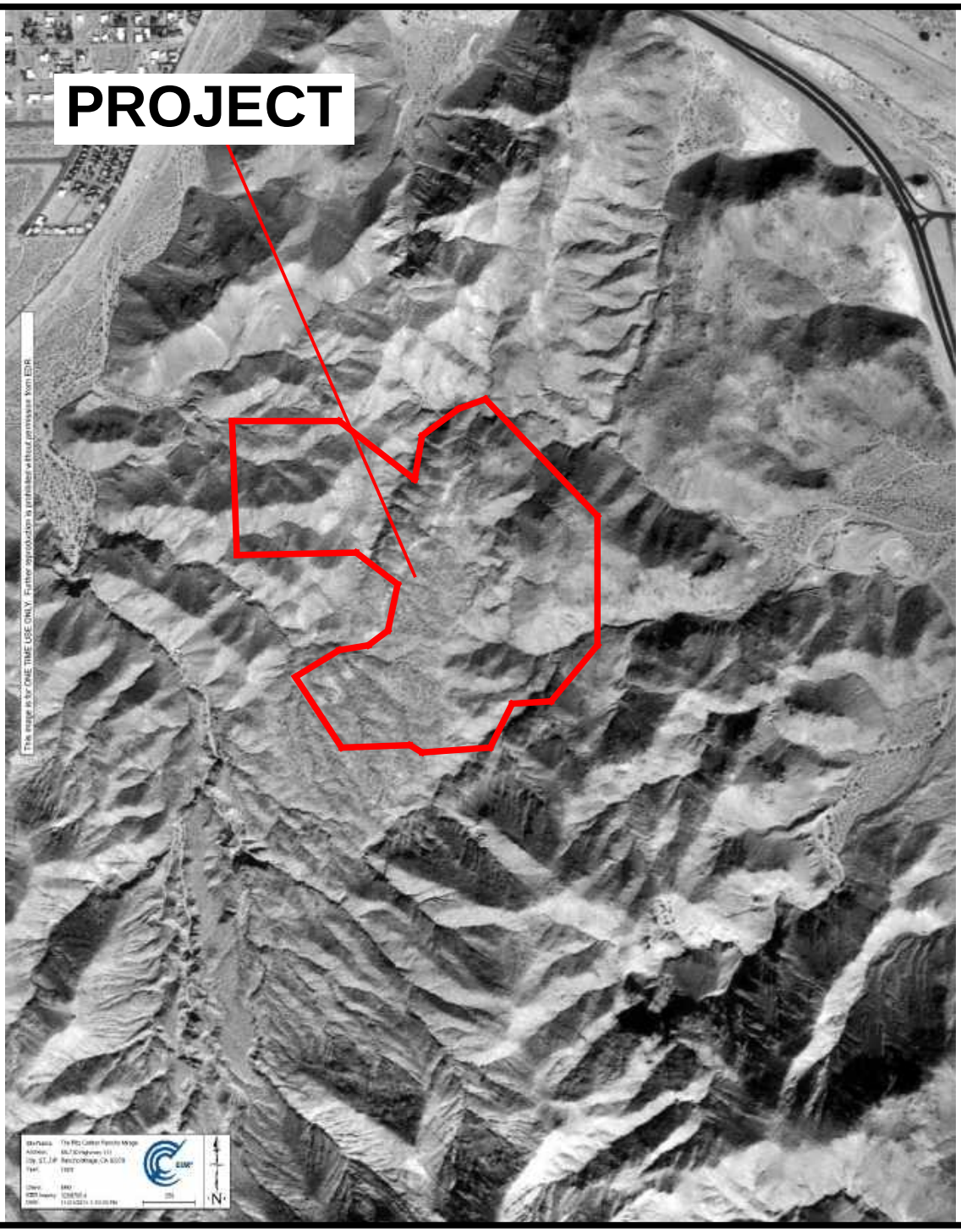



N

EMG

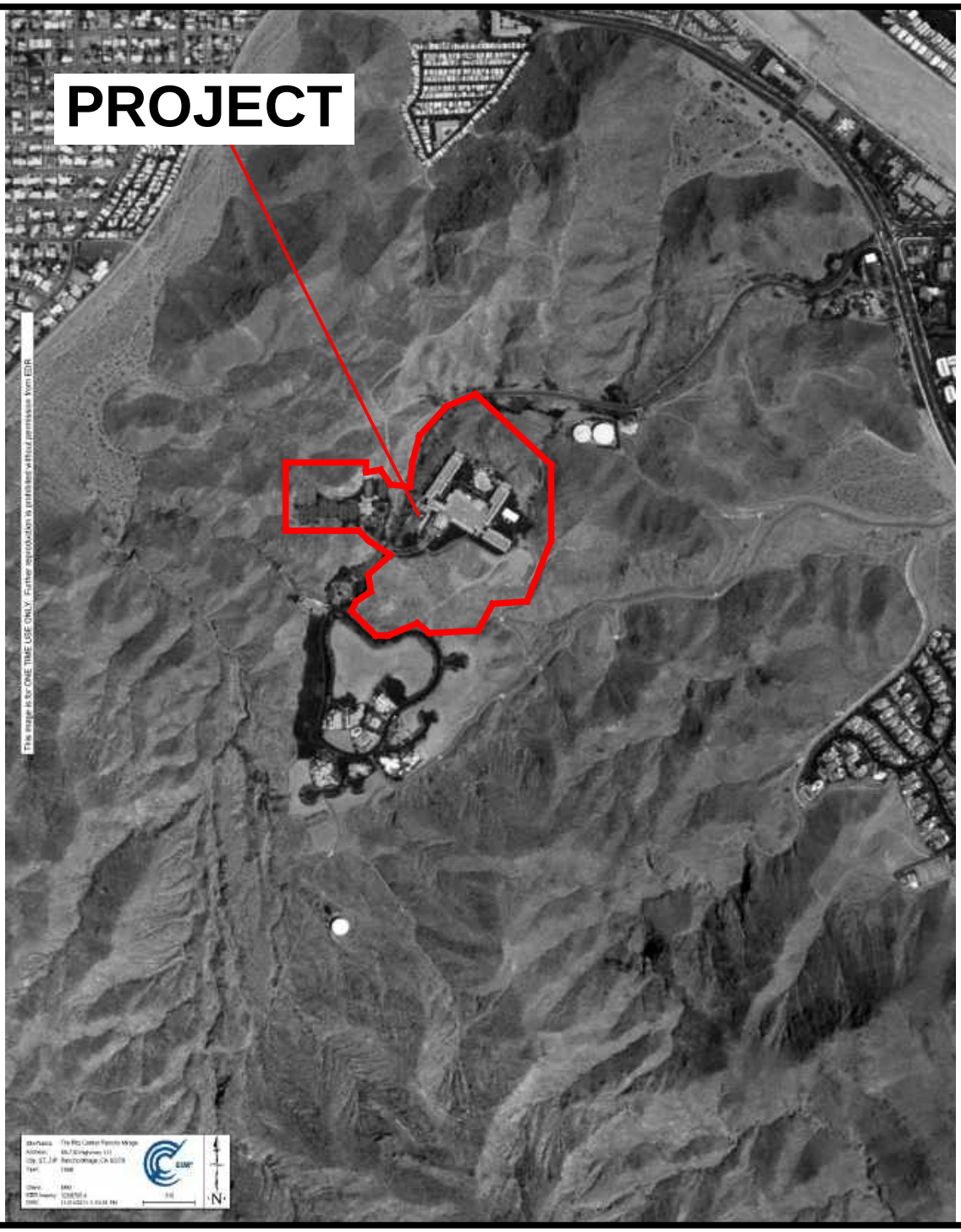
**1944 Historical Topo**
**The Ritz-Carlton Rancho Mirage**
**68-900 Frank Sinatra Drive, Rancho Mirage, California**

| | |
|---|---|
| **DRAWN BY:** | **Clarissa Lobaugh** |
| **DATE:** | **12/30/2011** |
| **PROJ. #:** | **100132.11R-001.135** |




**1953 Aerial Photo**
**The Ritz-Carlton Rancho Mirage**
**68-900 Frank Sinatra Drive, Rancho Mirage, California**

| | |
|---|---|
| **DRAWN BY:** | **Clarissa Lobaugh** |
| **DATE:** | **12/30/2011** |
| **PROJ. #:** | **100132.11R-001.135** |

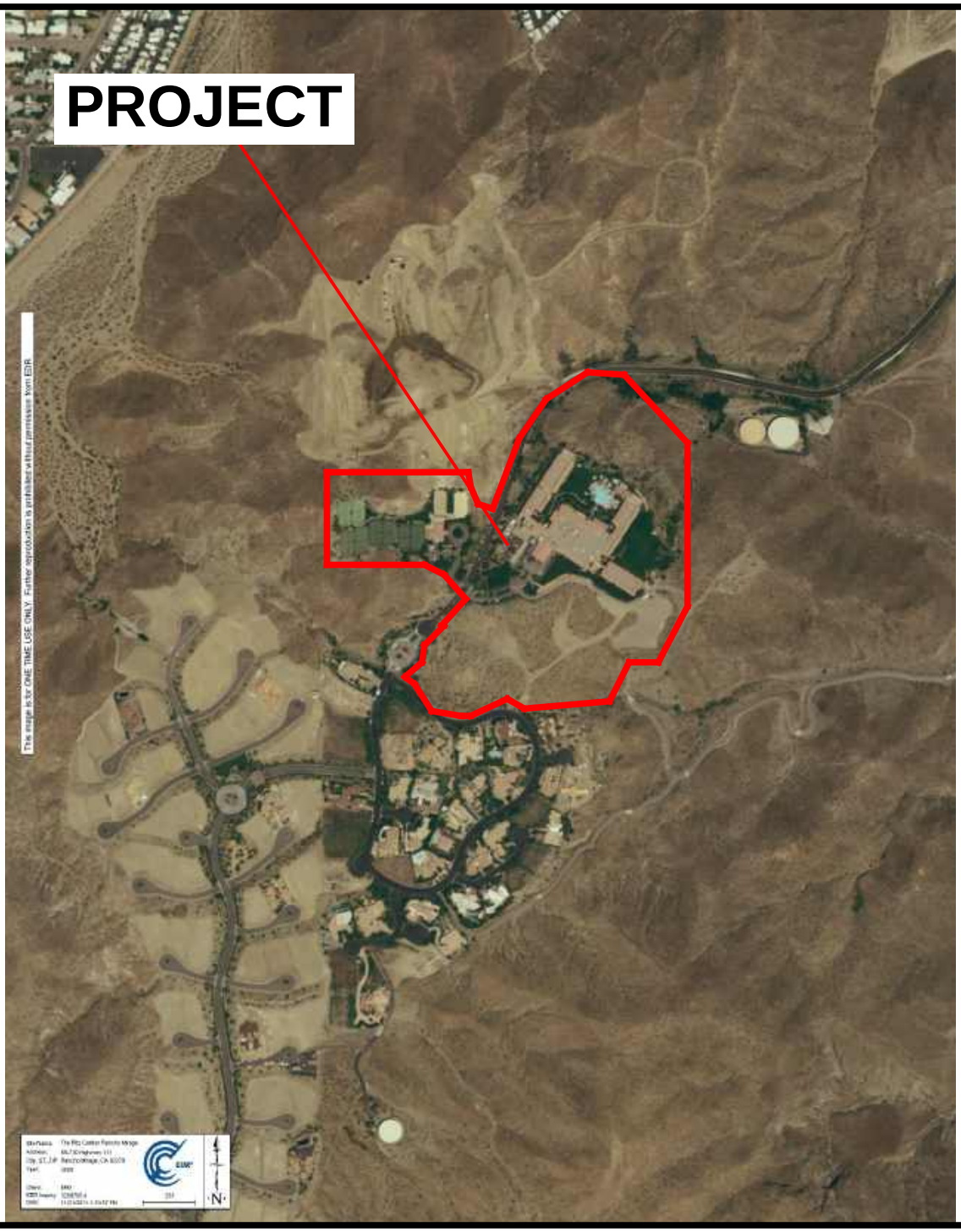



N

EMG

**1996 Aerial Photo**
**The Ritz-Carlton Rancho Mirage**
**68-900 Frank Sinatra Drive, Rancho Mirage, California**

| | |
|---|---|
| **DRAWN BY:** | **Clarissa Lobaugh** |
| **DATE:** | **12/30/2011** |
| **PROJ. #:** | **100132.11R-001.135** |




N

EMG

**2005 Aerial Photo**
**The Ritz-Carlton Rancho Mirage**
**68-900 Frank Sinatra Drive, Rancho Mirage, California**

| | |
|---|---|
| **DRAWN BY:** | **Clarissa Lobaugh** |
| **DATE:** | **12/30/2011** |
| **PROJ. #:** | **100132.11R-001.135** |

# Appendix D:

# Questionnaires

# KEY SITE MANAGER PRE-SURVEY QUESTIONNAIRE

**Date:**
**Name of person completing questionnaire:** Not returned to EMG
**Company Name:**
**Association with the property:**
**Length of association with property:**
**Phone Number:**
**Property Name/Address:** 68-900 Frank Sinatra Drive, Rancho Mirage, California 92270
**EMG Project Number:** 100132.11R-001.135

**Directions:** Please answer all questions to the best of your knowledge and in good faith. Mark the column corresponding to the appropriate response. Additional details necessary to explain any yes or unknown responses should be provided in the "Comments" column.
Note: U/NR indicates "Unknown" or "No Response", and "N/A" indicates not applicable.

| QUESTION | | RESPONSE | | | COMMENTS |
|---|---|---|---|---|---|
| | | Y | N | U/NR | |
| 1 | Is the Project used for an industrial use? | | | | |
| 1B | Are any adjoining properties used for an industrial use? | | | | |
| 2a | To the best of your knowledge, has the Project been used for an industrial use in the past? | | | | |
| 2b | To the best of your knowledge, has any adjoining properties been used for an industrial use in the past? | | | | |
| 3a | Is the Project used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility? | | | | |
| 3b | Is any adjoining property used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility? | | | | |
| 4a | To the best of your knowledge, has the Project been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility? | | | | |
| 4b | To the best of your knowledge, has any adjoining property been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility? | | | | |
| 5a | Are there currently any automotive or industrial batteries, pesticides, paints, or other chemicals in individual containers of greater than five gallons in volume or fifty gallons in the aggregate, stored on or used at the Project? | | | | |
| 5b | To the best of your knowledge, have there been previously any automotive or industrial batteries, pesticides, paints, or other chemicals in individual containers of greater than five gallons in volume or fifty gallons in the aggregate, stored on or used at the Project? | | | | |
| 6a | Are there currently any industrial drums (typically 55 gallon) or sacks of chemicals located on the Project? | | | | |
| 6b | To the best of your knowledge, have there been previously any industrial drums (typically 55 gallon) or sacks of chemicals located on the Project? | | | | |
| 7a | Are there currently any groundwater monitoring wells or other groundwater wells (i.e., potable drinking water wells) located on the Project? | | | | |
| 7b | To the best of your knowledge, have there been previously any groundwater monitoring wells or other groundwater wells (i.e., potable drinking water wells) located on the Project? | | | | |

| QUESTION | | RESPONSE | | | COMMENTS |
|---|---|---|---|---|---|
| | | Y | N | U/NR | |
| 8a | Has fill dirt been brought onto the Project which originated from a contaminated site? | | | | |
| 8b | Has fill dirt been brought onto the Project which is of an unknown origin? | | | | |
| 9a | Are there currently any pits, ponds or lagoons located on the Project in connection with waste treatment or waste disposal? | | | | |
| 9b | To the best of your knowledge, have there been previously any pits, ponds or lagoons located on the Project in connection with waste treatment or waste disposal? | | | | |
| 10a | Is there currently, any stained soil on the Project? | | | | |
| 10b | To the best of your knowledge, has there been previously any stained soil on the Project? | | | | |
| 11a | Are there currently any registered or unregistered storage tanks (above or underground) located on the Project? | | | | |
| 11b | To the best of your knowledge, have there been previously any registered or unregistered storage tanks (above or underground) located on the Project? | | | | |
| 12a | Are there currently any vent pipes, fill pipes or access ways indicating a fill pipe protruding from the ground on the Project or adjacent to any structure located on the Project? | | | | |
| 12b | To the best of your knowledge, have there been previously any vent pipes, fill pipes or access ways indicating a fill pipe protruding from the ground on the Project or adjacent to any structure located on the Project? | | | | |
| 13a | Are there currently any flooring, drains, or walls located at the Project that are stained by substances other than water or are emitting foul odors? | | | | |
| 13b | To the best of your knowledge, have there been previously any flooring, drains, or walls located at the Project that are stained by substances other than water or are emitting foul odors? | | | | |
| 14a | If the Project is served by a private well or non-public water system, have contaminants been identified in the well or system that exceed guidelines applicable to the water system? | | | | |
| 14b | If the Project is served by a private well or non-public water system, has the well been designated as contaminated by any government environmental/health agency? | | | | |
| 15a | Have you been informed of the past existence of hazardous substances or petroleum products with respect to the Project or any facility located on the Project? | | | | |
| 15b | Have you been informed of the current existence of hazardous substances or petroleum products with respect to the Project or any facility located on the Project? | | | | |
| 16a | Are there any environmental liens or governmental notification relating to past or current violations of environmental laws with respect to the Project or any facility located on the Project? | | | | |
| 16b | Have you been informed of the past existence of environmental violations with respect to the Project or any facility located on the Project? | | | | |
| 16c | Are you aware of any pending, threatened, or past litigation relevant to hazardous substances of petroleum products in, on or from the property? | | | | |
| 16d | Are you aware of any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on or from the property? | | | | |
| 16e | Are you aware of any notices from any governmental entity regarding any possible violation or environmental laws or possible liability relating to hazardous substances or petroleum products? | | | | |

| | QUESTION | RESPONSE | | | COMMENTS |
|---|---|---|---|---|---|
| | | Y | N | U/NR | |
| 17 | Have there been any environmental site assessments of the Project that indicated the presence of hazardous substances or petroleum products on, or contamination of, the Project or recommended further assessment of the Project? | | | | |
| 18 | Does the Project discharge waste water on or adjacent to the project, other than storm water, into a storm water sewer system? | | | | |
| 19 | Does the Project discharge waste water on or adjacent to the project, other than storm water, or into a sanitary system? | | | | |
| 20 | Have any hazardous substances or petroleum products, unidentified waste materials, tires, automotive or industrial batteries or any other waste materials been dumped above grade, buried and/or burned on the Project? | | | | |
| 21 | Is there a transformer, capacitor or any hydraulic equipment for which there are any records indicating the presence of PCBs? | | | | |
| 22 | Is there now or has there ever been any asbestos-containing materials (ACM), in any application, on the Project? | | | | |
| 23 | Has there ever been any ACM testing conducted on the Project? | | | | |
| 24 | Is there an asbestos Operations and Maintenance (O&M) program in place at the Project? | | | | |
| 25 | Is there now or has there ever been any lead-based paint (LBP) applications on the Project? | | | | |
| 26 | Has there ever been LBP testing conducted on the Project? | | | | |
| 27 | Is there a Lead Paint Operations and Maintenance (O&M) Program in place at the Project? | | | | |
| 28 | Has the water at the Project ever been tested for lead? | | | | |
| 29 | Has Radon testing ever been conducted at the Project? | | | | |
| 30 | Are there any other Operations and Maintenance (O&M) programs in place that we should be made aware of? | | | | |
| 31 | Is the Project or any portion of the Project located or involved in any environmentally sensitive areas (i.e., wetlands, coastal barrier resource areas, coastal barrier improvement act areas, flood plains, endangered species, etc.)? | | | | |
| 32 | Do you know or suspect that mold was or is present in the building(s) or HVAC system?<br>- If "Yes", proceed to question #33.<br>- If "No"", skip question #33 and proceed to question #34. | | | | |
| 33 | Are there reliable procedures that specify the actions (i.e. operations and maintenance) to be taken to prevent and/or respond to mold or mold producing problems? | | | | |
| 34 | Is there a mold Operations and Maintenance (O&M) program in place at the Project? | | | | |
| 35 | Is the HVAC system inspected at least annually? | | | | |
| 36 | Have identified HVAC problems been corrected in a timely manner? | | | | |
| 37 | Is there now, or has there ever been evidence of mold or mildew present at the building(s)?<br>If so, when? | | | | |
| 38 | Is there now, or has there ever been any water damage in the building(s), whether from flooding, plumbing, roof leaks, or other sources?<br>If so, when? | | | | |
| 39 | Has there ever been any sort of Indoor Air Quality (IAQ) or mold testing conducted in the building(s)? | | | | |
| | Summarize Historical Use: | | | | |

# ASTM E1527-05 USER QUESTIONNAIRE
# PHASE I ENVIRONMENTAL SITE ASSESSMENT

EMG has been retained to conduct a Phase I Environmental Site Assessment (ESA) on your behalf as agreed in our contract for the subject transaction. The Phase I ESA will involve site observations, interviews, and a review of available documentation. To ensure the success of the assessment, and in accordance with the ASTM E1527-05 Scope of Work, we are required to ask the following questions to the User of the report seeking to fulfill the User Requirements of the Standard. Please complete and return via email to ENTER EMAIL HERE or by fax to 410-785-6220 (within one day of receipt).

**Date:** 11-18-2011

| | | | |
|---|---|---|---|
| **Company name:** | Rancho California Investments, LLC | | |
| **Property Name/Street Address:** | 68-900 Frank Sinatra Drive, Rancho Mirage, CA 92270 | | |
| **Property City/State/Zip:** | Rancho Mirage, CA 92270 | | |
| **Name of person completing questionnaire:** | Blythe Edwards | **Phone Number:** | 305-416-4571 |
| **Role/Title:** | Vice President | **Fax Number:** | 305-442-9809 |
| **Length of association with property:** | 5 years | **E-mail address:** | bedwards@gencomgrp.com |
| **Please check one:** | **User:** ☐ **User Representative:** ☒ | | |

**Directions:** Please answer all questions to the best of your knowledge and in good faith. Mark the column corresponding to the appropriate response. Additional details necessary to explain any yes or unknown responses should be provided in the "Comments" column. Note: *U/NR* indicates *"Unknown"* or *"No Response"*, and *"N/A"* indicates not applicable.

| | QUESTION | | RESPONSE | | | COMMENTS |
|---|---|---|---|---|---|---|
| | | | Y | N | U/ NR | |
| 1 | Are you aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the property? | | ☐ | ☒ | ☐ | |
| 2 | Are you aware of any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on or from the property? | | ☐ | ☒ | ☐ | |
| 3 | Are you aware of any notices from any governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products? | | ☐ | ☒ | ☐ | |
| 4 | Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law? | | ☐ | ☒ | ☐ | |
| 5 | Are you aware of any Activity and Use Limitations, such as engineering controls, land use restrictions or institutional controls that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law? | | ☐ | ☐ | ☒ | |
| 6 | As the user of this ESA do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business? | | ☐ | ☒ | ☐ | |
| 7 | Does the purchase price being paid for this property reasonably reflect the fair market value of the property? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property? | | ☐ | ☐ | ☒ | |
| 8 | Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example, as user | | ☐ | ☐ | ☒ | |
| | 8 (a) | Do you know the past uses of the property? | ☒ | ☐ | ☐ | Operating hotel resort prior to closure in 2006 |

## USER QUESTIONNAIRE
## PHASE I ENVIRONMENTAL SITE ASSESSMENT

| QUESTION | | | RESPONSE | | | COMMENTS |
|---|---|---|---|---|---|---|
| | | | Y | N | U/ NR | |
| | 8 (b) | Do you know of specific chemicals that are present or once were present at the property? | ☒ | ☐ | ☐ | HVAC systems (chillers) require use of chemicals, which are biodegradable and environmentally friendly. There are currently no combustible materials stored onsite. |
| | 8 (c) | Do you know of spills or other chemical releases that have taken place at the property? | ☐ | ☒ | ☐ | |
| | 8 (d) | Do you know of any environmental cleanups that have taken place at the property? | ☐ | ☒ | ☐ | |
| 9 | As the user of this ESA, based on your knowledge and experience related to the property are there any obvious indicators that point to the presence or likely presence of contamination at the property? | | ☐ | ☒ | ☐ | |

If you have access to any of the following helpful documents, please indicate them below and then send them to EMG via standard mail or e-mail along with this questionnaire. Mailing address: 222 Schilling Circle, Suite 275, Hunt Valley, MD 21031

☐ **Helpful Documents to be forwarded EMG:**

☒ Environmental site assessment reports (i.e., Phase I, Phase II, tank testing results, radon, lead paint, or asbestos testing, etc.)

☐ Environmental compliance audit reports; risk assessments; and recorded Activity and Use Limitations (AULs)

☐ Environmental permits (i.e., solid waste disposal, hazardous waste disposal, wastewater, NPDES, underground injection, etc.)

☐ Registrations for underground storage tanks (USTs) and aboveground storage tanks (ASTs)

☐ Registrations for underground injection systems

☐ Material safety data sheets

☐ Community right-to-know plan

☐ Safety plans; preparedness and prevention plans; spill prevention, countermeasure, and control plans, etc

☒ Reports regarding hydrogeological or geotechnical conditions on the property and surrounding area

☐ Notices/correspondence from any agency relating to past/current violations of environmental laws, or liens encumbering the property

☐ Hazardous waste generator notices or reports

☐ Other:

# ASTM E1527-05 OWNER QUESTIONNAIRE
# PHASE I ENVIRONMENTAL SITE ASSESSMENT

EMG has been retained to conduct a Phase I Environmental Site Assessment (ESA) of your facilities as part of our Client's transactional due diligence process. The Phase I ESA will involve site observations, interviews, and a review of available documentation. To ensure the success of the assessment, and in accordance with the ASTM E1527-05 Scope of Work, we are required to ask the following questions to the Owner or Owner representative. Please complete and return via email to ENTER EMAIL HERE or by fax to 410-785-6220 (within one day of receipt).

**Date:** 11-18-11

| | | | |
|---|---|---|---|
| **Company name:** | Rancho California Investments, LLC | | |
| **Property Name/Street Address:** | Ritz-Carlton Rancho Mirage, 68-900 Frank Sinatra Drive | | |
| **Property City/State/Zip:** | Rancho Mirage, CA 92270 | | |
| **Name of person completing questionnaire:** | Blythe Edwards | **Phone Number:** | 305-416-4571 |
| **Role/Title:** | Vice President | **Fax Number:** | 305-442-9809 |
| **Length of association with property:** | 5 years | **E-mail address:** | bedwards@gencomgrp.com |
| **Please check one:** | **Owner:** ☐ | **Owner Representative:** ☒ | |

**Directions:** Please answer all questions to the best of your knowledge and in good faith. Mark the column corresponding to the appropriate response. Additional details necessary to explain any yes or unknown responses should be provided in the "Comments" column. Note: *U/NR* indicates *"Unknown"* or *"No Response"*, and *"N/A"* indicates not applicable.

| | QUESTION | RESPONSE | | | COMMENTS |
|---|---|---|---|---|---|
| | | Y | N | U/ NR | |
| 1 | Are you aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the property? | ☐ | ☒ | ☐ | |
| 2 | Are you aware of any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on or from the property? | ☐ | ☒ | ☐ | |
| 3 | Are you aware of any notices from any governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products? | ☐ | ☒ | ☐ | |

Interviews with Owners and Occupants: Section 10 of the ASTM E1527-05 Standard recommends that in addition to the three specific questions above, the Environmental Professional shall attempt to interview owners, operators, and occupants of the property to obtain information indicating recognized environmental conditions in connection with the property. As such, EMG is providing a Pre-Survey Questionnaire under separate cover to the Key Site Manager or other site representative as designated by either the current owner or the intended User of the assessment data.

If you have access to any of the following helpful documents, please indicate them below and then send them to EMG via standard mail or e-mail along with this questionnaire. Mailing address: 222 Schilling Circle, Suite 275; Hunt Valley, MD 21031.

☐ **Helpful Documents to be forwarded EMG:**

☒ Environmental site assessment reports (i.e., Phase I, Phase II, tank testing results, radon, lead paint, or asbestos testing, etc.)

☐ Environmental compliance audit reports; risk assessments; and recorded Activity and Use Limitations (AULs)

☐ Environmental permits (i.e., solid waste disposal, hazardous waste disposal, wastewater, NPDES, underground injection, etc.)

☐ Registrations for underground storage tanks (USTs) and aboveground storage tanks (ASTs)

☐ Registrations for underground injection systems

☐ Material safety data sheets

☐ Community right-to-know plan

☐ Safety plans; preparedness and prevention plans; spill prevention, countermeasure, and control plans, etc

☒ Reports regarding hydrogeological or geotechnical conditions on the property and surrounding area

☐ Notices/correspondence from any agency relating to past/current violations of environmental laws, or liens encumbering the property

☐ Hazardous waste generator notices or reports

☐ Other:

# Appendix E:

# Laboratory Analytical Results

**No documents have been associated with this appendix.**

# Appendix F:

# Regulatory Database Report

**Project #: 100132.001.135**
The Ritz-Carlton Rancho Mirage
69-730 Highway 111
Rancho Mirage, CA 92270

Inquiry Number: 3208705.2s
November 16, 2011

# The EDR Radius Map™ Report

## Prepared for EMG

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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**GEOCHECK ADDENDUM**

**GeoCheck - Not Requested**


***Thank you for your business.***
Please contact EDR at 1-800-352-0050
with any questions or comments.


**Disclaimer - Copyright and Trademark Notice**

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

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# EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

## TARGET PROPERTY INFORMATION

### ADDRESS

69-730 HIGHWAY 111
RANCHO MIRAGE, CA 92270

### COORDINATES

| | |
|---|---|
| Latitude (North): | 33.766500 - 33° 45' 59.4'' |
| Longitude (West): | 116.458000 - 116° 27' 28.8'' |
| Universal Tranverse Mercator: | Zone 11 |
| UTM X (Meters): | 550190.5 |
| UTM Y (Meters): | 3736204.8 |

### USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

| | |
|---|---|
| Target Property Map: | 33116-G4 CATHEDRAL CITY, CA |
| Most Recent Revision: | 1981 |

### AERIAL PHOTOGRAPHY IN THIS REPORT

| | |
|---|---|
| Portions of Photo from: | 2009, 2010 |
| Source: | USDA |

## TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 8 of the attached EDR Radius Map report:

| Site | Database(s) | EPA ID |
|---|---|---|
| HOSPITALITY DENTAL GROUP RANCHO M<br>69-730 HIGHWAY 111 STE 105<br>RANCHO MIRAGE, CA 92270 | HAZNET | N/A |

# EXECUTIVE SUMMARY

**DATABASES WITH NO MAPPED SITES**

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

**STANDARD ENVIRONMENTAL RECORDS**

***Federal NPL site list***

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

***Federal Delisted NPL site list***

Delisted NPL ---------- National Priority List Deletions

***Federal CERCLIS list***

CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ---------- Federal Facility Site Information listing

***Federal CERCLIS NFRAP site List***

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

***Federal RCRA CORRACTS facilities list***

CORRACTS ---------- Corrective Action Report

***Federal RCRA non-CORRACTS TSD facilities list***

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

***Federal RCRA generators list***

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

***Federal institutional controls / engineering controls registries***

US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls

***Federal ERNS list***

ERNS ---------- Emergency Response Notification System

***State- and tribal - equivalent NPL***

RESPONSE ---------- State Response Sites

***State- and tribal - equivalent CERCLIS***

ENVIROSTOR ---------- EnviroStor Database

# EXECUTIVE SUMMARY

***State and tribal landfill and/or solid waste disposal site lists***

SWF/LF ---------- Solid Waste Information System

***State and tribal leaking storage tank lists***

SLIC ---------- Statewide SLIC Cases

***State and tribal registered storage tank lists***

UST ---------- Active UST Facilities
AST ---------- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land
FEMA UST ---------- Underground Storage Tank Listing

***State and tribal voluntary cleanup sites***

VCP ---------- Voluntary Cleanup Program Properties
INDIAN VCP ---------- Voluntary Cleanup Priority Listing

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Brownfield lists***

US BROWNFIELDS ---------- A Listing of Brownfields Sites

***Local Lists of Landfill / Solid Waste Disposal Sites***

DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---------- Open Dump Inventory
WMUDS/SWAT ---------- Waste Management Unit Database
SWRCY ---------- Recycler Database
HAULERS ---------- Registered Waste Tire Haulers Listing
INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands

***Local Lists of Hazardous waste / Contaminated Sites***

US CDL ---------- Clandestine Drug Labs
HIST Cal-Sites ---------- Historical Calsites Database
SCH ---------- School Property Evaluation Program
Toxic Pits ---------- Toxic Pits Cleanup Act Sites
CDL ---------- Clandestine Drug Labs
US HIST CDL ---------- National Clandestine Laboratory Register

***Local Lists of Registered Storage Tanks***

CA FID UST ---------- Facility Inventory Database
HIST UST ---------- Hazardous Substance Storage Container Database
SWEEPS UST ---------- SWEEPS UST Listing

***Local Land Records***

LIENS 2 ---------- CERCLA Lien Information

| | |
|---|---|
| LUCIS | Land Use Control Information System |
| LIENS | Environmental Liens Listing |
| DEED | Deed Restriction Listing |

***Records of Emergency Release Reports***

| | |
|---|---|
| HMIRS | Hazardous Materials Information Reporting System |
| LDS | Land Disposal Sites Listing |
| MCS | Military Cleanup Sites Listing |

***Other Ascertainable Records***

| | |
|---|---|
| RCRA-NonGen | RCRA - Non Generators |
| DOT OPS | Incident and Accident Data |
| DOD | Department of Defense Sites |
| FUDS | Formerly Used Defense Sites |
| CONSENT | Superfund (CERCLA) Consent Decrees |
| ROD | Records Of Decision |
| UMTRA | Uranium Mill Tailings Sites |
| MINES | Mines Master Index File |
| TRIS | Toxic Chemical Release Inventory System |
| TSCA | Toxic Substances Control Act |
| FTTS | FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act) |
| HIST FTTS | FIFRA/TSCA Tracking System Administrative Case Listing |
| SSTS | Section 7 Tracking Systems |
| ICIS | Integrated Compliance Information System |
| PADS | PCB Activity Database System |
| MLTS | Material Licensing Tracking System |
| RADINFO | Radiation Information Database |
| FINDS | Facility Index System/Facility Registry System |
| RAATS | RCRA Administrative Action Tracking System |
| CA BOND EXP. PLAN | Bond Expenditure Plan |
| WDS | Waste Discharge System |
| NPDES | NPDES Permits Listing |
| Cortese | "Cortese" Hazardous Waste & Substances Sites List |
| HIST CORTESE | Hazardous Waste & Substance Site List |
| DRYCLEANERS | Cleaner Facilities |
| WIP | Well Investigation Program Case List |
| ENF | Enforcement Action Listing |
| EMI | Emissions Inventory Data |
| SCRD DRYCLEANERS | State Coalition for Remediation of Drycleaners Listing |
| PROC | Certified Processors Database |
| FINANCIAL ASSURANCE | Financial Assurance Information Listing |
| HWP | EnviroStor Permitted Facilities Listing |
| PCB TRANSFORMER | PCB Transformer Registration Database |
| MWMP | Medical Waste Management Program Listing |
| COAL ASH DOE | Sleam-Electric Plan Operation Data |
| COAL ASH EPA | Coal Combustion Residues Surface Impoundments List |
| HWT | Registered Hazardous Waste Transporter Database |

**EDR PROPRIETARY RECORDS**

***EDR Proprietary Records***

| | |
|---|---|
| Manufactured Gas Plants | EDR Proprietary Manufactured Gas Plants |

# EXECUTIVE SUMMARY

EDR Historical Auto Stations EDR Proprietary Historic Gas Stations
EDR Historical Cleaners EDR Proprietary Historic Dry Cleaners

**SURROUNDING SITES: SEARCH RESULTS**

Surrounding sites were identified in the following databases.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

**STANDARD ENVIRONMENTAL RECORDS**

***Federal RCRA generators list***

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 06/15/2011 has revealed that there is 1 RCRA-SQG site within approximately 0.375 miles of the target property.

| Site | Address | Dist / Dir | Map ID | Page |
|---|---|---|---|---|
| ***RITZ CARLTON*** | ***68900 FRANK SINATRA DR*** | ***0 - 1/8 (0.086 mi.) WSW*** | ***A3*** | ***11*** |

***State and tribal leaking storage tank lists***

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 09/19/2011 has revealed that there are 7 LUST sites within approximately 0.75 miles of the target property.

| Site | Address | Dist / Dir | Map ID | Page |
|---|---|---|---|---|
| PALM SPRINGS MOTOR | 69200 HWY 111 | 1/2 - 1 (0.727 mi.) NNE | B4 | 12 |
| PALM SPRINGS FORD MOTORS<br>Status: Completed - Case Closed | 69200 HIGHWAY 111 | 1/2 - 1 (0.729 mi.) NNE | B5 | 12 |
| RANCHO MIRAGE HAND CAR WASH<br>Status: Completed - Case Closed | 69800 HIGHWAY 111 | 1/2 - 1 (0.735 mi.) ENE | C6 | 13 |
| RANCHO MIRAGE HAND CAR WASH | 69800 HWY 111 | 1/2 - 1 (0.735 mi.) ENE | C7 | 15 |
| ***EXXON STATION #7-3156***<br>Status: Completed - Case Closed | ***69800 111*** | ***1/2 - 1 (0.735 mi.) ENE*** | ***C8*** | ***15*** |
| SHELL STATION<br>Status: Completed - Case Closed | 69010 HIGHWAY 111 | 1/2 - 1 (0.748 mi.) N | D10 | 17 |
| ***SHELL STATION***<br>Status: Completed - Case Closed | ***69010 111*** | ***1/2 - 1 (0.748 mi.) N*** | ***D11*** | ***18*** |

INDIAN LUST: A listing of leaking underground storage tank locations on Indian Land.

A review of the INDIAN LUST list, as provided by EDR, and dated 10/01/2011 has revealed that there is 1 INDIAN LUST site within approximately 0.75 miles of the target property.

| Site | Address | Dist / Dir | Map ID | Page |
|---|---|---|---|---|
| CATHEDRAL CITY OIL (NOW EQUILI | 69010 HWY 111 | 1/2 - 1 (0.748 mi.) N | D9 | 16 |

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Records of Emergency Release Reports***

CHMIRS: The California Hazardous Material Incident Report System contains information on reported hazardous material incidents, i.e., accidental releases or spills. The source is the California Office of Emergency Services.

A review of the CHMIRS list, as provided by EDR, and dated 12/31/2010 has revealed that there is 1 CHMIRS site within approximately 0.25 miles of the target property.

| Site | Address | Dist / Dir | Map ID | Page |
|---|---|---|---|---|
| Not reported | 68900 FRANK SINATRA DR. | 0 - 1/8 (0.086 mi.) WSW | A2 | 9 |

***Other Ascertainable Records***

Notify 65: Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

A review of the Notify 65 list, as provided by EDR, and dated 10/21/1993 has revealed that there is 1 Notify 65 site within approximately 1.25 miles of the target property.

| Site | Address | Dist / Dir | Map ID | Page |
|---|---|---|---|---|
| SHELL OIL SERVICE STATION | 69010 HWY 111 @ DATE PL | 1/2 - 1 (0.828 mi.) N | 12 | 23 |

INDIAN RESERV: This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

A review of the INDIAN RESERV list, as provided by EDR, and dated 12/31/2005 has revealed that there is 1 INDIAN RESERV site within approximately 1 mile of the target property.

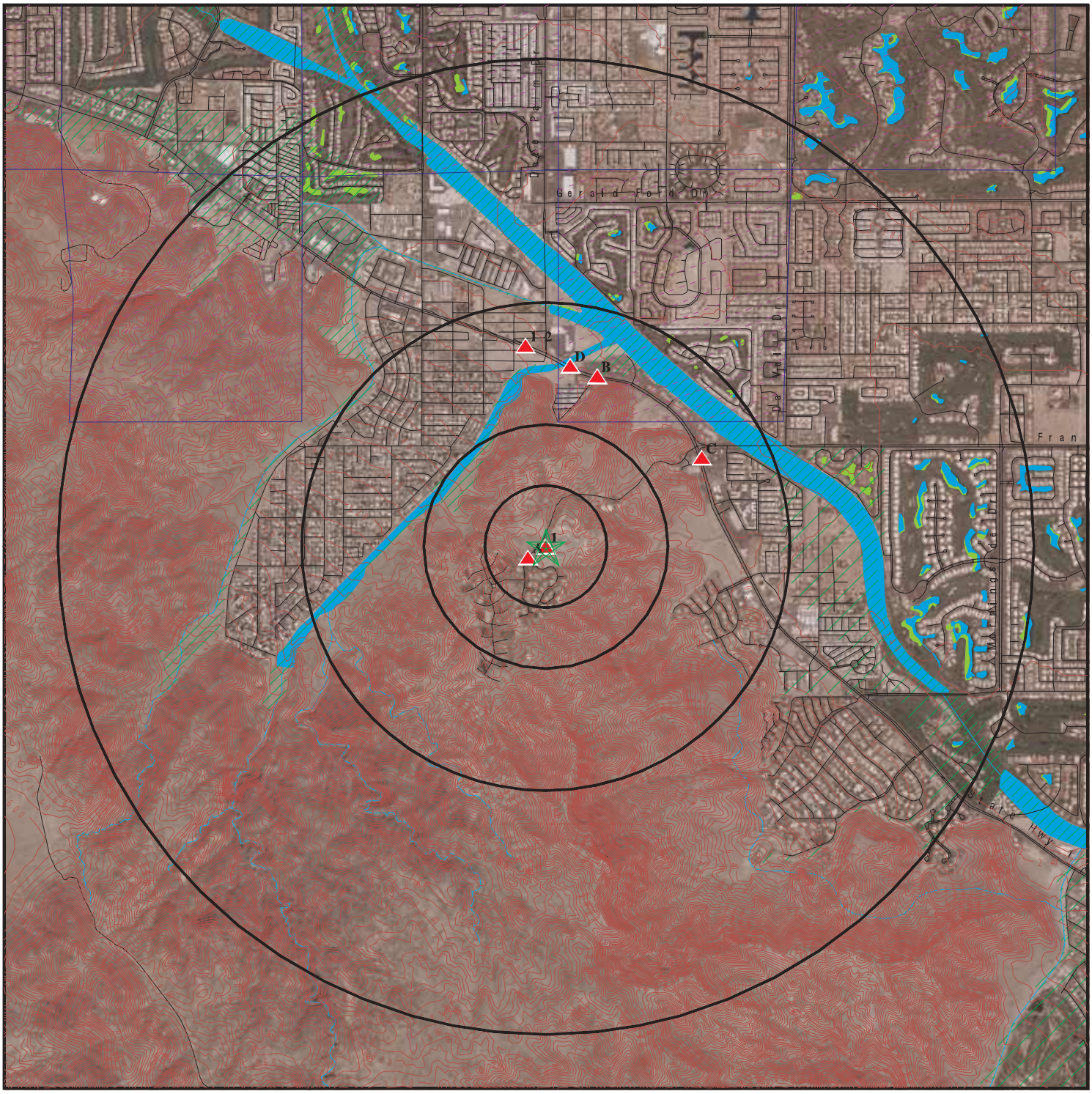
| Site | Address | Dist / Dir | Map ID | Page |
|---|---|---|---|---|
| AGUA CALIENTE INDIAN RESERVATI | | 1/2 - 1 (0.513 mi.) N | 0 | 9 |

# EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 20 records.

| Site Name | Database(s) |
|---|---|
| CA PARKS & REC SALTON SEA | HIST CORTESE |
| NAVAL AIR FACILITY EL CENTRO | CERCLIS-NFRAP,RCRA-LQG,FINDS |
| KAY OLESEN | LUST SAN MATEO |
| WASH (THE) | LUST SAN MATEO |
| JESSUP AUTO PLAZA | AST |
| CITY OF RANCHO MIRAGE | HAZNET |
| AMERICAN INDUSTRIAL MFG | RCRA-SQG,FINDS,HAZNET |
| GLIDDEN COMPANY | RCRA-SQG,FINDS |
| DESERT SHADOWS RV RESORT | RCRA-CESQG |
| RANCHO MIRAGE ELEMENTARY | FINDS |
| AUDREY LYNN MINE | MINES |
| ROBERTSONS READY MIX, INC. | MINES |
| TXI RIVERSIDE CEMENT | MINES |
| ELSINORE READY MIX CO., INC. | MINES |
| GRANITE CONSTRUCTION CO. | MINES |
| FOSTER SAND & GRAVEL CO. | MINES |
| WHITEWATER ROCK & SUPPLY CO | MINES |
| PACIFIC CLAY PRODS CO | MINES |
| WHITEWATER ROCK & SUPPLY CO. | MINES |
| WYROC, INC. | MINES |

# OVERVIEW MAP - 3208705.2s




- Target Property
- Toxic Sites
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

0 1/2 1 2 Miles

- Indian Reservations BIA
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | | | |
|---|---|---|---|
| SITE NAME: | The Ritz-Carlton Rancho Mirage | CLIENT: | EMG |
| ADDRESS: | 69-730 Highway 111<br>Rancho Mirage CA 92270 | CONTACT: | Jason Swam |
| | | INQUIRY #: | 3208705.2s |
| LAT/LONG: | 33.7665 / 116.4580 | DATE: | November 16, 2011 4:35 pm |

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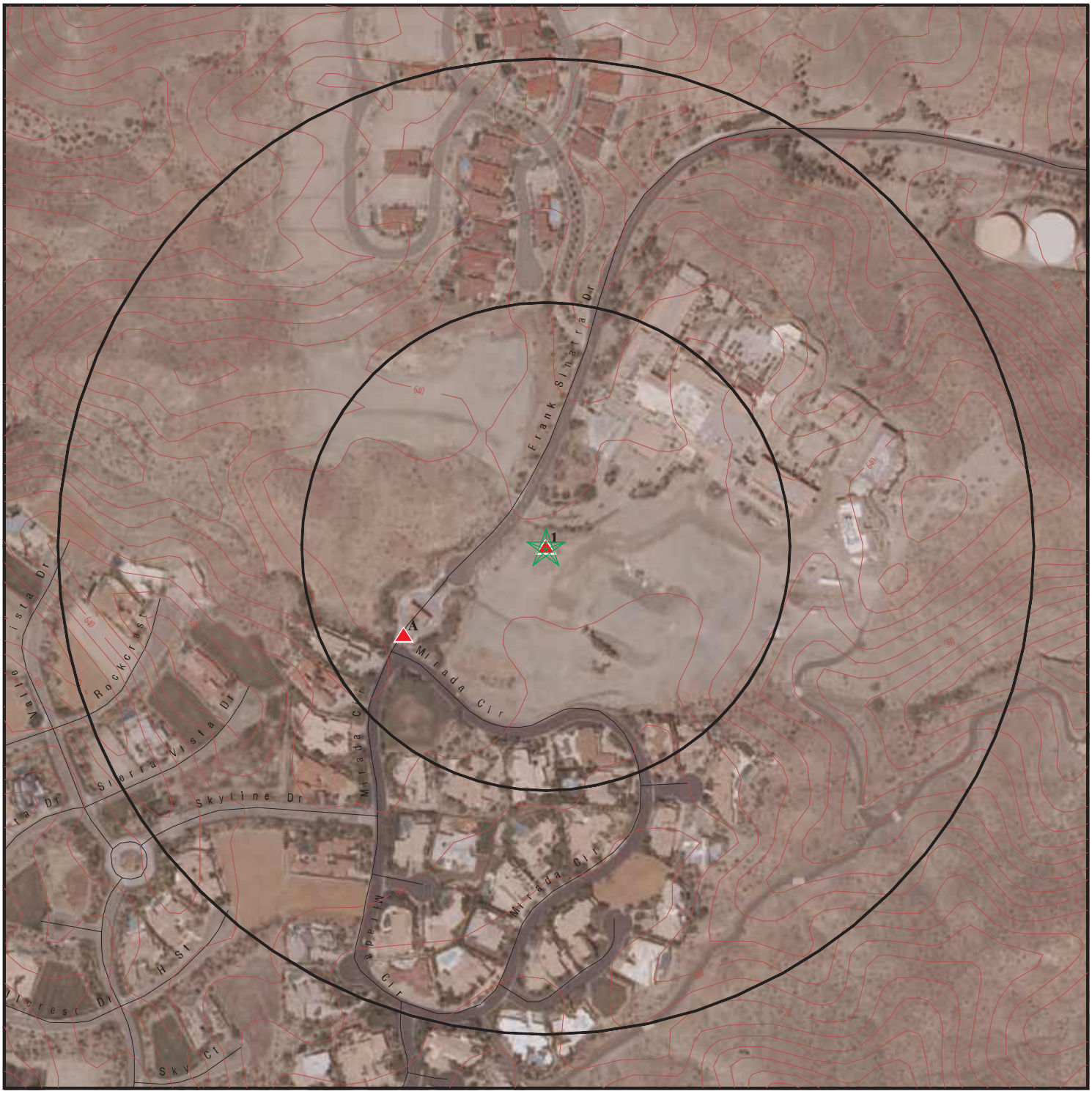
# DETAIL MAP - 3208705.2s




- Target Property
- Toxic Sites
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | | | |
|---|---|---|---|
| SITE NAME: | The Ritz-Carlton Rancho Mirage | CLIENT: | EMG |
| ADDRESS: | 69-730 Highway 111<br>Rancho Mirage CA 92270 | CONTACT: | Jason Swam |
| LAT/LONG: | 33.7665 / 116.4580 | INQUIRY #: | 3208705.2s |
| | | DATE: | November 16, 2011 4:36 pm |

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MAP FINDINGS SUMMARY

| Database | Target Property | Search Distance (Miles) | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| **STANDARD ENVIRONMENTAL RECORDS** | | | | | | | | |
| ***Federal NPL site list*** | | | | | | | | |
| NPL | | 1.250 | 0 | 0 | 0 | 0 | 0 | 0 |
| Proposed NPL | | 1.250 | 0 | 0 | 0 | 0 | 0 | 0 |
| NPL LIENS | | TP | NR | NR | NR | NR | NR | 0 |
| ***Federal Delisted NPL site list*** | | | | | | | | |
| Delisted NPL | | 1.250 | 0 | 0 | 0 | 0 | 0 | 0 |
| ***Federal CERCLIS list*** | | | | | | | | |
| CERCLIS | | 0.750 | 0 | 0 | 0 | 0 | NR | 0 |
| FEDERAL FACILITY | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal CERCLIS NFRAP site List*** | | | | | | | | |
| CERC-NFRAP | | 0.750 | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal RCRA CORRACTS facilities list*** | | | | | | | | |
| CORRACTS | | 1.250 | 0 | 0 | 0 | 0 | 0 | 0 |
| ***Federal RCRA non-CORRACTS TSD facilities list*** | | | | | | | | |
| RCRA-TSDF | | 0.750 | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal RCRA generators list*** | | | | | | | | |
| RCRA-LQG | | 0.375 | 0 | 0 | 0 | NR | NR | 0 |
| RCRA-SQG | | 0.375 | 1 | 0 | 0 | NR | NR | 1 |
| RCRA-CESQG | | 0.375 | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal institutional controls / engineering controls registries*** | | | | | | | | |
| US ENG CONTROLS | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| US INST CONTROL | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| ***Federal ERNS list*** | | | | | | | | |
| ERNS | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| ***State- and tribal - equivalent NPL*** | | | | | | | | |
| RESPONSE | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| ***State- and tribal - equivalent CERCLIS*** | | | | | | | | |
| ENVIROSTOR | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| ***State and tribal landfill and/or solid waste disposal site lists*** | | | | | | | | |
| SWF/LF | | 0.750 | 0 | 0 | 0 | 0 | NR | 0 |
| ***State and tribal leaking storage tank lists*** | | | | | | | | |
| LUST | | 0.750 | 0 | 0 | 0 | 7 | NR | 7 |
| SLIC | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |

MAP FINDINGS SUMMARY

| Database | Target Property | Search Distance (Miles) | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| INDIAN LUST | | 0.750 | 0 | 0 | 0 | 1 | NR | 1 |
| ***State and tribal registered storage tank lists*** | | | | | | | | |
| UST | | 0.375 | 0 | 0 | 0 | NR | NR | 0 |
| AST | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| INDIAN UST | | 0.375 | 0 | 0 | 0 | NR | NR | 0 |
| FEMA UST | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| ***State and tribal voluntary cleanup sites*** | | | | | | | | |
| VCP | | 0.750 | 0 | 0 | 0 | 0 | NR | 0 |
| INDIAN VCP | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| **ADDITIONAL ENVIRONMENTAL RECORDS** | | | | | | | | |
| ***Local Brownfield lists*** | | | | | | | | |
| US BROWNFIELDS | | 0.750 | 0 | 0 | 0 | 0 | NR | 0 |
| ***Local Lists of Landfill / Solid Waste Disposal Sites*** | | | | | | | | |
| DEBRIS REGION 9 | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| ODI | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| WMUDS/SWAT | | 0.750 | 0 | 0 | 0 | 0 | NR | 0 |
| SWRCY | | 0.750 | 0 | 0 | 0 | 0 | NR | 0 |
| HAULERS | | TP | NR | NR | NR | NR | NR | 0 |
| INDIAN ODI | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| ***Local Lists of Hazardous waste / Contaminated Sites*** | | | | | | | | |
| US CDL | | TP | NR | NR | NR | NR | NR | 0 |
| HIST Cal-Sites | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| SCH | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| Toxic Pits | | 1.250 | 0 | 0 | 0 | 0 | 0 | 0 |
| CDL | | TP | NR | NR | NR | NR | NR | 0 |
| US HIST CDL | | TP | NR | NR | NR | NR | NR | 0 |
| ***Local Lists of Registered Storage Tanks*** | | | | | | | | |
| CA FID UST | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| HIST UST | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| SWEEPS UST | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| ***Local Land Records*** | | | | | | | | |
| LIENS 2 | | TP | NR | NR | NR | NR | NR | 0 |
| LUCIS | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| LIENS | | TP | NR | NR | NR | NR | NR | 0 |
| DEED | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| ***Records of Emergency Release Reports*** | | | | | | | | |
| HMIRS | | TP | NR | NR | NR | NR | NR | 0 |
| CHMIRS | | 0.250 | 1 | 0 | NR | NR | NR | 1 |
| LDS | | TP | NR | NR | NR | NR | NR | 0 |

MAP FINDINGS SUMMARY

| Database | Target Property | Search Distance (Miles) | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| MCS | | TP | NR | NR | NR | NR | NR | 0 |
| ***Other Ascertainable Records*** | | | | | | | | |
| RCRA-NonGen | | TP | NR | NR | NR | NR | NR | 0 |
| DOT OPS | | TP | NR | NR | NR | NR | NR | 0 |
| DOD | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| FUDS | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| CONSENT | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| ROD | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| UMTRA | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| MINES | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| TRIS | | TP | NR | NR | NR | NR | NR | 0 |
| TSCA | | TP | NR | NR | NR | NR | NR | 0 |
| FTTS | | TP | NR | NR | NR | NR | NR | 0 |
| HIST FTTS | | TP | NR | NR | NR | NR | NR | 0 |
| SSTS | | TP | NR | NR | NR | NR | NR | 0 |
| ICIS | | TP | NR | NR | NR | NR | NR | 0 |
| PADS | | TP | NR | NR | NR | NR | NR | 0 |
| MLTS | | TP | NR | NR | NR | NR | NR | 0 |
| RADINFO | | TP | NR | NR | NR | NR | NR | 0 |
| FINDS | | TP | NR | NR | NR | NR | NR | 0 |
| RAATS | | TP | NR | NR | NR | NR | NR | 0 |
| CA BOND EXP. PLAN | | 1.250 | 0 | 0 | 0 | 0 | 0 | 0 |
| WDS | | TP | NR | NR | NR | NR | NR | 0 |
| NPDES | | TP | NR | NR | NR | NR | NR | 0 |
| Cortese | | 0.750 | 0 | 0 | 0 | 0 | NR | 0 |
| HIST CORTESE | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| Notify 65 | | 1.250 | 0 | 0 | 0 | 1 | 0 | 1 |
| DRYCLEANERS | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| WIP | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| ENF | | TP | NR | NR | NR | NR | NR | 0 |
| HAZNET | X | TP | NR | NR | NR | NR | NR | 0 |
| EMI | | TP | NR | NR | NR | NR | NR | 0 |
| INDIAN RESERV | | 1.000 | 0 | 0 | 0 | 1 | NR | 1 |
| SCRD DRYCLEANERS | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| PROC | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| FINANCIAL ASSURANCE | | TP | NR | NR | NR | NR | NR | 0 |
| HWP | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| PCB TRANSFORMER | | TP | NR | NR | NR | NR | NR | 0 |
| MWMP | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| COAL ASH DOE | | TP | NR | NR | NR | NR | NR | 0 |
| COAL ASH EPA | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| HWT | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| **EDR PROPRIETARY RECORDS** | | | | | | | | |
| ***EDR Proprietary Records*** | | | | | | | | |
| Manufactured Gas Plants | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| EDR Historical Auto Stations | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| EDR Historical Cleaners | | 0.250 | 0 | 0 | NR | NR | NR | 0 |

## MAP FINDINGS SUMMARY

| Database | Target Property | Search Distance (Miles) | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

**1 HOSPITALITY DENTAL GROUP RANCHO MIRAGE** **HAZNET** **S103957955**
**Target 69-730 HIGHWAY 111 STE 105** **N/A**
**Property RANCHO MIRAGE, CA 92270**

HAZNET:

| | |
|---|---|
| Year: | 2010 |
| Gepaid: | CAL000157220 |
| Contact: | DEBBIE BOTTROFF OFFICE MANAGER |
| Telephone: | 7603218869 |
| Mailing Name: | Not reported |
| Mailing Address: | 69730 US HIGHWAY 111 STE 105 |
| Mailing City,St,Zip: | RANCHO MIRAGE, CA 922700000 |
| Gen County: | Not reported |
| TSD EPA ID: | TXD077603371 |
| TSD County: | Not reported |
| Waste Category: | Off-specification, aged or surplus organics |
| Disposal Method: | FUEL BLENDING PRIOR TO ENERGY RECOVERY AT ANOTHER SITE |
| Tons: | 0.02 |
| Facility County: | Riverside |

| | |
|---|---|
| Year: | 2010 |
| Gepaid: | CAL000157220 |
| Contact: | DEBBIE BOTTROFF OFFICE MANAGER |
| Telephone: | 7603218869 |
| Mailing Name: | Not reported |
| Mailing Address: | 69730 US HIGHWAY 111 STE 105 |
| Mailing City,St,Zip: | RANCHO MIRAGE, CA 922700000 |
| Gen County: | Not reported |
| TSD EPA ID: | CAT000613893 |
| TSD County: | Not reported |
| Waste Category: | Not reported |
| Disposal Method: | STORAGE, BULKING, AND/OR TRANSFER OFF SITE--NO TREATMENT/REOVERY (H010-H129) OR (H131-H135) |
| Tons: | Not reported |
| Facility County: | Riverside |

| | |
|---|---|
| Year: | 2010 |
| Gepaid: | CAL000157220 |
| Contact: | DEBBIE BOTTROFF OFFICE MANAGER |
| Telephone: | 7603218869 |
| Mailing Name: | Not reported |
| Mailing Address: | 69730 US HIGHWAY 111 STE 105 |
| Mailing City,St,Zip: | RANCHO MIRAGE, CA 922700000 |
| Gen County: | Not reported |
| TSD EPA ID: | TXD077603371 |
| TSD County: | Not reported |
| Waste Category: | Off-specification, aged or surplus organics |
| Disposal Method: | FUEL BLENDING PRIOR TO ENERGY RECOVERY AT ANOTHER SITE |
| Tons: | 0.0125 |
| Facility County: | Riverside |

| | |
|---|---|
| Year: | 2010 |
| Gepaid: | CAL000157220 |
| Contact: | DEBBIE BOTTROFF OFFICE MANAGER |
| Telephone: | 7603218869 |
| Mailing Name: | Not reported |
| Mailing Address: | 69730 US HIGHWAY 111 STE 105 |
| Mailing City,St,Zip: | RANCHO MIRAGE, CA 922700000 |
| Gen County: | Not reported |

**HOSPITALITY DENTAL GROUP RANCHO MIRAGE (Continued)** **S103957955**

TSD EPA ID: CAT000613893
TSD County: Not reported
Waste Category: Not reported
Disposal Method: STORAGE, BULKING, AND/OR TRANSFER OFF SITE--NO TREATMENT/REOVERY (H010-H129) OR (H131-H135)
Tons: 0.03336
Facility County: Riverside

Year: 2010
Gepaid: CAL000157220
Contact: DEBBIE BOTTROFF OFFICE MANAGER
Telephone: 7603218869
Mailing Name: Not reported
Mailing Address: 69730 US HIGHWAY 111 STE 105
Mailing City,St,Zip: RANCHO MIRAGE, CA 922700000
Gen County: Not reported
TSD EPA ID: CAT000613893
TSD County: Not reported
Waste Category: Not reported
Disposal Method: STORAGE, BULKING, AND/OR TRANSFER OFF SITE--NO TREATMENT/REOVERY (H010-H129) OR (H131-H135)
Tons: 0.04
Facility County: Riverside

Click this hyperlink while viewing on your computer to access
32 additional CA_HAZNET: record(s) in the EDR Site Report.

---

**IND RES** **AGUA CALIENTE INDIAN RESERVATION** **INDIAN RESERV** **CIND100449**
**Region** **N/A**
**North** **AGUA CALIENTE INDIAN RESE (County), CA**
**1/2-1**
**2707 ft.**

INDIAN RESERV:
Feature: Indian Reservation
Name: Agua Caliente Indian Reservation
Agency: BIA
State: CA

---

**A2** **CHMIRS** **S106396428**
**WSW** **68900 FRANK SINATRA DR.** **N/A**
**< 1/8** **RANCHO MIRAGE, CA**
**0.086 mi.**
**454 ft.** **Site 1 of 2 in cluster A**

CHMIRS:
OES Incident Number: 03-5821
OES notification: 11/10/200306:59:18 AM
OES Date: Not reported
OES Time: Not reported
Incident Date: Not reported
**Date Completed:** **Not reported**
Property Use: Not reported
Agency Id Number: Not reported
Agency Incident Number: Not reported
Time Notified: Not reported

**(Continued)** **S106396428**

| | |
|---|---|
| Time Completed: | Not reported |
| Surrounding Area: | Not reported |
| Estimated Temperature: | Not reported |
| Property Management: | Not reported |
| Special Studies 1: | Not reported |
| Special Studies 2: | Not reported |
| Special Studies 3: | Not reported |
| Special Studies 4: | Not reported |
| Special Studies 5: | Not reported |
| Special Studies 6: | Not reported |
| More Than Two Substances Involved?: | Not reported |
| Resp Agncy Personel # Of Decontaminated: | Not reported |
| Responding Agency Personel # Of Injuries: | Not reported |
| Responding Agency Personel # Of Fatalities: | Not reported |
| Others Number Of Decontaminated: | Not reported |
| Others Number Of Injuries: | Not reported |
| Others Number Of Fatalities: | Not reported |
| Vehicle Make/year: | Not reported |
| Vehicle License Number: | Not reported |
| Vehicle State: | Not reported |
| Vehicle Id Number: | Not reported |
| CA/DOT/PUC/ICC Number: | Not reported |
| Company Name: | Not reported |
| Reporting Officer Name/ID: | Not reported |
| Report Date: | Not reported |
| Comments: | Not reported |
| Facility Telephone: | Not reported |
| Waterway Involved: | Not reported |
| Waterway: | Storm Drain |
| Spill Site: | Not reported |
| Cleanup By: | Co. Health |
| Containment: | Not reported |
| What Happened: | Not reported |
| Type: | Not reported |
| Measure: | Not reported |
| Other: | Not reported |
| Date/Time: | Not reported |
| Year: | 2003 |
| Agency: | Riverside Co. Fire |
| Incident Date: | 11/10/200312:00:00 AM |
| Admin Agency: | Riverside County Environmental Health |
| Amount: | Not reported |
| Contained: | Yes |
| Site Type: | Road |
| E Date: | Not reported |
| Substance: | Diesel |
| Quantity Released: | Not reported |
| BBLS: | 0 |
| Cups: | 0 |
| CUFT: | 0 |
| Gallons: | 1 |
| Grams: | 0 |
| Pounds: | 0 |
| Liters: | 0 |
| Ounces: | 0 |
| Pints: | 0 |
| Quarts: | 0 |

**(Continued)** **S106396428**

| | |
|---|---|
| Sheen: | 0 |
| Tons: | 0 |
| Unknown: | 0 |
| Evacuations: | 0 |
| Number of Injuries: | 0 |
| Number of Fatalities: | 0 |
| Description: | Released from a truck's saddle tank, due to a solo vehicle accident. |

---

**A3** **RITZ CARLTON** **RCRA-SQG** **1000685878**
**WSW** **68900 FRANK SINATRA DR** **CAD983626011**
**< 1/8** **RANCHO MIRAGE, CA 92270**
**0.086 mi.**
**454 ft.** **Site 2 of 2 in cluster A**

RCRA-SQG:

| | |
|---|---|
| Date form received by agency: | 03/25/1992 |
| Facility name: | RITZ CARLTON |
| Facility address: | 68900 FRANK SINATRA DR<br>RANCHO MIRAGE, CA 92270 |
| EPA ID: | CAD983626011 |
| Contact: | NELSON TICMAN |
| Contact address: | 68900 FRANK SINATRA DR<br>RANCHO MIRAGE, CA 92270 |
| Contact country: | US |
| Contact telephone: | (619) 321-8282 |
| Contact email: | Not reported |
| EPA Region: | 09 |
| Classification: | Small Small Quantity Generator |
| Description: | Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time |

Owner/Operator Summary:

| | |
|---|---|
| Owner/operator name: | RITZ CARLTON CORP |
| Owner/operator address: | 68900 FRANK SINATRA DR<br>RANCHO MIRAGE, CA 92270 |
| Owner/operator country: | Not reported |
| Owner/operator telephone: | (619) 321-8282 |
| Legal status: | Private |
| Owner/Operator Type: | Owner |
| Owner/Op start date: | Not reported |
| Owner/Op end date: | Not reported |

Handler Activities Summary:

| | |
|---|---|
| U.S. importer of hazardous waste: | No |
| Mixed waste (haz. and radioactive): | No |
| Recycler of hazardous waste: | No |
| Transporter of hazardous waste: | No |
| Treater, storer or disposer of HW: | No |
| Underground injection activity: | No |
| On-site burner exemption: | No |
| Furnace exemption: | No |
| Used oil fuel burner: | No |
| Used oil processor: | No |
| User oil refiner: | No |

**RITZ CARLTON (Continued)** **1000685878**

Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Violation Status: No violations found

---

**B4** **PALM SPRINGS MOTOR** **LUST** **S103820968**
**NNE** **69200 HWY 111** **N/A**
**1/2-1** **CATHEDRAL CITY, CA**
**0.727 mi.**
**3839 ft.** **Site 1 of 2 in cluster B**

RIVERSIDE CO. LUST:
Region: RIVERSIDE
Facility ID: 94180
Site Closed: Yes
Date Closed: 6/9/1994
Case Type: Soil only

---

**B5** **PALM SPRINGS FORD MOTORS** **LUST** **S106152961**
**NNE** **69200 HIGHWAY 111** **N/A**
**1/2-1** **CATHEDRAL CITY, CA 92234**
**0.729 mi.**
**3851 ft.** **Site 2 of 2 in cluster B**

LUST:
Region: STATE
Global Id: T0606500917
Latitude: 33.7764445
Longitude: -116.4534234
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 09/06/1994
Lead Agency: RIVERSIDE COUNTY LOP
Case Worker: RIV
Local Agency: RIVERSIDE COUNTY LOP
RB Case Number: 7T2234013
LOC Case Number: 94180
File Location: Local Agency Warehouse
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

LUST:
Global Id: T0606500917
Contact Type: Regional Board Caseworker
Contact Name: Phan Le
Organization Name: COLORADO RIVER BASIN RWQCB (REGION 7)
Address: 73720 FRED WARING DRIVE SUITE #100
City: PALM DESERT
Email: ple@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0606500917
Contact Type: Local Agency Caseworker

**PALM SPRINGS FORD MOTORS (Continued)** **S106152961**

Contact Name: Riverside County LOP Closed Cases
Organization Name: RIVERSIDE COUNTY LOP
Address: PO Box 1280
City: RIVERSIDE
Email: Not reported
Phone Number: 9519558982

LUST:
Global Id: T0606500917
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Reported

Global Id: T0606500917
Action Type: ENFORCEMENT
Date: 1994-06-08 00:00:00
Action: File review - #RCDEH Upload Site File 7/28/2010

Global Id: T0606500917
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Stopped

Global Id: T0606500917
Action Type: ENFORCEMENT
Date: 1994-06-09 00:00:00
Action: Closure/No Further Action Letter - #Riv Co Closure

Global Id: T0606500917
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Discovery

LUST REG 7:
Region: 7
Status: 9 - Case Closed
Case Num: 7T2234013
Substance: Gasoline - Automotive
ID: 1060
Global ID: T0606500917
Lead Agency: Local Agency
Case Worker: KO

---

**C6** **RANCHO MIRAGE HAND CAR WASH** **LUST** **S107619892**
**ENE** **69800 HIGHWAY 111** **N/A**
**1/2-1** **RANCHO MIRAGE, CA 92270**
**0.735 mi.**
**3883 ft.** **Site 1 of 3 in cluster C**

LUST:
Region: STATE
Global Id: T0606521582
Latitude: 33.772112
Longitude: -116.446681
Case Type: LUST Cleanup Site
Status: Completed - Case Closed

**RANCHO MIRAGE HAND CAR WASH (Continued)** **S107619892**

| | |
|---|---|
| Status Date: | 10/15/2007 |
| Lead Agency: | RIVERSIDE COUNTY LOP |
| Case Worker: | LS |
| Local Agency: | RIVERSIDE COUNTY LOP |
| RB Case Number: | Not reported |
| LOC Case Number: | 200622177 |
| File Location: | Local Agency |
| Potential Media Affect: | Soil |
| Potential Contaminants of Concern: | Gasoline |
| Site History: | Not reported |

Click here to access the California GeoTracker records for this facility:

LUST:

| | |
|---|---|
| Global Id: | T0606521582 |
| Contact Type: | Local Agency Caseworker |
| Contact Name: | LINDA SHURLOW |
| Organization Name: | RIVERSIDE COUNTY LOP |
| Address: | 47950 Arabia Street, Suite A |
| City: | Indio |
| Email: | lshurlow@rivcocha.org |
| Phone Number: | 7608637570 |

| | |
|---|---|
| Global Id: | T0606521582 |
| Contact Type: | Regional Board Caseworker |
| Contact Name: | Phan Le |
| Organization Name: | COLORADO RIVER BASIN RWQCB (REGION 7) |
| Address: | 73720 FRED WARING DRIVE SUITE #100 |
| City: | PALM DESERT |
| Email: | ple@waterboards.ca.gov |
| Phone Number: | Not reported |

LUST:

| | |
|---|---|
| Global Id: | T0606521582 |
| Action Type: | ENFORCEMENT |
| Date: | 2006-07-10 00:00:00 |
| Action: | Staff Letter - #071006 |

| | |
|---|---|
| Global Id: | T0606521582 |
| Action Type: | ENFORCEMENT |
| Date: | 2006-09-28 00:00:00 |
| Action: | Staff Letter - #092806 |

| | |
|---|---|
| Global Id: | T0606521582 |
| Action Type: | Other |
| Date: | 1950-01-01 00:00:00 |
| Action: | Leak Reported |

| | |
|---|---|
| Global Id: | T0606521582 |
| Action Type: | RESPONSE |
| Date: | 2006-10-07 00:00:00 |
| Action: | Verbal Communication |

| | |
|---|---|
| Global Id: | T0606521582 |
| Action Type: | ENFORCEMENT |
| Date: | 2007-10-15 00:00:00 |
| Action: | Closure/No Further Action Letter - #RCDEH 101507 |

**RANCHO MIRAGE HAND CAR WASH (Continued)** **S107619892**

Global Id: T0606521582
Action Type: REMEDIATION
Date: 1950-01-01 00:00:00
Action: Not reported

Global Id: T0606521582
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Stopped

Global Id: T0606521582
Action Type: RESPONSE
Date: 2000-09-10 00:00:00
Action: Preliminary Site Assessment Workplan

Global Id: T0606521582
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Discovery

---

**C7** **RANCHO MIRAGE HAND CAR WASH** **LUST** **U003865001**
**ENE** **69800 HWY 111** **N/A**
**1/2-1** **RANCHO MIRAGE, CA**
**0.735 mi.**
**3883 ft.** **Site 2 of 3 in cluster C**

RIVERSIDE CO. LUST:
Region: RIVERSIDE
Facility ID: 200622177
Site Closed: Yes
Date Closed: 10/15/2007
Case Type: Soil only

---

**C8** **EXXON STATION #7-3156** **LUST** **S105025670**
**ENE** **69800 111** **N/A**
**1/2-1** **RANCHO MIRAGE, CA 92270**
**0.735 mi.**
**3883 ft.** **Site 3 of 3 in cluster C**

LUST:
Region: STATE
Global Id: T0606501061
Latitude: 33.7707317
Longitude: -116.4431382
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 07/16/1991
Lead Agency: COLORADO RIVER BASIN RWQCB (REGION 7)
Case Worker: PL
Local Agency: RIVERSIDE COUNTY LOP
RB Case Number: 7T2270003
LOC Case Number: Not reported
File Location: Not reported
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline

**EXXON STATION #7-3156 (Continued)** **S105025670**

Site History: Not reported

Click here to access the California GeoTracker records for this facility:

LUST:
Global Id: T0606501061
Contact Type: Regional Board Caseworker
Contact Name: Phan Le
Organization Name: COLORADO RIVER BASIN RWQCB (REGION 7)
Address: 73720 FRED WARING DRIVE SUITE #100
City: PALM DESERT
Email: ple@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0606501061
Contact Type: Local Agency Caseworker
Contact Name: Riverside County LOP Closed Cases
Organization Name: RIVERSIDE COUNTY LOP
Address: PO Box 1280
City: RIVERSIDE
Email: Not reported
Phone Number: 9519558982

LUST:
Global Id: T0606501061
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Reported

LUST REG 7:
Region: 7
Status: 9 - Case Closed
Case Num: 7T2270003
Substance: Gasoline - Automotive
ID: 740
Global ID: T0606501061
Lead Agency: Local Agency
Case Worker: KO

---

**D9** **CATHEDRAL CITY OIL (NOW EQUILION WAS SHELL)** **INDIAN LUST** **1011869667**
**North** **69010 HWY 111** **N/A**
**1/2-1** **CATHEDRAL CITY, CA 92234**
**0.748 mi.**
**3949 ft.** **Site 1 of 3 in cluster D**

INDIAN LUST:
Facility ID: 610
Region: 9
Alt Facility ID: AGUA006
Tribe Name: AGUA CALIENTE
LUST Status: CLEANUP COMPLETED
LUST Status Date: 2/25/2004

Facility ID: 610
Region: 9
Alt Facility ID: AGUA006

**CATHEDRAL CITY OIL (NOW EQUILION WAS SHELL) (Continued)** **1011869667**

Tribe Name: AGUA CALIENTE
LUST Status: CLEANUP INITIATED
LUST Status Date: 2/23/2004

Facility ID: 610
Region: 9
Alt Facility ID: AGUA006
Tribe Name: AGUA CALIENTE
LUST Status: CONFIRMED RELEASE
LUST Status Date: 2/23/2004

---

**D10** **SHELL STATION** **LUST** **S106152983**
**North** **69010 HIGHWAY 111** **N/A**
**1/2-1** **CATHEDRAL CITY, CA 92234**
**0.748 mi.**
**3949 ft.** **Site 2 of 3 in cluster D**

LUST:
Region: STATE
Global Id: T0606500910
Latitude: 33.7781965
Longitude: -116.4581485
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 09/13/1996
Lead Agency: RIVERSIDE COUNTY LOP
Case Worker: RIV
Local Agency: RIVERSIDE COUNTY LOP
RB Case Number: 7T2234006
LOC Case Number: 89936
File Location: Local Agency Warehouse
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

LUST:
Global Id: T0606500910
Contact Type: Regional Board Caseworker
Contact Name: Phan Le
Organization Name: COLORADO RIVER BASIN RWQCB (REGION 7)
Address: 73720 FRED WARING DRIVE SUITE #100
City: PALM DESERT
Email: ple@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0606500910
Contact Type: Local Agency Caseworker
Contact Name: Riverside County LOP Closed Cases
Organization Name: RIVERSIDE COUNTY LOP
Address: PO Box 1280
City: RIVERSIDE
Email: Not reported
Phone Number: 9519558982

LUST:
Global Id: T0606500910

**SHELL STATION (Continued)** **S106152983**

| | |
|---|---|
| Action Type: | Other |
| Date: | 1950-01-01 00:00:00 |
| Action: | Leak Reported |
| | |
| Global Id: | T0606500910 |
| Action Type: | Other |
| Date: | 1950-01-01 00:00:00 |
| Action: | Leak Stopped |
| | |
| Global Id: | T0606500910 |
| Action Type: | ENFORCEMENT |
| Date: | 1997-04-20 00:00:00 |
| Action: | File review - #RCDEH Upload Site File 10/19/2010 |
| | |
| Global Id: | T0606500910 |
| Action Type: | ENFORCEMENT |
| Date: | 1997-04-21 00:00:00 |
| Action: | Closure/No Further Action Letter - #Riv Co Closure |
| | |
| Global Id: | T0606500910 |
| Action Type: | Other |
| Date: | 1950-01-01 00:00:00 |
| Action: | Leak Discovery |

LUST REG 7:

| | |
|---|---|
| Region: | 7 |
| Status: | 9 - Case Closed |
| Case Num: | 7T2234006 |
| Substance: | Gasoline - Automotive |
| ID: | 1142 |
| Global ID: | T0606500910 |
| Lead Agency: | Local Agency |
| Case Worker: | KO |

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**D11** **SHELL STATION** **LUST** **S105023150**
**North** **69010 111** **N/A**
**1/2-1** **CATHEDRAL CITY, CA 92234**
**0.748 mi.**
**3949 ft.** **Site 3 of 3 in cluster D**

LUST:

| | |
|---|---|
| Region: | STATE |
| Global Id: | T0606512976 |
| Latitude: | 33.778092686 |
| Longitude: | -116.457633778 |
| Case Type: | LUST Cleanup Site |
| Status: | Completed - Case Closed |
| Status Date: | 08/26/2010 |
| Lead Agency: | RIVERSIDE COUNTY LOP |
| Case Worker: | LS |
| Local Agency: | RIVERSIDE COUNTY LOP |
| RB Case Number: | 7t2234032 |
| LOC Case Number: | 200420469 |
| File Location: | Local Agency |
| Potential Media Affect: | Aquifer used for drinking water supply |
| Potential Contaminants of Concern: | Gasoline |

**SHELL STATION (Continued)** **S105023150**

Site History: ***Data prior to 2005 does not appear in GeoTracker. Consult agency file for all site data*** On February 23, 2004, 3-12K gasoline and 1-500 gallon waste oil tank were removed. Up to 1400 ppm TPHg was detected at 3? under dispenser 5, 36 ppb MTBE at 14? in the tank pit, 42 ppm TBA at 14? in the tank pit and 1.5 ppm ethanol at 14? in the tank pit. On March 13, 2004 the tank pit was over excavated down to 19?. Up to 51 ppm TBA was detected at the bottom of the pit. 5 borings were drilled October 24-28, 2005 to 100-140?. All borings had TPHd, up to 53 ppm. All borings had TPHg, up to 7.8 ppm. All borings had MTBE, up to 13 ppm, and all borings had TBA, up to 52 ppm. Detectable concentrations of hydrocarbons were detected to 140? where the boring was terminated. Two borings were converted to dual nested vapor wells. VE-1 was screened from 15-25? and 30-45?. VE-2 was screened from 15-30? and 35-45?. Monitoring well MW-1 was drilled March 23-24, 2006. Groundwater was encountered at 193?. Up to 0.21 ppm MTBE was detected in the soil. A grab water sample was obtained prior to development and 48 ppb MTBE was detected. A water sample was taken on March 29, 2006 and showed 11 ppb MTBE. Based on the results of the grab sample, one additional boring and two additional wells were installed March 30 through April 5, 2006. Up to 8.6 ppm MTBE and 210 ppm TBA was detected in the soils. An additional boring was drilled June 5, 2006 to 100? near the north property line. 10 ppm TPHd was detected at 10? and 2.5 ppm naphthalene was detected at 35?. Another boring was drilled in the old tank pit to 45? and a nested SVE well was installed, screened from 22-27 and 35-45?. A maximum of 2.4 ppm TPHg was detected at 35?, MTBE was detected to a maximum of 0.82 to 30? and TBA was detected t a maximum of 90 ppm at 30?. SVE-4 was installed April 14, 2006 as a dual nested SVE well screened from 15-30? and 35-45?. TPHg was detected in the 30-45? samples with a maximum of 4.8 ppm. Benzene was detected at 40? at 4.6 ppb. MTBE was detected from 25-45? with a maximum of 0.3 ppm. TBA was detected from 30-45? with a maximum of 2.4 ppm. Low levels of VOC?s were detected. The SVE system began operating September 25, 2006 using all 4 SVE wells and was run until June 25, 2007 when a rebound test was successfully completed. Influent TPHg went from 74 ppmv to ND<3 ppm. MTBE went from 56 ppmv to 0.07 ppmv. TBA went from 15 ppmv to ND<0.002 ppmv. Ethanol went from 0.014 to 0.0084 ppmv. Case closed 08/26/2010 following well abandonments

Click here to access the California GeoTracker records for this facility:

LUST:

| | |
|---|---|
| Global Id: | T0606512976 |
| Contact Type: | Local Agency Caseworker |
| Contact Name: | LINDA SHURLOW |
| Organization Name: | RIVERSIDE COUNTY LOP |
| Address: | 47950 Arabia Street, Suite A |
| City: | Indio |
| Email: | lshurlow@rivcocha.org |
| Phone Number: | 7608637570 |

| | |
|---|---|
| Global Id: | T0606512976 |
| Contact Type: | Regional Board Caseworker |
| Contact Name: | KAI DUNN |
| Organization Name: | COLORADO RIVER BASIN RWQCB (REGION 7) |
| Address: | 73-720 FRED WARING DR. STE 100 |
| City: | PALM DESERT |

**SHELL STATION (Continued)** **S105023150**

Email: kdunn@waterboards.ca.gov
Phone Number: Not reported

LUST:

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2008-07-11 00:00:00
Action: File review

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2008-03-21 00:00:00
Action: Staff Letter - #032108

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2008-01-09 00:00:00
Action: Staff Letter - #010908

Global Id: T0606512976
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Reported

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2007-07-22 00:00:00
Action: Staff Letter - #072307

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2008-04-29 00:00:00
Action: File review

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2007-04-24 00:00:00
Action: File review

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2008-01-24 00:00:00
Action: File review

Global Id: T0606512976
Action Type: RESPONSE
Date: 2008-08-15 00:00:00
Action: Other Report / Document

Global Id: T0606512976
Action Type: RESPONSE
Date: 2007-11-18 00:00:00
Action: Other Workplan

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2009-07-14 00:00:00

**SHELL STATION (Continued)** **S105023150**

Action: File review

Global Id: T0606512976
Action Type: RESPONSE
Date: 2010-01-15 00:00:00
Action: Monitoring Report - Quarterly

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2010-06-02 00:00:00
Action: Staff Letter - #RCDEH 060210

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2008-10-29 00:00:00
Action: Technical Correspondence / Assistance / Other

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2009-04-29 00:00:00
Action: Staff Letter - #RCDEH042909

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2007-03-14 00:00:00
Action: Staff Letter - #031407

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2007-11-26 00:00:00
Action: Staff Letter - #112607

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2007-10-15 00:00:00
Action: File review

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2009-04-08 00:00:00
Action: File review

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2009-08-04 00:00:00
Action: Staff Letter - #Riv Co 080409

Global Id: T0606512976
Action Type: REMEDIATION
Date: 1950-01-01 00:00:00
Action: Soil Vapor Extraction w/Other

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2004-07-15 00:00:00
Action: Technical Correspondence / Assistance / Other

**SHELL STATION (Continued)** **S105023150**

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2007-07-30 00:00:00
Action: File review

Global Id: T0606512976
Action Type: RESPONSE
Date: 2010-08-06 00:00:00
Action: Well Destruction Report

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2010-08-26 00:00:00
Action: Closure/No Further Action Letter - #RCDEH Closure

Global Id: T0606512976
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Stopped

Global Id: T0606512976
Action Type: RESPONSE
Date: 2008-01-15 00:00:00
Action: Other Workplan

Global Id: T0606512976
Action Type: RESPONSE
Date: 2010-06-10 00:00:00
Action: Request for Closure

Global Id: T0606512976
Action Type: RESPONSE
Date: 2007-09-23 00:00:00
Action: Other Report / Document

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2007-10-03 00:00:00
Action: Staff Letter - #100307

Global Id: T0606512976
Action Type: ENFORCEMENT
Date: 2009-01-12 00:00:00
Action: File review

Global Id: T0606512976
Action Type: RESPONSE
Date: 2009-10-15 00:00:00
Action: Monitoring Report - Quarterly

Global Id: T0606512976
Action Type: RESPONSE
Date: 2010-04-15 00:00:00
Action: Monitoring Report - Annually

Global Id: T0606512976
Action Type: ENFORCEMENT

**SHELL STATION (Continued)** **S105023150**

Date: 2008-10-15 00:00:00
Action: File review

Global Id: T0606512976
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Discovery

RIVERSIDE CO. LUST:
Region: RIVERSIDE
Facility ID: 200420469
Site Closed: Yes
Date Closed: 8/26/2010
Case Type: Drinking Water Aquifer affected

Region: RIVERSIDE
Facility ID: 89936
Site Closed: Yes
Date Closed: 4/21/1997
Case Type: Soil only

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**12**
**North**
**1/2-1**
**0.828 mi.**
**4373 ft.**

**SHELL OIL SERVICE STATION** **Notify 65** **S100178944**
**69010 HWY 111 @ DATE PLAM** **N/A**
**CATHEDRAL CITY, CA 92234**

Notify 65:
Date Reported: Not reported
Staff Initials: Not reported
Board File Number: Not reported
Facility Type: Not reported
Discharge Date: Not reported
Incident Description: 92234-1423

Count: 20 records. ORPHAN SUMMARY

| City | EDR ID | Site Name | Site Address | Zip | Database(s) |
|---|---|---|---|---|---|
| EL CENTRO | 1000168872 | NAVAL AIR FACILITY EL CENTRO | 1605 THIRD STREET BLDG 504 | 92243 | CERCLIS-NFRAP,RCRA-LQG,FINDS |
| RANCHO | 1000360734 | AMERICAN INDUSTRIAL MFG | 28780 SINGLE OAK DR | 92390 | RCRA-SQG,FINDS,HAZNET |
| PALM DESERT | 1005415592 | GLIDDEN COMPANY | 41 905 BOARDWALK M 1 | 92264 | RCRA-SQG,FINDS |
| RANCHO MIRAGE | 1008303088 | RANCHO MIRAGE ELEMENTARY | 42-985 INDIAN TRAIL ROAD | 92270 | FINDS |
| CATHEDRAL CITY | 1012175452 | DESERT SHADOWS RV RESORT | 69-8011 RAMON ROAD | 92234 | RCRA-CESQG |
| CATHEDRAL CITY | A100324092 | JESSUP AUTO PLAZA | 66-111 HIGHWAY 111 | 92234 | AST |
| | M300000942 | TXI RIVERSIDE CEMENT | CRESTMORE PLANT | | MINES |
| | M300001891 | WHITEWATER ROCK & SUPPLY CO | PAINTED HILLS OPERATION | | MINES |
| | M300002115 | AUDREY LYNN MINE | AUDREY LYNN MINE | | MINES |
| | M300002452 | PACIFIC CLAY PRODS CO | RIVERSIDE COUNTY PITS (5 OPERA | | MINES |
| | M300003129 | FOSTER SAND & GRAVEL CO. | MAITRI CANYON PLANT | | MINES |
| | M300003130 | WHITEWATER ROCK & SUPPLY CO. | SAND & GRAVEL OPERATION | | MINES |
| | M300003131 | GRANITE CONSTRUCTION CO. | INDIO AGGREGATE PLANT | | MINES |
| | M300003132 | ELSINORE READY MIX CO., INC. | ELSINORE PIT | | MINES |
| | M300003133 | ROBERTSONS READY MIX, INC. | CABAZON PIT | | MINES |
| | M300003144 | WYROC, INC. | WYROC LAKE STREET PLANT | | MINES |
| CATHEDRAL CITY | S103820748 | KAY OLESEN | 68384 HWY 111 | | LUST SAN MATEO |
| CATHEDRAL CITY | S103821044 | WASH (THE) | 67790 HWY 111 | | LUST SAN MATEO |
| RANCHO MIRAGE | S105025669 | CA PARKS & REC SALTON SEA | HWY 111 | | HIST CORTESE |
| RANCHO MIRAGE | S108202282 | CITY OF RANCHO MIRAGE | 71939 HWY 111/71842 SAHARA RD | 92270 | HAZNET |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

**Number of Days to Update:** Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

**STANDARD ENVIRONMENTAL RECORDS**

***Federal NPL site list***

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 06/30/2011
Date Data Arrived at EDR: 07/12/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 79

Source: EPA
Telephone: N/A
Last EDR Contact: 10/12/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 06/30/2011
Date Data Arrived at EDR: 07/12/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 79

Source: EPA
Telephone: N/A
Last EDR Contact: 10/12/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

***Federal Delisted NPL site list***

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 06/30/2011
Date Data Arrived at EDR: 07/12/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 79

Source: EPA
Telephone: N/A
Last EDR Contact: 10/12/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Quarterly

***Federal CERCLIS list***

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 02/25/2011
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 12/10/2010
Date Data Arrived at EDR: 01/11/2011
Date Made Active in Reports: 02/16/2011
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 10/14/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Varies

***Federal CERCLIS NFRAP site List***

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 02/25/2011
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Quarterly

***Federal RCRA CORRACTS facilities list***

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/09/2011
Date Data Arrived at EDR: 03/15/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 91

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: Quarterly

***Federal RCRA non-CORRACTS TSD facilities list***

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/15/2011
Date Data Arrived at EDR: 07/07/2011
Date Made Active in Reports: 08/08/2011
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 10/05/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Quarterly

***Federal RCRA generators list***

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/15/2011
Date Data Arrived at EDR: 07/07/2011
Date Made Active in Reports: 08/08/2011
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 10/05/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 06/15/2011
Date Data Arrived at EDR: 07/07/2011
Date Made Active in Reports: 08/08/2011
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 10/05/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/15/2011
Date Data Arrived at EDR: 07/07/2011
Date Made Active in Reports: 08/08/2011
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 10/05/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Varies

***Federal institutional controls / engineering controls registries***

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/16/2011
Date Data Arrived at EDR: 03/25/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/16/2011
Date Data Arrived at EDR: 03/25/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Varies

***Federal ERNS list***

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 10/03/2011
Date Data Arrived at EDR: 10/04/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 38

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 10/04/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Annually

***State- and tribal - equivalent NPL***

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 09/13/2011
Date Data Arrived at EDR: 09/15/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 39

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/08/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Quarterly

***State- and tribal - equivalent CERCLIS***

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 09/13/2011
Date Data Arrived at EDR: 09/15/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 39

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/08/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Quarterly

***State and tribal landfill and/or solid waste disposal site lists***

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 08/22/2011
Date Data Arrived at EDR: 08/24/2011
Date Made Active in Reports: 10/03/2011
Number of Days to Update: 40

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 08/24/2011
Next Scheduled EDR Contact: 12/05/2011
Data Release Frequency: Quarterly

***State and tribal leaking storage tank lists***

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Quarterly

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 09/19/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 34

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 11/10/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/19/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 34

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/10/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 11/02/2011
Date Data Arrived at EDR: 11/04/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 7
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/01/2011
Date Data Arrived at EDR: 11/01/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 10
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 11/01/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/18/2011
Date Data Arrived at EDR: 08/19/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 25
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 59
Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 08/11/2011
Date Data Arrived at EDR: 08/12/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 32
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Semi-Annually

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/31/2011
Date Data Arrived at EDR: 02/01/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 48
Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 02/16/2011
Date Data Arrived at EDR: 06/02/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 103
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

***State and tribal registered storage tank lists***

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 09/19/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/19/2011
Number of Days to Update: 29

Source: SWRCB
Telephone: 916-480-1028
Last EDR Contact: 11/10/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 916-341-5712
Last EDR Contact: 10/11/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 11/02/2011
Date Data Arrived at EDR: 11/04/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 7

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 08/04/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 39

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 08/18/2011
Date Data Arrived at EDR: 08/19/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 25

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/01/2011
Date Data Arrived at EDR: 06/01/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 13

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/10/2011
Date Data Arrived at EDR: 05/11/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 34

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 07/01/2011
Date Data Arrived at EDR: 08/26/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 18

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 08/11/2011
Date Data Arrived at EDR: 08/12/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 32

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/01/2011
Date Data Arrived at EDR: 11/01/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 10

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 10/17/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Varies

***State and tribal voluntary cleanup sites***

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 09/13/2011
Date Data Arrived at EDR: 09/15/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 39

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/08/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 08/04/2011
Date Data Arrived at EDR: 10/04/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 38

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 10/04/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Varies

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Brownfield lists***

US BROWNFIELDS: A Listing of Brownfields Sites
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 06/27/2011
Date Data Arrived at EDR: 06/27/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 78

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 09/28/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: Semi-Annually

***Local Lists of Landfill / Solid Waste Disposal Sites***

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: No Update Planned

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 34

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 09/20/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 09/14/2011
Date Data Arrived at EDR: 09/15/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 39

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/05/2011
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 11/07/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Varies

***Local Lists of Hazardous waste / Contaminated Sites***

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 06/08/2011
Date Data Arrived at EDR: 09/16/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 13

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 09/07/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 09/13/2011
Date Data Arrived at EDR: 09/15/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 39

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/08/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 06/30/2011
Date Data Arrived at EDR: 08/11/2011
Date Made Active in Reports: 09/09/2011
Number of Days to Update: 29

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 10/03/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

***Local Lists of Registered Storage Tanks***

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8
Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18
Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing
Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35
Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

***Local Land Records***

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 09/09/2011
Date Data Arrived at EDR: 09/16/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 13
Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

LUCIS: Land Use Control Information System
LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31
Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 07/11/2011
Next Scheduled EDR Contact: 09/05/2011
Data Release Frequency: Varies

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 09/19/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 34
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 24

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 09/13/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

***Records of Emergency Release Reports***

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 10/04/2011
Date Data Arrived at EDR: 10/04/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 38

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 10/04/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 05/03/2011
Date Made Active in Reports: 06/15/2011
Number of Days to Update: 43

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 09/19/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 34

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/10/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 09/19/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 34

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 11/10/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

***Other Ascertainable Records***

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 06/15/2011
Date Data Arrived at EDR: 07/07/2011
Date Made Active in Reports: 08/08/2011
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 10/05/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/29/2011
Date Data Arrived at EDR: 08/09/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 94

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 11/08/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 10/20/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 08/12/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 112

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 06/01/2011
Date Data Arrived at EDR: 08/19/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 41

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 10/03/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 07/31/2011
Date Data Arrived at EDR: 09/14/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 15

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 09/14/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/21/2010
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 99

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/18/2011
Date Data Arrived at EDR: 09/08/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 21

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 09/08/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/17/2010
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 94

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 09/27/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/07/2011
Date Data Arrived at EDR: 01/21/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 59

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 11/01/2010
Date Data Arrived at EDR: 11/10/2010
Date Made Active in Reports: 02/16/2011
Number of Days to Update: 98

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 10/19/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 06/21/2011
Date Data Arrived at EDR: 07/15/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 60

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/11/2011
Date Data Arrived at EDR: 01/13/2011
Date Made Active in Reports: 02/16/2011
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 10/13/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/14/2010
Date Data Arrived at EDR: 04/16/2010
Date Made Active in Reports: 05/27/2010
Number of Days to Update: 41

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 09/13/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Quarterly

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 08/23/2011
Date Data Arrived at EDR: 08/24/2011
Date Made Active in Reports: 10/03/2011
Number of Days to Update: 40

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 08/24/2011
Next Scheduled EDR Contact: 12/05/2011
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 10/03/2011
Date Data Arrived at EDR: 10/04/2011
Date Made Active in Reports: 10/25/2011
Number of Days to Update: 21

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 10/04/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES].

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records

Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 06/28/2011
Date Data Arrived at EDR: 07/21/2011
Date Made Active in Reports: 08/11/2011
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Annually

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 10/03/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 08/15/2011
Date Data Arrived at EDR: 08/23/2011
Date Made Active in Reports: 10/03/2011
Number of Days to Update: 41

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 07/19/2011
Date Made Active in Reports: 08/16/2011
Number of Days to Update: 28

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 10/17/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 19

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 09/30/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 10/20/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 10/24/2011
Next Scheduled EDR Contact: 02/06/2012
Data Release Frequency: Varies

PROC: Certified Processors Database

A listing of certified processors.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 34

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 09/20/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 09/09/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 10/10/2011
Number of Days to Update: 27

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 10/18/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 08/17/2010
Date Data Arrived at EDR: 01/03/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 09/16/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 10/20/2011
Date Data Arrived at EDR: 10/21/2011
Date Made Active in Reports: 11/08/2011
Number of Days to Update: 18

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 10/21/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 08/09/2010
Date Data Arrived at EDR: 08/11/2010
Date Made Active in Reports: 08/20/2010
Number of Days to Update: 9
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Quarterly

FINANCIAL ASSURANCE 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 09/14/2011
Date Data Arrived at EDR: 09/16/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 38
Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 09/14/2011
Next Scheduled EDR Contact: 12/05/2011
Data Release Frequency: Varies

FINANCIAL ASSURANCE 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 03/01/2007
Date Data Arrived at EDR: 06/01/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 28
Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 11/04/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands
Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339
Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 10/20/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: N/A

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 01/01/2008
Date Data Arrived at EDR: 02/18/2009
Date Made Active in Reports: 05/29/2009
Number of Days to Update: 100
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 11/04/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

**EDR PROPRIETARY RECORDS**

***EDR Proprietary Records***

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Historical Auto Stations: EDR Proprietary Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Historical Cleaners: EDR Proprietary Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

**COUNTY RECORDS**

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 10/10/2011
Date Data Arrived at EDR: 10/11/2011
Date Made Active in Reports: 11/09/2011
Number of Days to Update: 29

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 10/03/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 10/10/2011
Date Data Arrived at EDR: 10/11/2011
Date Made Active in Reports: 11/14/2011
Number of Days to Update: 34

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 10/03/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Semi-Annually

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 03/29/2011
Date Data Arrived at EDR: 04/20/2011
Date Made Active in Reports: 05/17/2011
Number of Days to Update: 27

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Varies

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 12/01/2010
Date Data Arrived at EDR: 04/20/2011
Date Made Active in Reports: 05/17/2011
Number of Days to Update: 27

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 08/30/2011
Date Data Arrived at EDR: 08/31/2011
Date Made Active in Reports: 09/19/2011
Number of Days to Update: 19

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 11/07/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Semi-Annually

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 09/09/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/03/2011
Number of Days to Update: 24

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 11/07/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 10/17/2011
Date Data Arrived at EDR: 10/18/2011
Date Made Active in Reports: 11/08/2011
Number of Days to Update: 21

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 10/17/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/08/2011
Date Data Arrived at EDR: 03/03/2011
Date Made Active in Reports: 03/24/2011
Number of Days to Update: 21

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 10/27/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 10/03/2011
Number of Days to Update: 20

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 08/31/2010
Date Data Arrived at EDR: 09/01/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 29

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county?s Certified Unified Program Agency database. California?s Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 06/09/2011
Date Data Arrived at EDR: 06/09/2011
Date Made Active in Reports: 07/08/2011
Number of Days to Update: 29

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 07/28/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 24
Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 10/17/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 07/25/2011
Date Data Arrived at EDR: 07/27/2011
Date Made Active in Reports: 08/11/2011
Number of Days to Update: 15
Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 10/25/2011
Next Scheduled EDR Contact: 11/07/2011
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29
Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 08/23/2011
Next Scheduled EDR Contact: 12/05/2011
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 02/09/2011
Date Data Arrived at EDR: 02/09/2011
Date Made Active in Reports: 03/04/2011
Number of Days to Update: 23
Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 10/24/2011
Next Scheduled EDR Contact: 02/06/2012
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 02/03/2011
Date Data Arrived at EDR: 02/08/2011
Date Made Active in Reports: 03/03/2011
Number of Days to Update: 23
Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 10/24/2011
Next Scheduled EDR Contact: 02/06/2012
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34
Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 10/17/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 11/14/2011
Number of Days to Update: 26
Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 10/17/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List

A listing of sites included in the county?s Certified Unified Program Agency database. California?s Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 09/13/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 10/04/2011
Number of Days to Update: 21

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites

Currently permitted USTs in Marin County.

Date of Government Version: 10/17/2011
Date Data Arrived at EDR: 10/25/2011
Date Made Active in Reports: 11/14/2011
Number of Days to Update: 20

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 10/11/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 09/23/2011
Date Data Arrived at EDR: 09/23/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 31

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing

CUPA Program listing from the Environmental Health Division.

Date of Government Version: 09/19/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 34

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination

A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Date Data Arrived at EDR: 07/09/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 22

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 08/22/2011
Date Data Arrived at EDR: 08/23/2011
Date Made Active in Reports: 09/19/2011
Number of Days to Update: 27

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 11/08/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 08/01/2011
Date Data Arrived at EDR: 08/23/2011
Date Made Active in Reports: 09/19/2011
Number of Days to Update: 27

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 08/02/2011
Date Data Arrived at EDR: 08/23/2011
Date Made Active in Reports: 10/03/2011
Number of Days to Update: 41

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 08/01/2011
Date Data Arrived at EDR: 08/23/2011
Date Made Active in Reports: 09/16/2011
Number of Days to Update: 24

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 10/18/2011
Number of Days to Update: 35

Source: Placer County Health and Human Services
Telephone: 530-889-7312
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 10/20/2011
Date Data Arrived at EDR: 10/21/2011
Date Made Active in Reports: 11/08/2011
Number of Days to Update: 18
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 10/20/2011
Date Data Arrived at EDR: 10/21/2011
Date Made Active in Reports: 11/14/2011
Number of Days to Update: 24
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/26/2012
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 08/02/2011
Date Data Arrived at EDR: 10/12/2011
Date Made Active in Reports: 11/08/2011
Number of Days to Update: 27
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 10/07/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 08/02/2011
Date Data Arrived at EDR: 10/14/2011
Date Made Active in Reports: 11/08/2011
Number of Days to Update: 25
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 10/07/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 08/26/2011
Date Data Arrived at EDR: 08/31/2011
Date Made Active in Reports: 09/19/2011
Number of Days to Update: 19
Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database
The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 09/09/2010
Date Data Arrived at EDR: 09/15/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 14

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 09/16/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 10/01/2010
Date Data Arrived at EDR: 11/16/2010
Date Made Active in Reports: 01/25/2011
Number of Days to Update: 70

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 09/27/2011
Date Data Arrived at EDR: 09/28/2011
Date Made Active in Reports: 10/19/2011
Number of Days to Update: 21

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 24

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 07/13/2011
Date Data Arrived at EDR: 07/15/2011
Date Made Active in Reports: 08/11/2011
Number of Days to Update: 27

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/12/2012
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 09/20/2011
Date Data Arrived at EDR: 09/22/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 32

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

SANTA CLARA COUNTY:

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 09/06/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 10/10/2011
Number of Days to Update: 27

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 09/01/2011
Date Data Arrived at EDR: 09/01/2011
Date Made Active in Reports: 10/03/2011
Number of Days to Update: 32

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 11/14/2011
Next Scheduled EDR Contact: 02/27/2012
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 08/31/2011
Date Data Arrived at EDR: 08/31/2011
Date Made Active in Reports: 09/09/2011
Number of Days to Update: 9

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 08/31/2011
Date Data Arrived at EDR: 08/31/2011
Date Made Active in Reports: 09/19/2011
Number of Days to Update: 19

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 09/20/2011
Date Data Arrived at EDR: 09/28/2011
Date Made Active in Reports: 10/25/2011
Number of Days to Update: 27

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 09/20/2011
Date Data Arrived at EDR: 09/28/2011
Date Made Active in Reports: 10/19/2011
Number of Days to Update: 21

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SONOMA COUNTY:

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 04/05/2011
Date Data Arrived at EDR: 04/06/2011
Date Made Active in Reports: 05/12/2011
Number of Days to Update: 36

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 10/03/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks

Underground storage tank sites located in Sutter county.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 10/19/2011
Number of Days to Update: 36

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 07/26/2011
Date Data Arrived at EDR: 08/26/2011
Date Made Active in Reports: 09/19/2011
Number of Days to Update: 24

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 08/23/2011
Next Scheduled EDR Contact: 12/05/2011
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites

Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 09/14/2011
Date Data Arrived at EDR: 09/15/2011
Date Made Active in Reports: 10/24/2011
Number of Days to Update: 39

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites

Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 08/23/2011
Next Scheduled EDR Contact: 12/05/2011
Data Release Frequency: Quarterly

Medical Waste Program List

To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 07/26/2011
Date Data Arrived at EDR: 08/08/2011
Date Made Active in Reports: 09/09/2011
Number of Days to Update: 32

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 08/30/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/19/2011
Number of Days to Update: 29
Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 09/20/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 08/15/2011
Date Data Arrived at EDR: 08/23/2011
Date Made Active in Reports: 09/16/2011
Number of Days to Update: 24
Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 10/11/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 08/23/2011
Date Data Arrived at EDR: 08/26/2011
Date Made Active in Reports: 09/19/2011
Number of Days to Update: 24
Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 11/07/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Varies

**OTHER DATABASE(S)**

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 08/26/2009
Date Made Active in Reports: 09/11/2009
Number of Days to Update: 16
Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 10/28/2011
Next Scheduled EDR Contact: 12/05/2011
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 07/20/2011
Date Made Active in Reports: 08/11/2011
Number of Days to Update: 22
Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 10/18/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 08/01/2011
Date Data Arrived at EDR: 08/09/2011
Date Made Active in Reports: 09/16/2011
Number of Days to Update: 38

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 11/08/2011
Next Scheduled EDR Contact: 02/20/2012
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 12/01/2009
Date Made Active in Reports: 12/14/2009
Number of Days to Update: 13

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 06/24/2011
Date Made Active in Reports: 06/30/2011
Number of Days to Update: 6

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 08/19/2011
Date Made Active in Reports: 09/15/2011
Number of Days to Update: 27

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: Rextag Strategies Corp.
Telephone: (281) 769-2247
U.S. Electric Transmission and Power Plants Systems Digital GIS Data

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

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# Appendix G:

# Supporting Documentation

**The Ritz-Carlton Rancho Mirage**
69-730 Highway 111
Rancho Mirage, CA 92270
Project #: 100132.11R-001.135

Inquiry Number: 3208705.3
November 16, 2011

# Certified Sanborn® Map Report

## Prepared for EMG

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

# Certified Sanborn® Map Report

11/16/11

**Site Name:**
The Ritz-Carlton Rancho
69-730 Highway 111
Rancho Mirage, CA 92270

**Client Name:**
EMG
222 Schilling Circle
Hunt Valley, MD 21031

EDR Inquiry # 3208705.3

Contact: Jason Swam

EDR® Environmental Data Resources Inc

The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by EMG were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

## *Certified Sanborn Results:*

**Site Name:** The Ritz-Carlton Rancho Mirage
**Address:** 69-730 Highway 111
**City, State, Zip:** Rancho Mirage, CA 92270
**Cross Street:**
**P.O. #** 100132.11R-001.135
**Project:** 100132.001.135
**Certification #** 063A-4F54-951B

Sanborn® Library search results
Certification # 063A-4F54-951B

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- ✓ Library of Congress
- ✓ University Publications of America
- ✓ EDR Private Collection

*The Sanborn Library LLC Since 1866™*

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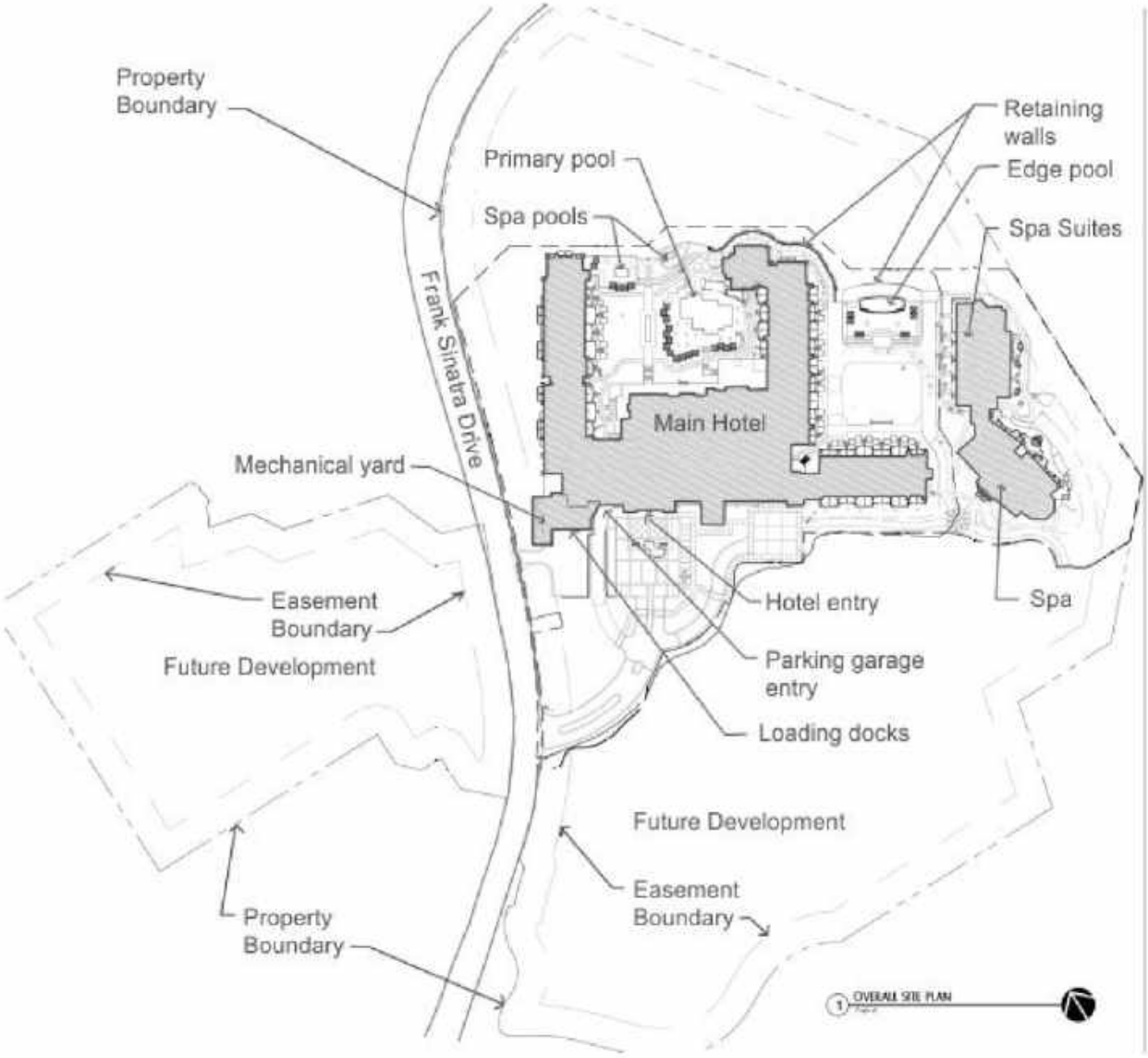

Property Boundary
Primary pool
Spa pools
Retaining walls
Edge pool
Spa Suites
Frank Sinatra Drive
Main Hotel
Mechanical yard
Easement Boundary
Future Development
Hotel entry
Spa
Parking garage entry
Loading docks
Future Development
Easement Boundary
Property Boundary
1 OVERALL SITE PLAN

# Certificate of Occupancy

## City of Rancho Mirage Department of Building and Safety

***This Certificate issued pursuant to the requirements of Section 306 of the Uniform Building Code certifying that at the time of issuance this structure was in compliance with the various ordinances of the City regulating building construction or use. For the following:***

Group R - 1 Type Construction I - F.R. Fire Zone 0 Zone 0

Building Permit No. 22535 Land Use Case No. _____

Building Address 68-900 Frank Sinatra Drive (Hotel) Rancho Mirage, CA 92270

Owner of Building Ritz-Carlton Hotel

Owner Address 3414 Peachtree Road, Atlanta, GA

Ronald L. Espaldon
Building Official

August 11, 1988
Date:

POST IN A CONSPICUOUS PLACE

# The Ritz-Carlton, Rancho Mirage
# Property Overview

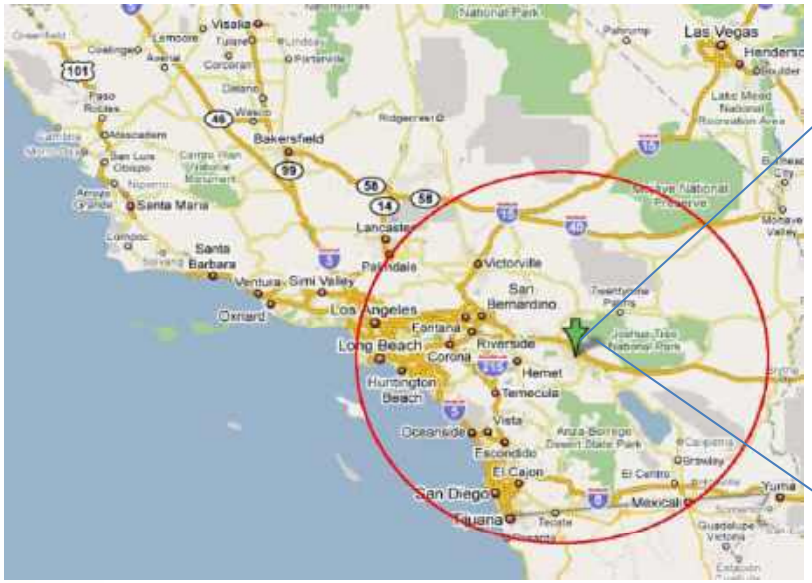
# Property Overview

## The Ritz-Carlton Rancho Mirage

### Location

- The Resort is located on a 650-foot bluff along Frank Sinatra Drive west of State Highway 111, centrally located to the affluent cities of Palm Springs, Palm Desert, Indian Wells and La Quinta.

- The City of Rancho Mirage was incorporated in 1973 and achieved its national notoriety shortly after World War II, when Walter Annenberg began to host parties at his “Sunnylands” winter estate in Rancho Mirage. Today, the area boasts come of the best private golf clubs and residential communities in the world, and is home to 17,000 permanent residents and 11,000 part-time and seasonal residents.





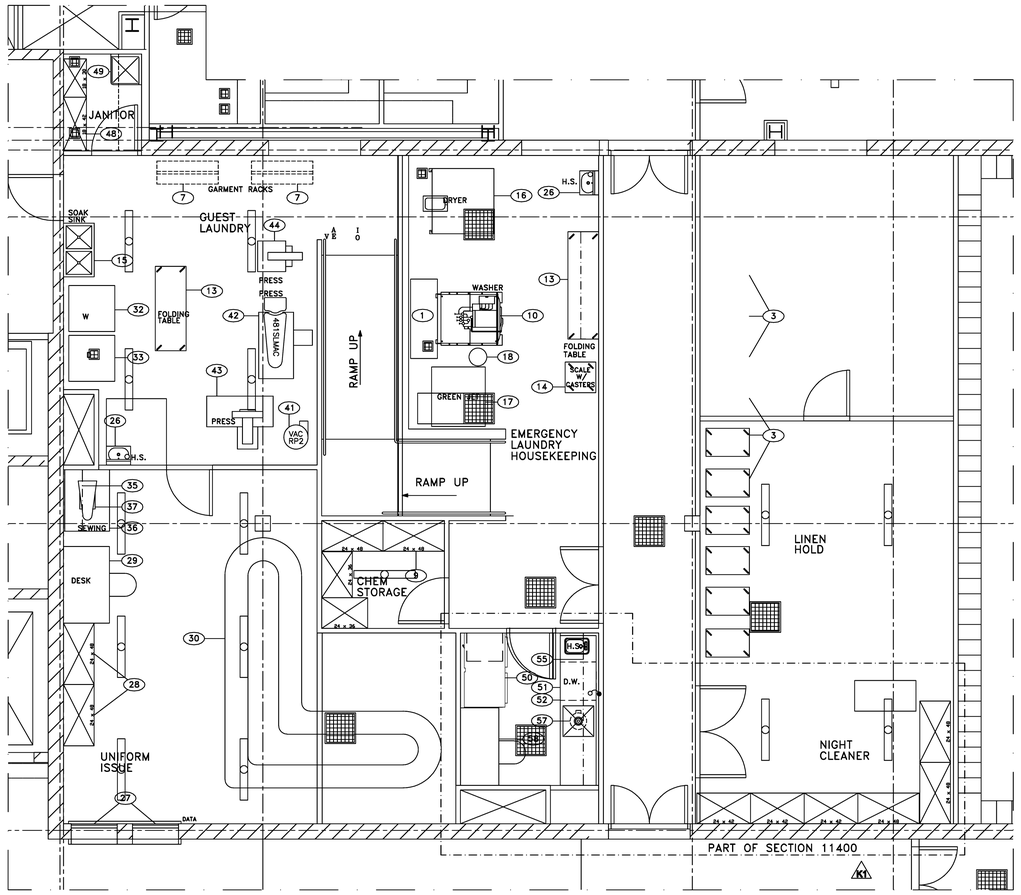

# Property Overview

## The Ritz-Carlton Rancho Mirage

### Development Aerial and Site Plan






LAUNDRY AREA
EQUIPMENT PLAN
LEVEL 1
SCALE: 1/4" = 1'-0"

## LAUNDRY EQUIPMENT SCHEDULE

| | NO. | DESCRIPTION | QTY. | REMARKS | NOT IN LAUNDRY EQUIPMENT CONTRACT PROVIDED BY: |
|---|---|---|---|---|---|
| | 1 | TRENCH COVERS, FRAME, & LINT SCREEN | LOT | CUSTOM FABRICATED (SEE DETAIL ON L1.2) | BY GENERAL CONTRACTOR |
| | 2 | SPARE NUMBER | – | | |
| K1 | 3 | LAUNDRY CART | 8 | 3 CLEAN, 5 BOILED, POLY BASKET | |
| | 4 | SPARE NUMBER | – | | |
| | 5 | SPARE NUMBER | – | | |
| | 6 | SPARE NUMBER | – | | |
| | 7 | GARMENT RACK (2 SHOWN) | 10 | 48"L | |
| | 8 | SPARE NUMBER | – | | |
| K1 | 9 | CHEMICAL SHELVING & DISPENSING SYSTEM | LOT | WITH PUMPS, RACKS, TUBING, ETC. | BY CHEMICAL PURVEYOR |
| | 10 | WASHER/EXTRACTOR, 60 LB. | 1 | RIGID MOUNT, FRONT LOAD, STEAM INJECT | |
| | 11 | SPARE NUMBER | – | | |
| | 12 | SPARE NUMBER | – | | |
| | 13 | FOLDING TABLE | 2 | OPEN BASE, (1) WITH SHELF | BY GENERAL CONTRACTOR |
| | 14 | BASKET SCALE | 1 | PORTABLE W/ DIAL INDICATOR | |
| | 15 | SOAK SINK (ONE DOUBLE) | 1 | INCLUDED W/ FAUCET | BY PLUMBING CONTRACTOR |
| | 16 | DRYER, 75 L.B. | 1 | GAS HEAT W/ REVERSE | |
| | 17 | GREEN JET MACHINE | 1 | DRY-WET CLEANING MACHINE | |
| | 18 | CHEMICAL BUCKET | 1 | | BY OWNER |
| | 19 | SPARE NUMBER | – | | |
| | 20 | SPARE NUMBER | – | | |
| | 21 | SPARE NUMBER | – | | |
| | 22 | SPARE NUMBER | – | | |
| | 23 | SPARE NUMBER | – | | |
| | 24 | SPARE NUMBER | – | | |
| | 25 | SPARE NUMBER | – | | |
| | 26 | HANDSINK WITH EYEWASH | 2 | WITH SOAP/TOWEL DISPENSER | BY PLUMBING CONTRACTOR |
| K1 | 27 | UNIFORM ISSUE COUNTER | 2 | CUSTOM FABRICATED, SPECIFIED BY ARCHITECT | BY MILLWORK CONTRACTOR |
| | 28 | STORAGE SHELVING | 2 | FIVE TIER | |
| | 29 | OFFICE FURNITURE | LOT | | BY OWNER |
| | 30 | UNIFORM CAROUSEL | 1 | DOUBLE SIDE | |
| | 31 | SPARE NUMBER | – | | |
| | 32 | WASHER | 1 | FRONT LOAD | |
| | 33 | DRYER | 1 | FRONT LOAD, ELECTRIC HEAT | |
| | 34 | SPARE NUMBER | – | | |
| K1 | 35 | WALL SHELF | LOT | STAINLESS STEEL, CUSTOM FABRICATED, SPEC. BY ARCH. | BY GENERAL CONTRACTOR |
| | 36 | WORKTABLE | 1 | CUSTOM FABRICATED W/ STORAGE BELOW, SPEC. BY ARCH | BY MILLWORK CONTRACTOR |
| | 37 | SEWING MACHINE | 1 | TAILOR TYPE | BY OWNER |
| | 38 | SPARE NUMBER | – | | |
| | 39 | SPARE NUMBER | – | | |
| | 40 | SPARE NUMBER | – | | |
| K1 | 41 | VACUUM UNIT | 1 | FOR ITEM #42 | |
| | 42 | PANT PRESS | 1 | STEAM HEATED | |
| | 43 | SHIRT PRESS | 1 | LAY DOWN MODEL | |
| | 44 | MUSHROOM PRESS | 1 | | |
| | 45 | SPARE NUMBER | – | | |
| | 46 | SPARE NUMBER | – | | |
| | 47 | SPARE NUMBER | – | | |
| | | REMAINING ITEMS, PART OF SECTION 11400, FOODSERVICE | | | |
| K1 | 48 | STORAGE SHELVING | 2 | FOUR TIER | |
| | 49 | MOP SINK & RACK | 1 | WITH HOSE BIBB | BY PLUMBING CONTRACTOR |
| | 50 | REACH-IN REFRIGERATOR | 1 | TWO SECTION | BY KEC |
| | 51 | GLASS WASHER | 1 | COMMERCIAL TYPE | BY KEC |
| | 52 | WORKTABLE | 1 | CUSTOM FABRICATED, WITH SINKS | BY KEC |
| | 53 | SPARE NUMNER | – | | |
| | 54 | SPARE NUMBER | – | | |
| | 55 | WALL SHELF | 1 | CUSTOM FABRICATED | BY KEC |
| | 56 | SPARE NUMBER | – | | |
| | 57 | DISPOSER W/ PRE-RINSE | 1 | | BY KEC |
| | 58 | DESK & CHAIR | 1 | | BY OWNER |

Ricca Newmark
DESIGN
*Foodservice Laundry Interiors*
6857 South Spruce St.
Centennial, Colorado 80112
Tel. (303) 221-0500
Fax (303) 221-0600
PROJECT#00000

**Existing Hotel Renovation**

THE RITZ-CARLTON

**Bulletin O Construction Set October 4, 2010**

The Ritz-Carlton Rancho Mirage

Rancho Mirage, California

Rancho California Investments LLC

LAUNDRY EQUIPMENT PLAN

| | |
|---|---|
| DATE | 10/04/10 |
| PROJECT NUMBER | 2929 |
| DRAWN BY | |
| SCALE | |

| NO | REV. DESCRIPTION | DATE |
|---|---|---|

SHEET NUMBER
LD 1.1

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File Name & Location: P:\2005_Projects\052900.F01 The Lodge at Rancho Mirage\The-Cast\LD1.dwg Layout: LD 1.1 Printed: Mon, 04 Oct 2010 - 16:03




## A Technological And Ecological Breakthrough For The Dry Cleaning Industry!

# GREEN JET®

**CLEANING MACHINE**

**From**

# AERO-TECH® USA INC.



The **Green Jet® Cleaning Machine** (patent pend.) not only cleans garments efficiently, it also eliminates the health, environmental, customer, landlord and governmental problems associated with traditional Perc dry cleaning...and the zoning, flammability, odor and cost issues that trouble the other alternative solvents and cleaning processes.

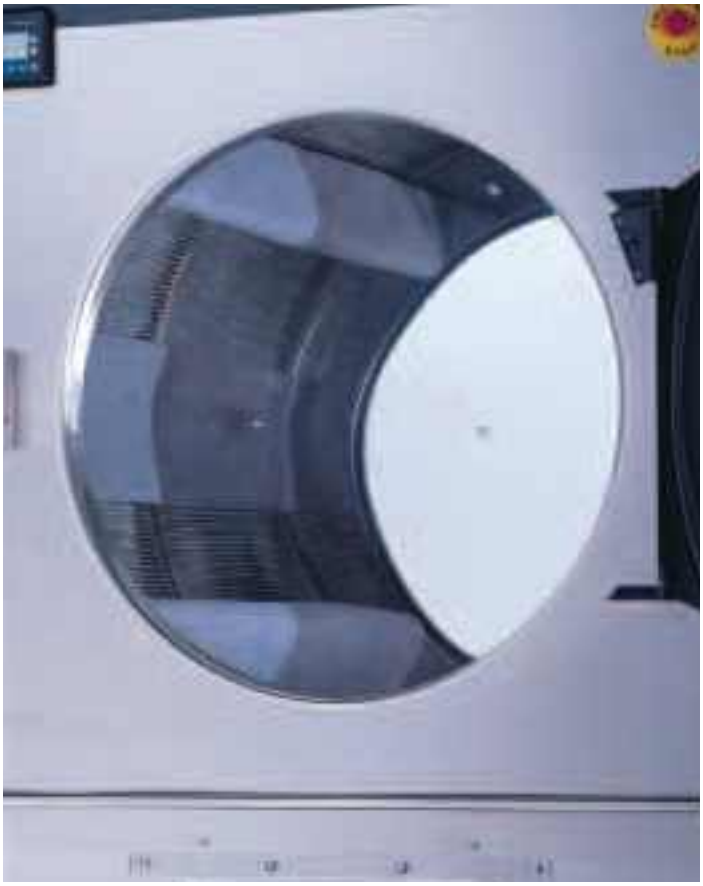
Compact. Powerful. Extremely economical. Easy to operate. Practically an environmental movement by itself. And while the **Green Jet® Cleaning Machine** may not change the world, it's nothing short of an engineering and ecological breakthrough for dry cleaners.

The new **Green Jet® Cleaning Machine** not only addresses environmental problems troubling the industry, it beautifully cleans all types of fabrics, garments and colors together in the same load, including problem garments and bleeders. This helps eliminate the splitting of customer orders, misassembly and lost garments while greatly reducing assembly and finishing time. And it does it all in a small space, with solvent costs at about 3.7 cents per pound, less than half the cost of other widely used processes!

## HOW THE NEW GREEN JET® CLEANING PROCESS WORKS USING DWX-44®, DRY-WETCLEANING SOLUTION

The Green Jet® Cleaning Machine (patent pend.) cleans and dries garments in a single computerized unit operated by regular cleaning personnel. The machine uses a unique air pulsating system to first dislodge dirt and soil from the weave of the fabric, then, filter it out and then inject ***DWX-44®*** Dry-Wetcleaning Solution, a water-based, ecologically correct, non-toxic, non-flammable, non-polluting, solution to clean the garments, and finally tumble dry the load. The ribs and part of the interior chamber of the machine are lined with specially designed, reusable osmosis "blotters" or pads (patent pend.) that filter out the dirt and soil during the process. The process removes all surface and most embedded soil as well as minor spots from the garments. Redeposition of soil is extremely minimal.

The gentle action and temperatures that facilitates the cleaning process doesn't allow spots and wrinkles to "set" into the garments, nor does the process leave harmful residue on the garments. Colors stay bright, fabrics stay soft with good hand, manufacturers' finishes remain intact.



The ribs and part of the cylinder are lined with specially designed reusable osmosis pads that attract and absorb dirt and soil.




## THE GREEN JET® CLEANING MACHINE OFFERS:

- Full high grade, non-porous Stainless Steel construction that prolongs the life of the machine, reduces drying time and helps eliminate the lint that clings to the porous shells of regular steel machines.
- Very compact, small enough to get into tight spaces.
- Requires no special piping.
- Long life - far less down time.
- All U.L. listed electrical components.
- Huge cylinder for great cleaning action.
- **Cleans all fabrics: wool, silk, spandex, leather, fur, etc.**
- Reusable, cleanable filters.
- Sealed, long life bearings.
- Automatic temperature control insures low temp drying.
- Quiet, simple and easy operation.
- Utilities: Requires only compressed air and three-phase electric.
- No fire hazard (no flash point).
- No odors in plant or garments.
- **No stills to clean.**
- No water chiller, boiler room or steam source is required.
- **No special handling for buttons, trim, sequins, or other difficult garments.**

## PLUS SUBSTANTIAL SAVINGS

- Save over 50% on cost of machine as compared to Perc and Hydrocarbon units.
- Save on installation costs.
- **No barrier rooms around machine required.**
- Save 50% of electrical costs (due to less heat and no refrigeration or chiller).
- No steam costs (saves gas or oil).
- Save with increased productivity (full loads, no classifying, clean by lot or customer order).
- Save with decreased labor costs (less finishing, sorting and assembly time).
- **No disposal costs.**
- Save about 50% of solvent and additives costs.
- Save on the cost of claims (damaged garments and misassembly).

## ALLEN-BRADLEY PANELVIEW 300 MICRO COMPUTER

- With flashing safety and trouble-shooting LED back lit graphic display.
- Pre-set cleaning programs for all types of garments and load sizes.
- Additional custom programs easily added.
- **Special Dry-Only Program allows machine to be used as a gentle cycle, low temperature wet-cleaning dryer.**

## WHO CAN USE THE GREEN JET® CLEANING MACHINE?

**EXISTING DRY CLEANERS**

- Can replace solvent machines not allowed by landlords or others. May save your business when lease renews.
- **Need additional capacity?** The Green Jet® also makes an ideal second machine. Can be added to existing solvent machines and assume much of the loads. Perc and Hydrocarbon plants using the Green Jet® as a second machine will probably clean 50% to 75% of all their garments in it, and 100% of all garments when the boiler is off and there is no steam. It is often compared to the Valclene® (Fluorocarbon) machines many cleaners loved and used for their fine garments a few years ago, without any of the environmental problems.

**NEW DRY CLEANERS**

- Environmentally safe process makes it much easier to get a lease.
- Since a solvent machine isn't necessary and the Green Jet® Cleaning Machine is smaller and requires no boiler room, much less store space is needed.
- Can be paired with wetcleaning.

**HOSPITALITY INDUSTRY**

- Perfect for smaller space requirements on cruise ships, in hotels and motels.
- Ideal for cleaning employee garments, valet services blankets, spreads and drapes.
- Easier to use than traditional dry cleaning equipment.
- No fire hazard.
- Eliminates risk of fines for dumping hazardous wastes.
- No contamination problems.

**DROP-OFF DRY CLEANING STORES**

- Can be converted to full service plants, eliminating trucking costs to central plants and offering faster service to customers.
- Requires smaller, more easily trained staff to operate a plant in space as small as 800 Sq. Ft.
- No boiler room is required, no steam is necessary.

**COIN LAUNDRIES**

- Can add dry cleaning service with or without finishing.




**All AERO-TECH® cleaning machines are started-up at your plant by trained technicians to insure proper operation and training in their use and maintenance.**

N.Y. APPROVED, MEA# 65-02-E

AERO-TECH® USA INC.

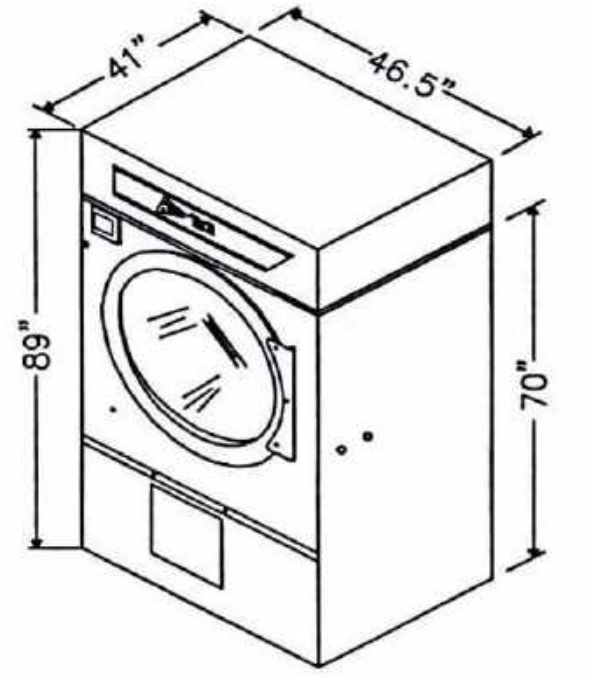
290 N.E. 68th Street, Miami, FL 33138
Phone: 800-333-8883 Fax: (305) 751-8390
E-Mail: sales@drywetcleaning.com
Website: www.drywetcleaning.com

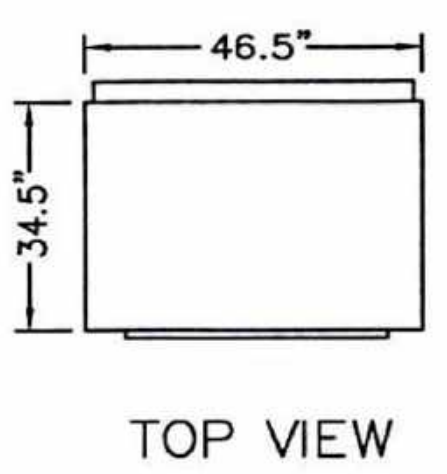
# AERO-TECH GREEN JET

## DRY-WETCLEANING MACHINE: MODEL DWC-45

| | | |
|---|---|---|
| **ELECTRICAL**: 208/60/3 50 Maximum Running AMPS<br>240/60/3 44 Maximum Running AMPS<br>Circuit Breaker, 3 Phase | | 60 AMPS |
| **COMPRESSED AIR**: ½ Inch NPT Pipe | | 5 HP<br>90 PSI (18 cfm min.) |
| **VENT DUCT**: | | 6 in. diameter * |
| **DIMENSIONS**: Width (Including hose connections)<br>Depth (Including back, door, and bumper)<br>Height | | 48 in. (121.9 cm)<br>41 in. (104.1 cm)<br>89 in. (226.1 cm) |
| **DIMENSIONS STRIPPED**: Width<br>Depth<br>Height | | 46.5 in. (118.1 cm)<br>34.5 in. (87.6 cm)<br>70.0 in. (177.8 cm) |
| **WEIGHT**: Empty<br>Shipping | | 1020 LBS.<br>1100 LBS. |

* Use 8 inch diameter duct for exhausts that exceed 20 feet with 2 or more elbows.




TOP VIEW

# MATERIAL SAFETY DATA SHEET

(Prepared According to 29 CFR 1910.1200) Date Prepared: November 14, 2001 Revised: February, 02
Prepared by: Robert V. Johnson Date Printed: February 6, 2002

## SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION:

Company Name: KLEERWITE CHEMICAL 24 Hour Emergency Phone: 1-800-535-5053 (InfoTrac)

P. O. BOX 10428, BURKE, VA 22009-0428, 703-451-3964; FAX: 703-451-7362

**Trade Name: DWX-44** **Product Type: DETERGENT**

## SECTION 2 - INGREDIENT INFORMATION: Not considered hazardous under 29 CFR 1910.1200

**This product is 100% Biodegradable. Contains no petroleum solvents or V.O.C.'s. Contains no products on the Federal H.A.P. list.**

| CHEMICAL NAME/COMMON NAME | CAS NO. | PERCENTAGE |
|---|---|---|
| WATER | 7732-18-5 | 75 – 85% |
| SURFACTANT BLEND – NON HAZARDOUS | MIXTURE | 15 – 25% |

SARA HAZARD TITLE III, SECTION 313-Contains no ingredient listed as a Hazardous Substance (40 CFR-355)

## SECTION 3 - HEALTH HAZARD DATA:

Primary Routes of Exposure Eye [X] [X] Skin [X] Oral [ ] Inhalation [ ] Other

Overexposure Effects: Irritating to mucous membranes, eyes and skin. May cause slight eye irritation.

Threshold Limit Value: Not Established.

H.M.I.S Values: Health (Blue) -1; Flammability (Red) - 0; Reactivity (Yellow) -0; Personal Protection – A

Carcinogen or Suspect Carcinogen Ingredients [ ] NTP [ ] IARC [ ] OSHA [ X ] None

## SECTION 4 - FIRST AID MEASURES:

Eyes: Remove contact lenses. Flush eyes with water for 15 minutes, get prompt medical attention.

Skin: Flush skin with water. Remove contaminated clothing.

Ingestion: Rinse mouth and give several glasses of water. Do not induce vomiting. NEVER give anything by mouth to an unconscious person. Get medical attention.

Inhalation: Seek well-ventilated area. If irritation persists seek medical attention.

## SECTION 5 - FIREFIGHTING MEASURES:

Flash Point (T.C.C.) Not applicable Flammable Limits Upper: Not Flammable; Lower: Not Flammable

Extinguishing Media: Foam, $CO_2$, Water fog, BC/ABC Extinguisher may be used in area where material is stored.

Special Firefighting Procedures: None known

Unusual Fire and Explosion Hazards: None known

## SECTION 6 - ACCIDENTAL RELEASE MEASURES:

If Released or Spilled: Stop leaks. Soak up spill with rags or towels.

Waste Disposal Methods: Dispose of spill byproducts according to State and Federal Regulations. Not a hazardous waste under CERCLA or RCRA, 40CFR; 261

## SECTION 7 - STORAGE AND HANDLING INFORMATION:

Store in a cool, dry area. Do not allow product to freeze. Do not get in the eyes, on skin or on clothing. Do not take internally.

## SECTION 8 - SPECIAL PROTECTION INFORMATION

Respiratory Protection: Not needed under normal condition of use. Ventilation Requirements: [X] Local Exhaust [ ] Mechanical

Protective Gloves: Recommended for prolonged contact Eye Protection: Not necessary Other protective Clothing: None needed

## SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES:

Boiling point ($^0$F.) Above 200°F Density (lb/gl) 8.34 Specific Gravity ($H_2O$ = 1) 1.0 pH (1%) = 8.5

Vapor Pressure (mm Hg) <0.01 mm Hg Vapor Density (Air = 1) >1.0 Evaporation Rate (vs. Ether): [ ] Faster [X ] Slower

Solubility in water: [X] Complete [ ] Insoluble [ ] Emulsifiable (or Dispersible) [ ] Slight (or Partial)

Appearance and Odor: Odorless, clear liquid.

## SECTION 10 - STABILITY AND REACTIVITY:

Stability: Stable Incompatibility: Oxidizers Hazardous Decomposition Products: None known.

## SECTION 11 - TRANSPORTATION INFORMATION:

Proper Shipping Name: COMPOUNDS, CLEANING LIQUID

D.O.T. Hazard Class: NOT REGULATED UN Number: N/A Packaging Group: N/A Label Required: NONE

This information is provided without any representation or warranty, express or implied, regarding its accuracy or correctness. Conditions or methods of handling, storage, use and disposal of the product are beyond our knowledge. **For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage and expense arising out of or in any way connected with the handing, storage, use or disposal of the product.**

# WATER DAMAGE REMEDIATION REPORT

**Ritz Carlton Hotel**
**68900 Frank Sinatra Drive**
**Rancho Mirage, CA 92270**



**Conducted for**
**RANCHO CALIFORNIA INVESTORS, LLC,**
**68900 FRANK SINATRA DRIVE**
**RANCHO MIRAGE, CA 92270**

**Report Date**
June 14, 2011

**ET&T Project Number 113321**

**Submitted by**

ET&T INDOOR ENVIRONMENTAL SURVEYS
1106 Second Street, Suite 102 ▲ Encinitas, CA 92024
Tel: 760-804-9400 ▲ www.ETandT.com

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## BACKGROUND INFORMATION

The Ritz Carlton Hotel was built in 1986 to 1987. A new wing was being constructed in 2008-2009, when the entire hotel operation was closed down. The building is vacant and is currently undergoing major renovation with completion of the new Spa and Suites Building. During the vacancy period water intrusions into the building and HVAC system have occurred. According to building management, during heavy rains, the water intrusions were due to roof leaks, window leaks and surface water.

The action of Ritz Carlton's Chief Engineer, Mr. Jake Cormier, to cut out wet drywall material and remove water damaged ceiling materials has prevented subsequent mold growth and allows identification of the water intrusion areas and pathways. ET&T was retained by Rancho California Investors, LLC to conduct a visual inspection for primary and secondary (mold growth) water damaged materials. ET&T was tasked to develop a remediation protocol for the remediation contractor and to perform post remediation verification once the repairs are completed. ET&T surveyed the facility during the time period between May 26th and June 3rd, 2011. This report presents our findings and recommends the necessary remediation actions to address the water related damages.

## EXECUTIVE SUMMARY

The building is currently a construction site and a heavy layer of construction dust is present on almost all horizontal surfaces. The main areas affected by water damage are walls, ceilings, sections of the HVAC system and fireproofing material. Overall, the number of areas where visible mold growth was discovered was relatively small because wet material had been removed by building management promptly.

Visible mold growth was discovered during the visual inspections behind cabinets, on walls and ceilings, baseboards, ceiling tiles and in bathrooms on drywall sandwiched between shower/tub enclosures. Water damaged areas in the form of water stains, bubbling paint or discoloration of building material have been indentified and are suspect for hidden mold growth. The remediation areas are outlined in a table format organized by location, building material, type of damage, size of the affected areas and remediation methods.

All sources of the moisture intrusions have to be identified and repaired. This includes but is not limited to: openings in the roof assembly of The Suites Building, roofs in general, sliding doors, windows, plumbing and drainage issues. The presence of microbial contaminants will continue or return unless the sources of the moisture intrusions are identified and remedied.

During our site inspections, large amounts of rodent and bird droppings, bird nests, bird feathers, cockroaches and other insects were detected in different building sections. The presence of vectors, such as rodents can contribute to persistent odor problems in the rooms and buildings. This is a significant health and safety concern for the facility and needs to be expediently, appropriately and professionally addressed.

Fine dust is present on every horizontal surface in the rooms and buildings, and inside the HVAC systems. The greatest challenge to obtain good air quality in the buildings is an effective and thorough cleaning of the fine dust and debris in all areas. This will need to include all kitchen installations, cabinets and drawers, floors in all rooms and components of the HVAC systems.

Please read the report in its entirety for more detailed information. Photo documentation of the conditions encountered is available upon request. ET&T has been retained to assess the air quality after the remediation work has been completed.

## INSPECTION METHODOLOGY



ET&T conducted site visits at the hotel facility between May 26th and June 3rd, 2011. During the site visits, a visual inspection of all rooms in the buildings was conducted. This included the guestrooms, corridors, conference rooms, public areas, administrative areas, employee work areas, and readily accessible ceiling spaces in the different buildings. The inspected areas include the main hotel building with Guestroom Wings A, B and C, the Core Area, the Spa and The Suites Building.

Many wall and ceiling surfaces appear to have been painted in the recently. Areas where visible mold growth or water damaged building materials were identified, documented and marked. A spray can with orange fluorescent paint was used to outline the areas where mold growth or water damaged materials should be removed. The results are compiled in the table in the remediation section of this document. ET&T did not inspect the heating ventilation and air conditioning (HVAC) systems in the different buildings.

## REMEDIATION PROTOCOL

Overall, the number of areas where visible mold growth was discovered was relatively small. The work procedures and containment types are outlined in the following guidelines and tables. We encountered a number of areas, especially in the B Wing, where water damage in the form of water stains, bubbling paint or discoloration of building material makes these areas suspect for hidden mold growth. We have marked these areas to be opened up for a follow-up inspection. These areas are marked with orange spray paint and are listed in the remediation tables.

It should be verified that all sources of the moisture intrusions have been identified and eliminated. Openings still remain at the roof assembly of The Suites Building. The presence of microbial contaminants will continue or return unless the sources of the moisture intrusions are identified and remedied. ET&T has been retained to conduct post remediation verification (PRV) testing once the remediation and deep cleaning have been completed.

### General

The building is currently a construction site and heavy layers of construction dust are present on almost all horizontal surfaces and the individual room air condition (AC) units. Contents are not present at the site, except for the construction management offices. The remediation areas are outlined in a table format organized by location, building material, type of damage and the size of the affected areas. The tables are separated into by wings and building sections.

The areas where remediation work is to be conducted has been marked with orange spray paint. The areas within the outlined areas are to be removed. The dots around the outlined areas are not to be removed. The dots are identifiers used by ET&T personnel to inspect the areas for the potential presence of additional water or mold damage once the outlined areas have been removed.

In the Great Ballroom, Pre-Function Room and Display Kitchen area, cut out work needs to be conducted at very high ceilings (12 feet or more). In these locations, we recommend the use of a moveable (wheeled) scaffolding platform to provide access to the work area. The local containment is then built on a scaffolding platform.

## Gerald Ford Boardroom

Based on background information, the Gerald Ford Boardroom was flooded multiple times with surface water. The entire wall surfaces consist of wood paneling. A very strong putrid, urine-like smell was present in the room. None of the paneling has been removed. We marked two wall areas outside the boardroom for intrusive investigation. This will provide access to the backside of two walls only. However, it will not allow inspection of the drywall side sandwiched behind the wood paneling.

## Table Definitions

The Remediation Table uses the following parameters and codes to describe the primary (water damage) and secondary water damage (mold growth) identified.

**VMG** = Visible mold growth on wallboard (drywall)
**WD** = Water damage on drywall or baseboards, suspect for VMG
**CD** = Plaster on concrete, or block ceilings or walls is deteriorated due to water damage

Size descriptions and enumerators:

| | |
|---|---|
| 0 to 2 square feet | 1 |
| 2 to 5 square feet | 2 |
| 5 to 10 square feet | 3 |
| More than 10 square feet | 4 |

Examples: Four square feet of visible mold growth is expressed as VMG 3, twelve (12) square feet of water damaged plaster on a ceiling as CD 4 or 2 square feet of water damaged baseboards as WD 1.

## Work Sequences

Phase 1, the initial step of identifying areas where remediation work needs to be conducted has been completed with this report. The following sequential steps are broken into different phases.

| | |
|---|---|
| Phase 2 | Remediation of the indentified areas in this report |
| Phase 3 | Re-inspection of the suspect areas by ET&T |
| Phase 4 | Deep cleaning of surface and airborne dust load by contractor |
| Phase 5 | Post remediation verification (PRV) testing by ET&T |

## REMEDIATION TABLES

### B Wing - Third Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 1 | B 302 | Bath and hall ceiling | CD 3 | | Remove plaster | None |
| 2 | B 303 | Hallway cabinet | | VMG 3 | Remove cabinetry and wall board behind | Local Containment |
| 3 | B 303 | Bathroom vanity | | VMG 2 | Remove vanity and drywall behind | Local Containment |
| 4 | B 304 | Bathroom vanity | | VMG 2 | Remove remaining drywall | Local Containment |
| 5 | B 304 | Hallway cabinet | WD 2 | VMG 1 | Remove vanity and drywall behind | Local Containment |
| 6 | B 304 | Guest bedroom ceiling | CD 4 | | Remove plaster | None |
| 7 | B 305 | Guest bedroom ceiling | CD 2 | | Remove plaster | None |
| 8 | B 325 | Vanity ceiling | CD 2 | | Remove plaster | None |
| 9 | B 320 | South closet and ceiling | WD 2 | VMG 2 | | Local Containment |
| 10 | B 325 | Guest bedroom ceiling | CD 4 | | Remove plaster | None |
| 11 | Master suite across B307 & B309 | Guest bedroom ceiling | CD 2 | | Remove plaster | None |
| 12 | Master suite across B307 & B309 | Guest bedroom pipe insulation about 4 linear feet | WD 2 | | Encapsulate or replace pipe insulation | None |
| | **B Wing Corridor 3rd Floor** | | | | | |
| 14 | South End – N wall left to elevator | | CD 2<br>WD 2 | | Remove drywall 2 feet high belt cut | DT |
| 15 | Wall left of door to B 302 | | WD 2 | | Remove drywall 2 feet high belt cut | DT |
| 16 | Wall right of door to B 302 | | WD 3 | | Remove drywall 2 feet high belt cut | DT |
| 17 | East wall opposite B 304 | | WD 2 | | Remove drywall 2 feet high belt cut | DT |
| 18 | W and E walls at B 309 | | WD 4 | | Remove drywall 2 feet high belt cut | DT |
| 19 | E wall at B 316 | | WD 2 | | Remove drywall 2 feet high belt cut | DT |
| 20 | W wall at B317 | | WD 3 | | Remove drywall 2 feet high belt cut | DT |

## B Wing – Second Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 21 | B 204 | Guest closet, vanity ceiling | WD 2 | | Remove drywall on ceiling and vanity | DT |
| 22 | B 206 | Guest bedroom ceiling | CD 1 | | Remove plaster | None |
| 23 | B 210 | Guest bedroom ceiling | CD 4 | | Remove plaster | None |
| 24 | B 212 | Guest bedroom and hallway ceiling | CD 4<br>WD 2 | | Remove plaster and drywall | None<br>DT |
| 25 | B 215 | Guest bedroom | WD 3 | VMG 2 | Remove drywall | Local Containment |
| 26 | B 216 | Guest bedroom | CD 2 | | Remove plaster | None |
| 27 | B 223 | Guest bedroom ceiling | CD 1 | | Remove plaster | None |
| 28 | B 228 | Guest bedroom | WD 1 | | Remove drywall | DT |
| | **B Wing Corridor 2nd Floor** | | | | | |
| 29 | Outside ice room near B 220 | | CD 4 | | Remove plaster | None |
| 30 | Wall left of door to B 210 | | CD 2 | | Remove plaster | None |
| 31 | Ceiling to the right of door to B 203 | | CD 2 | | Remove plaster | None |
| 32 | South End – Ceiling above hallway elevators and entrance | | CD 2<br>WD 2 | | Remove plaster and drywall | None<br>DT |
| 33 | South End – Across from elevators | | CD 2 | | Remove plaster | None |

## B Wing – First Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 34 | B 103 | Guest bedroom | CD 1 | | Remove plaster | None |
| 35 | B 105 | Guest bedroom | WD 3 | | Remove drywall | DT |
| 36 | B 106 | Guest bedroom ceiling | CD 1 | | Remove plaster | None |
| 37 | B 117 | Guest bedroom | CD 2<br>WD 2 | | Remove plaster and drywall | DT |
| 38 | B 119 | Hallway ceiling | WD 1 | | Remove drywall | DT |
| 39 | B 123 | Guest bedroom | CD 1 | | Remove plaster | None |
| 40 | B 124 | Vanity ceiling | WD 3 | | Remove drywall | DT |
| 41 | B 129 | Hallway ceiling | WD 1 | | Remove drywall | DT |
| 42 | B 139 | Paneling and crown molding | WD 4 | | Remove wood paneling and crown molding | DT |
| | **B Wing Corridor 1st Floor** | | | | | |
| 43 | South End – Ceiling above hallway elevators | | CD 2 | | Remove plaster | None |
| 44 | Exit hallway between B 117 and B 119 | | CD 3 | | Remove plaster | None |
| 45 | Ceiling outside of B104 | | CD 1 | | Remove plaster | None |
| 46 | East wall of corridor across from B 102 | | CD 2 | | Remove plaster | None |
| 47 | Exit hallway to the east of B 142 | | WD 4 | | Remove drywall | DT |
| 48 | To the right of B 127 | | CD 1 | | Remove plaster | None |
| 49 | Exit hallway common to ice maker next to B 118 | | CD 1 | | Remove plaster | None |
| 50 | Exit hallway common to ice maker next to B 118 | | CD 4 | | Remove plaster | None |
| 51 | Exit hallway to outside (stairwell) | | WD 4 | | Remove entire wall common to exterior | DT |
| 52 | South wall near B 118 | | CD 4 | | Remove plaster | None |

## C Wing – Third Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 53 | C 377 | Bathroom ceiling and guest bedroom | CD 2 | | Remove plaster | None |
| 54 | C 375 | Bathroom ceiling and guest bedroom | CD 2<br>CD 1 | | Remove plaster | None |
| 55 | C 389 | Guest bedroom | CD 3 | | Remove plaster | None |
| 56 | C 383 | Bathroom ceiling | CD 2 | | Remove plaster | None |
| 57 | C 395 | Bathroom ceiling and guest bedroom | CD 3<br>CD 2<br>CD 2 | | Remove plaster | None |
| 58 | C 391 | Guest bedroom, bathroom ceiling and hallway ceiling | CD 1<br>CD 4<br>CD 2 | | Remove plaster | None |
| 59 | C 380 | Guest bedroom | CD 1 | | Remove plaster | None |
| 60 | C 378 | Guest bedroom and hallway ceiling | CD 3<br>CD 2 | | Remove plaster | None |
| 61 | C 388 | Bathroom ceiling and guest bedroom | CD 4<br>WD 3 | | Remove plaster and drywall | None<br>DT |
| 62 | C 396 | Guest bedroom | WD 1 | | Remove drywall | DT |
| | **C Wing Corridor - Third Floor** | | | | | |
| 63 | Ice room near C 395 | | CD 4 | | Remove plaster | None |
| 64 | Between C 391 and C 389 | | CD 1 | | Remove plaster | None |
| 65 | Wall and ceiling common to C 389 | | CD 4 | | Remove plaster | None |
| 66 | Ceiling in front of C 375 | | CD 2 | | Remove plaster | None |
| 67 | Ceiling next to C 373 | | CD 3 | | Remove plaster | None |
| 68 | Ceiling near ice room | | CD 2 | | Remove plaster | None |
| 69 | Ceiling between A wing, C wing, and elevators | | CD 4 | | Remove plaster | None |
| 70 | Wall and ceiling of elevators between A wing and C wing | | CD 1<br>WD 3 | | Remove plaster and drywall | None<br>DT |
| 71 | Ceiling of service room facing southwest of building | | WD 3 | | Remove plaster | DT |

## C Wing – Second Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 72 | C 279 | Bathroom ceiling and guest bedroom | CD 1<br>WD 1 | | Remove plaster and drywall | None<br>DT |
| 73 | C 280 | Bathroom ceiling | CD 1 | | Remove plaster | None |
| 74 | C 281 | Bathroom ceiling | CD 1 | | Remove plaster | None |
| 75 | C 283 | Bathroom ceiling | CD 1 | | Remove plaster | None |
| 76 | C 284 | Guest bedroom | WD 1 | | Remove drywall | DT |
| 77 | C 288 | Bathroom ceiling and guest bedroom | CD 1<br>WD 1 | | Remove plaster and drywall | None<br>DT |
| 78 | C 287 | Bathroom ceiling | CD 1 | | Remove plaster | None |
| 79 | C 289 | Bathroom ceiling and guest bedroom | CD 2<br>WD 1 | | Remove plaster and drywall | None<br>DT |
| 80 | C 292 | Guest bedroom | CD 1 | | Remove plaster | None |
| 81 | C 294 | Guest bedroom | WD 2 | | Remove drywall | DT |
| 82 | C 296 | Bathroom ceiling and guest bedroom | CD 1<br>WD 1 | | Remove drywall and plaster | DT |
| 83 | C 285 | Bathroom ceiling | CD 1 | | Remove plaster | None |

## C Wing – First Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 84 | C 173 | Guest bedroom | WD 3 | | Remove drywall | DT |
| 85 | C 177 | Bathroom ceiling and guest bedroom | WD 2<br>CD 2 | | Remove drywall and plaster | DT |
| 86 | C 179 | Bathroom ceiling and guest bedroom | CD 2<br>CD 1 | | Remove plaster | None |
| 87 | C 181 | Guest bedroom | CD 2<br>WD 3 | | Remove plaster and drywall | None<br>DT |
| 88 | C 183 | Guest bedroom | WD 4 | VMG 1 | Remove drywall | Source Containment |
| 89 | C 185 | Guest bedroom | WD 4 | VMG 1 | Remove drywall and plaster | Source Containment |
| 90 | C 187 | Bathroom ceiling and guest bedroom | WD 1<br>CD 1 | | Remove drywall and plaster | DT<br>None |
| 91 | C 189 | Bathroom ceiling and guest bedroom | WD 3<br>CD 2 | | Remove drywall and plaster | DT<br>None |
| 92 | C 193 | Guest bedroom | WD 2 | | Remove drywall | DT |
| 93 | C 195 | Bathroom ceiling and guest bedroom, AC Unit | CD 2<br>WD 2 | VMG 1 | Remove drywall and plaster | Local Containment |
| | **C Wing Corridor - First Floor** | | | | | |
| 94 | Between C 189 and C 191 | | WD 2 | | Remove green board | DT |
| 95 | Hallway between A Wing and C Wing at bottom N.W. corner | | | VMG 2 | Remove mold behind baseboard | Source Containment and DT |
| 96 | West wall crown of elevator room between A Wing and C Wing | | WD 2 | | Remove crown molding carefully and drywall | DT |

## A Wing – Third Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 97 | A 347 | Guest bedroom | CD 2 | | Remove plaster | None |
| 98 | A 348 | Guest hallway | CD 1 | | Remove plaster | None |
| 99 | A 349 | Guest bedroom | CD 3<br>CD 1 | | Remove plaster | None |
| 100 | A 355 | Bathroom ceiling and guest bedroom | CD 2 | | Remove plaster | None |
| 101 | A 359 | Vanity ceiling | CD 1 | | Remove plaster | None |
| 102 | A 350 | Bathroom ceiling and guest bedroom | CD 3<br>CD 1 | | Remove plaster | None |
| 103 | A 360 | Guest bedroom | CD 1<br>CD 2 | | Remove plaster | None |
| | **A Wing Corridor - Third Floor** | | | | | |
| 104 | In front of A 348 | | CD 2<br>CD 3 | | Remove plaster | None |
| 105 | To the right of A 361 | | CD 3 | | Remove plaster in multiple areas | None |
| 106 | Ceiling of entrance to third floor A wing | | CD 2 | | Remove plaster | None |
| 107 | Ceiling next to first window at entrance to A wing | | CD 2 | | Remove plaster | None |
| 108 | Hallway between A 367 and A 369 on ceiling | | CD 2 | | Remove plaster | None |

## A Wing – Second Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 109 | A 246 | Guest bedroom | WD 2 | | Remove drywall | DT |
| 110 | A 249 | Guest bedroom | WD 2 | | Remove drywall | DT |
| 111 | A 251 | Guest bedroom | WD 3 | VMG 3 | Remove drywall | Local Containment |
| 112 | A 257 | Guest bedroom | WD 3 | | Remove drywall | DT |
| 113 | A 258 | Bathroom ceiling | WD 2 | | Remove drywall | DT |
| 114 | A 259 | Guest bedroom | WD 2 | | Remove drywall | DT |
| 115 | A 261 | Guest bedroom | WD 2 | | Remove drywall | DT |
| 116 | A 262 | Bathroom area | WD 4 | | Remove drywall | DT |
| 117 | A 265 | Guest bedroom | WD 4 | | Remove drywall | DT |
| 118 | A 267 | Guest bedroom<br>AC Unit | WD 4 | VMG 2 | Remove drywall and plaster | Local Containment |
| 119 | A 269 | Guest bedroom<br>AC Unit | WD 2 | VMG 1 | Remove drywall | Local Containment |

## A Wing – First Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 120 | A 146 | Guest bedroom | WD 2 | | Remove drywall | DT |
| 121 | A 147 | Guest bedroom | WD 2 | | Remove drywall | DT |
| 122 | A 148 | Guest bedroom<br>AC Unit | WD 4 | VMG 1 | Remove drywall | Local Containment |
| 123 | A 149 | Guest bedroom<br>AC Unit | WD 2 | VMG 1 | Remove drywall | Local Containment |
| 124 | A 151 | Guest bedroom | WD 4<br>CD 1 | | Remove drywall and plaster | DT |
| 125 | A 160 | Guest bedroom | CD 4 | | Remove plaster | None |
| 126 | A 161 | Guest bedroom<br>AC Unit | WD 4 | VMG 1 | Remove drywall and plaster | Local Containment |
| 127 | A 166 | Guest bedroom<br>AC Unit | WD 3 | VMG 2 | Remove drywall | Local Containment |
| | **A Wing Corridor - First Floor** | | | | | |
| 128 | Ceiling of room 1249 | | WD 4 | | Remove drywall | DT |
| 129 | Right side of the door in front of room 1247 | | WD 2 | | Remove drywall | DT |

## The Suites – Third Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 130 | 303 | Bathroom ceiling | WD 3 | | Remove drywall | DT |
| 131 | 305 | Guest bedroom and vanity bathroom | CD 1<br>WD 2 | VMG 2 | Remove drywall and plaster, unscrew top of bathroom bench seat and inspect | Local Containment |

## The Suites – Second Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 132 | 207 | Guest hallway and bathroom area | WD 4 | VMG 4 | Remove drywall in closet and on back end of bench seat in vanity area, tile shower | Local Containment |
| 133 | 209 | Guest entry | | VMG 3 | Remove drywall at left bottom side of entry (back wall). | Local Containment |
| | **Spa Suites Corridor - Second Floor** | | | | | |
| 134 | N wall between S 205 and S 207 | | WD 2<br>WD 1 | VMG 2<br>VMG 1 | Remove gypsum board | Local Containment |
| 135 | S wall opposite S 209 | | | VMG 2 | Remove drywall | Local Containment |
| 136 | N wall between S 203 and S 205 | | WD 2 | VMG 2 | Remove drywall | Local Containment |

## The Suites – First Floor

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 137 | S 104/S 105 (one room) | N wall of S.E. bedroom to right of slider | WD 4 | | Remove drywall | DT |
| | | Drywall inside cavity behind tub | WD 2 | VMG 2 | | Source Containment |
| | | Wall cavity at shower enclosure | WD 1 | | | DT |
| | | Demising wall between S 104 and S 103 | WD 1 | | | DT |

## Spa Building

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 138 | Main entry 2nd floor at south side | | WD 4 | | Remove drywall | DT |
| 139 | Entry area ceiling 2nd floor south side | | WD 2 | | Tube sticking through ceiling extended 2 ft. Cannot reach, cannot be marked. | DT |
| 140 | First Floor - Room on N side of building facing courtyard – east wall | | WD 4 | | Remove drywall | DT |
| 141 | Mechanical Room | | WD | | Water stains on block wall, eliminate water intrusion source | Damp wipe water stains of wall |

## Core Area

| ID | Room | Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|---|
| 142 | 2316 | Near Junior Ballroom | WD 4 | | Remove drywall and plaster, possible mold growth | DT |
| 143 | 2327 | Display Kitchen near restaurant | WD 4 | VMG 4 | Remove drywall. HVAC needs 10 ft ladder and HVAC contractor to inspect ductwork | Local Containment |
| 144 | | Kitchen – dishwashing area | WD 3 | VMG 3 | Remove ceiling tiles (2) | Local Containment |
| 145 | | Kitchen | WD 4 | VMG 1 | Remove ceiling tiles (6) | Local Containment |
| 146 | | Kitchen – janitorial area | WD 4 | VMG 4 | Remove ceiling tiles (6) | Local Containment |
| 147 | 2387 | Great Ballroom | WD 4 | VMG 1 | Very suspect, access limited due to stored content. Remove drywall and wood paneling | Local Containment |
| 148 | 2388 | West wall | WD 4 | | Contents to be removed to allow access, remove drywall and wood paneling | DT |
| 149 | 2388 | North wall | WD 4 | | Contents to be removed to allow access, remove drywall and wood paneling | DT |
| 150 | 2358 | All walls | WD 2 | | Remove drywall, remove baseboards in entire room | DT |
| 151 | 2356 | Pre Ford Room - Wood paneling prevents inspection | | | Paneled, strong odor, no access to walls | DT from corridor |
| 152 | 2369 | Back room | WD 3 | | Remove all baseboards | DT |
| 153 | 2355 | Gerald Ford Boardroom - Wood paneling prevents inspection | | | Strong urine odor, wall cavities suspect. Destructive testing from corridor to west wall | DT from corridor |
| **Core area Corridor** | | | | | | |
| 154 | Lobby 2301 left at first beam, Back side of ceiling above fireplace | | WD 4 | VMG 1 | Remove drywall or HEPA vacuum, disinfect and encapsulate | Source Containment |
| 155 | Closet in service corridor next to kitchen janitorial | | WD 4 | | Remove drywall | DT |

### Employee Corridor

| ID | Room and Location | WD | VMG | Specifications | Containment |
|---|---|---|---|---|---|
| 156 | Employee corridor base level – efflorescent present along block retaining wall causing paint to peel. Suspect to water intrusion. | | | Investigate drainage and eliminate water intrusion. | None |

## CONTAINMENT TYPES

### None

Water damaged plaster or other deteriorated building materials which needs to be removed. The visual inspection did not show visible mold growth. Inorganic materials such as plaster, concrete or block wall are not likely to support microbial growth. Dust control methods are recommended during the removal or surface cleaning of the materials.

### Source Containment

A source containment is used for a small limited area of visible mold growth. It is an engineering control method used to reduce fungal spore and fragment release into the surrounding areas and to reduce exposure to remediation workers.





Use plastic film materials with adhesive backing such as carpet tack mat or carpet protector to cover over moldy material prior removal. Adhere the plastic film directly to the moldy material extending beyond the area of visible mold growth. Place a HEPA-filtered air scrubber next to the work area to capture dust particulates released during cut out process. Cut sealed material out with dust control methods. Remove the affected material and place immediately into a 4- to 6-mil polyethylene trash bag. HEPA vacuum the remaining construction debris and dust from the vicinity of the removal work area.

### Local Containment

A local containment is used to remove larger areas of visible mold growth or water damaged materials where significant mold growth is expected to be exposed. Erect a local barrier system around the work area to prevent the release of fungal spores and fragments into the surrounding areas and reduce exposure to remediation workers.

Use 4 to 6 mil polyethylene sheeting material and spring mounted expendable poles such as the Zipwalls™ system to create the structural enclosure. PVC pipes can also be used to build structural enclosures but only where the use of extension poles is not feasible. Tape or attach the sheeting material around the perimeter to the building assembly to create a tight seal. A decontamination chamber is not required.

Place a HEPA-filtered air scrubber inside the enclosure, next to the work area, to capture dust particulates

released during cut out process. Remove the affected or specified materials carefully with as little agitation as possible using dust control methods. Remove the affected material and place immediately into a 4- to 6-mil polyethylene trash bag before removing from containment. HEPA vacuum the remaining construction debris and dust from the vicinity of the removal work area.

## Full Containment

A full containment is a work area enclosure which encompasses the entire room. Establish a barrier system with spring mounted pole such as a Zipwall system or PVC pipes to seal the work area from the surrounding areas. This is done to prevent the release of fungal spores and fragments to the surrounding areas and reduce exposure to remediation workers.

Place a HEPA-filtered air scrubber in the enclosure, next to the work area, to capture dust particulates released during cut out process. Remove the affected or specified materials carefully with as little agitation as possible using dust control methods. Remove the affected material and place it immediately into a 4- to 6-mil polyethylene trash bag before removing from the containment. HEPA vacuum the remaining construction debris and dust from the vicinity of the removal work area.

## DT (Destructive Testing)

An intrusive investigation needs to be conducted in this area. Building materials such as ceilings, baseboards and walls need to be removed to gain access to other suspect areas for inspection by the mold consultant.

Place HEPA-filtered air scrubber(s) next to the work area to capture dust particulates released during cut out process. Carefully cut out the affected or specified materials with as little agitation as possible using dust control methods. If visible mold growth is detected on the backside of the cutout material, photo document extent and location prior to the disposal of the material. Report condition and transmit photos to ET&T's mold consultant for the project.

If small areas of visible mold growth (less than 5 square feet) are discovered on the backside of the wallboard, place a source containment over the affected surface area and remove the material. Place the demolition material immediately into a 4- to 6-mil polyethylene trash bag. HEPA vacuum the remaining construction debris and dust from the vicinity of the removal work area.

If large areas of visible mold growth (more than 5 square feet) are discovered on the backside of the wallboard, establish a local containment around the work area. Remove the cut out material and place the demolition material immediately into a 4- to 6-mil polyethylene trash bag. HEPA vacuum the remaining construction debris and dust from the vicinity of the removal work area.

## HVAC System



The heating ventilation and air conditioning (HVAC) systems in the different buildings were not inspected by ET&T. Visibly accessible sections of the HVAC showed water intrusions into the system in some areas. The main area is the Display Kitchen in the main building core.



During the inspection of the guestrooms, it became apparent that all individual room AC units had a heavy layer of fine white drywall dust in them. This is due to the construction work in the building. We highly recommend that all sections of the HVAC system are cleaned after the dust generating work has been completed. HVAC and duct cleaning should be conducted by a professional duct cleaning company according to NADCA ACR 2006 standard. All air filters need to be replaced after duct and AC cleaning has been completed.

## Fire Proofing Materials



Sprayed on fire proofing materials on metal beams and sheeting materials have been affected by water intrusions. A fire marshal or structural engineer needs to inspect and assess the fire proofing material for appropriate performance and adherence. We recommend that a spray-on encapsulant coating such as *Fiberlock ABC* or equivalent product is applied to the affected areas of the fire proofing material.

ET&T has collected four (4) material samples for fungal analysis to evaluate if fungal amplification is likely. The laboratory analysis data is not available yet.

## Cleaning



Fine dust is present on every horizontal surface in the rooms and buildings, and inside the HVAC systems. The greatest challenge to obtain good air quality in the buildings is an effective and thorough cleaning of the fine dust and debris in all areas. This will include all kitchen installations, cabinets and drawers in all rooms and components of the HVAC systems.

Surface cleaning methods should consist of thorough HEPA vacuuming and damp wiping. Place HEPA filtered air filtration devices ("scrubbers") in the cleaning area to effectively reduce the airborne dust and particle load. Critical plastic barriers need to be installed to separate "cleaned" from "to be cleaned" areas. Otherwise, air flow may carry particulates back into previously cleaned areas.

The use of a laser particle counter will be helpful to verify the efficacy of the cleaning efforts. ET&T has been retained to conduct spore trap air sampling to assess the airborne spore load upon completion of the

remediation and cleaning efforts. ET&T will be able to provide more detailed cleaning specification upon request.

## SCHEDULING

ET&T will conduct an inspection of the opened and remediated areas once the contractor has completed the material removal but prior to the deep cleaning. The contractor or building management shall inform ET&T in a timely manner when the work areas are ready for inspection. The work areas shall be accessible.

## POST REMEDIATION VERIFICATION

Upon completion of the remediation work, ET&T will conduct a post remediation verification survey. The survey will consist of a visual inspection, to assure that the areas are dust free, air and surface sampling. The sampling results should reflect and be comparable to typical background spore levels in the local outside air or in known non-complaint indoor environments. The spore type and concentration levels should be similar to or lower than local outdoor reference air. The work areas need to be dry to industry standards.

## HEALTH AND SAFETY

The remediation contractor or each employer is responsible for complying with all federal, state and local safety and regulatory requirements. ET&T is only responsible for the health and safety of its own employees and is providing a site-specific health and safety plan for others involved in the project.

### Personal Protection Equipment

The use of appropriate personal protection equipment such as coveralls, respirators, gloves and goggles is highly recommended during destructive testing, demolition and clean-up work. The type of personal equipment selected varies with the type of contaminant, the quantity of affected material, airborne dust and spore load and work time period.

Professional judgment in personal protection equipment selection is required. At a minimum an N-95 respirator shall be used during any dust generating work. The contractor must follow applicable local, state and federal regulation when using personal protection equipment.

## OTHER ENVIRONMENTAL ISSUES, REGULATIONS AND STANDARDS

### Rodents

During our site inspections large amounts of mice and rat droppings, cockroaches and other insects were detected in different sections of the buildings, especially the lower sections of the B Wing and The Suites. This is a significant health and safety concern to the facility. A rodent type odor is already perceived in some part of the complex, especially the Gerald Ford Boardroom. This discovery has to be incorporated into the remedial efforts for the hotel complex. It appears to be a systemic infestation. The presence of rodents and vectors raises the following health and safety issues:

- Persistent odor problems in buildings
- Nests inside the wall and ceiling cavities
- Carriers of viruses, for example Hanta viruses in rodents

- Produce known allergens (cockroaches)
- Suspected bird or bat droppings (Histoplasmosis)

The suspected routes of entry for the rodents are:

- Dried out toilets that are not sealed securely
- Surface and bathroom drains that are not sealed
- Boarded windows and doors that have gaps

Regular maintenance pest control methods such as spraying chemicals in and around facilities are not sufficient in our opinion. A vector control professional needs to be brought to the site to assess the rodent population, consults on prevention of further entry and design the professional eradication strategy. This issue needs to the addressed expediently to prevent further damage to the building, odor problems and related health and safety issues.

### Asbestos

A comprehensive and regulatory asbestos survey has not been conducted. The oldest buildings were built in 1986-1987 when use of asbestos containing materials (ACM) was restricted. An asbestos survey was not part of our scope of work. ET&T conducted limited asbestos sampling as part of its own Job Hazard Analysis. Two samples each were collected from drywall material, surface dust and fire proofing materials. All six (6) samples were negative for ACM. Each employer is responsible for complying with all federal, state and local safety and regulatory requirements for asbestos.

### Lead

Testing for lead containing materials was not part of ET&T's scope of work. Lead containing materials are regulated federally under the EPA and OSHA. Due to the age of the building, type of building and type of use, we assume that the EPA's Repair, Remodeling and Painting (RRP) rule does not apply to the buildings. Each employer is responsible for complying with all federal, state and local safety and regulatory requirements for lead.

### Mold

ET&T bases its inspection, remediation and repair recommendations on the following industry documents:

- IICRC/ANSI S520 *Standard and Reference Guide for Professional Mold Remediation*
- New York City Department of Health and Mental Hygiene - *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*
- ACGIH: *Bioaerosols: Assessment and Control*
- AIHA: *Recognition, Evaluation, and Control of Indoor Mold*

## LIMITATIONS

Reasonable efforts were made by Environmental Testing & Technology, Inc.'s personnel to locate suspect areas of mold growth. However, the existence of hidden and concealed mold growth is always a possibility in buildings. Environmental Testing & Technology, Inc. does not warrant, guarantee or profess to have the ability to locate or identify all mold and fungi in a building. Conditions of mold growth can change in a short period of time due to water intrusion, environmental conditions and other factors. Results of this report represent the conditions at the time of site inspection only.

A diligent inspection of normally visible and accessible areas was made in accordance with the scope of work. However, due to the inherent limitations of the physical inspection process, Environmental Testing & Technology, Inc. cannot report, or accept responsibility for, materials or conditions, which may exist in areas that were inaccessible at the time of its inspection. This survey cannot guarantee, nor warrantee the absence of microbial growth in areas not accessible for inspection or not part of this scope of work.

This inspection is not intended to reflect the structural integrity, or value of the property, nor do we make any representation as to the advisability of purchase or the suitability for use. We do not assume responsibility for choices or decisions made regarding the purchase or rental of properties, mitigation or potential legal action, based on our site inspections. The inspection is not intended to be technically exhaustive, and is not to be used as a guarantee or warranty, expressed or implied, regarding the adequacy, performance, or condition of the inspected structure.

Thank you for choosing ET&T for your survey needs. If you have any further questions, please feel free to contact us at (760) 942-9400.

Sincerely yours,



Peter H. Sierck
Principal/Industrial Hygienist

Certified Microbial Consultant #0706039
Florida Licensed Mold Assessor # 5560460
Certified Microbial Remediation Supervisor #0710010
Certified Indoor Environmental Consultant #0702028
Certified Indoor Air Quality Professional #184

3565 Lexington Av.
El Monte, CA 91731

**Micron Environmental Labs**

PAT ID No.: 103012
Analytical Method NIOSH 7400

Micron Ref. No.: 12211078
Date: 7/5/11

# Air Sample Analysis Summary

**Project:** 110526
68900 Frank Sinatra Dr, Rancho Mirage

Analyst: Nick Orozco

**Name:** ACM+ Environmental
**Address:** 3561 Lexington Ave
**City, State, Zip:** El Monte, CA 91731

Date Received: 5/27/11
Date Analyzed: 5/27/11
No. Samples: 2

| Micron ID | Client ID | Date Collected | Sample Description/Location | Total Time (min) | Flow (LPM) | Volume (Liters) | No. of Fibers | No. of Fields | Result (F/cc) |
|---|---|---|---|---|---|---|---|---|---|
| 328350 | 1 | 5/26/11 | 2nd Floor, S. B-Wing | 110 | 15 | 1650 | 5.5 | 100 | 0.002 |
| 328351 | 2 | 5/26/11 | 3rd Floor, S. B-Wing | 110 | 15 | 1650 | 5.5 | 100 | 0.002 |

Analyst: _____

Field Area: .007854mm Filter Media: MCE, 25mm$^2$/0.8µ Filter Area: 385mm

95% Upper Confidence Limit based on intralaboratory coefficient of variation. Limit of Detection based on 5.5 fibers/100 fields

Micron Environmental Labs

3565 Lexington Ave. • El Monte, California 91731 (626) 454-4782 Fax (626) 454-4849

July 19, 2011

Alfredo Amaro
ACM +
3561 Lexington Av.
El Monte, CA 91731

Subject: PLM Analysis of Bulk Samples
Micron Job No.: 12211077
Client Ref.: Project # 110526/68900 Frank Sinatra Dr.

Dear Mr. Amaro:

This report includes an attached summary of the samples collected for the analyses of the 10 bulk samples received by this laboratory on May 27, 2011. The analyses were completed using polarized light microscopy (PLM) in accordance with the EPA Method 600/R-93/116, July 1993. The quantification is based on the percentage of visual area estimation and is expressed as percent area. Samples that are multilayer are analyzed by layer unless, it has been requested as a composite analysis. These visual area estimate results are based on using reference standards materials that are routinely used in the laboratory.

For all the organic matrix samples that were not asbestos detected by (PLM), Micron Environmental recommends the use of Transmission Electron Microscopy (TEM) due to the size and the masking of the fibers.

Micron Environmental Labs is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) Lab Code 200294-0 for asbestos fiber analysis (PLM).

Micron Environmental Labs is responsible for the accuracy in this report, but we are not liable for any wrong data given to us by the client regarding these samples or for any misuse or interpretation of information supplied by us. Liability shall extend to providing replicate analyses only. This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government. We will retain these samples for a period of ninety days unless otherwise specified. This report pertains only to the samples submitted and analyzed.

Micron Environmental will not grant reproduction of this report unless an approval is obtained from this laboratory. Please feel free to contact the laboratory for questions regarding results or the analytical methods used at (626)454-4782.

Sincerely,
Micron Environmental Labs

Daniel Gamez
Director
Attachments
LW

Micron Environmental Labs
3565 Lexington Ave.
El Monte, CA 91731
626-454-4782
FAX: 626-454-4849

Analytical Method: EPA 600/R-93/116
NIST / NVLAP Lab Code No. 200294-0
California ELAP Certificate No. 2297

Micron Ref. No.
*12211077*

# Sample Summary Results

Customer Project: *Project # 110526/68900 Frank Sinatra Dr.* Microscopist: *Nick Orozco*

*July 19, 2011*

*Alfredo Amaro*
*ACM +*
*3561 Lexington Av.*
*El Monte, CA 91731*

Date Collected: *May 26, 2011*
Date Received: *May 27, 2011*
Date Analyzed: *May 27, 2011*
No. Samples: *10*

| Cust ID No. / Micron ID No | Sample Description / Color | Asbestos Detected | Analytical Results | Q.C. |
|---|---|---|---|---|
| **1** 328340 | Fireproofing beige | No | 40% Cellulose<br>20% Mineral Filler<br>40% Vermiculite | |
| **2** 328341 | Drywall/Ceiling white | No | 100% Mineral Filler | |
| **2** 328342 | Joint Compound/Ceiling beige | No | 100% Mineral Filler | |
| **3** 328343 | Drywall/Wall white | No | 100% Mineral Filler | |
| **3** 328344 | Joint Compound/Wall beige | No | 100% Mineral Filler | |
| **4** 328345 | Drywall/Wall white | No | 100% Mineral Filler | |

# Sample Summary Results



Date: *July 19, 2011*

Microscopist: *Nick Orozco*

Micron Ref. No.: *12211077*

| Cust ID No. / Micron ID No | Sample Description / Color | Asbestos Detected | Analytical Results | Q.C. |
|---|---|---|---|---|
| **4** 328346 | Joint Compound/Wall beige | No | 100% Mineral Filler | |
| **5** 328347 | Fireproofing grey | No | 40% Cellulose<br>20% Mineral Filler<br>40% Vermiculite | X |
| **6** 328348 | Drywall white | No | 100% Mineral Filler | |
| **6** 328349 | Joint Compound beige | No | 100% Mineral Filler | |

Microscopist: _____

The limit of detection for this analytical method is less than one percent asbestos (visual area estimates). CV=0.04

# Appendix H:

# Resumes

# LANEICIA A. STONE

*Director, Environmental Technical Operations*

## Education

- Bachelor of Science, Civil Engineering, University of Texas at Arlington, 1993

## Project Experience

***Landfill, Carrollton, TX*** Ms. Stone served as Project Scientist and was responsible for monthly field collection and client reporting of monitoring well and piezometer readings, as well as the surveying of water levels of streams and lakes near the existing two phases of the landfill. Ms. Stone also helped in the permitting of Phase III of this landfill, which included the installation of a High Density Poly-Urethane liner.

***Rapid Transit Authority, Dallas, TX*** Ms. Stone served as a Project Scientist for the remediation efforts, which were encountered during the excavation of contaminated soils for the underground DART system. This project included the field collection of samples and reporting directly to the DART authorities on remediation efforts of contaminated soils. These soils were removed and taken to an off-site location to be remediated and then were incinerated.

***NationsBank, Dallas, TX*** Ms. Stone served as a Project Scientist for the OREO division of NationsBank. Ms. Stone was placed in the environmental offices for NationsBank on a long term contract by her employer, GZA. Ms. Stone assisted in reviewing other consultant's environmental reports for technical accuracy, assisted in closing out deficiencies between these reports and the bank's Scope, and then made appropriate recommendations to the bank based on these reports.

***Airports, Houston, TX*** Ms. Stone served as Project Manager over air monitoring and indoor air quality. Her responsibilities included the air monitoring and PCM sample analysis as well as project management and oversight of asbestos removal at the three city of Houston airports. This job included unlimited security clearance and access to all three airports (Ellington, Intercontinental and Hobby).

***Walgreen Facilities (Nationwide)*** Ms. Stone served as the environmental technical lead for a portfolio of 96 Walgreen facilities. Over half of these facilities had historical gas stations located on the asset lands which required further investigations (i.e. Phase II Subsurface Investigations and review of State files).

***Automotive Dealerships*** Ms. Stone performed Phase I Environmental Site Assessments for several automotive dealerships

### *Industry Tenure*

- Environmental: 1990
- EMG: September, 1995

### *Industry Experience*

- Office
- Banking
- Industrial
- Retail
- Residential

### *Active Licenses/Registration*

- Certified EPA/AHERA Building Inspector/205349, 1992
- EPA Model Curriculum for Residential Lead-Based Paint Hazard Reduction Act of 1992 (Title X), 1992
- OSHA/40 Hour Health and Safety Training/29 CFR 1910.120, 1991
- State of Texas Licensed Asbestos Management Planner (1995)
- Texas Certified Lead-based Paint Inspector/Risk Assessor/Management Planner, 1999
- CEI – Certified Environmental Risk Assessor, Environmental Assessment Association, 1991
- NIOSH 7400, Microscopic Identification of Asbestos, 1993

### *Professional Affiliations*

- Society of Women Engineers (Young Woman of the Year, 1991)

### *Regional Location*

- Baltimore, MD

throughout the south and southeast as part of a national automotive portfolio. The automotive dealerships had numerous environmental concerns including, underground storage tanks, oil/water separators, and in-ground hydraulic lifts. Based on an evaluation of the automotive sites, Ms. Stone recommended Phase II subsurface investigations to further evaluate the adverse environmental impacts from the various environmental concerns to the subsurface environment.

***Historic Building –*** Ms. Stone performed a Phase I Environmental Site Assessment, limited asbestos survey and lead-based paint survey at a historic building in downtown Houston. Asbestos-containing materials and lead-based paints were identified throughout the facility. The facility developed and implemented an operations and maintenance plan for asbestos and lead-based paint.

***Golf Courses (Nationwide)*** Ms. Stone served as the environmental technical lead for a portfolio of over 100 golf course facilities. Over half of these facilities had issues including leaking underground storage tanks, unregistered water wells, and contamination resulting from pesticides and herbicides which required further investigations (i.e. Phase II Subsurface Investigations and review of State files).

***Sands Hotel (Las Vegas, NV)*** Ms. Stone served as the Project Manager for the environmental due diligence prior to demolition of the Sands Hotel in Las Vegas. Asbestos-containing materials were identified that required abatement prior to demolition. In addition, contaminated groundwater was encountered during demolition, which resulted in the installation of carbon filtration and extraction and reinjection wells to remediate the contaminated groundwater encountered during dewatering efforts. After successful completion of the remediation, the Venetian Hotel was given clearance for development.

***Hilton Hotels (International locations)*** Ms. Stone assisted in the environmental management activities for over 170 Hilton international locations as well as performing onsites for Phase I Environmental Site Assessments and Property Condition Surveys of various Hilton Hotels located throughout Europe.

# SARAH SWEENEY

*Technical Report Reviewer*

## Education

- Bachelor of Science in Environmental Conservation at California University of Pennsylvania
- 29 Credits towards Master of Environmental Pollution Control at the Pennsylvania State University

## Project Experience

***Rental Car Facility, Arlington, VA –*** Ms. Sweeney performed a Phase I Environmental Assessment for an existing rental car facility, which included a leaking underground storage tank. At her recommendation, a Phase II Subsurface Investigation was conducted. Groundwater monitoring wells were installed at the property to determine groundwater flow and extent of contamination.

***Vacant Land, Charles Town, WV –*** Ms. Sweeney performed a Phase I Environmental Assessment for 200 acres that was slated for residential development. A pile of asphalt roofing shingles, potentially containing asbestos was found on the property. At her recommendation, the roofing shingles were removed and disposed of in accordance with State and Federal regulations.

***Apartment Building, Libertytown, MD –*** Ms. Sweeney performed a Phase I Environmental Assessment for an existing apartment building with an on-site drinking water well. Through interviews with governmental officials, as well as historical research, she found that the groundwater in the area was contaminated with TCE. She recommended that the well be properly abandoned and the property be connected to the public water system.

***Business Park, Hanover, MD –*** Ms. Sweeney performed a Phase I Environmental Assessment for a business park, which contained four buildings and numerous laboratory tenants.

***Hotel, Harpers Ferry, WV –*** Ms. Sweeney performed a Phase I Environmental Assessment for a hotel that was to be purchased. The hotel was built in the 1960s and had an on-site wastewater treatment plant. At her recommendation, an asbestos survey was conducted.

### *Industry Tenure*

- Environmental: 2001
- EMG: May, 2002

### *Industry Experience*

- Office
- Industrial
- Housing
- Hospitality
- Retail

### *Active Licenses/Registration*

- Maryland Biological Stream Survey – Spring 2002 Training
- Maryland Biological Stream Survey – Summer 2001 Training
- Lead Inspector Technician Certification, Maryland, Certificate # 33016 since 2002
- AHERA Asbestos Inspector Certification, Certificate # 059130 since 2002

### *Regional Location*

- Hanover, PA

# **Appendix J**
Response to Comments

# Responses to Comment Letters Received on the Draft MND

The Draft MND was circulated for public review from March 11, 2024, through April 9, 2024, in accordance with Section 15105(a) of the California Environmental Quality Act (CEQA) Guidelines. The MND was recirculated from July 22,2024 to August 20, 2024. A total of eight written comment letters were received on the Draft MND from agencies, tribes, and organizations as shown in Table 1. Each of the written comment letters have been assigned an alphanumeric label, and the individual comments within each written comment letter are bracketed and numbered. For example, Comment Letter A1 contains one comment that is numbered A1-1.

The responses to each comment on the Draft MND represent a good-faith, reasoned effort to address the environmental issues identified by the comments. Pursuant to Section 15088(a) of the CEQA Guidelines, the City of Rancho Mirage (City), as lead agency, is not required to respond to all comments on the Draft MND, but only those comments that raise environmental issues. In accordance with CEQA Guidelines Sections 15088 and 15204, the City has independently evaluated the comments and prepared the attached written responses to any significant environmental issues raised.

**Table 1. Comment letters and Commenters**

| Comment Letter | Commenter | Date Received |
|---|---|---|
| *Agency* | | |
| A1 | California Department of Fish and Wildlife | April 8, 2024 |
| *Tribal Government* | | |
| T1 | Agua Caliente Band of Cahuilla Indians | March 25, 2024 |
| T2 | Agua Caliente Band of Cahuilla Indians | August 19, 2024 |
| *Organization* | | |
| O1 | Western States Regional Council of Carpenters | April 9, 2024 |
| O2 | Californians Allied for a Responsible Economy | April 9, 2024 |
| O3 | Oswit Land Trust | August 20, 2024 |
| O4 | Western States Regional Council of Carpenters | August 20, 2024 |
| O5 | Californians Allied for a Responsible Economy | August 20, 2024 |

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Comment Letter A1

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region
3602 Inland Empire Boulevard, Suite C-220
Ontario, CA 91764
www.wildlife.ca.gov

*GAVIN NEWSOM, Governor*
*CHARLTON H. BONHAM, Director*

April 8, 2024
*Sent via email*

Ben Torres
Planning Manager
City of Rancho Mirage
69-825 Highway 111
Rancho Mirage, CA 92270

Ritz-Carlton Rancho Mirage Project (PROJECT)
Mitigated Negative Declaration (MND)
SCH# 2024030267

Dear Ben Torres:

The California Department of Fish and Wildlife (CDFW) received a Mitigated Negative Declaration (MND) from the City of Rancho Mirage (City) for the Project pursuant to the California Environmental Quality Act (CEQA) and CEQA guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

A1-1

**CDFW ROLE**

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802.) Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on Projects and related activities that have the potential to adversely affect fish and wildlife resources.

A1-2

[1]CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

*Conserving California's Wildlife Since 1870*

CDFW is also submitting comments as a **Responsible Agency** under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority. (Fish & G. Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the Project proponent may seek related take authorization as provided by the Fish and Game Code.

A1-2 Cont.

**PROJECT DESCRIPTION SUMMARY**

**Proponent:** Kam Sang Company, Inc.

**Objective:** The proposed Project is to construct residential units within the Ritz-Carlton Residences section of the Project site (encompassing approximately 200,474 square feet), to construct 23,840 square feet of venue space, 5,510 square feet of amenity space, and 6,273 square feet of commercial space within the Sky Mesa Recreational Area portion of the Project site for a total project size of approximately 236,750 square feet. The residential suites, hotel villas, and sky mesa uses would include outdoor lighting. A desert landscape design is proposed throughout the Project site including water cascades, multiple pools, rock escarpments, and fountains. Landscaping would be located throughout the Project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network.

A1-3

**Location:** The proposed Project is located at 68900 Frank Sinatra Drive, approximately 0.85 miles southwest of the intersection with State Route 111 in the City of Rancho Mirage, Riverside County (Assessor's Parcel Numbers 689-020-012, 689-020-014, 689-330-031, 689-330-032, 689-330-034, and 689,331-018). The majority of the 4.5-acre project site is currently vacant and lies east of the existing Ritz-Carlton Rancho Mirage Hotel. The project site is located in Section 3, Township 5 South, and Range 5 East of the San Bernardino Baseline and Meridian, U.S. Geological Survey Cathedral City 7.5-minute quadrangle. The Project site is located within the Coachella Valley Multiple Species Habitat Conservation Plan area, outside of a Conservation Area, and approximately 350 feet from the boundary of the Santa Rosa and San Jacinto Mountains Conservation Area.

**Timeframe:** The MND does not indicate a timeline for the start of Project construction.

**COMMENTS AND RECOMMENDATIONS**

CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (i.e., biological resources). CDFW offers the comments and

A1-4

recommendations below to assist the City in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. The MND has not adequately identified and disclosed the Project's impacts (i.e., direct, indirect, and cumulative) on biological resources and whether those impacts are reduced to less than significant.

CDFW's comments and recommendations on the MND are explained in greater detail below and summarized here. CDFW is concerned that the MND does not adequately identify or mitigate the Project's significant, or potentially significant, impacts to biological resources. CDFW also concludes that the MND lacks sufficient information to facilitate a meaningful review by CDFW, including a complete and accurate assessment of biological resources on the Project site and an incomplete Project description. CDFW requests that additional information and analyses be added to a revised MND, along with avoidance, minimization, and mitigation measures that avoid or reduce impacts to less than significant.

A1-4 Cont.

Project Description

Compliance with CEQA is predicated on a complete and accurate description of the proposed Project. Without a complete and accurate Project description, the MND likely provides an incomplete assessment of Project-related impacts to biological resources. CDFW has identified gaps in information related to the Project description.

The MND lacks an adequate discussion of plans for artificial nighttime lighting. CDFW requests that the MND is revised to include design plans for artificial nighttime lighting and lighting specifications. Artificial nighttime lighting can negatively impact biological resources in a variety of ways as discussed in the Artificial Nighttime Lighting section below. The MND also lacks an adequate discussion of perimeter fencing (or a functionally equivalent structure) that may serve to prohibit the entry of Peninsular bighorn sheep (*Ovis canadensis nelsoni*) and avoid take of this California fully protected species, as discussed in the Peninsular Bighorn Sheep section. The MND also lacks details on the landscape plants that will be used, specifically plants known to be toxic to Peninsular bighorn sheep.

A1-5

To conduct a meaningful review and provide biological expertise on how to protect biological resources, CDFW requires a complete and accurate Project description.

Existing Environmental Setting

Compliance with CEQA is predicated on a complete and accurate description of the environmental setting that may be affected by the proposed Project. CDFW is concerned that the assessment of the existing environmental setting has not been adequately analyzed in the MND. CDFW is concerned that without a complete and

A1-6

accurate description of the existing environmental setting, the MND may provide an incomplete analysis of Project-related environmental impacts.

The MND lacks a complete assessment of biological resources within the Project site and surrounding area specifically as it relates to burrowing owl (*Athene cunicularia*). A complete and accurate assessment of the environmental setting and Project-related impacts to burrowing owl is needed to both identify appropriate avoidance, minimization, and mitigation measures and demonstrate that these measures reduce Project impacts to less than significant.

A1-6 Cont.

Mitigation Measures

CEQA requires that an MND include mitigation measures to avoid or reduce significant impacts. CDFW is concerned that the mitigation measures proposed in the MND are not adequate to avoid or reduce impacts to biological resources to below a level of significance. To support the City in ensuring that Project impacts to biological resources are reduced to less than significant, CDFW recommends adding mitigation measures for artificial nighttime lighting and Peninsular bighorn sheep, as well as revising the mitigation measures for nesting birds and burrowing owl.

A1-7

***1) Nesting Birds***

It is the Project proponent's responsibility to comply with all applicable laws related to nesting birds and birds of prey. Fish and Game Code sections 3503, 3503.5, and 3513 afford protective measures as follows: section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by Fish and Game Code or any regulation made pursuant thereto. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by Fish and Game Code or any regulation adopted pursuant thereto. Fish and Game Code section 3513 makes it unlawful to take or possess any migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703 et seq.).

Page 16 of the MND indicates that the Project "construction could result in direct and indirect impacts to nesting birds, including the loss of nests, eggs, and fledglings if ground-disturbing activities occur during the nesting season." The MND includes Mitigation Measures BIO-3 for nesting birds, which indicates that "if ground-disturbing and/or vegetation clearance activities are scheduled to occur during the avian nesting season (typically February 15 through August 31), a qualified biologist shall conduct a preconstruction nesting bird survey within the project impact footprint and a 500-foot buffer". CDFW considers the Mitigation Measure BIO-3 to be insufficient in scope and timing to reduce impacts to nesting birds to a level less than significant. CDFW is

A1-8

concerned about impacts to nesting birds including loss of nesting/foraging habitat and potential take from ground-disturbing activities and construction. Conducting work outside the peak nesting season is an important avoidance and minimization measure. CDFW also recommends the completion of nesting bird surveys *regardless* of the time of year to ensure that impacts to nesting birds are avoided. The timing of the nesting season varies greatly depending on several factors, such as bird species, weather conditions in any given year, and long-term climate changes (e.g., drought, warming, etc.). In response to warming, birds have been reported to breed earlier, thereby reducing temperatures that nests are exposed to during breeding and tracking shifts in availability of resources (Socolar et al., 2017[2]). CDFW staff have observed that climate change conditions may result in nesting bird season occurring earlier and later in the year than historical nesting season dates. CDFW recommends that disturbance of occupied nests of migratory birds and raptors within the Project site and surrounding area be avoided any time birds are nesting on-site. CDFW therefore recommends the completion of nesting bird surveys *regardless of the time of year* to ensure compliance with all applicable laws pertaining to nesting and migratory birds.

Although the MND includes Mitigation Measure BIO-3 for nesting birds, CDFW considers the measure insufficient to scope and timing to reduce impacts to a level less than significant. CDFW recommends that the City revise Mitigation Measure BIO-3 with the following additions in **bold** and removals in ~~strikethrough~~:

A1-8
Cont.

**Mitigation Measure BIO-3: Nesting Birds**

**Regardless of the time of year, nesting bird surveys shall be performed by a qualified avian biologist no more than 3 days prior to vegetation removal or ground-disturbing activities. Pre-construction surveys shall focus on both direct and indirect evidence of nesting, including nest locations and nesting behavior. The qualified avian biologist will make every effort to avoid potential nest predation as a result of survey and monitoring efforts. If active nests are found during the pre-construction nesting bird surveys, a qualified biologist shall establish an appropriate nest buffer to be marked on the ground. Nest buffers are species specific and shall be at least 300 feet for passerines and 500 feet for raptors. A smaller or larger buffer may be determined by the qualified biologist familiar with the nesting phenology of the nesting species and based on nest and buffer monitoring results. Construction activities may not occur inside the established buffers, which shall remain on site until a qualified biologist determines the young have fledged or the nest is no longer active. Active nests and adequacy of the established buffer distance shall be monitored daily by the**

[2] Socolar JB, Epanchin PN, Beissinger SR and Tingley MW (2017). Phenological shifts conserve thermal niches. Proceedings of the National Academy of Sciences 114(49): 12976-12981.

**qualified biologist until the qualified biologist has determined the young have fledged or the Project has been completed. The qualified biologist has the authority to stop work if nesting pairs exhibit signs of disturbance.** ~~To maintain compliance with the Migratory Bird Treaty Act and California Fish and Game Code, if ground-disturbing and/or vegetation clearance activities are scheduled to occur during the avian nesting season (typically February 15 through August 31), a qualified biologist shall conduct a preconstruction nesting bird survey within the project impact footprint and a 500-foot buffer where legal access is granted around the disturbance footprint. Surveys shall be conducted within 3 days prior to initiation of ground-disturbing activities. If an active nest is detected during the nesting bird survey, avoidance buffers shall be implemented as determined by a qualified biologist (typically 300 feet for passerines and 500 feet for raptors and special-status species). The buffer shall be of a distance to ensure avoidance of adverse effects to the nesting bird by accounting for topography, ambient conditions, species, nest location, and activity type. All nests shall be monitored as determined by the qualified biologist until nestlings have fledged and dispersed or it is confirmed that the nest has been unsuccessful or abandoned. The qualified biologist shall halt all construction activities within proximity to an active nest if it is determined that the activities are harassing the nest and may result in nest abandonment or take. The qualified biologist shall also have the authority to require implementation of avoidance measures related to noise, vibration, or light pollution if indirect impacts are resulting in harassment of the nest.~~

A1-8 Cont.

Pursuant to the CEQA Guidelines, section 15097(f), CDFW has prepared a draft mitigation monitoring and reporting program (MMRP) for revised MM BIO-3 and MM BIO-4 as well as CDFW-recommended MM BIO-[A] and MM BIO-[B].

***2) Burrowing Owl***

Burrowing owl is a California Species of Special Concern. Take of individual burrowing owls and their nests is defined by Fish and Game Code section 86, and prohibited by sections 3503, 3503.5, and 3513. Fish and Game Code section 3513 makes it unlawful to take or possess any migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703 et seq.). Take is defined in Fish and Game Code section 86 as "hunt, pursue, catch, capture or kill, or attempt to hunt, pursue, catch, capture or kill."

A1-9

Page 14 of the MND indicates that burrowing owl have a "low potential to occur within the flatter portions of the Project site." CDFW notes that in California, preferred habitat

for burrowing owl is generally typified by short, sparse vegetation with few shrubs,[3] and that burrowing owls may occur in ruderal grassy fields, vacant lots, and pastures if the vegetation structure is suitable and there are useable burrows and foraging habitat proximity.[4] In addition, burrowing owls frequently move into disturbed areas prior to and during construction activities since they are adapted to highly modified habitats[5,6]. Based on review of historical aerial imagery, the Project site contains sparce vegetation cover and is adjacent to open-space areas that would provide foraging habitat for burrowing owl. The Project site contains suitable habitat for burrowing owl.

Page 9 of the Project's Biological Resources Assessment dated February 21, 2022 (Biological Assessment), indicates that "no focused special-status wildlife surveys were conducted." Given the MND's lack of findings from a recent habitat assessment and focused surveys for burrowing owl following the guidelines in the *Staff Report on Burrowing Owl Mitigation*[7], the number of suitable and occupied burrows within the Project site and surrounding areas is unknown. Because suitable habitat for burrowing owls exists within the Project site, CDFW recommends the MND is revised to include the findings of focused surveys for burrowing owl following guidelines outlined in the *Staff Report on Burrowing Owl Mitigation*. Focused surveys for burrowing owl provide information needed to determine the potential effects of proposed projects and activities on burrowing owls, and to avoid take in accordance with Fish and Game Code sections 86, 3503, 3503.5, and 3513. If focused surveys confirm occupied burrowing owl habitat in or adjacent to the Project area, CDFW recommends that the MND is revised to include an impact assessment per guidelines in the Staff Report on Burrowing Owl Mitigation. Impact assessments evaluate the extent to which burrowing owls and their habitat may be impacted, directly or indirectly, on and within a reasonable distance of the proposed Project. Focused surveys and an impact assessment will also inform appropriate avoidance, minimization, and mitigation measures for the Project and help demonstrate that impacts to burrowing owls are less than significant.

A1-9
Cont.

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[3] Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. Burrowing owl (*Speotyto cunicularia*), in A. Poole and F. Gill, editors, The Birds of North America, The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, D.C., USA.
[4] Gervais, J. A., D. K. Rosenberg, R. G. Anthony. 2003. Space use and pesticide exposure risk of male burrowing owls in an agricultural landscape. Journal of Wildlife Management 67: 155-164.
[5] Chipman, E. D., N. E. McIntyre, R. E. Strauss, M. C. Wallace, J. D. Ray, and C. W. Boal. 2008. Effects of human land use on western burrowing owl foraging and activity budgets. Journal of Raptor Research 42(2): 87-98.
[6] Coulombe, H. N. 1971. Behavior and population ecology of the Burrowing Owl, *Speotyto cunicularia*, in the Imperial Valley of California. Condor 73:162–176.

[7] California Department of Fish and Game (CDFG). 2012. Staff report of burrowing owl mitigation. State of California, Natural Resources Agency. Available for download at: http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html

Although the MND includes Mitigation Measure BIO-4 for burrowing owl, CDFW considers the measure to be insufficient in scope and timing to reduce impacts to a level less than significant. CDFW recommends that the City revise Mitigation Measure BIO-4 with the following additions in **bold** and removals in ~~strikethrough~~:

**Mitigation Measure BIO-4: Burrowing Owl Surveys**

**Suitable burrowing owl habitat has been confirmed on the site; therefore, focused burrowing owl surveys shall be conducted by a qualified biologist according to the *Staff Report on Burrowing Owl Mitigation* prior to vegetation removal or ground-disturbing activities. If burrowing owls are detected during the focused surveys, the qualified biologist and Project proponent shall prepare a Burrowing Owl Plan that shall be submitted to CDFW for review and approval prior to commencing Project activities. The Burrowing Owl Plan shall describe proposed avoidance, minimization, mitigation, and monitoring actions. The Burrowing Owl Plan shall include the number and location of occupied burrow sites, acres of burrowing owl habitat that will be impacted, details of site monitoring, and details on proposed buffers and other avoidance measures if avoidance is proposed. If impacts to occupied burrowing owl habitat or burrow cannot be avoided, the Burrowing Owl Plan shall also describe minimization and relocation actions that will be implemented. Proposed implementation of burrow exclusion and closure should only be considered as a last resort, after all other options have been evaluated as exclusion is not in itself an avoidance, minimization, or mitigation method and has the possibility to result in take. If impacts to occupied burrows cannot be avoided, information shall be provided regarding adjacent or nearby suitable habitat available to owls along with proposed relocation actions. The Project proponent shall implement the Burrowing Owl Plan following CDFW and USFWS review and approval.**

**Preconstruction burrowing owl surveys shall be conducted no less than 14 days prior to the start of Project-related activities and within 24 hours prior to ground disturbance, in accordance with the *Staff Report on Burrowing Owl Mitigation* (2012 or most recent version). Preconstruction surveys should be performed by a qualified biologist following the recommendations and guidelines provided in the *Staff Report on Burrowing Owl Mitigation*. If the preconstruction surveys confirm occupied burrowing owl habitat, Project activities shall be immediately halted. The qualified biologist shall coordinate with CDFW and prepare a Burrowing Owl Plan that shall be submitted to CDFW and USFWS for review and approval prior to commencing Project activities.** ~~Pre-construction surveys for burrowing owls shall be completed within areas of suitable habitat (i.e., flatter portions of the site) in accordance with the Staff Report on Burrowing Owl Mitigation (CDFG 2012), with the first survey no less than 14 days prior to initiation of project-related activities, and the second within 24 hours of project-related activities. If~~

A1-9
Cont.

~~an active burrowing owl burrow is detected within 500 feet of the impact footprint, avoidance and minimization measures shall be implemented in accordance with the Staff Report on Burrowing Owl Mitigation guidelines or agreed upon by the California Department of Fish and Wildlife, including implementation of a non-disturbance buffer and monitoring of the nest to ensure activities are not adversely affecting the nest. If the project will occur within this zone, then work must occur outside the nesting season, or until it can be shown that the birds have finished nesting, at which point passive relocation may occur.~~

A1-9 Cont.

***3) Artificial Nighttime Lighting***

The Proposed project will result in new sources of artificial nighttime lighting. Page 55 of the MND indicates that the "residential suites, hotel villas, and sky mesa uses would include outdoor lighting. While this is a new source of light, existing hotel and the surrounding Mirada residential development already contains night-lighting. All lighting would comply with City of Rancho Mirage Municipal Code Section 17.18.050 (City of Rancho Mirage 2002) for shielding to control glare and prevent light spillover onto adjacent areas." Mitigation Measure BIO-2 indicates the Project will comply with CVMSHCP Land-Use Adjacency Guidelines for Lighting. The MND lacks any additional details on the Project's lighting plans and lighting specifications or additional avoidance and minimization measures associated with artificial nighttime lighting. The Project is located adjacent to open-space areas to the south and north of the Project site—areas that provide suitable nesting, roosting, foraging, and refugia habitat for birds, migratory birds that fly at night, bats, other nocturnal and crepuscular wildlife.

A1-10

The Project's proposed artificial nighttime lighting has the potential to significantly and adversely affect wildlife in the open-space areas adjacent to the Project site. Artificial lighting alters ecological processes including, but not limited to, the temporal niches of species; the repair and recovery of physiological function; the measurement of time through interference with the detection of circadian and lunar and seasonal cycles; the detection of resources and natural enemies; and navigation[8]. Many species use photoperiod cues for communication (e.g., bird song[9]), determining when to begin foraging[10], behavioral thermoregulation[11], and migration[12]. Phototaxis, a phenomenon

[8] Gatson, K. J., Bennie, J., Davies, T., Hopkins, J. 2013. The ecological impacts of nighttime light pollution: a mechanistic appraisal. Biological Reviews, 88.4: 912-927.
[9] Miller, M. W. 2006. Apparent effects of light pollution on singing behavior of American robins. The Condor 108:130–139.
[10] Stone, E. L., G. Jones, and S. Harris. 2009. Street lighting disturbs commuting bats. Current Biology 19:1123–1127.
[11] Beiswenger, R. E. 1977. Diet patterns of aggregative behavior in tadpoles of *Bufo americanus*, in relation to light and temperature. Ecology 58:98–108.
[12] Longcore, T., and C. Rich. 2004. Ecological light pollution - Review. Frontiers in Ecology and the Environment 2:191–198.

that results in attraction and movement towards light, can disorient, entrap, and temporarily blind wildlife species that experience it[8].

CDFW recommends the MND is revised to include an analysis of the direct, indirect, and cumulative impacts of artificial nighttime lighting expected to adversely affect biological resources within open-space areas adjacent to the Project site. CDFW also recommends the MND is revised to include lightning design plans and lighting specifications to allow CDFW to conduct a meaningful review and provide appropriate biological expertise. The MND includes Mitigation Measure BIO-2, indicating that the Project will comply with CVMSHCP Land-Use Adjacency Guidelines for Lighting, though the MND lacks details on how the Project will comply with these guidelines related to lighting. To support the City in avoiding or reducing impacts of artificial nighttime lighting on biological resources to less than significant, CDFW recommends that the City add the following mitigation measure to a revised MND:

A1-10 Cont.

**Mitigation Measure BIO-[A]: Artificial Nighttime Lighting**

**Throughout construction and the lifetime operations of the Project, the City of Rancho Mirage and Project proponent shall eliminate all nonessential lighting throughout the Project area and avoid or limit the use of artificial light at night during the hours of dawn and dusk when many wildlife species are most active. The City of Rancho Mirage and Project proponent shall ensure that all lighting for the Project is fully shielded, cast downward and directed away from surrounding open-space and agricultural areas, reduced in intensity to the greatest extent possible, and does not result in lighting trespass including glare into surrounding areas or upward into the night sky (see the International Dark-Sky Association standards at http://darksky.org/). The City of Rancho Mirage and Project proponent shall ensure use of LED lighting with a correlated color temperature of 3,000 Kelvins or less, proper disposal of hazardous waste, and recycling of lighting that contains toxic compounds with a qualified recycler.**

***4) Peninsular Bighorn Sheep***

The Project site is located approximately 350 feet from the Santa Rosa and San Jacinto Mountains Conservation Area and Essential Habitat for Peninsular bighorn sheep. Peninsular bighorn sheep is a Covered Species under the CVMSHCP and a California fully protected species per Fish and Game Code Section 4700. Section 13.2 of the Implementing Agreement for the CVMSHCP obligates cities to ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the CVMSHCP, among other obligations. Section 9.8.4.4 of the CVMSHCP indicates that "Bighorn sheep are a California Fully Protected Species. All Covered Activities *of the Plan* must avoid actions that would result in violation of Section 4700 of the Fish and Game Code that addresses Fully Protected Species." The MND lacks discussion and

A1-11

mitigation measures on how the City and Project will avoid take of Peninsular bighorn sheep.

In the Peninsular Ranges, a significant number of Peninsular bighorn sheep mortalities have been both directly and indirectly attributed to urbanization, including, but not limited to, mortalities associated with the consumption of toxic plants, the drowning in swimming pools, canals, and other water features, collisions with automobiles, and facilitation of disease and parasite transmission.[13] Plants known to be toxic to Peninsular bighorn sheep include, but are not limited to, oleander (*Nerium oleander*), laurel cherry (*Prunus Sp.*) and nightshade (species in the Solanaceae family)[14], plants that should not be used within or near habitat occupied by Peninsular bighorn sheep. Page 114 of the MND indicates that "desert landscape design is proposed throughout the project site including water cascades, multiple pools, rock escarpments, and fountains. Landscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network." The Project's proposed water and landscape features have the potential to result in take of Peninsular bighorn sheep. The MND lacks a discussion of the plant species that will be used in landscaping and if plants toxic to Peninsular bighorn sheep will be used. Further, the MND does not indicate if the Project will include a fence or other barrier around the perimeter of the development that prohibits the entry of Peninsular bighorn sheep and their exposure to the Project's water and landscape features. Without additional details on these aspects of Project design, CDFW is unable to conduct a meaningful review and provide appropriate biological expertise on the topic of the City and Project avoiding take of Peninsular bighorn sheep. CDFW recommends the MND is revised to include discussion proposed perimeter fencing and the plants that will be used and avoided in landscaping.

To support the City and Project in avoiding take of Peninsular bighorn sheep, CDFW recommends the Project incorporates plans for the construction of a fence, wall, or similar structure surrounding the entire Project area that prohibits the entry of Peninsular bighorn sheep and their access to attractive nuisances including water features and landscaping vegetation. CDFW recommends the City revise the MND to include the following measure:

**Mitigation Measure BIO-[B]: Peninsular Bighorn Sheep Barrier**

A1-11
Cont.

[13] DeForge, J. R. and S. D. Ostermann. 1 998b. The effects of urbanization on a population of desert bighorn sheep. Abstract for the 5~ Annual Conference of Wildlife Society, Buffalo, New York.

[14] U.S. Fish and Wildlife Service. 2000. Recovery plan for bighorn sheep in the Peninsular Ranges, California. U.S. Fish and Wildlife Service, Portland, OR. xv+251 pp.

**Prior to the installation of water features and landscaping, the Project shall construct a fence, or functionally equivalent structure, surrounding the entire Project area that prohibits the entry of Peninsular bighorn sheep. The fence shall be a minimum of 8 feet high, or functionally equivalent, and shall not contain gaps in which bighorn sheep can be entangled. Gaps shall be 4.3 inches or less. The Project shall maintain a fence, or functionally equivalent structure, as described above, throughout the lifetime of the Project.**

A1-11 Cont.

***5) Landscaping***

Page 115 of the MND indicates that the Project's "[l]andscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network. The proposed plant palette would comprise of native, drought-tolerant plantings, consistent with the existing hotel landscaping and surrounding areas". No other details are provided in the MND on the Project's proposed landscaping plans. CDFW recommends incorporation of water-wise concepts in any Project landscape design plans. In particular, CDFW recommends xeriscaping with locally native California species and installing water-efficient and targeted irrigation systems (such as drip irrigation). Native plants support butterflies, birds, reptiles, amphibians, small mammals, bees, and other pollinators that evolved with those plants. More information on native plants suitable for the Project location and nearby nurseries is available at Calscape: https://calscape.org/. Local water agencies/cities and resource conservation cities in your area may be able to provide information on plant nurseries that carry locally native species, and some facilities display drought-tolerant locally native species demonstration gardens. Information on drought-tolerant landscaping and water-efficient irrigation systems is available on California's Save our Water website: https://saveourwater.com/. CDFW also recommends that the MND include recommendations regarding landscaping from Section 4.0 of the CVMSHCP "Table 4-112: Coachella Valley Native Plants Recommended for Landscaping" (pp. 4-180 to 4-182; https://cvmshcp.org/plan-documents/).

A1-12

**ENVIRONMENTAL DATA**

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be filled out and submitted online at the following link: https://wildlife.ca.gov/Data/CNDDB/Submitting-Data. The types of information reported to CNDDB can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Plants-and-Animals.

A1-13

**ENVIRONMENTAL DOCUMENT FILING FEES**

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of environmental document filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the environmental document filing fee is required in order for the underlying Project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

A1-14

**CONCLUSION**

CDFW appreciates the opportunity to comment on the MND to assist the City in identifying and mitigating Project impacts to biological resources. CDFW concludes that the MND does not adequately identify or mitigate the Project's significant, or potentially significant, impacts to biological resources. CDFW also concludes that the MND lacks sufficient information for a meaningful review of impacts to biological resources, including an assessment of impacts to Peninsular bighorn sheep and Project description. The CEQA Guidelines indicate that recirculation is required when insufficient information in the MND precludes a meaningful review (§ 15088.5) or when a new significant effect is identified and additional mitigation measures are necessary (§ 15073.5). CDFW recommends that a revised MND, including a complete assessment of biological resources (burrowing owl), impacts to Peninsular bighorn sheep, and Project description, be recirculated for public comment. CDFW also recommends that revised and additional mitigation measures and analysis as described in this letter be added to a revised MND.

A1-15

CDFW personnel are available for consultation regarding biological resources and strategies to avoid and minimize impacts. Questions regarding this letter or further coordination should be directed to Jacob Skaggs, Senior Environmental Scientist Specialist, at jacob.skaggs@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Kim Freeburn
84F92FFEEFD24C8...

Kim Freeburn
Environmental Program Manager

**Attachment 1:** MMRP for CDFW-Proposed Mitigation Measures

ec:

Heather Brashear, Senior Environmental Scientist (Supervisor), CDFW

Heather.Brashear@Wildlife.ca.gov

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Peter Satin, Coachella Valley Conservation Commission
psatin@cvag.org

**ATTACHMENT 1: MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)**

| Mitigation Measures | Timing and Methods | Responsible Parties |
|---|---|---|
| **Mitigation Measure BIO-3: Nesting Birds**<br><br>**Regardless of the time of year, nesting bird surveys shall be performed by a qualified avian biologist no more than 3 days prior to vegetation removal or ground-disturbing activities. Pre-construction surveys shall focus on both direct and indirect evidence of nesting, including nest locations and nesting behavior. The qualified avian biologist will make every effort to avoid potential nest predation as a result of survey and monitoring efforts. If active nests are found during the pre-construction nesting bird surveys, a qualified biologist shall establish an appropriate nest buffer to be marked on the ground. Nest buffers are species specific and shall be at least 300 feet for passerines and 500 feet for raptors. A smaller or larger buffer may be determined by the qualified biologist familiar with the nesting phenology of the nesting species and based on nest and buffer monitoring results. Construction activities may not occur inside the established buffers, which shall remain on site until a qualified biologist determines the young have fledged or the nest is no longer active. Active nests and adequacy of the established buffer distance shall be monitored daily by the qualified biologist until the qualified biologist has determined the young have fledged or the Project has been completed. The qualified biologist has the authority to stop work if nesting pairs exhibit signs of disturbance. ~~To~~** | **Timing**: No more than 3 days prior to vegetation removal or ground-disturbing activities.<br><br>**Methods:** See Mitigation Measure | **Implementation**: City of Rancho Mirage and Project proponent<br><br>**Monitoring and Reporting**: City of Rancho Mirage |
| **Mitigation Measure BIO-4: Burrowing Owl Surveys**<br><br>**Suitable burrowing owl habitat has been confirmed on the site; therefore, focused burrowing owl surveys shall be conducted by a qualified biologist according to the *Staff Report on Burrowing Owl Mitigation* prior to vegetation removal or ground-disturbing activities. If burrowing owls are detected during the focused surveys, the qualified biologist and Project proponent shall prepare a Burrowing Owl Plan that shall be submitted to CDFW for review and approval prior to commencing Project activities. The** | **Timing: Focused surveys:** Prior to vegetation removal or ground-disturbing activities. **Pre-construction surveys:** No less than 14 days prior to start of Project-related activities and within 24 | **Implementation**: City of Rancho Mirage and Project proponent<br><br>**Monitoring and Reporting**: City of Rancho Mirage |

A1-16

| | | |
|---|---|---|
| **Burrowing Owl Plan shall describe proposed avoidance, minimization, mitigation, and monitoring actions. The Burrowing Owl Plan shall include the number and location of occupied burrow sites, acres of burrowing owl habitat that will be impacted, details of site monitoring, and details on proposed buffers and other avoidance measures if avoidance is proposed. If impacts to occupied burrowing owl habitat or burrow cannot be avoided, the Burrowing Owl Plan shall also describe minimization and relocation actions that will be implemented. Proposed implementation of burrow exclusion and closure should only be considered as a last resort, after all other options have been evaluated as exclusion is not in itself an avoidance, minimization, or mitigation method and has the possibility to result in take. If impacts to occupied burrows cannot be avoided, information shall be provided regarding adjacent or nearby suitable habitat available to owls along with proposed relocation actions. The Project proponent shall implement the Burrowing Owl Plan following CDFW and USFWS review and approval.**<br><br>**Preconstruction burrowing owl surveys shall be conducted no less than 14 days prior to the start of Project-related activities and within 24 hours prior to ground disturbance, in accordance with the *Staff Report on Burrowing Owl Mitigation* (2012 or most recent version). Preconstruction surveys should be performed by a qualified biologist following the recommendations and guidelines provided in the *Staff Report on Burrowing Owl Mitigation*. If the preconstruction surveys confirm occupied burrowing owl habitat, Project activities shall be immediately halted. The qualified biologist shall coordinate with CDFW and prepare a Burrowing Owl Plan that shall be submitted to CDFW and USFWS for review and approval prior to commencing Project activities.** | hours prior to ground disturbance.<br><br>**Methods:** See Mitigation Measure | |
| **Mitigation Measure BIO-[A]: Artificial Nighttime Lighting**<br><br>**Throughout construction and the lifetime operations of the Project, the City of Rancho Mirage and Project proponent shall eliminate all nonessential lighting throughout the Project area and avoid or limit the use of artificial light at night during the hours of dawn and dusk when many wildlife species are most active. The City of Rancho Mirage and Project proponent shall ensure that all lighting for the Project is fully shielded, cast downward and directed away from** | **Timing**: Throughout construction and the lifetime operations of the Project.<br><br>**Methods:** See Mitigation Measure | **Implementation**: City of Rancho Mirage and Project proponent<br><br>**Monitoring and Reporting**: City of Rancho Mirage |

A1-16
Cont.

| | | |
|---|---|---|
| **surrounding open-space and agricultural areas, reduced in intensity to the greatest extent possible, and does not result in lighting trespass including glare into surrounding areas or upward into the night sky (see the International Dark-Sky Association standards at http://darksky.org/). The City of Rancho Mirage and Project proponent shall ensure use of LED lighting with a correlated color temperature of 3,000 Kelvins or less, proper disposal of hazardous waste, and recycling of lighting that contains toxic compounds with a qualified recycler.** | | |
| **Mitigation Measure BIO-[B]: Peninsular Bighorn Sheep Barrier**<br><br>**Prior to the installation of water features and landscaping, the Project shall construct a fence, or functionally equivalent structure, surrounding the entire Project area that prohibits the entry of Peninsular bighorn sheep. The fence shall be a minimum of 8 feet high, or functionally equivalent, and shall not contain gaps in which bighorn sheep can be entangled. Gaps shall be 4.3 inches or less. The Project shall maintain a fence, or functionally equivalent structure, as described above, throughout the lifetime of the Project.** | **Timing**: Prior to the installation of water features, and throughout the lifetime of the Project.<br><br>**Methods:** See Mitigation Measure | **Implementation**: City of Rancho Mirage and Project proponent<br><br>**Monitoring and Reporting**: City of Rancho Mirage |

A1-16
Cont.

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# Response to Comment Letter A1

**Agency**
**California Department of Fish and Wildlife (CDFW)**
**April 8, 2024**

**A1-1** The City acknowledges the comment as an introduction to comments that follow. This comment is included in the Final MND for review and consideration by the decision-makers prior to a final decision on the project. No further response is required.

**A1-2** The comment identifies California Department of Fish and Wildlife's (CDFW) role as a Trustee Agency and provides a description of its function as a Trustee Agency. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**A1-3** The comment provides a summary of the project description and project location. The commenter incorrectly identifies the acreage, direction of the project site from the existing Ritz-Carlton Rancho Mirage, and Assessor's Parcel Numbers identified in the MND project description, see Chapter 1, Project Description. The comment uses the project description included in the Project's *Biological Resources Assessment* dated February 21, 2022. The project description has changed since *February 21, 2022*, but this does not change the adequacy of the *Biological Resources Assessment* and does not cause any changes to the MND. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**A1-4** The comment is a preface to the detailed comments that follow and summarizes the concerns. The comment states that the MND has not adequately identified, disclosed, or mitigated project impacts on biological resources. The comment also states that the incomplete and inaccurate assessment of biological resources and incomplete project description prevent a meaningful review. Please see Responses to Comments A1-5 through A1-12.

**A1-5** The comment states that the MND lacks an adequate project description, missing an adequate discussion of plans for artificial nighttime lighting, perimeter fencing, and landscape plants.

According to Section 15124, a project description shall reflect the specifics of the project, the project site, and its surroundings, but should not provide extensive detail beyond that needed for evaluating environmental impacts. The Project Description section of the Draft IS/MND includes a detailed description of the project, the project site and its surroundings, and the anticipated operational and construction characteristics of the project. The narrative project description and accompanying figures meet the specifications required by the CEQA Guidelines and provide sufficient detail to evaluate environmental impacts. Discussion regarding the plans for artificial nighttime lighting, perimeter fencing, and landscape plants are not required to be specifically included in the project description.

The comment also notes that an adequate discussion of plans for artificial nighttime lighting, perimeter fencing, and landscaping is missing from the MND in general. As stated in MND Section 4.3, Mitigation Measures, the project applicant shall implement the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) Land Use Adjacency Guidelines as described in Section 4.5 of the CVMSHCP. Therefore, the project does include a discussion of plans for artificial nighttime lighting, perimeter fencing, and landscaping.

The comment also requests that design plans for artificial nighttime lighting and lighting specifications be included. Please refer to Response to Comment A1-10.

A1-6 The comment states that the MND lacks an adequate analysis of existing environmental setting, specifically as related to burrowing owl. The comment states that an accurate assessment of the environmental setting and project-related impacts to burrowing owl is needed to identify appropriate avoidance, minimization, and mitigation measures and demonstrate that these measures reduce project impacts to less than significant.

The environmental setting associated with species is included in the project's *Biological Resources Assessment* dated February 21, 2022. As discussed in the project's *Biological Resources Assessment*, a literature review and general biological reconnaissance survey was conducted on June 29, 2021. The *Biological Resources Assessment* describes the existing conditions of special-status biological resources on the project site (proposed project footprint) and within a 500-foot buffer where access was granted (study area), quantifies impacts to special-status biological resources that would result from implementation of the project and describes those impacts in terms of biological significance under both CEQA and compliance with the CVMSHCP, and provides recommended avoidance, minimization, and mitigation measures to avoid and reduce impacts to special-status biological resources, if necessary. The burrowing owl, which is covered under the CVMSCHCP, was not incidentally detected during the June 2021 survey and has a low potential to occur within the flatter portions of the study area. Despite having low potential to occur, mitigation measures are proposed to be consistent with the CVMSCHP and Land Use Adjacency Guidelines. Therefore, the project does include a discussion of existing conditions as related to burrowing owl.

A1-7 The comment is a preface to the comments that follow regarding proposed changes to mitigation measures. The comment identifies that mitigation measures for artificial nighttime lighting and Peninsular bighorn sheep as well as revisions to the mitigation measures for nesting birds and burrowing owl are recommended. See Responses to Comments A1-8 through A1-12 regarding changes to mitigation measures.

A1-8 The comment expresses concern regarding impacts to nesting birds including loss of nesting and foraging habitat and recommends that disturbance of occupied nests of migratory birds and raptors within the project site and surrounding area be avoided any time birds are nesting on site. The comment recommends the completion of nesting bird surveys regardless of the time of year to ensure compliance with all applicable laws pertaining to nesting and migratory birds and provides recommended revisions to MM- BIO-3.

Edits have been made to MM-BIO-3 within the MND to clarify that the pre-construction nesting bird survey shall be performed regardless of the time of year to ensure compliance with all applicable laws pertaining to nesting and migratory birds. Additions to the MND are shown here in <u>underline</u> text while deletions are shown in ~~strikethrough~~ text.

**MM-BIO-3 Nesting Birds.**

To maintain compliance with the Migratory Bird Treaty Act and California Fish and Game Code, <u>regardless of the time of year,</u> if ground-disturbing and/or vegetation clearance activities are scheduled to occur ~~during the avian nesting season (typically February 15 through August 31)~~, a

> qualified biologist shall conduct a pre-construction nesting bird survey within the project impact footprint and a 500-foot buffer where legal access is granted around the disturbance footprint. Surveys shall be conducted within 3 days prior to initiation of ground-disturbing activities.
>
> If an active nest is detected during the nesting bird survey, avoidance buffers shall be implemented as determined by a qualified biologist (typically 300 feet for passerines and 500 feet for raptors and special-status species). The buffer shall be of a distance to ensure avoidance of adverse effects to the nesting bird by accounting for topography, ambient conditions, species, nest location, and activity type. All nests shall be monitored as determined by the qualified biologist until nestlings have fledged and dispersed or it is confirmed that the nest has been unsuccessful or abandoned. The qualified biologist shall halt all construction activities within proximity to an active nest if it is determined that the activities are harassing the nest and may result in nest abandonment or take. The qualified biologist shall also have the authority to require implementation of avoidance measures related to noise, vibration, or light pollution if indirect impacts are resulting in harassment of the nest.

These changes merely clarify or amplify information already found in the Draft MND, and do not raise important new issues about significant effects on the environment. Revisions are presented in strikeout/<u>underline</u> format in the Final MND.

**A1-9** The comment states that suitable habitat for burrowing owl exists within the project site and recommends that the MND is revised to include the findings of focused surveys for burrowing owl following guidelines outline in the CDFW's Staff Report on Burrowing Owl Mitigation. The comment recommends that if focused surveys confirm occupied burrowing owl habitat in or adjacent to the project, then the MND should be revised to include an impact assessment per guidelines in the Staff Report on Burrowing Owl Mitigation.

As discussed in the project's *Biological Resources Assessment* dated February 21, 2022, Appendix F states that burrowing owl was determined to have a low potential to occur within the project. This was a conservative determination. As noted in Appendix F, the project site did not contain burrows suitable for burrowing owl. The flatter portions of the project were previously graded or disturbed and contain highly compacted soils not suitable for burrows. The remainder of the project site consists of rocky and steep slopes which are not suitable for burrowing owl.

Additionally, the project is a Covered Activity under the CVMSHCP and would receive "take" coverage for impacts to covered species, including burrowing owl. Furthermore, Section 4.4, Required Avoidance, Minimization, and Mitigation Measures, of the CVMSHCP states,

> For other projects that are subject to CEQA, the Permittees *will require burrowing owl surveys in the Conservation Areas* using an accepted protocol (as determined by the CVCC in coordination with the Permittees and the Wildlife Agencies).

The project site is *not* located within a CVMSHCP conservation area, and the nearest CVMSHCP conservation area, the Santa Rosa and San Jacinto Mountains Conservation Area, is located approximately 332 feet south of the project site. Per the CVMSHCP, Section 4.4, Required Avoidance, Minimization, and Mitigation Measures applies only to Covered Activities *within* the Conservation Areas. Therefore, focused burrowing owl surveys are not required under the CVMSHCP for Covered Activities

outside of the Conservation Area, and only require payment of the CVMSHCP Local Development Mitigation Fee (LDMF), which is a component of CVMSHCP to provide funding of the acquisition and long-term management of conservation lands within the CVMSHCP boundary. Therefore, the project would not conflict with the CVMSHCP.

Finally, as discussed in the project's *Biological Resources Assessment*, Section 5.1.2.1, burrowing owl is also protected under the Migratory Bird Treaty Act and California Fish and Game Code Section 3516, which protect nesting birds. Implementation of MM-BIO-3, Nesting Birds, and MM-BIO-4, Burrowing Owl, would reduce potential direct impacts to burrowing owl to less than significant.

Edits have been made to MM-BIO-4 within the MND. Additions to the MND are shown here in underline text while deletions are shown in ~~strikethrough~~ text.

MM-BIO-4 Burrowing Owl.

Pre-construction surveys for burrowing owls shall be completed within areas of suitable habitat (i.e., flatter portions of the site) in accordance with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012), with the first survey no less than 14 days prior to initiation of project-related activities, and the second within 24 hours of project-related activities. If ~~an~~ burrowing owls or active burrowing owl burrows ~~is~~ are detected, the qualified biologist shall coordinate with CDFW and prepare a Burrowing Owl Plan that shall be submitted to CDFW and USFWS for review and approval prior to commencing project activities. The Burrowing Owl Plan shall describe proposed avoidance, minimization, mitigation, and monitoring actions. The Burrowing Owl Plan shall include the number and location of occupied burrow sites, acres of burrowing owl habitat that will be impacted, details of site monitoring, and details on proposed buffers and other avoidance measures if avoidance is proposed. If impacts to occupied burrowing owl habitat or burrow cannot be avoided, the Burrowing Owl Plan shall also describe minimization and relocation actions that will be implemented. Proposed implementation of burrow exclusion and closure should only be considered as a last resort, after all other options have been evaluated as exclusion is not in itself an avoidance, minimization, or mitigation method and has the possibility to result in take. If impacts to occupied burrows cannot be avoided, information shall be provided regarding adjacent or nearby suitable habitat available to owls along with proposed relocation actions. The project proponent shall implement the Burrowing Owl Plan following CDFW and USFWS review and approval. ~~within 500 feet of the impact footprint, avoidance and minimization measures shall be implemented in accordance with the *Staff Report on Burrowing Owl Mitigation* guidelines or agreed upon by the California Department of Fish and Wildlife, including implementation of a non-disturbance buffer and monitoring of the nest to ensure activities are not adversely affecting the nest. If the project will occur within this zone, then work must occur outside the nesting season, or until it can be shown that the birds have finished nesting, at which point passive relocation may occur.~~

These changes merely clarify or amplify information already found in the Draft MND, and do not raise important new issues about significant effects on the environment. Revisions are presented in strikeout/underline format in the Final MND.

A1-10 The comment states that the project proposed artificial nighttime lighting has the potential to significantly adversely affect wildlife in the open-space areas adjacent to the project. The comment recommends a revision to the MND to include an analysis of the direct, indirect, and cumulative impacts of artificial nighttime lighting. The comment states that the MND lacks details on how the project will comply with the

CVMSHCP Land-Use Adjacency Guidelines for Lighting and recommends the addition of a mitigation measure to a revised MND.

The MND includes MM-BIO-2, which states that the project will comply with the CVMSHCP Land-Use Adjacency Guidelines for Lighting. Per Section 4.5 of the CVMSHCP:

> For proposed development adjacent to or within a Conservation Area, lighting shall be shielded and directed toward the developed area. Landscape shielding or other appropriate methods shall be incorporated in project designs to minimize the effects of lighting adjacent to or within the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual.

Therefore, the project is consistent with the CVMSHP related to reducing potential direct, indirect, and cumulative impacts of artificial nighttime lighting within open space (i.e., Santa Rosa and San Jacinto Mountains Conservation Area which is located approximately 332 feet south of the project site).

Nonetheless, edits have been made to MM-BIO-2 within the MND. Additions to the MND are shown here in <u>underline</u> text while deletions are shown in ~~strikethrough~~ text.

**MM-BIO-2 Coachella Valley Multiple Species Habitat Conservation Plan Land Use Adjacency Guidelines.**

The project applicant shall implement the following Land Use Adjacency Guidelines (Coachella Valley Multiple Species Habitat Conservation Plan [CVMSHCP], Section 4.5) to minimize and avoid indirect effects from development adjacent to conservation areas (i.e., Santa Rosa and San Jacinto Mountains Conservation Area), where applicable:

- Drainage: Proposed Development adjacent to or within a Conservation Area shall incorporate plans to ensure that the quantity and quality of runoff discharged to the adjacent Conservation Area is not altered in an adverse way when compared with existing conditions. Stormwater systems shall be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials, or other elements that might degrade or harm biological resources or ecosystem processes within the adjacent Conservation Area.
- Toxics: Land uses proposed adjacent to or within a Conservation Area that use chemicals or generate bioproducts such as manure that are potentially toxic or may adversely affect wildlife and plant species, habitat, or water quality shall incorporate measures to ensure that application of such chemicals does not result in any discharge to the adjacent Conservation Area.
- Lighting: For proposed development adjacent to or within a Conservation Area, lighting shall be shielded and directed toward the developed area. Landscape shielding or other appropriate methods shall be incorporated in project designs to minimize the effects of lighting adjacent to or within the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual. <u>The City of Rancho Mirage and project proponent shall avoid or limit the use of artificial lighting at night during the hours of dawn and dusk when many wildlife species are most active and ensure use of LED lighting with a correlated color temperature of 3,000 Kelvins or less.</u>

- Noise: Proposed development adjacent to or within a Conservation Area that generates noise in excess of 75 A-weighted decibels sound equivalent level hourly shall incorporate setbacks, berms, or walls, as appropriate, to minimize the effects of noise on the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual.
- Invasives: Invasive, non-native plant species shall not be incorporated in the landscape for land uses adjacent to or within a Conservation Area. Landscape treatments within or adjacent to a Conservation Area shall incorporate native plant materials to the maximum extent feasible; recommended native species are listed in Table 4-112 [CVMSHCP, Section 4.5.5]. The plants listed in Table 4-113 shall not be used within or adjacent to a Conservation Area. This list may be amended from time to time through a Minor Amendment with Wildlife Agency Concurrence.
- Barriers: Land uses adjacent to or within a Conservation Area shall incorporate barriers in individual project designs to minimize unauthorized public access, domestic animal predation, illegal trespass, or dumping in a Conservation Area. Such barriers may include native landscaping, rocks/boulders, fencing, walls and/or signage. Existing fencing separating the Big Horn Reserve Land (i.e., adjacent Conservation Area) from the proposed project site was previously installed to prevent Peninsular bighorn sheep from entering and grazing on the Ritz Carlton Hotel property (i.e., project). The project shall maintain a fence, or functionally equivalent structure throughout the lifetime of the project. Therefore, necessary barriers (i.e., fencing) is currently in place.
- Grading/Land Development: Manufactured slopes associated with site development shall not extend into adjacent land in a Conservation Area.

These changes merely clarify or amplify information already found in the Draft MND, and do not raise important new issues about significant effects on the environment. Revisions are presented in strikeout/underline format in the Final MND. The comment also recommends that lighting design plans and lighting specifications be provided in a revised MND to allow for a meaningful review. Additional details on the lighting design plan and light specification will be provided during the City's Condition of Approval (COA) process.

**A1-11** The comment letter states Section 13.2 of the Implementing Agreement for the CVMSHP obligates cities to ensure implementation consistent with the Species Conservation Goals and Objectives in Section 9 of the CVMHSP, among other obligations including Section 9.8.4.4. The comment states that the MND lacks discussion and mitigation measures to avoid take of Peninsular bighorn sheep. Specifically, the comment states that the MND lacks discussion of the plant species to be used in landscaping and if the proposed plants are toxic Peninsular bighorn sheep. The comment also states that the MND does not indicate if the project will use a barrier fence to prohibit entrance of Peninsular bighorn sheep into the project. The comment recommends a discussion of plants that will be used and avoided in landscaping, incorporation of a barrier fence, and addition of a new mitigation measure in a revised MND.

Section 9.8.4.4 of the CVMSHP states,

> Bighorn sheep are a California Fully Protected Species. All Covered Activities of the Plan must avoid actions that would result in violation of Section 4700 of the Fish and Game Code that addresses Fully Protected Species. *In Essential bighorn sheep Habitat*, the Habitat must be

> avoided or measures approved by the Wildlife Agencies taken to ensure that no take of an individual occurs, other than projects where Fish and Game Code Section 2081.7 is applicable.

The project is *not* located in CVMSHP Essential Habitat for peninsular bighorn sheep, nor is the project located with any CVMSHCP designated conservation areas (e.g., Santa Rosa and San Jacinto Mountains Conservation Area is approximately 332 feet south of the project site). Furthermore, Species Conservation Goals and Objectives in Section 9 of the CVMSHCP are specifically related to conserving and managing populations within the MSHCP Reserve System (i.e. Conservation Areas providing Essential Habitats). Additionally, the MND includes a discussion of applicable Section 4.5 CVMSHCP Land Use Adjacency Guidelines to minimize and avoid indirect effects from development adjacent to conservation areas that provide Essential Habitat for peninsular bighorn sheep (i.e., Santa Rosa and San Jacinto Mountains Conservation Area).

CDFW also recommends revising MM-BIO-2 to include plans for the construction of a fence, wall, or other similar structure surrounding the entire project area that prohibits the entry of Peninsular bighorn sheep. Existing fencing separating the Big Horn Reserve Land from the proposed project site was previously installed to prevent Peninsular bighorn sheep from entering and grazing on the Ritz Carlton Hotel property (i.e., project). Therefore, MND MM-BIO-2 has been revised to include this information. Please see MM-BIO-2 in in Response to Comment A1-10.

**A1-12** The comment states that page 115 of the MND indicates that the project's "[l]andscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network. The proposed plant palette would comprise of native, drought-tolerant plantings, consistent with the existing hotel landscaping and surrounding areas". The comment states that no other details are provided in the MND on the project's proposed landscaping plans. The comment recommends incorporation of water-wise concepts in any project landscape plans, including xeriscaping with locally native California species and installing water-efficient and targeted irrigation systems. The comment also recommends that the MND include recommendations regarding landscaping from Section 4 of the CVMSHCP.

MND, MM-BIO-2, CVMSHCP Land Use Adjacency Guidelines, specifically addresses invasive species and provides additional details to the proposed landscaping to ensure consistency with the CVMSHCP. Specifically, MM-BIO-2 states,

> Invasive, non-native plant species shall not be incorporated in the landscape for land uses adjacent to or within a Conservation Area. Landscape treatments within or adjacent to a Conservation Area shall incorporate native plant materials to the maximum extent feasible; recommended native species are listed in Table 4-112 [CVMSHCP, Section 4.5.5]. The plants listed in Table 4-113 shall not be used within or adjacent to a Conservation Area. This list may be amended from time to time through a Minor Amendment with Wildlife Agency Concurrence.

**A1-13** The comment states that any special status species detected on the project site would need to be disclosed and populated on the CNDDB Field Survey Forms to be incorporated in CDFW's database of known special status specie occurrences. As discussed in the project's *Biological Resources Assessment* dated February 21, 2022, no focused special status species surveys were conducted, but no special status or wildlife plant species were incidentally detected on the project site during the general biological survey. Therefore, no entries of special status species into this database will be made.

**A1-14** The comment accurately states that a filing fee to CDFW would be required as part of the proposed project's permit and entitlement process. The filing fee would be paid upon filing of the Notice of Determination by the City for the project.

**A1-15** The comment includes concluding remarks and reiterates a summary of concerns. The comment also calls for the recirculation of a revised MND because the insufficient information in the MND precluded a meaningful review, a new significant effect is identified, and additional mitigation measures are necessary.

CEQA Guidelines Section 15073.5 provides the legal criteria that a lead agency is to consider when deciding whether is required to recirculate the MND. Recirculation is required when the document must be substantially revised after public notice of its availability. A substantial revision is defined as a new, avoidable significant effect where mitigation measures or project revisions must be added to reduce the effect to insignificant (CEQA Guidelines Section 15073.5(b)). The CDFW concerns are addressed in Responses to Comments A1-8 through A1-11 and there are no substantial revisions to the MND. Rather, new information is added to the MND which merely clarifies, amplifies, or makes insignificant modification, which does not require Recirculation of the MND per CEQA Guidelines Section 15073.5(c)(4).

**A1-16** The comment includes the recommended mitigation measures in the form of an MMRP. An MMRP was includes as part of the Draft IS/MND. Please see Responses to Comments A1-8 through A1-11.

Comment Letter T1

AGUA CALIENTE BAND OF CAHUILLA INDIANS

TRIBAL HISTORIC PRESERVATION

03-008-2006-001

March 25, 2024

[VIA EMAIL TO:bent@RanchoMirageCA.gov]
City of Rancho Mirage
Mr. Ben Torres
69-825 Highway 111
Rancho Mirage, California 92270

**Re: Ritz-Carlton Expansion MND**

Dear Mr. Ben Torres,

The Agua Caliente Band of Cahuilla Indians (ACBCI) appreciates your efforts to include the Tribal Historic Preservation Office (THPO) in the Ritz Carlton Rancho Mirage Expansion project. We have reviewed the documents and have the following comments: T1-1

> *The language in TCR/CR MM-CUL-1 is very confusing and should be rewritten. The first paragraph states a Native American Monitor will be present during initial ground disturbing activities. Two paragraphs down it is said that if Tribal Cultural Resources are found then ACBCI will be contacted and asked to provide a Native American Monitor. If we are out there for initial ground disturbing activities we should not need to be contacted or asked to provide a monitor, there should already be a contract in place. T1-2

Again, the Agua Caliente appreciates your interest in our cultural heritage. If you have questions or require additional information, please call me at (760) 423-3485. You may also email me at ACBCI-THPO@aguacaliente.net. T1-3

Cordially,

Xitlaly Madrigal
Cultural Resources Analyst
Tribal Historic Preservation Office
AGUA CALIENTE BAND
OF CAHUILLA INDIANS

5401 DINAH SHORE DRIVE, PALM SPRINGS, CA 92264
T 760/699/6800 F 760/699/6924 WWW.AGUACALIENTE-NSN.GOV

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# Response to Comment Letter T1

**Tribal Government**
**Agua Caliente Band of Cahuilla Indians**
**March 25, 2024**

**T1-1** The City acknowledges the comment as an introduction to comments that follow. This comment is included in the Final MND for review and consideration by the decision-makers prior to a final decision on the project. No further response is required.

**T1-2** This comment notes that TCR/CR MM-CUL-1 should be rewritten. The comment notes that the mitigation measure is confusing as it states that a Native American Monitor will be present during initial ground disturbing activities and that if Tribal Cultural Resources are found, then the Tribe would be contacted and asked to provide a Native American Monitor. The comment notes that if a Native American Monitor is onsite there initially, there should already be a contract in place if Tribal Cultural Resources are found.

To provide clarity, the City has made the following changes to Section 5.3, Mitigation Measures of the MND. Additions to the MND are shown here in underline text while deletions are shown in ~~strikethrough~~ text.

MM-CUL-1

Prior to the issuance of a grading permit or ground disturbing activities, the Applicant/Owner shall enter into a Tribal Cultural Resources Agreement and Repatriation Agreement with Agua Caliente Band of Cahuilla Indians (ACBCI). The purpose of the agreement shall be to formalize protocols and procedures between the Applicant/Owner and the Tribe for protection, treatment, and repatriation of Native American human remains, funerary objects, cultural and /or religious, ceremonial items, and other Tribal Cultural resources.

A Qualified Archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, and a ACBCI Native American monitor shall be present to attend pre-construction meetings with the general contractor or associated subcontractors. The Qualified Archaeologist and the ACBCI Native American monitor will be present for all initial ground-disturbing activities associated with the current proposed project that may occur in areas of native soil. Both the Qualified Archaeologist and ACBCI Native American monitors may temporally halt or diver round disturbing activities if potential archaeological or Tribal Cultural resources are discovered during construction activities. stop ground-disturbing activities in order to assess any discoveries in the field.

In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 50 feet of the find shall immediately stop until a Qualified Archaeologist can evaluate the significance of the find and determine whether additional study is warranted. Depending on the significance of the find under the California Environmental Quality Act (CEQA) and the CEQA Guidelines (California Public Resources Code, Section 21082; 14 CCR 15064.5(f)), the Qualified Archaeologist may exhaust the data potential of the find through the process of field level recordation and then allow work to continue. Isolates are clearly non-significant archaeological resources (as determined by

the Qualified archaeologist, in consultation with the Native American monitor) will be minimally documented in the field. If the discovery proves significant under CEQA, additional work such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted. In the event that curation of archaeological resources is required by the superseding regulatory agency, curation shall be conducted by an approved local facility in Riverside County, and curation shall be guided by California State Historical Resources Commission's Guidelines for the Curation of Archaeological Collections. The Applicant/Owner shall be responsible for all curation costs and provide the City written documentation from the curation facility that the curation have been completed.

If Tribal Cultural Resources (i.e., prehistoric or ethnohistoric-period artifacts, food remains, or features associated with Native Americans) are exposed during proposed project-related ground disturbance, the actions identified by the Agua Caliente Band of Cahuilla Indians in a preexisting agreement for unanticipated discovery shall be followed ~~contacted~~. This agreement may require ~~group shall be asked to provide the services of a trained~~ the Native American Monitor to return to site ~~consultant~~ to monitor ground-disturbing work in the area containing the Native American cultural resources. This monitoring would occur on an as-needed basis and would be intended to ensure that Native American concerns are taken into account during the construction process."

These changes merely clarify or amplify information already found in the Draft MND, and do not raise important new issues about significant effects on the environment. Revisions are presented in strikeout/underline format in the Final MND.

**T1-3** The City acknowledges the concluding comment and will include the comment as part of the Final MND for review and consideration by the decision-makers prior to a final decision on the project. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

Comment Letter T2

AGUA CALIENTE BAND OF CAHUILLA INDIANS

TRIBAL HISTORIC PRESERVATION

*03-008-2006-001*

August 19, 2024

[VIA EMAIL TO:bent@RanchoMirageCA.gov]
City of Rancho Mirage
Mr. Ben Torres
69-825 Highway 111
Rancho Mirage, California 92270

**Re: Ritz-Carlton Expansion Recirculated MND**

Dear Mr. Ben Torres,

The Agua Caliente Band of Cahuilla Indians (ACBCI) appreciates your efforts to include the Tribal Historic Preservation Office (THPO) in the Ritz Carlton Rancho Mirage Expansion project. We have reviewed the documents and have the following comments:

*Please find ACBCI-THPO comments in the attachment.

Again, the Agua Caliente appreciates your interest in our cultural heritage. If you have questions or require additional information, please call me at (760) 423-3485. You may also email me at ACBCI-THPO@aguacaliente.net.

T2-1

Cordially,

Xitlaly Madrigal
Cultural Resources Analyst
Tribal Historic Preservation Office
AGUA CALIENTE BAND
OF CAHUILLA INDIANS

5401 DINAH SHORE DRIVE, PALM SPRINGS, CA 92264
T 760/699/6800 F 760/699/6924 WWW.AGUACALIENTE-NSN.GOV

# Introduction

The City has prepared this recirculated Initial Study/ Mitigated Negative Declaration (IS/MND) in conformance with Section 15070(a) of the CEQA Guidelines. This recirculated IS/MND includes a description of the proposed project, evaluation of potentially significant impacts associated with the proposed project, and incorporation of mitigation measures into the project design as necessary to reduce or eliminate the potentially significant effects of the project.

**March 2024 IS/MND**

The March IS/MND was circulated for a 30-day public review period from March 11 to April 9, 2024. The Notice of Availability was posted on the State Clearinghouse website, posted with the Riverside County Clerk, and published in the Desert Sun. The IS/MND was also made available for public review at the project site and on the lead agency's website.

During the public review period, the lead agency received four comment letters from the following entities:

- California Department of Fish and Wildlife (CDFW)
- Agua Caliente Band of Cahuilla Indians
- Western States Regional Council of Carpenters
- Californians Allied for a Responsible Economy

T2-2

The comment letters raised issues related to biological resources, air quality, cultural resources, Greenhouse Gases (GHG), and noise. Responses to these comment letters will be included in the Final IS/MND after the public review period of the recirculated IS/MND has been completed.

**Reasons for Recirculation**

Pursuant to Section 15073.5 of the CEQA Guidelines, an MND must be recirculated when a major revision is made that discloses a new significant impact or a substantial increase in the severity of a previously identified impact.

CEQA Guidelines Section 15073.5 (b) defines a substantial revision as:

(1) A new, avoidable significant effect is identified and mitigation measures or project revisions must be added in order to reduce the effect to insignificance, or
(2) The lead agency determines that the proposed mitigation measures or project revisions will not reduce potential effects to less than significance and new measures or revisions must be required.

After reviewing the comments received on the March 2024 IS/MND, the lead agency determined that the proposed project would have a potentially significant impact related to air quality that was not adequately analyzed or mitigated in the March 2024 IS/MND. The recirculated IS/MND supersedes the March IS/MND and is being recirculated for public review and comment in accordance with Section 15073.5 of the CEQA Guidelines.

**Revisions to the IS/MND**

In response to the comments received, the lead agency made revisions to the IS/MND to clarify, correct, or supplement the information presented in the initial document. As specifically requested in the comment letter from Californians Allied for a Responsible Economy, a Health Risk Assessment (HRA) was prepared to analyze the project's potential to expose sensitive receptors to substantial pollutant concentrations. The results of this HRA concluded that additional mitigation was required to reduce impacts to less than significant.

Revisions were also made to mitigation measures MM-BIO-1 through MM-BIO-3 in response to comments made from CDFW, and MM-CUL-1 in response to comments from Agua Caliente Band of Cahuilla Indians. These changes merely clarify or amplify information already found in the March 2024 IS/MND, and do not raise important new issues about significant effects on the environment. Revisions are presented in strikeout/underline format in the Recirculated MND.

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# ENVIRONMENTAL INITIAL STUDY

| | |
|---|---|
| Project Title: | Ritz-Carlton Rancho Mirage |
| City Project No: | EA21-0002, GPZMA21-0001, MOD21-0004 DA21-0002, and TPM23-0002 |
| Lead Agency Name and Address: | City of Rancho Mirage<br>69-825 Highway 111<br>Rancho Mirage, California 92270<br>Phone: (760) 328-2266 Fax: (760) 324-9851 |
| Applicant: | Kam Sang Company, Inc.<br>411 E. Huntington Drive, Suite 305<br>Arcadia, California 91006 |
| Contact Person: | Ben Torres<br>Planning Manager |
| Phone Number: | Phone: (760) 328-2266 X253 |
| Project Location: | The project site occurs along Frank Sinatra Drive approximately 0.85 miles southwest of the intersection with Highway 111 within the City of Rancho Mirage. |
| Accessor Parcel Numbers: | 689-330-026, -28, -31, -32, -34; 689-020-012, -14 ; 689-331-001,-18 |
| General Plan Designation: | Resort Hotel (Rs-H) and Mountain Reserve (MR) |
| Zoning Designation: | Resort Hotel (Rs-H) and Mountain Reserve (MR) |

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# CHAPTER 1: PROJECT DESCRIPTION

## Background

In 2006, an environmental impact report (EIR) was prepared for the Lodge at Rancho Mirage Hotel Expansion Project, which encompassed a total of 39.01 acres that included the existing Lodge Hotel site, and other developed and entitled lands within the lower foothills of the Santa Rosa Mountains. The 2006 Lodge at Rancho Mirage Hotel Expansion Project EIR (2006 EIR) included expansion, renovation and upgrading of the existing Lodge at Rancho Mirage Hotel (the "Hotel"), construction of new structures, parking and interior roadways, accessory buildings, support facilities and infrastructure, landscaping, and demolition of the existing tennis complex. The 2006 EIR also included an amendment to the existing Development Agreement for the subject property. The 2006 EIR analyzed portions of the Ritz-Carlton Residences site of the Ritz-Carlton Rancho Mirage Project (the proposed project) analyzed in this Initial Study but did not analyze the Sky Mesa Recreational Area (Figures 1-1 and 1-2).

The 2006 Lodge at Rancho Mirage Hotel Project site is located to the southwest of the Sky Mesa Recreation Area (Figure 1-2). The proposed project as analyzed in this Initial Study is not a tiered document of the 2006 The Lodge at Rancho Mirage Hotel Expansion Project EIR because the project analyzed in this Initial Study contains an area (the Sky Mesa Recreation Area) not analyzed in the 2006 EIR. Additionally, the 2006 EIR included development of the Tennis Villas within the approximately 7.96-acre area (APN: 689-330-011) across Frank Sinatra Drive from the project site. The Tennis Villas include the development of 80,248 square feet of new development including 25 villas (with a total of 49 keys), outdoor patios/ gardens, plunge pool, hot tub, water features, pool bar, a wine cave, a covered golf cart pickup area, equipment, and a 26,330-sf underground parking structure onsite. The 25 Villas would be comprised of (1) one-bedroom suite (1 key); (11) two-bedroom villas (2 keys); (11) two-bedroom suites (2 keys); and (2) three-bedroom suites (2 keys). The currently proposed project as addressed in this Initial Study does not alter any portion of the Tennis Villas as analyzed in the 2006 EIR.

T2-2
Cont.

## California Environmental Quality Act Compliance

The City of Rancho Mirage (City) is the California Environmental Quality Act (CEQA) lead agency responsible for the review and approval of the proposed project. The City has prepared this Initial Study pursuant to the requirements of Section 15063 of the State CEQA Guidelines to determine if the proposed project may have a significant effect on the environment. The purpose of an Initial Study is to provide the Lead Agency (in this case, the City of Rancho Mirage) with information to use as the basis for deciding whether a project may have a significant effect on the environment. The City will utilize the Initial Study to determine if an EIR or a Negative Declaration is the appropriate environmental review document for the proposed project. The Initial Study also enables the applicant or City to modify a project to mitigated adverse impacts before an EIR is prepared, thereby enabling the project to qualify for a Negative Declaration.

In accordance with Section 15063(d) of the State CEQA Guidelines, this Initial Study contains: a description of the project; an identification of the environmental setting; an identification of environmental effects by use of a checklist and explanation; a discussion of ways to mitigate the significant effects identified, if any; an examination of the project's consistency with existing zoning and plans; and the persons who prepared the Initial Study.

**Purpose and Need**

The purpose of the proposed project is to construct 48 residential suites (Building A-1) and 58 villas (Buildings B-1 to B-15) within the Ritz-Carlton Residences section of the project site (encompassing approximately 200,474 square feet), to construct 23,840 square feet of venue space, 5,510 square feet of amenity space, and 6,273 square feet of commercial space within the Sky Mesa Recreational Area portion of the project site for a total project size of approximately 236,750 square feet (Figure 1-2).

**Project Location**

The project site is located at 68900 Frank Sinatra Drive approximately 0.85 miles southwest of the intersection with State Route 111 in the City of Rancho Mirage, Riverside County (Assessor's Parcel Numbers 689-330-026, -028, -031 -032, -034; 689-020-012, -014 and 689-331-001, -18) (Figure 1-2). The majority of the 16.13-acre project site is currently vacant and lies south and east of the existing Ritz-Carlton Rancho Mirage Hotel. Figures 1-1 and 1-2 show the regional location and local vicinity, respectively. The Residences portion accounts for approximately 11.62 acres and the Sky Mesa Recreation Area accounts for approximately 4.51 acres.

**Environmental Setting and Surrounding Land Uses**

The project site is vacant with dirt covering the majority of the site. The majority of the site that includes The Residences is mass graded. The portion of the site for the Sky Mesa Recreational Area is partially graded. An asphalt dead-end road has been constructed on the property as a temporary construction access point for the hotel to the north. A shipping container and construction equipment remain on the project site from construction staging activities during previous development on the hotel property. As mentioned above, the existing Ritz-Carlton Rancho Mirage Hotel is to the north and west of the project site with a hotel service access road immediately bordering the property. Another hotel service access road borders the project site to the northeast which leads to the proposed Sky Mesa Recreation Area. To the south is Mirada Circle and the Mirada single-family residential development. Confronting the project site across Frank Sinatra Drive to the northwest is a rough graded but undeveloped parcel that contains the site where the Tennis Villas of the Lodge at Rancho Mirage Hotel Project would be developed.

T2-2
Cont.

***Land Use***

The project site is situated on all or portions of Assessor parcel numbers 689-330-026, -028, -031 -032, -034; 689-020-012, -014 and 689-331-001, -18 which have a General Plan Land Use designation of Commercial: Resort Hotel (Rs-H) and on parcels 689-020-012, -14 carrying an Open Space: Mountain Reserve (MR) designation.

The stated goal of the Resort Hotel (Rs-H) zone is for "the development of hotels and destination resorts with limited, ancillary commercial uses, such as spas, recreational facilities, restaurants, lounges, and small retail shops that directly support the primary use."

The stated goal of the Mountain Reserve (MR) zone is "for public lands or property subject to conservation easements in the Santa Rosa Mountains. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation."

## Project Description

### *Proposed Land Uses*

The applicant, Kam Sang Company, proposes to construct 106 residential suites and hotel villas encompassing approximately 200,474-square feet, approximately 23,840-square feet of event space, approximately 6,273-square feet of commercial, and approximately 5,510-square feet of amenity space at 68900 Frank Sinatra Drive. The proposed project would be approximately 236,748 square feet in total. Figure 1-3 and 1-4 shows the proposed site plans for the Ritz Carlton Residences and the Sky Mesa Recreational Area, respectively.

***Ritz Carlton Residences and Hotel Villas***

***Residential Suites (Building A-1):*** The residential suites, event space, and commercial area would be located within Building A-1. This new building would provide an approximately 23,840-square feet indoor event space and 3,960-square feet exterior entertaining and garden spaces. The building would also house 48 residential suites over underground parking for both the suites and the event space along with additional parking for the existing hotel. Building A-1 would be 3 stories with a maximum height of 30-feet, 3-inches, with the exception of the entrance of the event space, which will be 39- feet 3- inches in height. Building elevations are shown on Figure 1-5.

***Hotel Villas (Buildings B-1 to B-15):*** The proposed project also includes 58 proposed hotel villas with private garages across 15 buildings (Buildings B-1 to B-15) to the south and east of Building A-1. The hotel villas would be 2 stories with a maximum height of approximately 32-feet, 4-inches and building elevations are shown on Figures 1-6a and 1-6b. These residential suites and hotel villas would be comprised of a mix of one, two, and three-bedroom units; refer to Table 1-1, Proposed Residential Suite and Hotel Villa Unit Types, for a breakdown of unit types between the residential suites and hotel villas.

T2-2
Cont.

**Table 1-1. Proposed Residential Suite and Hotel Villa Unit Types**

| Location | Unit Type | Count |
|---|---|---|
| Residential Suites | 1 bedroom/1 bath | 26 |
| | 2 bedroom/2 bath | 12 |
| | 3 bedroom/3 bath | 10 |
| | *Residential Suite Subtotal* | *48* |
| Hotel Villas | 2 bedroom/2 bath | 29 |
| | 3 bedroom/3 bath | 29 |
| | *Hotel Villas Subtotal* | *58* |
| | **Total Units** | **106** |

An approximately 5,510-square-foot, 33 feet and 6 inches tall, community clubroom/lounge with access to a central pool terrace as well as smaller amenity areas would also be located with the same area as the hotel villas. Refer to Figure 1-3 for the proposed location of the community lounge and Figure 1-5 for building elevations.

***Sky Mesa Recreation Area***

To the northeast, the proposed 6,273-square-foot Sky Mesa Recreation Area would provide additional event space, restaurant, and amenities such as a pool terrace and view opportunities of the surrounding areas. The Sky Mesa Recreation Area includes a restaurant built into the natural hillside with a pool and large lawn event space below the restaurant. A proposed 693 square foot restroom facility would be constructed into the hillside adjacent the restaurant and pool. Figure 1-7 shows the proposed building elevations for the Sky Mesa Recreation Area. A General Plan Zoning Map Amendment from Mountain Reserve (MR) to Resort Hotel (Rs-H) is concurrently proposed for the Sky Mesa Recreation Area.

***Access and Parking***

Proposed access and circulation to and within the project site is shown on Figure 1-8. Primary site access would be from Frank Sinatra Drive, with associated monument signage. Access to the hotel villas would be located at the existing traffic circle on Frank Sinatra Drive just south of the existing hotel access driveway. Access to Building A-1 (residential suites, event spaces, and underground parking) would be from the existing hotel access driveway. The existing hotel motor court would be modified to serve as the drop-off and entry point for the new event space and residential suites. An additional vehicular connection would be located to the east of Building A-1, which would provide additional hotel villa residential and service access. An internal road network and sidewalks provide connections throughout the site, to the existing hotel, and to the Sky Mesa Recreation Area.

The proposed project would include 499 parking spaces total, with 381 subterranean parking and 116 residential parking. As mentioned above, parking for Building A-1 is provided in a parking structure where 381 spaces serve the residential suites, event space, commercial uses, and additional spaces for the existing hotel. The hotel villas would have either 1 or 2-car private garages, plus a driveway space for the one car garage hotel villas totaling 116 spaces.

T2-2
Cont.

***Landscaping and Open Space***

The proposed project will provide approximately 35% open space made up of landscape areas, pools, water features, and paths. Figures 1-9a and 1-9b shows the proposed landscape plan for the Residences at Ritz Carlton and the Sky Mesa Recreational Area, respectively. A desert landscape design is proposed throughout the project site including water cascades, multiple pools, rock escarpments, and fountains. Landscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network. The proposed plant palette would comprise of native, drought-tolerant plantings, consistent with the existing hotel landscaping and surrounding areas.

A pedestrian walkway network would be located throughout the hotel villas and Sky Mesa Recreation Area. The pedestrian network would provide access to pools, ponds, and open space areas within the project site. Within the Sky Mesa Recreation Area, north of the proposed restaurant and pool, the pedestrian network would include viewpoints towards the north/east.

***Utilities***

Coachella Valley Water District (CVWD) provides domestic water service to the existing Ritz-Carlton Hotel via 18-inch diameter water mains located in Frank Sinatra Drive and 8-inch mains located in previous Tennis Complex entry drive. 12-inch water mains are also located in roadways within the

adjacent Mirada Estates subdivision.

CVWD provides wastewater collection and treatment services to the proposed project vicinity. Wastewater is collected via 8-inch sewer mains located within the Frank Sinatra Drive right-of-way. These mains extend north along Frank Sinatra Drive, cross Highway 111 and connect with a sewer line located about one block northeast of Highway 111.

The proposed project would require sewer, water, and fire-serve water line lateral connections to the existing facilities in Frank Sinatra Drive. New irrigation improvements would follow the CVWD Model Water Efficient Landscape Ordinance.

T2-2
Cont.

**Construction**

For the purposes of air quality analysis, it is anticipated that construction of the proposed project would begin in 2023[1]. The anticipated sequence of construction is as follows:

- Demolition (none necessary)
- Site Preparation (previously performed)
- Grading (5 months)
- Building Construction (17 months)
- Paving (1 month)
- Architectural Coating (3 months)

Refer to the air quality analysis in Section 3 of this Initial Study for additional details. During the grading phase of construction, it is anticipated that approximately 6,920 cubic yards of material would be exported and no material would be imported. No-VOC paint, defined as paint with a VOC content of 5 grams/liter or less is proposed for the project.

**Operation**

The proposed project entails operation of residential suites and hotel villas, event space, commercial, and amenity space. The proposed 23,840 square foot event space and exterior entertaining and garden space would provide a space for residents, visitors and hotel guests. The proposed project would involve the construction of 106 residential units. These residential units would operate similar to time-share properties and therefore future residents would not be in the proposed residential units year-round.

T2-2
Cont.

During operation of the proposed project, special events would be held, similar to special events held at the existing hotel. Prior to any special event, the proposed project would obtain necessary and required approvals from the City with respect to special event permits and traffic management.

**Discretionary Approvals**

The two primary components of the proposed project, the Ritz Carlton Residences and the Sky Mesa Recreation Area, require a separate set of discretionary approvals. While these two components are considered a single project under CEQA, one portion may be developed separately from the other The approvals required of each are outlined below. The project requires approval of a Tentative Parcel Map (TPM38768) (see Figure 1-10, Tentative Parcel Map) which proposes to establish three parcels with Parcel 3 of the map containing 106 condo units.

[1] The analysis assumes a construction start date of February 2023 and conclude in November 2024 , which represents the earliest date construction would initiate. While February 2023 has already passed, assuming the earliest start date and duration for construction represents the worst-case scenario for criteria air pollutant and GHG emissions because equipment and vehicle emission factors for later years would be slightly less due to more stringent standards for in-use off-road equipment and heavy-duty trucks, as well as fleet turnover replacing older equipment and vehicles in later years. Additionally, a shorter modeled duration results in slightly higher daily and annual emissions. Therefore, despite the fact that the construction schedule used for modeling has previously passes, given it represents the worst-case scenario, the analysis is still valid.

**Ritz Carlton Residences Discretionary Approvals**

- Environmental Assessment
- Development Agreement Amendment
- Major Modification
- Tentative Parcel Map

**Sky Mesa Recreation Area Discretionary Approvals**

- Environmental Assessment
- Development Agreement Amendment
- General Plan Zoning Map Amendment from Mountain Reserve to Resort Hotel
- Major Modification~~Preliminary Development Plan~~
- Tentative Parcel Map

T2-2
Cont.

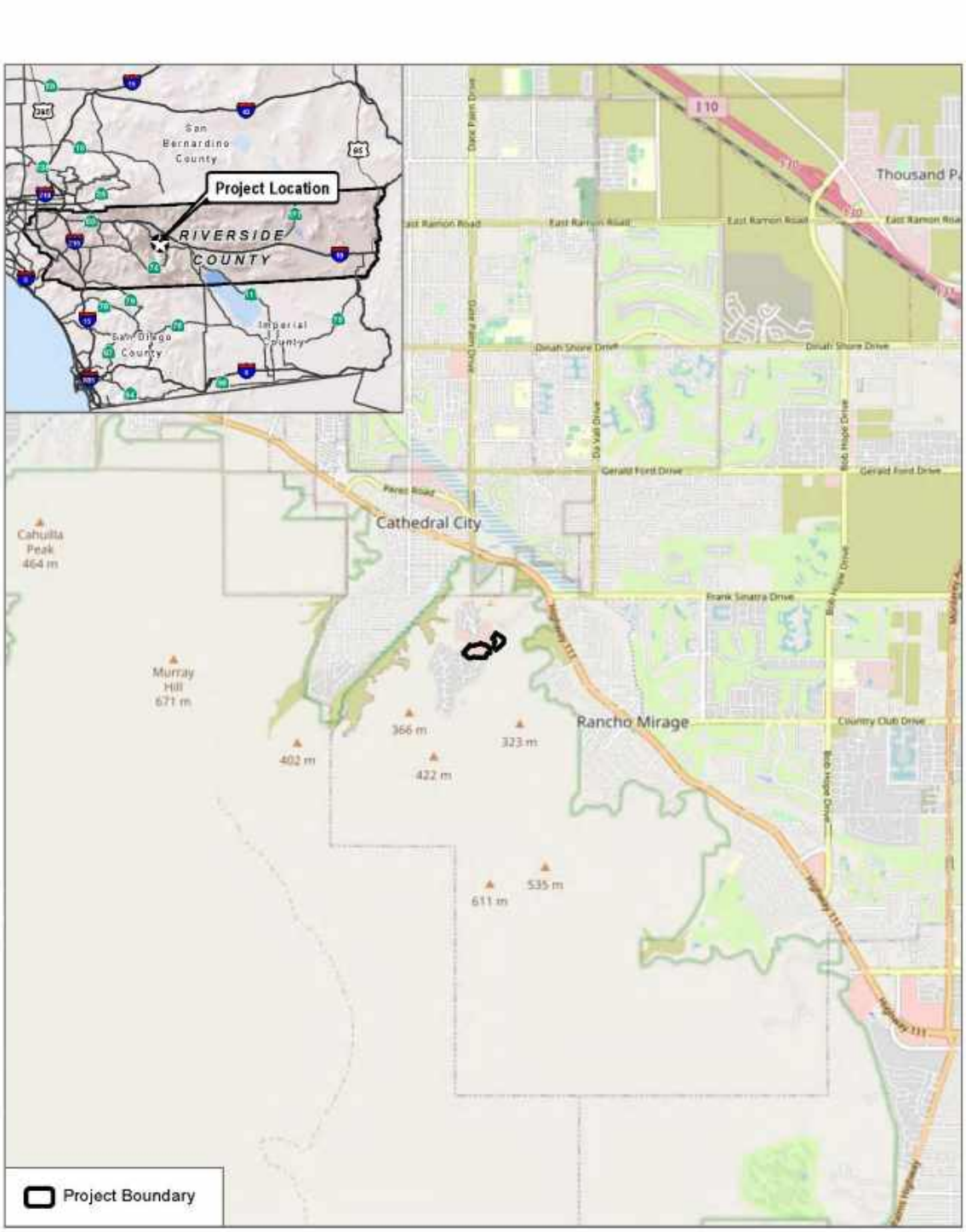


FIGURE 1-1
Regional Map
Ritz-Carlton Rancho Mirage Initial Study

T2-2 Cont.

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T2-2
Cont.

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SOURCE: ESRI Clarity Imagery 2019

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FIGURE 1-2
Project Location
Ritz-Carlton Rancho Mirage Initial Study

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T2-2
Cont.




SOURCE: LCRA 2019

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FIGURE 1-3
Ritz-Carlton Residences Site Plan
Ritz-Carlton Rancho Mirage Initial Study

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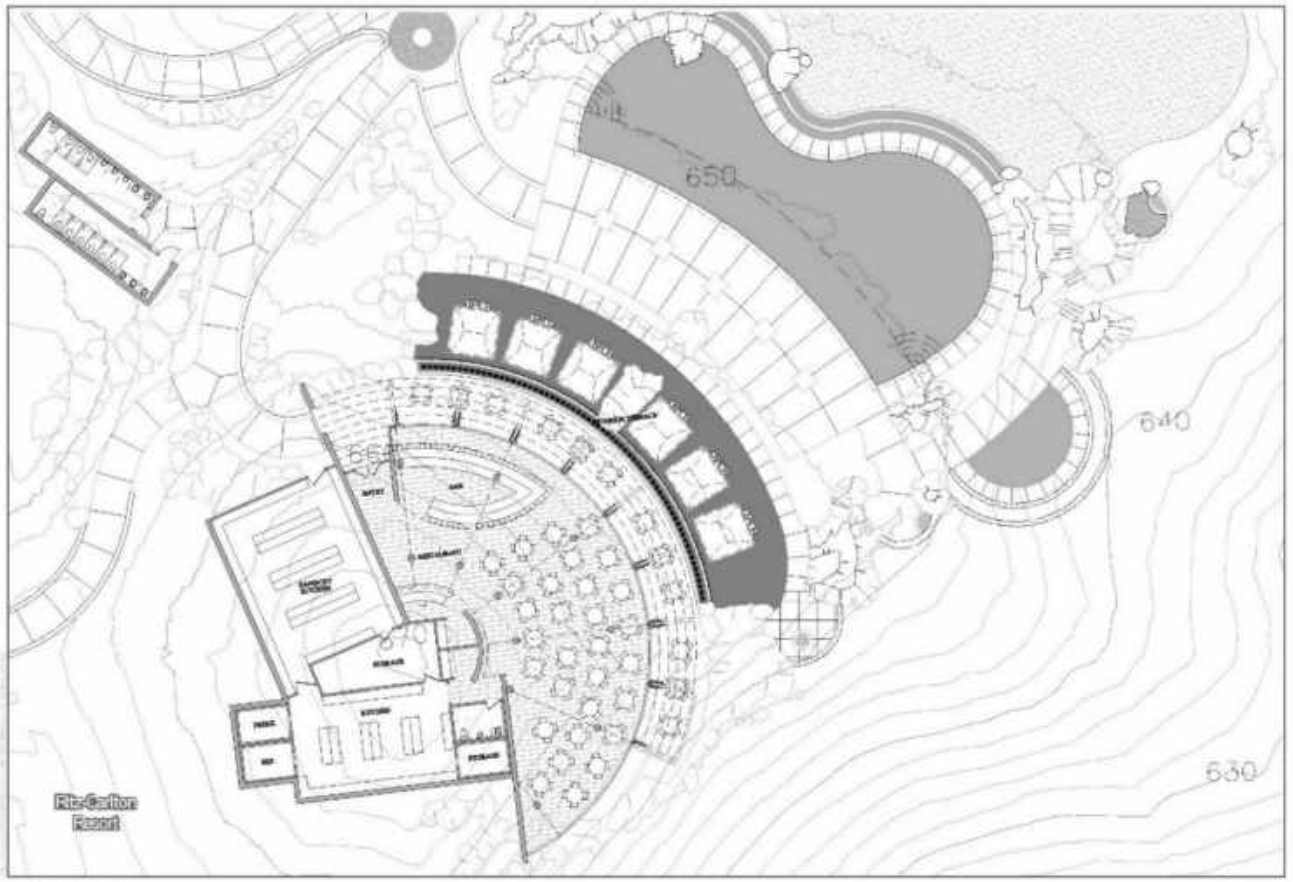
Cont.




SOURCE: LCRA 2018

DUDEK

FIGURE 1-4
Sky Mesa Recreational Site Plan
Ritz-Carlton Rancho Mirage Initial Study

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Cont.

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T2-2
Cont.




T2-2
Cont.

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T2-2
Cont.




T2-2
Cont.

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T2-2
Cont.



SOURCE: LCRA 2016

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FIGURE 1-6b
Residences Elevations
Ritz-Carlton Rancho Mirage Initial Study

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Cont.

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T2-2
Cont.




SOURCE: LCRA 2018

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FIGURE 1-7
Sky Mesa Recreation Area Elevations
Ritz-Carlton Rancho Mirage Initial Study

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Cont.

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T2-2
Cont.




SOURCE: Silver Creek 2020

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FIGURE 1-8
Proposed Access and Circulation
Ritz-Carlton Rancho Mirage Initial Study

T2-2 Cont.

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T2-2
Cont.



SOURCE: Michael McKay 2019

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FIGURE 1-9a
Landscape Plan for Residences at Ritz Carlton
Ritz-Carlton Rancho Mirage Initial Study

T2-2
Cont.

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T2-2
Cont.



SOURCE: LCRA, 2022

DUDEK

FIGURE 1-9b
Landscape Plan for Sky Mesa Recreational Area
Ritz-Carlton Rancho Mirage Initial Study

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Cont.

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Cont.

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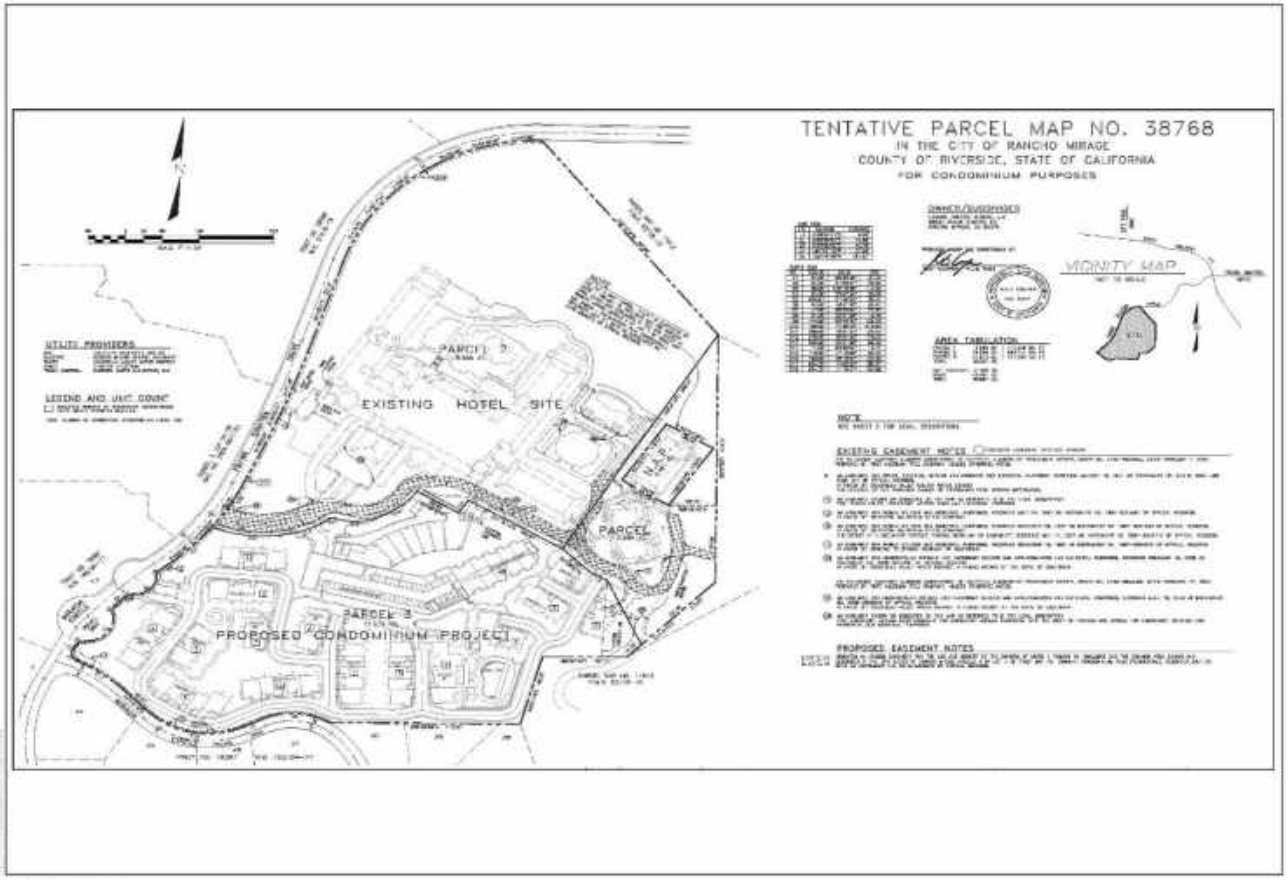


SOURCE: mSwift, 2024

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FIGURE 1-10
Tentative Parcel Map
Ritz-Carlton Rancho Mirage Initial Study

T2-2
Cont.

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T2-2
Cont.





FIGURE 1-11a
Visual Simulation 1 – Rancho Mirage Entrance
Ritz-Carlton Rancho Mirage Initial Study

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Cont.

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Cont.





FIGURE 1-11b
Visual Simulation 2 – Villas of Mirada (Southern Entrance)
Ritz-Carlton Rancho Mirage Initial Study

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T2-2
Cont.

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T2-2
Cont.






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FIGURE 1-11c
Visual Simulation 3 – Villas of Mirada (Northern Entrance)
Ritz-Carlton Rancho Mirage Initial Study

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Cont.

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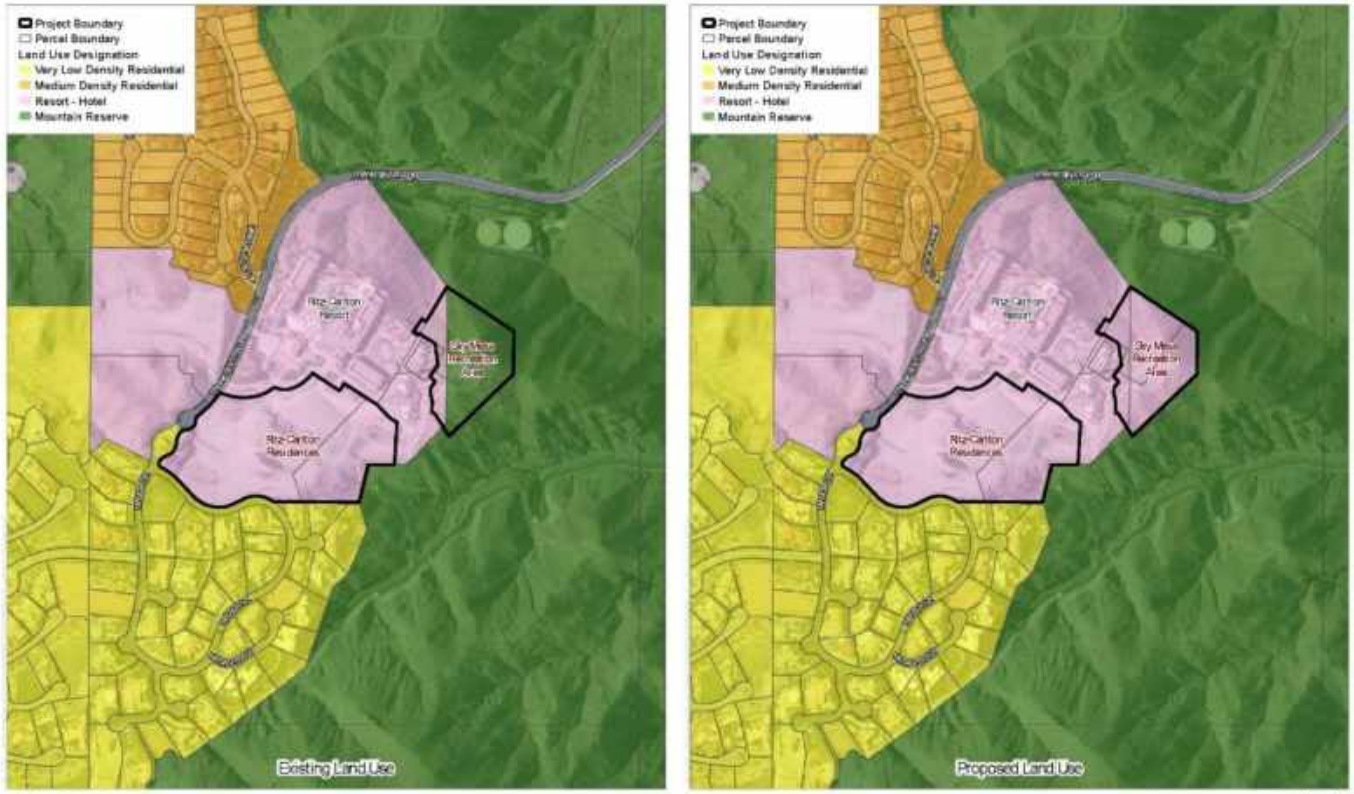
Cont.

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T2-2
Cont.

## CHAPTER 2: ENVIRONMENTAL ANALYSIS AND DETERMINATION
## ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

| | | |
|---|---|---|
| ☐ Aesthetics | ☐ Agriculture and Forestry Resources | ☐ Air Quality |
| ☐ Biological Resources | ☐ Cultural Resources | ☐ Energy |
| ☐ Geology and Soils | ☐ Greenhouse Gas Emissions | ☐ Hazards and Hazardous Materials |
| ☐ Hydrology and Water Quality | ☐ Land Use and Planning | ☐ Mineral Resources |
| ☐ Noise | ☐ Population and Housing | ☐ Public Services |
| ☐ Recreation | ☐ Transportation | ☐ Tribal Cultural Resources |
| ☐ Utilities and Service Systems | ☐ Wildfire | ☐ Mandatory Findings of Significance |

T2-2 Cont.

## EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.

   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

T2-2
Cont.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

a) the significance criteria or threshold, if any, used to evaluate each question; and

b) the mitigation measure identified, if any, to reduce the impact to less than significance

T2-2
Cont.

**DETERMINATION:** (To be completed by the Lead Agency) On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Ben Torres, Planning Manager
City of Rancho Mirage

7-17-2024
Date:

T2-2
Cont.

## Environmental Checklist and Discussion:

The following checklist evaluates the proposed project's potential adverse impacts. For those environmental topics for which a potential adverse impact may exist, a discussion of the existing site environment related to the topic is presented followed by an analysis of the proposed project's potential adverse impacts. When the project does not have any potential for adverse impacts for an environmental topic, the reasons why there are no potential adverse impacts are described.

1. AESTHETICS

| AESTHETICS – Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Have a substantial adverse effect on a scenic vista? | ☐ | ☐ | ☒ | ☐ |
| b) Substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | ☐ | ☐ | ☐ | ☒ |
| c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality? | ☐ | ☐ | ☒ | ☐ |
| d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? | ☐ | ☐ | ☒ | ☐ |

T2-2
Cont.

### 1.1 Setting

For the purposes of this analysis, a scenic vista is defined as a long, expansive view of a highly valued landscape from a publicly accessible vantage point. "Highly valued landscapes" can include natural open spaces, topographic formations including mountains or hills, or more generally, areas that

contribute to a high level of visual quality. The City of Rancho Mirage's General Plan has identified view corridors along State Route (SR-) 111.

The proposed project consists of developing 48 residential suites and 58 hotel villas encompassing approximately 200,474-square feet, approximately 23,840-square feet of event space, approximately 6,273-square feet of commercial, and approximately 5,510-square feet of amenity space at 68900 Frank Sinatra Drive. As discussed in the Project Description, the proposed project also includes 58 proposed hotel villas with private garages across 15 buildings (Buildings B-1 to B-15) to the south and east of Building A-1. The hotel villas would be 2 stories with a maximum height of 32-feet, 4-inches and building elevations are shown on Figures 1-6a and 1-6b. The proposed Sky Mesa Recreational Area would construct an event space, a restaurant and bathroom facility built into the natural hillside, a pool and a large lawn event space. The heights of the structures would not substantially differ as the existing buildings are of similar heights.

The proposed Ritz-Carlton Residences site is located south of the existing hotel, north of a gated residential community, and southeast of another gated residential community (Figure 1-2). Additionally, there is a trail adjacent to the gated residential community to the northwest of the project site (Road Runner Trail). The proposed Ritz-Carlton Residences site is graded and is sparsely occupied by small vegetation and storage containers. The proposed Sky Mesa Recreational Area is located east of the existing hotel (Figure 1-2). The proposed Sky Mesa Recreational Area is largely graded atop a hillside and dotted with chaparral vegetation.

## 1.2 Discussion of Impacts

T2-2
Cont.

a) ***Less-than-Significant Impact:*** The City of Rancho Mirage General Plan (City of Rancho Mirage 2017) Land Use Element policy states that "the City shall ensure adequate visibility and accessibility for commercial development while preserving the scenic viewsheds from adjoining properties and public rights-of-way" (Policy LU 2.5).

The proposed project is located off of Frank Sinatra Drive, a public right-of-way, which includes views of the Santa Rosa Mountains to the north and southeast. The proposed project occurs to the east/southeast of Frank Sinatra Drive and therefore there is no impact to views to the north. The views of the mountains to the southeast include the existing Mirada single-family residential development which is situated at an elevation approximately 30-feet higher than the proposed project entrance. The proposed buildings are designed to meet the building height and setback regulations as required by the City of Rancho Mirage Zoning Ordinance, as discussed in Threshold 2(c).

Three renderings of the proposed project are presented in Figures 1-11a–c. Locations of the proposed project renderings are also presented in Figures 1-11a-c. The three renderings include renderings of two entrances to the Villas of Mirada (one on the North side of the site and one to the South; Figure 1-11b and 1-11c, respectively) and a rendering from the perspective from the entrance to the proposed development (Figure 1-11a). These three perspectives are generally the only locations along Frank Sinatra Drive in which a motorist could see the proposed project from a public vantage point. The terrain is such that it blocks the project up until the proposed project entrance. Figure 1-11c of the north end of Frank Sinatra Drive is the first location in which the project site can be seen by motorist.

A rendering at the entrance to the project site along Frank Sinatra Drive is presented in Figure 1-11a. Views of the rendering includes multiple palm trees and desert landscaping along the entrance.

Beyond the entrance are multiple buildings that are color blocked with neutral cream or tan color exterior. The buildings are two stories tall and would be surrounded by landscaping. A rendering from the perspective of the southern entrance to the Villas of Mirada (a gated residential neighborhood) shows the proposed buildings of similar designs as previously described (Figure 1-11b). Landscaping along the streets would not change, and low dense landscaping can be seen along the proposed development. A rendering from the perspective of the northern entrance of the Villas of Mirada shows the proposed development just beyond the view of the existing hotel. The proposed Sky Mesa Recreational Area cannot be seen from any of the three perspective locations as specified in Figures 1-11a through 1-11c.

There would be minimal visibility of the proposed development from Highway 111. A brief view of existing hotel buildings can be seen peaking over the hillside, although the majority of the proposed buildings would not be seen from Highway 111 due to mountains and elevation. Visibility of the existing hotel can be seen from the parking lot of a car wash directly adjacent to Highway 111 and Frank Sinatra Drive. Even from the parking lot of the aforementioned car wash, the proposed development cannot be seen. The proposed development cannot be seen until motorists arrive at the northern entrance of Villas of Mirada (Figure 1-11c).

As the existing topography increases to the southeast the views will not be obstructed by the proposed project and the impact to scenic vistas from the public right-of-way will be less than significant.

The City's General Plan Community Design Element (City of Rancho Mirage 2017) includes the goal of preservation and promotion of the special identity of Rancho Mirage as an "Oasis in the Desert," combining quality development with scenic, natural, and open space amenities. Exhibit 32 in the Community Design Element shows designated view corridors. The view corridors potentially within the potential project vicinity are looking northwest/southeasterly along both Highway 111 and the Whitewater River. The Community Design Element also addresses scenic arterial roadways which include Bob Hope Drive, Highway 111, Monterey Avenue, and Da Vall Drive.

The proposed project is not visible from the designated view corridors as it is located to the west over the Santa Rosa Mountains. Additionally, the proposed project is located off of Frank Sinatra Drive which is not considered a scenic roadway (City of Rancho Mirage 2017). Therefore, impacts to scenic vistas regarding view corridors would be **less than significant**.

T2-2
Cont.

b) ***No Impact:*** The project site is located off of Frank Sinatra Drive, which is not considered a scenic highway (City of Rancho Mirage 2017). Additionally, the project site has been previously graded and contains no scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings. Therefore, there would be **no impact.**

c) ***Less-than-Significant Impact:*** Per CEQA Statute 21071(a)(2), and urbanized area is defined as "an incorporated city that has a population of less than 100,000 persons ...and not more than two contiguous incorporated cities combined equals at least 100,000 persons." The combined populations of Rancho Mirage, Cathedral City, and Palm Springs exceed 100,000 persons, and therefore Rancho Mirage is considered an urbanized area under CEQA (SCAG 2019a, b, c).

In accordance with the City's Zoning Ordinance, the proposed project would comply with all applicable city design standards to protect scenic viewsheds. The project proposes buildings of varying heights with a maximum building height of 33-feet, 6-inches, with the exception of

the entrance to the venue space in Building A-1 (with a height of 39 -feet and 3 inches) and the entrance to the underground parking structure (with a height of 47- feet). Table 2-5 in Section 17.10.20 of the City's Municipal Code identifies the development standards for setbacks and building height in the Rs-H zone, with additional height requirements outlined in Section 17.20.100. As part of the development plan application and project mapping progresses, the applicant would comply with the City's Municipal Code building height requirements with respect to the finished grade and setback requirements along the property line. The proposed event space would be located closest to the existing hotel, with the residential villas proposed between the hotel/event space and neighboring residential to the south. The proposed residential villas would be located at varying finished grades which would provide a variation in rooflines. The residential villas would be set back from surrounding properties by an internal landscaping buffer and internal driveways. Project design would provide a transition between the existing hotel use/proposed event space and the existing residential to the south in compliance with the development standards of the City's Municipal Code.

Additionally, the project site is currently zoned Resort Hotel (Rs-H) and Open Space: Mountain Reserve (MR) in the General Plan (City of Rancho Mirage 2017). The proposed hotel suites and villas are located on the Rs-H zoned property; with the concurrently proposed zoning amendment for the Sky Mesa Recreation Area, the proposed uses would also be located on an Rs-H zoned parcel. Therefore, the project would be consistent with the General Plan designation. Furthermore, the project site is not located within a scenic overlay zone. As described in Response 1(a) above, the proposed buildings will comply with building height and setback regulations and there would be **less than significant impact** regarding existing views and scenic quality from the public right-of-way will not be impacted.

T2-2
Cont.

d) ***Less-than-Significant Impact:*** The residential suites, hotel villas, and sky mesa uses would include outdoor lighting. While this is a new source of light, existing hotel and the surrounding Mirada residential development already contains night-lighting. All lighting would comply with City of Rancho Mirage Municipal Code Section 17.18.050 (City of Rancho Mirage 2002) for shielding to control glare and prevent light spillover onto adjacent areas. The proposed project would have a **less-than-significant impact** on day or nighttime views related to light or glare.

### 1.3 Mitigation Measures

No mitigation measures required.

2. AGRICULTURE AND FORESTRY RESOURCES

| AGRICULTURE AND FORESTRY RESOURCES – In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | ☐ | ☐ | ☐ | ☒ |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | ☐ | ☐ | ☐ | ☒ |
| c) Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production? | ☐ | ☐ | ☐ | ☒ |
| d) Result in the loss of forest land or conversion of forest land to non forest use? | ☐ | ☐ | ☐ | ☒ |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use? | ☐ | ☐ | ☐ | ☒ |

T2-2 Cont.

## 2.1 Setting

The project site is situated on all or portions of Assessor parcel numbers 689-330-026, -28, -32 which have a General Plan Land Use designation of Commercial: Resort Hotel (Rs-H) and on parcels 689-020-012, -14 carrying an Open Space: Mountain Reserve (MR) designation.

According to the City of Rancho Mirage's 2005 General Plan Update EIR (City of Rancho Mirage 2005), there is no farming activity in the City and no agricultural land uses in the General Plan. Furthermore, the 2017 Rancho Mirage General Plan Update Addendum (2017 Addendum) states that agricultural lands are still not present in the City.

## 2.2 Discussion of Impacts

a) ***No Impact:*** According to the California Department of Conservation's Important Farmland Finder, the project site is located in Urban and Built-Up Land and Other Land. Urban and Build-Up Land is described as areas occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to 10-acre parcels (DOC 2016). Other Land is described as land not included in any other mapping category, with common examples including low density rural developments, brush, timber, etc. (DOC 2016).

As previously discussed, there is no farming activity in the City and no agricultural land uses in the General Plan. Additionally, the 2005 General Plan EIR, which analyzed the entirety of the City, determined that agricultural resource impacts would be considered less than significant. Furthermore, the 2017 Addendum to the General Plan EIR would not facilitate any conversion of agriculturally zoned lane. Therefore, this threshold is not addressed.

As such, the proposed project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use, and **no impact** would occur.

b) ***No Impact***: The Residences at Ritz Carlton portion of the project site is designated as Resort Hotel (Rs-H), and the Sky Mesa Recreational Area of the project site is designated as an Open Space: Mountain Reserve (MR) zone according to the City's Land Use Map (City of Rancho Mirage 2017). The Rs-H designation is zoned for commercial uses and the MR designation is zoned for open space preserve space (City of Rancho Mirage 2013). Neither of the designations support agricultural uses. As such, development of the proposed project would not conflict with existing zoning for agricultural use or a Williamson Act contract. **No impacts** would occur.

c) ***No Impact:*** The Residences at Ritz Carlton portion of the project site is designated as Resort Hotel (Rs-H), and the Sky Mesa Recreational Area of the project site is designated as an Open Space: Mountain Reserve (MR) zone according to the City's Land Use Map (City of Rancho Mirage 2017). The project site is not currently designated as or used for forestry resources. Therefore, the proposed project would not conflict with existing zoning for forest land or timberland, and **no impact** would occur.

T2-2
Cont.

d) ***No Impact:*** See response to Threshold 2(c). The proposed project would not result in the loss of forest land or conversion of forest land to non-forest use, and therefore **no impacts** would occur.

e) ***No Impact:*** See response to Threshold 2(c). The proposed project would not result in the direct or indirect conversion of agricultural uses or forest land, and **no impact** would occur.

## 2.3 Mitigation Measures

No mitigation measures required.

T2-2
Cont.

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T2-2
Cont.

3. AIR QUALITY

| **AIR QUALITY** – Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Conflict with or obstruct implementation of the applicable air quality plan? | ☐ | ☐ | ☒ | ☐ |
| b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard? | ☐ | ☐ | ☒ | ☐ |
| c) Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☒ | ☐☒ | ☐ |
| d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people? | ☐ | ☐ | ☒ | ☐ |

T2-2
Cont.

### 3.1 Setting

This section is based upon the Air Quality and Greenhouse Gas Technical Report and the Health Risk Assessment Memorandum prepared by Dudek (Appendix A-1 and A-2, respectively). Background and methodologies regarding the air quality analysis can be found in Appendix A-1 and A-2.

#### Criteria Air Pollutants

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include $O_3$, nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), $PM_{10}$, $PM_{2.5}$, and lead. In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants. A detailed discussion of each pollutant of concern are presented in Appendix A-1.

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the National Ambient Air Quality Standards (NAAQS) to the states. In California, the task of air quality management and regulation has been legislatively granted to the California Air Resources Board (CARB), with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. Air quality is considered "in attainment" if pollutant levels are continuously below the CAAQS and violate the standards no more than once each year. The CAAQS for $O_3$, CO, $SO_2$ (1-hour and 24-hour), $NO_2$, $PM_{10}$, and $PM_{2.5}$ and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. The NAAQS and CAAQS are presented in Table 3-1, Ambient Air Quality Standards.

**Table 3-1. Ambient Air Quality Standards**

| Pollutant | Averaging Time | California Standards[a] | National Standards[b] | |
|---|---|---|---|---|
| | | *Concentration*[e] | *Primary*[c,d] | *Secondary*[c,e] |
| $O_3$ | 1 hour | 0.09 ppm (180 µg/m³) | — | Same as primary standard[f] |
| | 8 hours | 0.070 ppm (137 µg/m³) | 0.070 ppm (137 µg/m³)[f] | |
| $NO_2$[g] | 1 hour | 0.18 ppm (339 µg/m³) | 0.100 ppm (188 µg/m³) | Same as primary standard |
| | Annual arithmetic mean | 0.030 ppm (57 µg/m³) | 0.053 ppm (100 µg/m³) | |
| CO | 1 hour | 20 ppm (23 mg/m³) | 35 ppm (40 mg/m³) | None |
| | 8 hours | 9.0 ppm (10 mg/m³) | 9 ppm (10 mg/m³) | |
| $SO_2$[h] | 1 hour | 0.25 ppm (655 µg/m³) | 0.075 ppm (196 µg/m³) | — |
| | 3 hours | — | — | 0.5 ppm (1,300 µg/m³) |
| | 24 hours | 0.04 ppm (105 µg/m³) | 0.14 ppm (for certain areas)[i] | — |
| | Annual | — | 0.030 ppm (for certain areas)[i] | — |
| $PM_{10}$[j] | 24 hours | 50 µg/m³ | 150 µg/m³ | Same as primary standard |
| | Annual arithmetic mean | 20 µg/m³ | — | |
| $PM_{2.5}$[g] | 24 hours | — | 35 µg/m³ | Same as primary standard |

T2-2 Cont.

**Table 3-1. Ambient Air Quality Standards**

| Pollutant | Averaging Time | California Standards[a] | National Standards[b] | |
|---|---|---|---|---|
| | | *Concentration*[f] | *Primary*[c,d] | *Secondary*[c,e] |
| | Annual arithmetic mean | 12 µg/m³ | 12.0 µg/m³ | 15.0 µg/m³ |
| Lead[h] | 30-day average | 1.5 µg/m³ | — | — |
| | Calendar quarter | — | 1.5 µg/m³ (for certain areas)[i] | Same as primary standard |
| | Rolling 3-month average | — | 0.15 µg/m³ | |
| Hydrogen sulfide | 1 hour | 0.03 ppm (42 µg/m³) | — | — |
| Vinyl chloride[i] | 24 hours | 0.01 ppm (26 µg/m³) | — | — |
| Sulfates | 24- hours | 25 µg/m³ | — | — |
| Visibility reducing particles | 8 hour (10:00 a.m. to 6:00 p.m. PST) | Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to the number of particles when the relative humidity is less than 70% | — | — |

**Source:** Appendix A-1.

**Notes:** $O_3$ = ozone; ppm = parts per million by volume; µg/m³ = micrograms per cubic meter; $NO_2$ = nitrogen dioxide; CO = carbon monoxide; mg/m³= milligrams per cubic meter; $SO_2$ = sulfur dioxide; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; PST = Pacific Standard Time.

a. California standards for $O_3$, CO, $SO_2$ (1-hour and 24-hour), $NO_2$, suspended particulate matter ($PM_{10}$, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

b. National standards (other than $O_3$, $NO_2$, $SO_2$, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The $O_3$ standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For $PM_{10}$, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

c. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

d. National primary standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

e. National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

f. On October 1, 2015, the national 8-hour $O_3$ primary and secondary standards were lowered from 0.075 to 0.070 ppm.

g. To attain the national 1-hour standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of ppm. To directly compare



T2-2 Cont.

the national 1-hour standard to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

- On June 2, 2010, a new 1-hour $SO_2$ standard was established, and the existing 24-hour and annual primary standards were revoked. To attain the national 1-hour standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 $SO_2$ national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
- On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour $PM_{10}$ standards (primary and secondary) of 150 $\mu g/m^3$ were also retained. The form of the annual primary and secondary standards is the annual mean averaged over 3 years.
- CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
- The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

### Sensitive Receptors

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. People most likely to be affected by air pollution include children, the elderly, athletes, and people with cardiovascular and chronic respiratory diseases. Facilities and structures where these air pollution-sensitive people live or spend considerable amounts of time are known as sensitive receptors. Land uses where air pollution-sensitive individuals are most likely to spend time include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities (sensitive sites or sensitive land uses). The South Coast Air Quality Management District (SCAQMD) identifies sensitive receptors as residences, schools, playgrounds, childcare centers, long-term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes (SCAQMD 1993). Residential land uses are located to the south of the project site. The closest off-site sensitive receptors to the project site include residences located approximately 25 meters (82 feet) south of the proposed project's limits of construction.

T2-2
Cont.

### Toxic Air Contaminants (TACs)

The state Air Toxics Program was established in 1983 under AB 1807 (Tanner). The California TAC list identifies more than 700 pollutants, of which carcinogenic and noncarcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. In accordance with AB 2728, the state list includes the (federal) HAPs. In 1987, the Legislature enacted the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) to address public concern over the release of TACs into the atmosphere. AB 2588 law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years. TAC emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment (HRA), and if specific thresholds are exceeded, the facility operator is required to communicate the results to the public in the form of notices and public meetings.

In 2000, CARB approved a comprehensive diesel risk reduction plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines (CARB 2000). The regulation is anticipated to result in an 80% decrease in statewide diesel health risk in 2020 compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-Ignition (Diesel) Engines and Equipment program. These regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment. There are several Airborne Toxic Control Measures that reduce diesel emissions, including In-Use Off-Road Diesel-Fueled Fleets (13 CCR 2449 et seq.) and In-Use On-Road Diesel-Fueled Vehicles (13 CCR 2025).

**Regional and Local Air Quality Conditions**

***Coachella Valley Portion of the Salton Sea Air Basin Attainment Designation***

Pursuant to the 1990 federal Clean Air Act amendments, the U.S. Environmental Protection Agency (EPA) classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutant, based on whether NAAQS have been achieved. Generally, if the recorded concentrations of a pollutant are lower than the standard, the area is classified as "attainment" for that pollutant. If an area exceeds the standard, the area is classified as "nonattainment" for that pollutant. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated as "unclassified" or "unclassifiable." The designation of "unclassifiable/attainment" means that the area meets the standard or is expected to be meet the standard despite a lack of monitoring data. Areas that achieve the standards after a nonattainment designation are re-designated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the standards. The California Clean Air Act, like its federal counterpart, called for the designation of areas as "attainment" or "nonattainment," but based on CAAQS rather than the NAAQS. Table 3-2, Coachella Valley Portions of the Salton Sea Air Basin Attainment Classification, depicts the current attainment status of the project site with respect to the NAAQS and CAAQS.

T2-2
Cont.

**Table 3-2. Coachella Valley Portion of the Salton Sea Air Basin Attainment Classification**

| Pollutant | Designation/Classification | |
|---|---|---|
| | *Federal Standards* | *State Standards* |
| Ozone ($O_3$) – 1 hour | No federal standard | **Nonattainment** |
| Ozone ($O_3$) – 8 hour | **Severe nonattainment** | **Nonattainment** |
| Nitrogen dioxide ($NO_2$) | Unclassifiable/attainment | Attainment |
| Carbon monoxide (CO) | Unclassifiable/attainment | Attainment |
| Sulfur dioxide ($SO_2$) | Unclassifiable/attainment | Attainment |
| Coarse particulate matter ($PM_{10}$) | **Serious nonattainment** | **Nonattainment** |
| Fine particulate matter ($PM_{2.5}$) | Unclassifiable/attainment | Attainment |
| Lead (Pb) | Unclassifiable/attainment | Attainment |
| Hydrogen sulfide | No federal standard | Unclassified |
| Sulfates | No federal standard | Attainment |

**Table 3-2. Coachella Valley Portion of the Salton Sea Air Basin Attainment Classification**

| Pollutant | Designation/Classification | |
|---|---|---|
| | *Federal Standards* | *State Standards* |
| Visibility-reducing particles | No federal standard | Unclassified |
| Vinyl chloride | No federal standard | No designation |

**Source:** Appendix A-1
**Notes: Bold text** = not in attainment; attainment = meets the standards; attainment/maintenance = achieve the standards after a nonattainment designation; nonattainment = does not meet the standards; unclassified or unclassifiable = insufficient data to classify; unclassifiable/attainment = meets the standard or is expected to be meet the standard despite a lack of monitoring data.

In summary, the Salton Sea Air Basin (SSAB), which is where the project site is located, is designated as a nonattainment area for federal and state $O_3$ standards and federal and state $PM_{10}$ standards. The SSAB is designated as an attainment area for federal and state CO, $PM_{2.5}$, $NO_2$, and $SO_2$ standards.

Despite the current nonattainment status, air quality within the SSAB has generally improved since the inception of air pollutant monitoring in 1976. This improvement is mainly due to lower-polluting on-road motor vehicles, more stringent regulation of industrial sources, and the implementation of emission reduction strategies by SCAQMD. This trend toward cleaner air has occurred in spite of continued population growth. Despite this growth, air quality has improved significantly over the years, primarily due to the impacts of the region's air quality control program. $PM_{10}$ levels have declined almost 50% since 1990, and $PM_{2.5}$ levels have also declined 50% since measurements began in 1999 (SCAQMD 2013). Similar improvements are observed with $O_3$, although the rate of $O_3$ decline has slowed in recent years.

T2-2
Cont.

### *Local Ambient Air Quality*

CARB, air districts, and other agencies monitor ambient air quality at approximately 250 air quality monitoring stations across the state. SCAQMD monitors local ambient air quality in the region of the project site. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The most recent background ambient air quality data from 2017 to 2019 are presented in Table 3-3, Local Ambient Air Quality Data. The Palm Springs monitoring station, located at 590 Racquet Club Road, Palm Springs, California, is the nearest air quality monitoring station to the project site, located approximately 12.6 miles northwest of the project site. The data collected at this station are considered representative of the air quality experienced in the proposed project vicinity. Air quality data for $O_3$, CO, $NO_2$, $PM_{10}$, and $PM_{2.5}$ from the Palm Springs monitoring station are provided in Table 3-3, Local Ambient Air Quality Data. Because $SO_2$ measurements are not monitored at the Palm Springs monitoring station, the measurements were taken from the Rubidoux monitoring station (1588 Mission Boulevard, Rubidoux, California, approximately 69 miles northwest of the project site). The number of days exceeding the ambient air quality standards is also shown in Table 3-3, Local Ambient Air Quality Data.

Table 3-3. Local Ambient Air Quality Data

| Monitoring Station | Unit | Averaging Time | Agency/ Method | Ambient Air Quality Standard | Measured Concentration by Year | | | Exceedances by Year | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2017 | 2018 | 2019 | 2017 | 2018 | 2019 |
| *Ozone ($O_3$)* | | | | | | | | | | |
| Palm Springs | ppm | Maximum 1-hour concentration | State | 0.09 | 0.113 | 0.111 | 0.100 | 18 | 11 | 5 |
| | ppm | Maximum 8-hour concentration | State | 0.070 | 0.097 | 0.099 | 0.084 | 63 | 58 | 34 |
| | | | Federal | 0.070 | 0.097 | 0.099 | 0.085 | 57 | 56 | 39 |
| *Nitrogen Dioxide ($NO_2$)* | | | | | | | | | | |
| Palm Springs | ppm | Maximum 1-hour concentration | State | 0.18 | 0.043 | 0.043 | 0.041 | 0 | 0 | 0 |
| | | | Federal | 0.100 | 0.043 | 0.043 | 0.041 | 0 | 0 | 0 |
| | ppm | Annual concentration | State | 0.030 | 0.007 | 0.007 | 0.00726 | 0 | 0 | 0 |
| | | | Federal | 0.053 | 0.0065 | 0.0068 | 0.00726 | 0 | 0 | 0 |
| *Carbon Monoxide (CO)* | | | | | | | | | | |
| Palm Springs | ppm | Maximum 1-hour concentration | State | 20 | 1 | 1.1 | 1.3 | 0 | 0 | 0 |
| | | | Federal | 35 | 1 | 1.1 | 1.3 | 0 | 0 | 0 |
| | ppm | Maximum 8-hour concentration | State | 9.0 | 0.4 | 0.8 | 0.7 | 0 | 0 | 0 |
| | | | Federal | 9 | 0.4 | 0.8 | 0.7 | 0 | 0 | 0 |
| *Sulfur Dioxide ($SO_2$)* | | | | | | | | | | |
| Rubidoux | ppm | Maximum 1-hour concentration | Federal | 0.075 | 0.0025 | 0.0017 | 0.0018 | 0 | 0 | 0 |
| | ppm | Maximum 24-hour concentration | Federal | 0.14 | 0.0012 | 0.0009 | 0.0009 | 0 | 0 | 0 |



T2-2 Cont.

**Table 3-3. Local Ambient Air Quality Data**

| Monitoring Station | Unit | Averaging Time | Agency/ Method | Ambient Air Quality Standard | Measured Concentration by Year | | | Exceedances by Year | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2017 | 2018 | 2019 | 2017 | 2018 | 2019 |
| | ppm | Annual concentration | Federal | 0.030 | 0.00029 | 0.00045 | 0.00042 | 0 | 0 | 0 |
| ***Coarse Particulate Matter ($PM_{10}$)[b]*** | | | | | | | | | | |
| Palm Springs | µg/m³ | Maximum 24-hour concentration | State | 50 | 60.5 | 37.4 | 51.8 | – | 0 | 6 |
| | | | Federal | 150 | 105.6 | 422.3 | 75.6 | 0 | 2 | 0 |
| | µg/m³ | Annual concentration | State | 20 | ND | 20.1 | 19.9 | – | – | – |
| ***Fine Particulate Matter ($PM_{2.5}$)[b]*** | | | | | | | | | | |
| Palm Springs | µg/m³ | Maximum 24-hour concentration | Federal | 35 | 14.5 | 30.2 | 15.5 | 0 | 0 | 0 |
| | µg/m³ | Annual concentration | State | 12 | 6.0 | 6.0 | 6.0 | – | – | – |
| | | | Federal | 12.0 | 6.0 | 6.0 | 6.0 | – | – | – |

**Sources:** Appendix A-1.
**Notes:** ppm = parts per million by volume; ND = insufficient data available to determine the value; – = not available; µg/m³ = micrograms per cubic meter. Data taken from CARB IADAM (CARB 2020) and EPA AirData (http://www.epa.gov/airdata/) represent the highest concentrations experienced over a given year.
Exceedances of federal and state standards are only shown for $O_3$ and particulate matter. Daily exceedances for particulate matter are estimated days because $PM_{10}$ and $PM_{2.5}$ are not monitored daily. All other criteria pollutants did not exceed federal or state standards during the years shown. There is no federal standard for 1-hour ozone, annual $PM_{10}$, or 24-hour $SO_2$, nor is there a state 24-hour standard for $PM_{2.5}$.
[a] Mean does not satisfy minimum data completeness criteria.
[b] Measurements of $PM_{10}$ and $PM_{2.5}$ are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.



T2-2 Cont.

**Air Quality Significance Criteria**

The SCAQMD has established Air Quality Significance Thresholds, as revised in March 2023, that set forth quantitative emission significance thresholds below which a project would not have a significant impact on ambient air quality under existing and cumulative conditions. The quantitative air quality analysis provided herein applies the SCAQMD thresholds identified in Table 3-4, SCAQMD Air Quality Significance Thresholds to determine the potential for the proposed project to result in a significant impact under CEQA.

**Table 3-4. SCAQMD Air Quality Significance Thresholds**

| Criteria Pollutants Mass Daily Thresholds | | |
|---|---|---|
| ***Pollutant*** | ***Construction (Pounds per Day)*** | ***Operation (Pounds per Day)*** |
| VOCs | 75 | 55 |
| $NO_x$ | 100 | 55 |
| CO | 550 | 550 |
| $SO_x$ | 150 | 150 |
| $PM_{10}$ | 150 | 150 |
| $PM_{2.5}$ | 55 | 55 |
| Lead[a] | 3 | 3 |
| ***TACs and Odor Thresholds*** | | |
| TACs[b] | Maximum incremental cancer risk ≥ 10 in 1 million<br>Chronic and acute hazard index ≥ 1.0 (project increment) | |
| Odor | Project creates an odor nuisance pursuant to SCAQMD Rule 402 | |
| GHG | 10,000 MT/yr $CO_{2eq}$ for industrial facilities | |
| ***Ambient Air Quality Standards for Criteria Pollutants[c]*** | | |
| $NO_2$ 1-hour average<br>$NO_2$ annual arithmetic mean | SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards:<br>0.18 ppm (state)<br>0.030 ppm (state) and 0.0534 ppm (federal) | |
| CO 1-hour average<br>CO 8-hour average | SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards:<br>20 ppm (state) and 35 ppm (federal)<br>9.0 ppm (state/federal) | |
| $PM_{10}$ 24-hour average<br>$PM_{10}$ annual average | 10.4 µg/m³ (construction)[d]<br>2.5 µg/m³ (operation)<br>1.0 µg/m³ | |
| $PM_{2.5}$ 24-hour average | 10.4 µg/m³ (construction)[d]<br>2.5 µg/m³ (operation) | |
| $SO_2$ 1-hour average<br>$SO_2$ 24-hour average | 0.25 ppm (state) & 0.075 ppm (federal – 99th percentile)<br>0.04 ppm (state) | |
| Sulfate 24-hour average | 25 µg/m3 (state) | |

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Cont.

**Table 3-4. SCAQMD Air Quality Significance Thresholds**

| Criteria Pollutants Mass Daily Thresholds | | |
|---|---|---|
| ***Pollutant*** | ***Construction (Pounds per Day)*** | ***Operation (Pounds per Day)*** |
| Lead 30-day average<br>Lead Rolling 3-month average | 1.5 µg/m3 (state)<br>0.15 µg/m3 (federal) | |

**Source:** Appendix A. (SCAQMD 2023).
**Notes:** SCAQMD = South Coast Air Quality Management District; VOC = volatile organic compounds; $NO_x$ = oxides of nitrogen; CO = carbon monoxide; $SO_x$ = sulfur oxides; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; TAC = toxic air contaminant; $NO_2$ = nitrogen dioxide; ppm = parts per million by volume; µg/$m^3$ = micrograms per cubic meter.
GHG emissions thresholds for industrial projects, as added in the March 2015 revision to the SCAQMD Air Quality Significance Thresholds, were not include included in Table 4 as they are addressed within the GHG emissions analysis and not the air quality study.
For Coachella Valley, the mass daily thresholds for operations are the same as the construction thresholds.
a. The phaseout of leaded gasoline started in 1976. Since gasoline no longer contains lead, the project is not anticipated to result in impacts related to lead; therefore, it is not discussed in this analysis.
b. TACs include carcinogens and noncarcinogens.
c. Ambient air quality standards for criteria pollutants are based on SCAQMD Rule 1303, Table A-2, unless otherwise stated.
d. Ambient air quality threshold are based on SCAQMD Rule 403.

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## 3.2 Discussion of Impacts

a) ***Less-than-Significant Impact:*** The project site is located in the City of Rancho Mirage within the South Coast Air Basin (SCAB), which includes the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, and all of Orange County, and is within the jurisdictional boundaries of the South Coast Air Quality Management District (SCAQMD).

The SCAQMD administers the SCAB's Air Quality Management Plan (AQMP), which is a comprehensive document outlining an air pollution control program for attaining the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS).

The 2022 AQMP was adopted on December 2, 2022, and was developed to address the 2015 national ozone standard. The 2022 AQMP provides the regional path towards improving air quality and meeting federal standards for air pollutants. The 2022 AQMP builds upon measures already in place from previous AQMPs. It also includes a variety of additional strategies such as regulation, accelerated deployment of available cleaner technologies (e.g., zero emissions technologies, when cost-effective and feasible, and low $NO_x$ technologies in other applications), best management practices, co-benefits from existing programs (e.g., climate and energy efficiency), incentives, and other Clean Air Act measures to achieve the 2015 federal ozone standard. The 2022 AQMP provides actions, strategies and steps needed to reduce air pollution emissions and meet ozone standards by 2037 (SCAQMD 2022).

The purpose of a consistency finding with regard to the AQMP is to determine if a project is consistent with the assumptions and objectives of the regional air quality plans, and if it would interfere with the region's ability to comply with federal and state air quality standards. The SCAQMD has established criteria for determining consistency with the currently applicable AQMP in Chapter 12, Sections 12.2 and 12.3 of the SCAQMD CEQA Air Quality Handbook. These criteria are as follows (SCAQMD 1993):

To address the first criterion, project-generated criteria air pollutant emissions have been estimated and analyzed for significance and are addressed under Section 3.3(b). Detailed results of this analysis are included in ~~Appendix A~~Appendix A-1. As presented in Section 3(b), construction and operation of the proposed project would not generate criteria air pollutant emissions that exceed the SCAQMD's thresholds, and it would therefore be consistent with Criterion No. 1.

The second criterion regarding the potential of the proposed project to exceed the assumptions in the AQMP or increments based on the year of project buildout and phase is primarily assessed by determining consistency between the proposed project's land use designations and its potential to generate population growth. In general, projects are considered consistent with, and not in conflict with or obstruct implementation of, the Air Quality Management Plan (AQMP) if the growth they produce in socioeconomic factors is consistent with the underlying regional plans used to develop the AQMP (SCAQMD 1993). The SCAQMD primarily uses demographic growth forecasts for various socioeconomic categories (e.g., population, housing, and employment by industry) developed by the Southern California Association of Governments (SCAG) for its 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (2020 RTP/SCS, also known as Connect SoCal) (SCAG 2020). SCAQMD uses this document, which is based on general plans for cities and counties in the SCAB, to develop the AQMP emissions inventory.[2] The SCAG RTP/SCS, and associated Regional Growth Forecast, are generally consistent with the local plans; therefore, the 2022 AQMP is generally consistent with local government plans. SCAG has developed Connect SoCal, the 2020-2045 RTP/SCS, which is a long-range visioning plan that balances future mobility and housing needs with economic, environmental and public health goals. Connect SoCal charts a path toward a more mobile, sustainable and prosperous region by making connections between transportation networks, between planning strategies and between the people whose collaboration can improve the quality of life for Southern Californians. Connect SoCal embodies a collective vision for the region's future and is developed with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange,

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[2] Information necessary to produce the emissions inventory for the SCAB is obtained from the SCAQMD and other governmental agencies, including the California Air Resources Board, Caltrans, and SCAG. Each of these agencies is responsible for collecting data (e.g., industry growth factors, socioeconomic projections, travel activity levels, emission factors, emission speciation profile, and emissions) and developing methodologies (e.g., model and demographic forecast improvements) required to generate a comprehensive emissions inventory. SCAG incorporates these data into its Travel Demand Model for estimating/projecting vehicle miles traveled and driving speeds. SCAG's socioeconomic and transportation activities projections in their *2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* are integrated in the 2022 AQMP (SCAQMD 2022).

Riverside, San Bernardino and Ventura. Connect SoCal was adopted by the regional council on September 3, 2020.

As discussed in Section 11, Land Use and Planning, of this Initial Study, the project site is currently zoned Resort Hotel (Rs-H) and Open Space: Mountain Reserve (MR) in the General Plan (City of Rancho Mirage 2017). The proposed hotel suites and villas are located on the Rs-H zoned property and therefore consistent with the General Plan designation. This designation allows for the development of hotels and destination resorts with limited, ancillary commercial uses, such as spas, recreational facilities, restaurants, lounges, and small retail shops that directly support the primary use. The Sky Mesa is located on the MR zoned portion of the project site which is assigned to public lands or property subject to conservation easements in the Santa Rosa Mountains. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation. Under existing conditions, the Sky Mesa portion of the project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning to encompass the Sky Mesa portion of the site, which is a privately owned property and not public land.

Per the description of allowable uses for Rs-H outlined above, the Sky Mesa Recreation Area would be consistent with Rs-H zone. With future approval and adoption of the zone change by City Council, the proposed project would not conflict with the City's General Plan with regard to allowable land uses.

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Cont.

As discussed in Section 14, Population and Housing, of this Initial Study, SCAG reported the City's population to be 18,739 persons as of 2018 (SCAG 2019a). In 2018 the City had a total of 14,492 housing units, and in 2017 the City had a total of 16,902 jobs (SCAG 2019a). By 2040, SCAG projected the City to have a population of 25,000 persons and 20,500 jobs (SCAG 2016). According to the City of Rancho Mirage's General Plan – Housing Element (City of Rancho Mirage 2022~~2017~~), the 2022~~14~~ - 202~~21~~ Regional Housing Needs Allocation (RHNA) determined that the City needed a total of 1,746~~25~~ housing units. The proposed project would construct 106 residential units. However, these residential units would operate similar to time-share properties and therefore future residents would not be in the proposed residential units year-round. Because the proposed residential units are not typical residential units that residents cannot occupy year-round, theses housing units do not count towards the RHNA housing unit determination. SCAG's Local Profile Report for the City of Rancho Mirage indicated that the City's average household size was two persons per dwelling unit as of 2018 (SCAG 2019a). Using these assumptions, implementation of the proposed project would have the potential to increase the City's population by 216 persons. This population increase would comply with SCAG's projected population increase for the City. Accordingly, the proposed project is consistent with the SCAG RTP/SCS forecasts used in the SCAQMD AQMP development.

In summary, based on the considerations presented for the two criteria, impacts relating to the proposed project's potential to conflict with or obstruct implementation of the applicable AQMP would be **less than significant**.

b) ***Less-than-Significant Impact:*** Air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development, and the SCAQMD develops and implements plans for future attainment of ambient air quality standards. Based on these considerations, project-level thresholds of significance for criteria pollutants are used in the determination of whether a project's individual emissions would have a cumulatively considerable contribution on air quality. If a project's emissions would exceed the SCAQMD significance thresholds, it would be considered to have a cumulatively considerable contribution. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant.

A quantitative analysis was conducted to determine whether proposed construction activities would result in a cumulatively considerable net increase in emissions of criteria air pollutants for which the South Coast Air Basin (SCAB) is designated as nonattainment under the NAAQS or CAAQS. Criteria air pollutants include ozone ($O_3$), nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), particulate matter with an aerodynamic diameter less than or equal to 10 microns ($PM_{10}$), particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and lead. Pollutants that are evaluated herein include volatile organic compounds (VOCs) and oxides of nitrogen ($NO_x$), which are important because they are precursors to $O_3$, as well as CO, sulfur oxides ($SO_x$), $PM_{10}$, and $PM_{2.5}$.

Regarding NAAQS and CAAQS attainment status,[3] the SCAB is designated as a nonattainment area for national and California $O_3$ and $PM_{2.5}$ standards. The SCAB is designated as a nonattainment area for California $PM_{10}$ standards; however, it is designated as an attainment area for national $PM_{10}$ standards. The SCAB nonattainment status of $O_3$, $PM_{10}$, and $PM_{2.5}$ standards is the result of cumulative emissions from various sources of air pollutants and their precursors within the SCAB, including motor vehicles, off-road equipment, and commercial and industrial facilities. The SCAB is designated as an attainment area for national and California $NO_2$, CO, and $SO_2$ standards. Although the SCAB has been designated as partial nonattainment (Los Angeles County) for the federal rolling 3-month average lead standard, it is designated attainment for the state lead standard.[4]

The proposed project would result in emissions of criteria air pollutants for which CARB and U.S. Environmental Protection Agency (EPA) have adopted ambient air quality standards (i.e., the NAAQS and CAAQS). Projects that emit these pollutants have the potential to cause, or contribute to, violations of these standards. The SCAQMD CEQA Air Quality Significance Thresholds (refer to Table 3-4), as revised in April 2019, set forth quantitative emission significance

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[3] An area is designated as in attainment when it is in compliance with the NAAQS and/or the CAAQS. The NAAQS and CAAQS are set by the Environmental Protection Agency (EPA) and California Air Resources Board (CARB), respectively, for the maximum level of a given air pollutant that can exist in the outdoor air without unacceptable effects on human health or the public welfare. Attainment = meets the standards; attainment/maintenance = achieve the standards after a nonattainment designation; nonattainment = does not meet the standards.

[4] Re-designation of the lead NAAQS designation to attainment for the Los Angeles County portion of the SCAB is expected based on current monitoring data. The phase out of leaded gasoline started in 1976. Since gasoline no longer contains lead, the project is not anticipated to result in impacts related to lead; therefore, it is not discussed in this analysis.

thresholds for criteria air pollutants, which, if exceeded, would indicate the potential for a project to contribute to violations of the NAAQS or CAAQS.

A proposed project would result in a substantial contribution to an existing air quality violation of the NAAQS or CAAQS for $O_3$, which is a nonattainment pollutant, if the proposed project's construction or operational emissions would exceed the SCAQMD VOC or $NO_x$ thresholds shown in Table 3-4. These emission-based thresholds for $O_3$ precursors are intended to serve as a surrogate for an "ozone significance threshold" (i.e., the potential for adverse $O_3$ impacts to occur) because $O_3$ itself is not emitted directly, and the effects of an individual project's emissions of $O_3$ precursors (VOCs and $NO_x$) on $O_3$ levels in ambient air cannot be determined through air quality models or other quantitative methods.

The following discussion quantitatively evaluates project-generated emissions and impacts that would result from implementation of the proposed project.

**Construction Emissions**

Construction of the proposed project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (e.g., off-road construction equipment, soil disturbance, VOC off-gassing from architectural coatings and asphalt pavement application) and off-site sources (e.g., vendor trucks, haul trucks, and worker vehicle trips). Specifically, entrained dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, resulting in $PM_{10}$ and $PM_{2.5}$ emissions. Internal combustion engines used by construction equipment, haul trucks, vendor trucks (i.e., delivery trucks), and worker vehicles would result in emissions of VOC, $NO_x$, CO, $PM_{10}$, and $PM_{2.5}$. Construction emissions can vary substantially from day to day depending on the level of activity; the specific type of operation; and, for dust, the prevailing weather conditions.

Application of architectural coatings, such as exterior paint and other finishes, and application of asphalt pavement would also produce VOC emissions. VOC off-gassing emissions result from evaporation of solvents contained in surface coatings such as in paints and primers used during construction of the facility. CalEEMod calculates the VOC evaporative emissions from application of surface coatings based on the VOC emissions factor, the building square footage, and the assumed fraction of surface area. No-VOC paint, defined as paint with a VOC content of 5 grams/liter or less is proposed for the project.

The proposed project would be required to comply with SCAQMD Rule 403 to control dust emissions generated during any dust-generating activities. Standard construction practices that would be employed to reduce fugitive dust emissions include watering of the active dust areas up to two times per day, depending on weather conditions. Rule 403.1 is a supplemental rule to Rule 403 and is applicable to man-made sources of fugitive dust in Coachella Valley. Rule 403.1 requires a Fugitive Dust Control Plan approved by South Coast AQMD or an authorized local government agency prior to initiating any construction/ earth-moving activity. These requirements are only applicable to construction projects with 5,000 or more square feet of surface area disturbance and therefore applicable to the proposed project.

Emissions from the construction phase of the proposed project were estimated using the California Emissions Estimator Model (CalEEMod) version 2020.04.0. For a conservative emission estimation, construction is assumed to begin in February 2023 and conclude in

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November 2024. In the event actual construction proceeds longer than this assumption, this analysis provides a conservative approach resulting in slightly higher daily emissions and annual emissions. While February 2023 has already passed, assuming the earliest start date and duration for construction represents the worst-case scenario for criteria air pollutant and GHG emissions because equipment and vehicle emission factors for later years would be slightly less due to more stringent standards for in-use off-road equipment and heavy-duty trucks, as well as fleet turnover replacing older equipment and vehicles in later years. Therefore, despite the fact that the construction schedule used for modeling has previously passed, given it represents the worst-case scenario, the analysis is still valid. Construction is expected to last 22 months. A detailed depiction of expected construction schedules—including information regarding phasing, equipment used during each phase, trucks, and worker vehicles—is provided in ~~Appendix A~~Appendix A-1. General construction equipment modeling assumptions are provided in Table 3-5, Construction Scenario Assumptions. The applicant provided project specific values for equipment mix for all construction phase. Equipment horsepower, and load factors were based on CalEEMod defaults. The project site is currently vacant and site preparation included clearing and grubbing has previously been performed and as such is not part of this analysis.

During the grading phase of construction, it is anticipated that approximately 6,920 cubic yards of material would be exported, and no material would be imported. For the analysis, it was generally assumed that heavy-duty construction equipment would be operating at the site 5 days per week. Detailed construction equipment modeling assumptions are provided in ~~Appendix A~~Appendix A-1.

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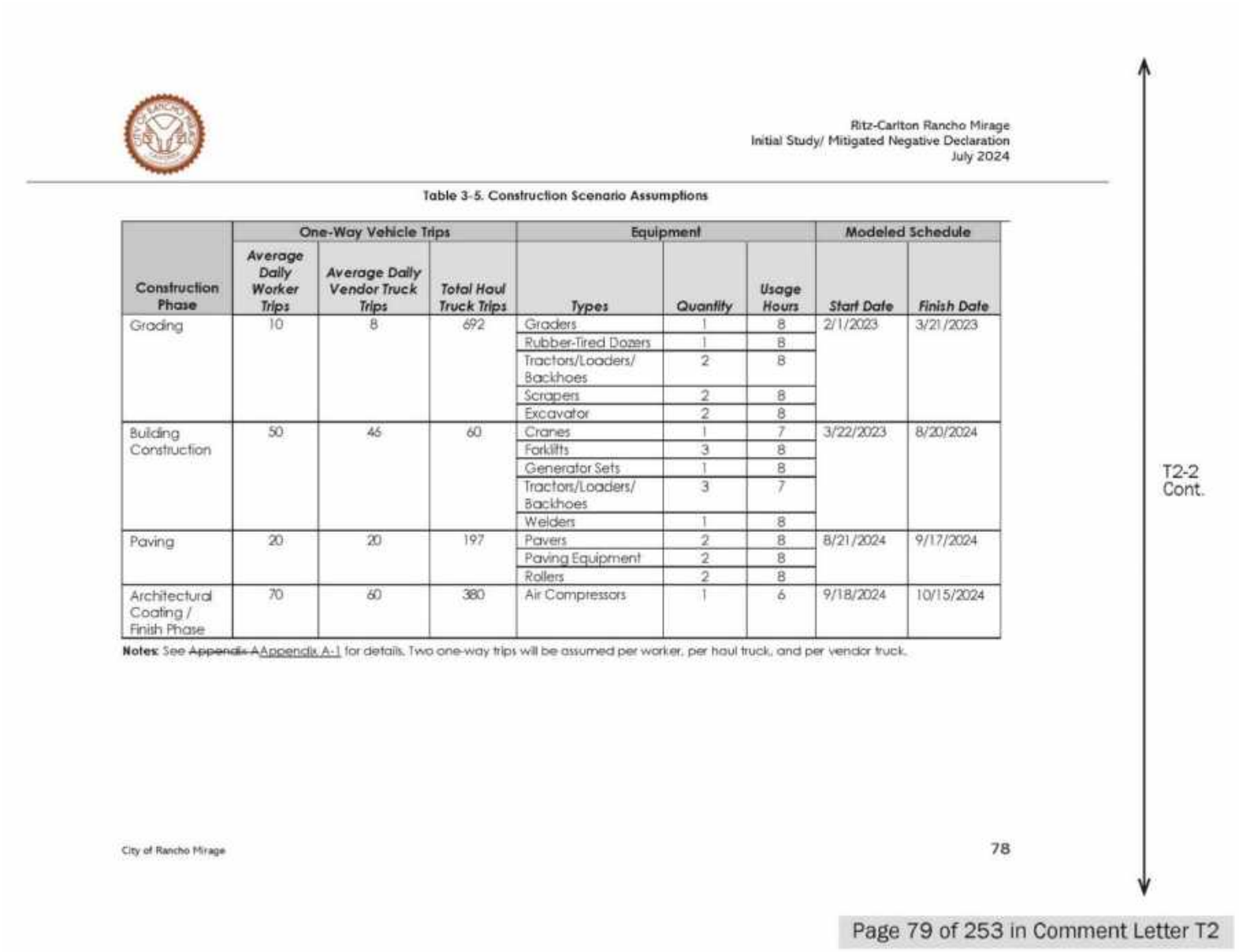



Table 3-5. Construction Scenario Assumptions

| Construction Phase | One-Way Vehicle Trips | | | Equipment | | | Modeled Schedule | |
|---|---|---|---|---|---|---|---|---|
| | Average Daily Worker Trips | Average Daily Vendor Truck Trips | Total Haul Truck Trips | Types | Quantity | Usage Hours | Start Date | Finish Date |
| Grading | 10 | 8 | 692 | Graders | 1 | 8 | 2/1/2023 | 3/21/2023 |
| | | | | Rubber-Tired Dozers | 1 | 8 | | |
| | | | | Tractors/Loaders/ Backhoes | 2 | 8 | | |
| | | | | Scrapers | 2 | 8 | | |
| | | | | Excavator | 2 | 8 | | |
| Building Construction | 50 | 46 | 60 | Cranes | 1 | 7 | 3/22/2023 | 8/20/2024 |
| | | | | Forklifts | 3 | 8 | | |
| | | | | Generator Sets | 1 | 8 | | |
| | | | | Tractors/Loaders/ Backhoes | 3 | 7 | | |
| | | | | Welders | 1 | 8 | | |
| Paving | 20 | 20 | 197 | Pavers | 2 | 8 | 8/21/2024 | 9/17/2024 |
| | | | | Paving Equipment | 2 | 8 | | |
| | | | | Rollers | 2 | 8 | | |
| Architectural Coating / Finish Phase | 70 | 60 | 380 | Air Compressors | 1 | 6 | 9/18/2024 | 10/15/2024 |

**Notes:** See ~~Appendix A~~Appendix A-1 for details. Two one-way trips will be assumed per worker, per haul truck, and per vendor truck.



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Table 3-6, Estimated Maximum Daily Construction Criteria Air Pollutant Emissions – Unmitigated, shows the estimated maximum daily construction emissions associated with the construction phase of the proposed project.

**Table 3-6. Estimated Maximum Daily Construction Emissions – Unmitigated**

| Year | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$[a] | $PM_{2.5}$[a] |
|---|---|---|---|---|---|---|
| | *pounds per day* | | | | | |
| 2023 | 3.39 | 35.53 | 28.73 | 0.07 | 4.10 | 2.05 |
| 2024 | 6.15 | 30.88 | 40.98 | 0.10 | 4.50 | 2.03 |
| **Maximum Daily Emissions** | **6.15** | **35.53** | **40.98** | **0.10** | **4.50** | **2.05** |
| *SCAQMD Threshold* | *75* | *100* | *550* | *150* | *150* | *55* |
| Noted Threshold exceeded? | No | No | No | No | No | No |

**Source:** SCAQMD 2019.
**Notes:** VOC = volatile organic compound; $NO_x$ = oxides of nitrogen; CO = carbon monoxide; $SO_x$ = sulfur oxides; $PM_{10}$ = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District.
See ~~Appendix A~~Appendix A-1 for detailed results.
[a] These estimates reflect control of fugitive dust required by SCAQMD Rule 403, specifically, watering of active site areas two times per day.

As shown in Table 3-6, Estimated Maximum Daily Construction Emissions – Unmitigated, daily construction emissions would not exceed the SCAQMD significance thresholds for VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, or $PM_{2.5}$ during project construction. Therefore, construction impacts of the proposed project would be **less than significant**, and no mitigation measures are required.

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### Operational Emissions

Operation of the proposed project would produce VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, and $PM_{2.5}$ emissions associated with vehicular traffic, area sources (consumer products, architectural coatings, landscaping equipment), energy sources (natural gas, appliances, and space and water heating), and stationary sources (emergency generator). CalEEMod was used to estimate daily emissions from these operational sources including modelling the emissions of a 1,200-horsepower (hp) diesel-fired emergency generator based on 1-hour per day and 50-hours per year of operation per SCAQMD Rule 1470, which limits emergency generators to 50-hours of use per year for maintenance and testing. CalEEMod default emission factors were used for the proposed generator, corresponding with the install dates.

On-road vehicular emissions associated with the proposed project operation were modeled using trip generation rates for the Ritz-Carlton residences, Sky Mesa Restaurant, and weekend special events at the proposed project venue space estimated by Urban Crossroads. The venue space was modeled in CalEEMod as an arena. Additional modeled land uses include the parking garage with elevator, swimming pools, driveway parking and paved roads. Emissions from energy sources also include natural gas combustion for appliances and space and water heating. CalEEMod defaults were also used for area sources (landscape maintenance equipment, consumer products, and architectural coatings for maintenance of buildings).

Table 3-7, Estimated Maximum Daily Operational Emissions, summarizes the maximum daily area, energy, mobile, and stationary (emergency generator) emissions of criteria pollutants that would be generated by the development of the proposed project and how emissions compare to the SCAQMD thresholds of significance. As shown, the increase in all criteria pollutants is below SCAQMD thresholds. The values shown are the maximum summer or winter daily emissions (i.e., foreseeable worst case) results from CalEEMod. Details of the emission calculations are provided in ~~Appendix A~~Appendix A-1.

**Table 3-7. Estimated Maximum Daily Operational Emissions**

| Emission Source | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| | *(pounds per day)* | | | | | |
| *Proposed Project* | | | | | | |
| Area | 3.23 | 0.10 | 8.80 | <0.01 | 0.05 | 0.05 |
| Energy | 0.13 | 1.12 | 0.77 | 0.01 | 0.09 | 0.09 |
| Mobile | 5.29 | 7.37 | 52.23 | 0.12 | 12.46 | 3.39 |
| Stationary | 1.97 | 8.81 | 5.02 | 0.01 | 0.29 | 0.30 |
| **Total** | **10.62** | **17.40** | **66.82** | **0.14** | **12.89** | **3.83** |
| *SCAQMD Threshold* | *75* | *100* | *550* | *150* | *150* | *55* |
| Threshold Exceeded? | No | No | No | No | No | No |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** VOC = volatile organic compound; NOx = oxides of nitrogen; CO = carbon monoxide; SOx = sulfur oxides; PM10 = coarse particulate matter; PM2.5 = fine particulate matter.
Area sources = consumer product use, architectural coatings, and landscape maintenance equipment. Energy sources = natural gas. Mobile sources = motor vehicles. Stationary sources = emergency generator.
See ~~Appendix A~~Appendix A-1 for detailed results. The values shown are the maximum summer or winter daily emissions results from CalEEMod.

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As shown in Table 3-7, Estimated Maximum Daily Operational Emissions, the increase in emissions associated with the operation of the proposed project would not exceed the SCAQMD thresholds for VOC, $NO_x$, CO, $SO_x$, $PM_{10}$, or $PM_{2.5}$.

As previously discussed, the SCAB has been designated as a federal nonattainment area for $O_3$ and $PM_{2.5}$, and a state nonattainment area for $O_3$, $PM_{10}$, and $PM_{2.5}$. Construction and operational activities of the proposed project would generate VOC and $NO_x$ emissions (precursors to $O_3$) and emissions of $PM_{10}$ and $PM_{2.5}$. However, as indicated in Tables 3-6 and 3-7, project-generated emissions would not exceed the SCAQMD emission-based significance thresholds for VOCs, $NO_x$, $PM_{10}$, or $PM_{2.5}$, and therefore the proposed project would not cause a cumulatively significant impact.

Cumulative localized impacts would potentially occur if a project were to occur concurrently with another off-site project. Schedules for potential future projects near the proposed project area are currently unknown; therefore, potential impacts associated with two or more simultaneous projects would be considered speculative.[5] However, future projects would be subject to CEQA and would require an air quality analysis and, where necessary, mitigation.

[5] The CEQA Guidelines state that if a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact (14 CCR 15145).

Criteria air pollutant emissions associated with construction activity of future projects would also be reduced through implementation of control measures required by the SCAQMD. Cumulative $PM_{10}$ and $PM_{2.5}$ emissions would be reduced because all future projects would be subject to SCAQMD Rule 403 (Fugitive Dust), which sets forth general and specific requirements for all sites in the SCAQMD. In addition, cumulative VOC emissions would be subject to SCAQMD Rule 1113 (Architectural Coatings).

Therefore, the proposed project would not result in a cumulatively considerable increase in emissions of nonattainment pollutants, and impacts would be **less than significant** during construction and operation. No mitigation is required.

c) ***Less-than-Significant Impact with Mmitigation Incorporated:*** Localized project impacts associated with construction criteria air pollutants emissions are assessed below and were determined to be less than significant. Sensitive receptors are discussed in detail in Section 3.1.2, Sensitive Receptors.

**Localized Significance Thresholds**

A localized significance threshold (LST) analysis was performed to evaluate localized air quality impacts to sensitive receptors in the immediate vicinity of the project site as a result of project activities. The impacts were analyzed using methods consistent with those in the SCAQMD's Final Localized Significance Threshold Methodology (2008). The project site is located within Source-Receptor Area 30 (Coachella Valley).

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The greatest on-site daily emissions of NOx, CO, $PM_{10}$, and $PM_{2.5}$ generated during construction occurred during the grading period of the project construction. Based on the construction schedule, it was assumed that one grader, one rubber tired dozer, two scrappers and two crawler tractors (CalEEMod category: tractor/loader/backhoes) would be used based on the applicant provided construction equipment schedule. CalEEMod default values assume that during an 8-hour day, graders, rubber tired dozers and crawler tractors can each disturb a maximum of 0.5 acres and scrapers each disturb one acre. This results in a total of four acres disturbed per day from the equipment. The SCAQMD LST values for 2 acres and 5 acres within Source–Receptor Area 30, with a nearby receptor distance of 25 meters (82 feet), were used to interpolate values for the proposed project's 4-acre disturbance per day.

Project construction activities would result in temporary sources of on-site criteria air pollutant emissions associated with construction equipment exhaust and dust-generating activities. According to the Final Localized Significance Threshold Methodology, "off-site mobile emissions from the proposed project should not be included in the emissions compared to the LSTs" (SCAQMD 2008). Trucks and worker trips associated with the proposed project are not expected to cause substantial air quality impacts to sensitive receptors along off-site roadways since emissions would be relatively brief in nature and would cease once the vehicles pass through the main streets. Therefore, off-site emissions from trucks and worker vehicle trips are not included in the LST analysis. For the on-site portions of operation of trucks and worker vehicles, trips were limited to 1,000 feet (assumed on-site distance). The maximum daily on-site construction emissions generated during construction of the proposed project is presented in Table 3-8, Construction Localized Significance Thresholds Analysis, and compared to the SCAQMD localized significance

criteria for Source-Receptor Area 30 to determine whether project-generated on-site construction emissions would result in potential LST impacts.

**Table 3-8. Construction Localized Significance Thresholds Analysis**

| Year | $NO_2$ | CO | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|
| | *pounds per day (on site)* | | | |
| 2023 | 34.76 | 28.30 | 3.77 | 1.95 |
| 2024 | 26.29 | 34.86 | 1.20 | 1.09 |
| **Maximum Daily On Site Emissions** | **34.76** | **34.86** | **3.77** | **1.95** |
| *SCAQMD LST Criteria* | *266.33* | *1,961.00* | *11.67* | *7.00* |
| **Threshold Exceeded?** | No | No | No | No |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** $NO_2$ = nitrogen dioxide; CO = carbon monoxide; $PM_{10}$ = particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District; LST = localized significance threshold.
See ~~Appendix A~~Appendix A-1 for detailed results.
Localized significance thresholds are shown for a 4-acre project site and a distance of 25 meters (82 feet) to the nearest sensitive receptor.

As shown in Table 3-8, proposed construction activities would not generate emissions in excess of site-specific LSTs. Furthermore, in compliance with Program AQ 1.1C, described in the City's General Plan, the City will coordinate with developers and encourage the phasing and staging of development to assure the lowest construction related pollutant emission levels practical and impose mitigation measures, including the use of water trucks and temporary irrigation systems, as well as other measures that will effectively limit fugitive dust emissions resulting from construction or other site disturbance. Therefore, localized project construction impacts would be **less than significant**. No mitigation is required.

***CO Hotspots***

Traffic-congested roadways and intersections have the potential to generate localized high levels of CO. Localized areas where ambient concentrations exceed federal and/or state standards for CO are termed CO "hotspots." CO transport is extremely limited and disperses rapidly with distance from the source. Under certain extreme meteorological conditions, however, CO concentrations near a congested roadway or intersection may reach unhealthy levels, affecting sensitive receptors. Typically, high CO concentrations are associated with severely congested intersections operating at an unacceptable level of service (LOS) (LOS E or worse is unacceptable). Projects contributing to adverse traffic impacts may result in the formation of a CO hotspot. Additional analysis of CO hotspot impacts would be conducted if a project would result in a significant impact or contribute to an adverse traffic impact at a signalized intersection that would potentially subject sensitive receptors to CO hotspots.

The Code of Federal Regulations (CFR) Procedures for Determining Localized CO, $PM_{10}$, and $PM_{2.5}$ Concentrations (hot-spot analysis), states that "CO, $PM_{10}$, and $PM_{2.5}$ hot-spot analyses are not required to consider construction-related activities, which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established 'Guideline' methods. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site"

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(40 CFR 93.123(c)(5)). While project construction would involve on-road vehicle trips from trucks and workers during construction, construction activities are considered temporary. As a result, the proposed construction activities would not require a project-level construction hotspot analysis.

Projects contributing to adverse traffic impacts may result in the formation of CO hotspots. To verify that the project would not cause or contribute to a violation of the CO standard, a screening evaluation of the potential for CO hotspots was conducted. The traffic impact study for the proposed project, which is included in this Initial Study as Appendix F, and Section 17 of this Initial Study evaluated whether there would be a decrease in the level of service (LOS) (i.e., increased congestion) at the intersections affected by the proposed project. The potential for CO hotspots was evaluated based on the results of the traffic impact study. The California Department of Transportation Institute of Transportation Studies Transportation Project-Level Carbon Monoxide Protocol (CO Protocol; Caltrans 2010) was followed for this analysis. CO hotspots are typically evaluated when (1) the LOS of an intersection decreases to LOS E or worse; (2) signalization and/or channelization is added to an intersection; and (3) sensitive receptors such as residences, schools, and hospitals are located in the vicinity of the affected intersection or roadway segment.

The proposed project's traffic impact study evaluated 3 intersections including Frank Sinatra Drive and Dwy. 1, Frank Sinatra Drive and Dwy. 2, and Hwy 111 and Frank Sinatra Drive. As determined by the traffic impact study, the addition of the proposed project traffic to study area intersections did not result in deficient intersection LOS operations. Therefore, further analysis is not required. Accordingly, the proposed project would not generate traffic that would contribute to potential adverse traffic impacts that may result in the formation of CO hotspots. In addition, due to continued improvement in vehicular emissions at a rate faster than the rate of vehicle growth and/or congestion, the potential for CO hotspots in the SCAB is steadily decreasing. Based on these considerations, the proposed project would result in a **less-than-significant impact** to air quality with regard to potential CO hotspots. No mitigation is required.

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***Toxic Air Contaminants***

Toxic air contaminants (TACs) are defined as substances that may cause or contribute to an increase in deaths or in serious illness, or that may pose a present or potential hazard to human health. As discussed under the LST analysis, the nearest sensitive receptors are single family residential dwellings adjacent and south of the project site.

Health effects from carcinogenic air toxics are usually described in terms of cancer risk. The SCAQMD recommends an incremental cancer risk threshold of 10 in 1 million. "Incremental cancer risk" is the net increased likelihood that a person continuously exposed to concentrations of TACs resulting from a project over a 9-, 30-, and 70-year exposure period will contract cancer based on the use of standard Office of Environmental Health Hazard Assessment (OEHHA) risk-assessment methodology (OEHHA 2015). In addition, some TACs have non-carcinogenic effects. The SCAQMD recommends a Hazard Index of 1 or more for acute (short-term) and chronic (long-term) non-carcinogenic effects.[6]

[6] Non-cancer adverse health risks are measured against a hazard index, which is defined as the ratio of the predicted incremental exposure concentrations of the various non-carcinogens from the project to published reference exposure levels that can cause adverse health effects.

TACs that would potentially be emitted during construction activities associated with development of the proposed project would be diesel particulate matter.

Diesel particulate matter (DPM) emissions would be emitted from heavy equipment operations and heavy-duty trucks. Heavy-duty construction equipment is subject to a California Air Resources Board (CARB) Airborne Toxics Control Measure for in-use diesel construction equipment to reduce diesel particulate emissions. As described for the LST analysis, $PM_{10}$ (representative of diesel particulate matter) exposure would be minimal. According to the OEHHA, health risk assessments (which determine the exposure of sensitive receptors to toxic emissions) should be based on a 30-year exposure period for the maximally exposed individual resident. A Health Risk Assessment has been prepared for the project, and the construction HRA for the project demonstrate that the construction DPM emissions would result in a potential maximum cancer risk at the MEIR above the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold in the absence of mitigation. Because the potential maximum cancer risk at the MEIR exceeds the applicable CEQA threshold, project construction would result in a potentially significant impact if mitigation were not imposed.

Mitigation Measure **MM-AQ-1** has been set forth to reduce DPM and any associated cancer risk. **MM-AQ-1** states that, prior to the commencement of construction activities, the applicant shall require its construction contractor to demonstrate that all 75-horsepower or greater diesel-powered equipment is powered with CARB-certified Tier 4 engines. ~~1.However, such assessments should also be limited to the period/duration of activities associated with the proposed project. The duration of the proposed construction activities would constitute a small percentage of the total 30-year exposure period. The construction period for the proposed project would be approximately 22 months, after which construction-related TAC emissions would cease. Due to this relatively short period of exposure and minimal particulate emissions on site, TACs generated during construction would not be expected to result in concentrations causing significant health risks.~~

Following completion of on-site construction activities, the proposed project would not involve routine operational activities that would generate TAC emissions other than intermittent maintenance and testing of the natural diesel-fired emergency generator, which would be limited to 50 hours per year. SCAQMD Rule 1470 limits operation of emergency generators to 50 hours per year for maintenance and testing). Due to this relatively short period of exposure, small engine size of the emergency generator (1,200 hp), and minimal on-site particulate emissions from other sources, TACs generated during operation would not result in concentrations causing significant health risks as demonstrated through SCAQMD' Risk Assessment Tool for Rule 1401 and 212, (Version 8.1). The Risk Assessment Tool, a spreadsheet program, was used to perform a screening level evaluation of the cancer and non-cancer health effects of the emergency generator emissions pursuant to Rule 1401, see ~~Appendix A~~Appendix A-1 for program results. As shown in ~~Appendix A~~Appendix A-1, the emergency generator passes Tier II Maximum Individual Cancer Risk (MICR).

For the reasons described above, the proposed project would not result in substantial TAC exposure to sensitive receptors in the vicinity of the proposed project with the inclusion of MM-AQ-1, and impacts would be **less than significant with mitigation**. ~~No mitigation is required.~~

***Health Effects of Criteria Air Pollutants***

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Cont.

Construction of the proposed project would generate criteria air pollutant emissions; however, the project would not exceed the SCAQMD mass-emission thresholds.

Health effects associated with $O_3$ include respiratory symptoms, worsening of lung disease leading to premature death, and damage to lung tissue. VOCs and $NO_x$ are precursors to $O_3$, for which the SCAB is designated as nonattainment with respect to the NAAQS and CAAQS. Thus, existing $O_3$ levels in the SCAB are at unhealthy levels during certain periods. Because the project would not involve construction or operational activities that would result project is not anticipated to substantially contribute to regional $O_3$ concentrations and the associated health impacts.

Exposure to $NO_2$ and $NO_x$ can irritate the lungs, cause bronchitis and pneumonia, lower resistance to respiratory infections, and enhance allergic responses. Project construction and operation would not exceed the SCAQMD $NO_x$ threshold, and existing ambient $NO_2$ concentrations are below the NAAQS and CAAQS. Thus, implementation of the project is not expected to exceed the $NO_2$ standards or contribute to associated health effects.

Health effects associated with CO include chest pain in patients with heart disease, headache, light-headedness, and reduced mental alertness. CO tends to be a localized impact associated with congested intersections. CO hotspots were discussed previously as a less than significant impact. Thus, the proposed project's CO emissions would not contribute to the health effects associated with this pollutant.

Particulate matter exposure has been linked to a variety of problems, including premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing (EPA 2016). The SCAB is designated as nonattainment for $PM_{10}$ under the CAAQS and nonattainment for $PM_{2.5}$ under the NAAQS and CAAQS. Implementation of the proposed project would not generate emissions of $PM_{10}$ or $PM_{2.5}$ that would exceed the SCAQMD's thresholds. Accordingly, the proposed project's $PM_{10}$ and $PM_{2.5}$ emissions are not expected to cause any increase in related regional health effects for these pollutants. Impacts would be less than significant. No mitigation is required.

In summary, the proposed project would not result in a potentially significant contribution to regional concentrations of non-attainment pollutants and would not result in a significant contribution to the adverse health effects associated with those pollutants with implementation of MM-AQ-1. Impacts would be **less than significant with mitigation**.

~~No mitigation is required.~~

***Less-than-Significant Impact:*** The occurrence and severity of potential odor impacts depend on numerous factors. The nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receiving location each contribute to the intensity of the impact. Although offensive odors seldom cause physical harm, they can be annoying, cause distress among the public, and generate citizen complaints.

During construction of the proposed project, exhaust from equipment may produce discernible odors typical of most construction sites. Potential odors produced during construction would be

T2-2
Cont.

attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment. However, such odors would disperse rapidly from the project site and generally occur at magnitudes that would not affect substantial numbers of people. Accordingly, impacts associated with odors during construction would be less than significant.

SCAQMD provides a list of land uses associated with odor concerns, which include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding (SCAQMD 1993). The proposed project includes operation of hotel facilities, and restaurant spaces, which are not anticipated to generate odors and does not result in operation of the types of land uses listed in SCAQMD's screening criteria. For the reasons described above, proposed project construction and operation would result in an odor impact that would be **less than significant**. No mitigation is required.

## 3.3 Mitigation Measures

~~No mitigation is required.~~

**MM-AQ-1 Construction Equipment – Use of Tier 4 Engines**

Prior to the commencement of construction activities for the project, the applicant shall require its construction contractor to use California Air Resources Board (CARB)-certified Tier 4 engines for all diesel-powered equipment pieces that are 75 horsepower or greater throughout all phases of construction.

In the event of changed circumstances (e.g., changes in the availability of specific types of construction equipment), the applicant may submit a request to the City to apply an equivalent method of achieving project-generated construction emissions that fall below the numeric cancer risk standards established by the South Coast Air Quality Management District (SCAQMD). Documentation using industry-standard emission estimation methodologies shall be furnished to the City demonstrating that estimated project-generated construction emissions would not exceed the applicable SCAQMD cancer risk threshold with the alternate construction method(s). If the documentation demonstrates that project-generated construction emissions will remain below the applicable SCAQMD cancer risk threshold, then the City may approve the alternate construction method(s), at the City's discretion.

Required construction equipment fleet and methodologies approved by the City shall be included in the contract specifications for the applicant's construction contractor.

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Cont.

4. BIOLOGICAL RESOURCES

| **BIOLOGICAL RESOURCES** -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ☒ | ☐ | ☐ |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service? | ☐ | ☒ | ☐ | ☐ |
| c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ☐ | ☐ | ☐ | ☒ |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☐ | ☒ | ☐ | ☐ |
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☒ | ☐ | ☐ |

T2-2
Cont.

| BIOLOGICAL RESOURCES -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☒ | ☐ | ☐ |

## 4.1 Setting

This section is partially based upon the Biological Resources Report prepared by Dudek for the Sky Mesa Recreation portion of the project (Appendix B). As the Residences portion of the project site has been analyzed for potential impacts to biological resources as part of the 2006 EIR and subsequently cleared and graded, it is only briefly discussed in this section.

The Residences Area of the project site is vacant and has been extensively graded. The surrounding areas to the east and north are also disturbed, developed urban areas. Surveys conducted in 2006 for the Residences portion indicated that sensitive species known to occur in the area include the Coachella desert snail, chuckwalla, and the Peninsular bighorn sheep (City of Rancho Mirage 2006). The project site is located within the Coachella Valley's Multiple Species Habitat Conservation Plan (CVMSHCP) area of interest, and the Santa Rosa and San Jacinto Mountains Conservation Area is located just south of the project's proposed Sky Mesa Recreational Area (CVMSHCP 2016).

The Sky Mesa Recreation Area is vacant, with a portion that has been partially graded and the remaining areas containing native desert vegetation along steep slopes. A total of six vegetation communities and land cover types occur within the study area based on general physiognomy and species composition. Four vegetation communities were mapped and include brittle bush scrub, creosote bush – brittle bush scrub, fountain grass swards, and tamarisk thickets, and two land covers (disturbed habitat and urban/developed) occur within the Sky Mesa Recreation Area.

## 4.2 Discussion of Impacts

a) ***Less-than-Significant Impact with Mitigation Incorporated.*** The proposed Residence Area of the project site has been extensively graded and is not likely support any candidate, sensitive, or special status species (City of Rancho Mirage 2006).

No federally or state-listed plant species have a potential to occur within the proposed Sky Mesa Recreation Area of the project site. There are no special-status plant species with a moderate or high potential to occur. No listed or non-listed special-status wildlife species were incidentally observed during the June 2021 biological survey. One federally and state-listed species has a moderate potential to occur within the study area: Peninsular bighorn sheep. Peninsular bighorn sheep is covered under the CVMSHCP. One non-listed species has a moderate potential to occur within the project site: red diamondback rattlesnake. Red diamondback rattlesnake is not covered under the CVMSHCP.



T2-2 Cont.

**Birds**

One non-listed special-status species, burrowing owl, has a low potential to occur within the flatter portions of the proposed Sky Mesa Recreation Area site. This species is covered by the CVMSHCP; therefore, the project would implement **MM-BIO-1**, which would ensure consistency with the CVMSHCP, by including payment of the CVMSHCP development mitigation fee. Additionally, **MM-BIO-2** would be implemented and would require adherence to the Land Use Adjacency Guidelines to ensure there would be no significant impacts to this special-status wildlife species. This species is also protected under the Migratory Bird Treaty Act and California Fish and Game Code Section 3516, which protect nesting birds. Additionally, project construction could result in direct and indirect impacts to nesting birds, including the loss of nests, eggs, and fledglings if ground-disturbing activities occur during the nesting season (generally February 15 through August 31). Construction activities during this time may result in reduced reproductive success and may violate the federal Migratory Bird Treaty Act and California Fish and Game Code. If construction (including any ground-disturbing activities) occurs during the nesting season, a nesting bird survey must be conducted by a qualified biologist prior to grading activities and impacts to nests must be avoided. As such, implementation of **MM-BIO-3**, which requires a pre-construction nesting bird survey, and **MM-BIO-4**, which requires a pre-construction survey for burrowing owls, would be required to reduce potential impacts to less than significant.

**Reptiles**

One special-status reptile has a moderate potential to occur within the Sky Mesa Recreation Area of the project site: red diamondback rattlesnake. This species is not covered by the CVMSHCP, and impacts could be potentially significant. Due to the amount of adjacent and nearby habitat, loss of fragmented habitat is considered less than significant. However, direct impacts could occur through crushing of individuals during grading, entombment of burrowing species, and removal of habitat.

Most reptile species exhibit a "flight" response to disturbance, resulting in temporary displacement, or if disturbance is constant, permanent displacement. The project contains suitable habitat (i.e., desert scrub and rocky conditions) that may be impacted as a result of project implementation; however, suitable habitat will be available adjacent to the affected region, and individuals would be expected to move away from construction activities. Entombment of individuals would be avoided through implementation of **MM-BIO-5**, which would include covering open trenches. With implementation of **MM-BIO-5**, direct impacts to the few individuals that may be harmed by construction activities would be less than significant.

Potential indirect impacts to red diamondback rattlesnake would be limited to short-term impacts from construction activities and could result from fugitive dust that can degrade habitat and result in health implications for wildlife species; noise and vibration that can stress wildlife species or cause them to leave an area of otherwise suitable habitat; increased human presence, which can also disrupt daily activities of wildlife and cause them to leave an area; and release of chemical pollutants, such as from oil leaks from construction vehicles and machinery. Therefore, indirect impacts to red diamondback rattlesnake could be significant. However, although red diamondback rattlesnake is not covered under the CVMSHCP, the project would be required to implement **MM-BIO-2**, which includes construction best management practices and compliance; therefore, with implementation of **MM-BIO-2**, impacts would be less than significant.

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One federally and state-listed threatened species, desert tortoise, has additional requirements under the CVMSHCP. This species is covered by the CVMSHCP; however, according to the USWFS CVMSHCP amended permit (TE-104601-1), permit term and condition no. 45 states for projects located outside of the proposed conservation areas within the 50,272 acres of naturally occurring desert tortoise habitat anticipated to be impacted, the Permittee shall either (1) notify the USFWS 45 days prior to the issuance of a grading permit to allow for the potential salvage of adult tortoises within this notification time period or (2) condition such projects to conduct desert tortoise clearance surveys per the USFWS's protocol. The project site overlaps modeled desert tortoise habitat; however, since it was determined to not support suitable habitat for desert tortoise as discussed in Appendix B, it is recommended that the Permittee notify the USFWS 45 days prior to issuance of a grading permit. Therefore, with implementation of **MM-BIO-1**, **MM-BIO-2**, and **MM-BIO-6**, which requires adherence to the USFWS CVMSHCP amended permit term and condition no. 45, potential impacts to desert tortoise would be reduced to less than significant.

**Mammals**

One federally and state-listed species has a moderate potential to occur within the project area: Peninsular bighorn sheep; however, this species is covered under the CVMSHCP. However, with implementation of **MM-BIO-1** and **MM-BIO-2**, impacts would be reduced to a less than significant level.

As such, impacts to candidate, sensitive, or special status species would be **less than significant with mitigation incorporated**.

T2-2 Cont.

b) ***Less-than-Significant Impact with Mitigation Incorporated.*** The Residences Area of the project site is vacant and heavily graded. There are no riparian habitat or other sensitive natural communities identified in local or regional plans. The Sky Mesa Recreation Area portion of the project site does not contain any riparian habitat or other sensitive natural community identified by CDFW or USFWS. However, the Sky Mesa Recreation Area portion of the project site includes Sonoran creosote bush scrub, which is a naturally occurring community covered under the CVMSHCP. To comply with the CVMSHCP, development fees will be required to mitigate habitat loss. Therefore, **MM-BIO-1** and **MM-BIO-2** would be implemented to ensure that there would be no significant impacts to special-status vegetation communities. Therefore, impacts would be **less than significant with mitigation incorporated**.

c) ***No Impact.*** The Residences Area portion of the project site has been mass graded and contains no watercourses or natural drainage features. Additionally, the Sky Mesa Recreation Area portion of the project site does not contain any jurisdictional waters. Therefore, **no impacts** associated with federally protected wetlands would occur.

d) ***Less-than-Significant Impact with Mitigation Incorporated.*** According to the City's General Plan – Conservation and Open Space element, the City offers limited opportunities for the preservation of wildlife migration corridors due to the pattern of Santa Rosa Mountains and the Whitewater River (City of Rancho Mirage 2017). The project site does not function as a wildlife corridor and does not support any wildlife nursery sites. Therefore, no impacts associated with wildlife corridors would occur.

Additionally, the project would comply with the federal Migratory Bird Treaty Act with implementation mitigation measure **MM-BIO-3**, which requires pre-construction nesting bird surveys and would reduce potentially significant impacts. Therefore, impacts would be **less than significant with mitigation incorporated**.

e) ***Less-than-Significant Impact with Mitigation Incorporated.*** The City of Rancho Mirage General Plan contains several elements that were established to address potential impacts to biological resources. Specifically, the Conservation and Open Space Element establishes biological resources goals, policies, and programs that address potential impacts to candidate, sensitive, or special-status species and their habitats. The City is a Permittee of the CVMSHCP; therefore, compliance with the CVMSHCP provides Permittees with take authorization for covered species for all covered activities, which includes development outside of CVMSHCP conservation areas. Therefore, the project is a covered activity, and compliance with the CVMSHCP would provide take authorization for covered species. Therefore, with implementation of **MM-BIO-1** through **MM-BIO-6**, the project would not conflict with the City of Rancho Mirage General Plan.

In addition, a General Plan Zoning Map Amendment from Mountain Reserve (MR) to Resort Hotel (Rs-H) is concurrently proposed for the proposed Sky Mesa Recreation Area. Under existing conditions, the proposed Sky Mesa project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning of the existing Ritz Carlton to encompass the Sky Mesa site. As noted, the MR zone was adopted for the purposed of avoiding or mitigating possible impacts on sensitive biological resources and with implementation and adherence of the above mitigation measures, the project would not conflict with the City of Rancho Mirage General Plan. Therefore, impacts would be **less than significant with mitigation incorporated**.

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f) ***Less-than-Significant Impact with Mitigation Incorporated.*** The City of Rancho Mirage is a participant of the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) (CVMSHCP n.d.a.). The CVMSHCP aims to conserve over 240,000 acres of open space and protect 27 plant and animal species, and the City of Rancho Mirage represents approximately 15,760 acres of the area covered by the plan (CVMSHCP n.d.a.; City of Rancho Mirage 2017). As stated in Appendix B, the project site is within the CVMSHCP area. The project site is not located within any CVMSHCP conservation areas; however, it is adjacent to the Santa Rosa and San Jacinto Mountains Conservation Area. A fee is required for all projects located within the CVMSHCP plan area. As such, the proposed project would adhere to **MM-BIO-1** and would pay applicable fees as described in Threshold 4(e). Therefore, impacts to the CVMSHCP are expected to be **less than significant with Mitigation Incorporated**.

## 4.3 Mitigation Measures

**MM-BIO-1** **Coachella Valley Multiple Species Habitat Conservation Plan Fee Payment.** As a signatory to the Coachella Valley Multiple Species Habitat Conservation Plan, the City of Rancho Mirage shall require a local development mitigation fee prior to the issuance of building permits for the proposed use on the project site at the rates applicable at the time of payment of the fee as set forth in the most recent fee schedule. The project

applicant shall be required to provide documentation to the City of Rancho Mirage confirming the payment of the local development mitigation fee.

MM-BIO-2 **Coachella Valley Multiple Species Habitat Conservation Plan Land Use Adjacency Guidelines.** The project applicant shall implement the following Land Use Adjacency Guidelines (Coachella Valley Multiple Species Habitat Conservation Plan [CVMSHCP], Section 4.5) to minimize and avoid indirect effects from development adjacent to conservation areas (i.e., Santa Rosa and San Jacinto Mountains Conservation Area), where applicable:

- **Drainage**: Proposed Development adjacent to or within a Conservation Area shall incorporate plans to ensure that the quantity and quality of runoff discharged to the adjacent Conservation Area is not altered in an adverse way when compared with existing conditions. Stormwater systems shall be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials, or other elements that might degrade or harm biological resources or ecosystem processes within the adjacent Conservation Area.
- **Toxics**: Land uses proposed adjacent to or within a Conservation Area that use chemicals or generate bioproducts such as manure that are potentially toxic or may adversely affect wildlife and plant species, habitat, or water quality shall incorporate measures to ensure that application of such chemicals does not result in any discharge to the adjacent Conservation Area.
- **Lighting**: For proposed development adjacent to or within a Conservation Area, lighting shall be shielded and directed toward the developed area. Landscape shielding or other appropriate methods shall be incorporated in project designs to minimize the effects of lighting adjacent to or within the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual. The City of Rancho Mirage and project proponent shall avoid or limit the use of artificial lighting at night during the hours of dawn and dusk when many wildlife species are most active and ensure use of LED lighting with a correlated color temperature of 3,000 Kelvins or less.
- **Noise**: Proposed development adjacent to or within a Conservation Area that generates noise in excess of 75 A-weighted decibels sound equivalent level hourly shall incorporate setbacks, berms, or walls, as appropriate, to minimize the effects of noise on the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual.
- **Invasives**: Invasive, non-native plant species shall not be incorporated in the landscape for land uses adjacent to or within a Conservation Area. Landscape treatments within or adjacent to a Conservation Area shall incorporate native plant materials to the maximum extent feasible; recommended native species are listed in Table 4-112 [CVMSHCP, Section 4.5.5]. The plants listed in Table 4-113 shall not be used within or adjacent to a Conservation Area. This list may be amended from time to time through a Minor Amendment with Wildlife Agency Concurrence.

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- **Barriers**: Land uses adjacent to or within a Conservation Area shall incorporate barriers in individual project designs to minimize unauthorized public access, domestic animal predation, illegal trespass, or dumping in a Conservation Area. Such barriers may include native landscaping, rocks/boulders, fencing, walls and/or signage. Existing fencing separating the Big Horn Reserve Land (i.e., adjacent Conservation Area) from the proposed Project site was previously installed to prevent Peninsular bighorn sheep from entering and grazing on the Ritz Carlton Hotel property (i.e., Project). The project shall maintain a fence, or functionally equivalent structure throughout the lifetime of the project. Therefore, necessary barriers (i.e., fencing) is currently in place.
- **Grading/Land Development**: Manufactured slopes associated with site development shall not extend into adjacent land in a Conservation Area.

**MM-BIO-3** **Nesting Birds.** To maintain compliance with the Migratory Bird Treaty Act and California Fish and Game Code, regardless of the time of year, if ground-disturbing and/or vegetation clearance activities are scheduled to occur ~~during the avian nesting season (typically February 15 through August 31),~~ a qualified biologist shall conduct a pre-construction nesting bird survey within the project impact footprint and a 500-foot buffer where legal access is granted around the disturbance footprint. Surveys shall be conducted within 3 days prior to initiation of ground-disturbing activities.

If an active nest is detected during the nesting bird survey, avoidance buffers shall be implemented as determined by a qualified biologist (typically 300 feet for passerines and 500 feet for raptors and special-status species). The buffer shall be of a distance to ensure avoidance of adverse effects to the nesting bird by accounting for topography, ambient conditions, species, nest location, and activity type. All nests shall be monitored as determined by the qualified biologist until nestlings have fledged and dispersed or it is confirmed that the nest has been unsuccessful or abandoned. The qualified biologist shall halt all construction activities within proximity to an active nest if it is determined that the activities are harassing the nest and may result in nest abandonment or take. The qualified biologist shall also have the authority to require implementation of avoidance measures related to noise, vibration, or light pollution if indirect impacts are resulting in harassment of the nest.

T2-2
Cont.

**MM-BIO-4** **Burrowing Owl.** Pre-construction surveys for burrowing owls shall be completed within areas of suitable habitat (i.e., flatter portions of the site) in accordance with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012), with the first survey no less than 14 days prior to initiation of project-related activities, and the second within 24 hours of project-related activities. If ~~an~~ burrowing owls or active burrowing owl burrows ~~is/are~~ detected, the qualified biologist shall coordinate with CDFW and prepare a Burrowing Owl Plan that shall be submitted to CDFW and USFWS for review and approval prior to commencing Project activities. The Burrowing Owl Plan shall describe proposed avoidance, minimization, mitigation, and monitoring actions. The Burrowing Owl Plan shall include the number and location of occupied burrow sites, acres of burrowing owl habitat that will be impacted, details of site monitoring, and details on proposed buffers and other avoidance measures if avoidance is proposed. If impacts to occupied burrowing owl

habitat or burrow cannot be avoided, the Burrowing Owl Plan shall also describe minimization and relocation actions that will be implemented. Proposed implementation of burrow exclusion and closure should only be considered as a last resort, after all other options have been evaluated as exclusion is not in itself an avoidance, minimization, or mitigation method and has the possibility to result in take. If impacts to occupied burrows cannot be avoided, information shall be provided regarding adjacent or nearby suitable habitat available to owls along with proposed relocation actions. The Project proponent shall implement the Burrowing Owl Plan following CDFW and USFWS review and approval ~~within 500 feet of the impact footprint, avoidance and minimization measures shall be implemented in accordance with the *Staff Report on Burrowing Owl Mitigation* guidelines or agreed upon by the California Department of Fish and Wildlife, including implementation of a non-disturbance buffer and monitoring of the nest to ensure activities are not adversely affecting the nest. If the project will occur within this zone, then work must occur outside the nesting season, or until it can be shown that the birds have finished nesting, at which point passive relocation may occur.~~

**MM-BIO-5** **General Avoidance and Minimization Measures.** The following avoidance and minimization measures shall be implemented during project construction activities:

- To prevent inadvertent entrapment of special-status wildlife during construction, all excavated steep-walled holes or trenches more than 2 feet deep shall be covered with plywood or similar materials at the close of each working day, or be provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped wildlife. If trapped animals are observed, escape ramps or structures shall be installed immediately to allow escape.

**MM-BIO-6** **Desert Tortoise.** Because the project is located outside of a Conservation Area but within the 50,272 acres of naturally occurring desert tortoise habitat anticipated to be impacted under the Coachella Valley Multiple Species Habitat Conservation Plan, the project applicant shall notify the U.S. Fish and Wildlife Service 45 days prior to the issuance of a grading permit to allow for the potential salvage of adult tortoises within this notification time period.

T2-2
Cont.

5. CULTURAL RESOURCES

| CULTURAL RESOURCES -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5? | ☐ | ☐ | ☒ | ☐ |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | ☐ | ☒ | ☐ | ☐ |
| c) Disturb any human remains, including those interred outside of dedicated cemeteries? | ☐ | ☒ | ☐ | ☐ |

### 5.1 Setting

The Residences at Ritz Carlton portion of the project site was previously included in a cultural resources survey completed by CRM TECH in 2006. The 2006 study consisted of a historical/archaeological resources records search, historical background research, Native American consultation, and a systematic field survey. The records search determined that a segment of a prehistoric trail has been recorded in 1979 as extending into the 39-acre area covered in the 2006 study, however a field survey revealed that the segment of the original trail was no longer extant. The 2006 study concluded that there were no cultural resources in the area surveyed, and no evidence of archaeological deposits were found during the monitoring program.

An updated historical/archaeological resources survey was prepared by CRM TECH on September of 2019. The 2019 study includes a survey and analysis on both the proposed Residences at Ritz Carlton and Sky Mesa Recreational Area, updates to the 2006 records search and the historical background research, further consultation with Native American representatives, and a systematic field survey at intensive and reconnaissance levels as appropriate. This section is based upon the 2019 Historical/Archaeological Resources Survey (cultural report) prepared by CRM TECH in September 2019. The cultural report is included as Appendix C to this Initial Study. Background and methodologies regarding the cultural resources analysis are found in Appendix C.

### 5.2 Discussion of Impacts

a) ***Less-than-Significant Impact***: CRM TECH historian Terri Jacquemain, M.A., conducted historical background research for the project site. Historic maps indicated that there were no man-made features present in or near the project site. The earliest man-made features known to be present within the proposed project boundaries were a leveled pad on a hilltop in the eastern portion of the proposed project area and part of a winding dirt road leading to it, both of which were first



T2-2 Cont.

noted in 1972.

The western portion of the project site received limited disturbance until 2006 – 2007, when the ground surface in the entire area was cleared and graded. As a result, all preexisting features in that portion of the project site, including a segment of dirt road, where obliterated. To date, however, the property has remained undeveloped and was used only for materials stockpiling, construction staging, and occasional parking. In the eastern portion, the dirt road and the leveled pad observed in 1972 have been the only notable man-made features known to exist.

CRM TECH archaeologist Nina Gallardo, B.A., conducted a records search update on June of 2019 at the Eastern Information Center (EIC), University of California – Riverside. No historic resources were found within the project site. The records search results indicated that 69 historic-period sites have been recorded within a 1-mile radius of the project site. However, the proposed project is not anticipated to impact these resources because of their distance from the site.

CRM TECH archaeologist Daniel Ballester, M.S., conducted a field survey on June and September of 2019. The field survey encountered no potential "historical resources" within or adjacent to the proposed project boundaries.

No historical resources exist within or adjacent to the proposed project area. Therefore, the proposed project will not cause a substantial adverse change to any known historical resources and impacts would be **less than significant**.

T2-2
Cont.

b) ***Less-than-Significant Impact with Mitigation Incorporated:*** CRM TECH archaeologist Nina Gallardo, B.A., conducted a records search update on June of 2019 at the Eastern Information Center (EIC), University of California – Riverside. The results indicated that no further studies have occurred in the current proposed project area since 2007, and no cultural resources have been identified on the property. A total of 38 cultural resources studies were found within a 1-mile radius of the project site.

CRM TECH archaeologist Daniel Ballester, M.S., conducted a field survey at the western and eastern portions of the proposed project area. In the western portion of the site, grading activities leveled the majority of the land and removed bedrock outcrops. In the eastern portion, the slopes beyond the leveled hilltops retain the area's native landscape with some bedrock boulders. The badly exfoliating boulders suggest that it would be poor material for use as milling surfaces by the Native people or for preservation of any evidence of such use.

On June 21 and September 6, 2019, CRM TECH archaeologist Daniel Ballester, M.S., carried out the field survey of the western and eastern portions of the proposed project area, respectively. In light of the extensive past ground disturbance, the western portion was surveyed at a reconnaissance level by walking a series of parallel north-south transects at 25-meter (approximately 75-foot) intervals. The less disturbed eastern portion, including the area not covered by the 2006-2007 studies, was surveyed at an intensive level by walking along parallel north-south transects at five-meter (approximately 15-foot) intervals in the relatively level areas and along the contours on the slopes.

Using these methods, the ground surface of the entire proposed project area was systematically and carefully examined for any evidence of human activities dating to the prehistoric or historic period (i.e., 50 years or older). Ground visibility was excellent (90%-100%)

due to the lack of any substantial vegetation growth in either portion of the proposed project area (Appendix C). In addition, bedrock outcrops on the slopes in the eastern portion of the property were closely inspected for any evidence of prehistoric milling features.

The field survey encountered no potential archaeological resources within or adjacent to the proposed project boundaries. In the western portion, past grading of the ground surface has leveled most of the land and removed bedrock outcrops, resulting in a sizable rock pile near the center of the property. In the eastern portion, the slopes beyond the leveled hilltop and the **dirt access road retain more of the area's native landscape, with some bedrock boulders** exposed naturally on the surface. The badly exfoliating boulders, however, presents a poor material for use as milling surfaces by the Native people or for preservation of any evidence of such use.

Although no archaeological resources were identified as a result of the literature review and field survey, there is a possibility of encountering previously undiscovered archaeological resources at subsurface levels during ground-disturbing activities associated with the proposed project. Implementation of **MM-CUL-1** would ensure that potential impacts to archaeological resources during construction activities to a less than significant level. Therefore, the proposed project would not result in a substantial adverse change in the significance of an archaeological resource and impacts would be **less than significant**.

c) ***Less-than-Significant Impact with Mitigation Incorporated.*** As stated previously, there are no previously recorded cultural resources on the project site. Given the fact that the site has been previously developed, ground-disturbing activities associated with construction of the proposed project are unlikely to uncover previously unknown archaeological resources. In the unlikely event human remains are discovered on-site during construction ground-disturbing activities, implementation of **MM-CUL-2** would set forth proper procedure. Therefore, impacts would be **less than significant**.

T2-2
Cont.

## 5.3 Mitigation Measures

**MM-CUL-1** Prior to the issuance of a grading permit or ground disturbing activities, the Applicant/Owner shall enter into a Tribal Cultural Resources Agreement and Repatriation Agreement- with Agua Caliente Band of Cahuilla Indians (ACBCI). The purpose of the agreement shall be to formalize protocols and procedures between the Applicant/Owner and the Tribe for protection, treatment, and repatriation of Native American human remains, funerary objects, cultural and /or religious, ceremonial items, and other Tribal Cultural resources. A Qualified Archaeologist, meeting the Secretary of **the Interior's Professional Qualification Standards,** and an ACBCI Native American monitor shall be present for initial ground-disturbing activities associated with the current proposed project that may occur in areas of native soil. Both the Qualified Archaeologist and ACBCI Native American monitors may temporally halt or divert ground disturbing activities if potential archaeological or Tribal Cultural resources are discovered during construction activities, stop ground-disturbing activities in order to assess any discoveries in the field. ~~in the event unanticipated discoveries are made. The monitors may stop ground-disturbing activities in order to assess any discoveries in the field.~~

Summary of Comments on Agua Caliente Comment Letter MND Markup.pdf

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Number: 1 Author: xmadrigal Subject: Highlight Date: 8/19/2024 4:47:48 PM
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1 In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 50 feet of the find shall immediately stop until a Qualified Archaeologist can evaluate the significance of the find and determine whether additional study is warranted. Depending on the significance of the find under the California Environmental Quality Act (CEQA) and the CEQA Guidelines (California Public Resources Code, Section 21082; 14 CCR 15064.5(f)), the Qualified Archaeologist may exhaust the data potential of the find through the process of field level recordation and then allow work to continue. 2 Isolates are clearly non-significant archaeological resources (as determined by the Qualified archaeologist, in consultation with the Native American monitor) will be minimally documented in the field. 3 If the discovery proves significant under CEQA, additional work such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted. 4 In the event that curation of archaeological resources is required by the superseding regulatory agency, curation shall be conducted by an approved local facility in Riverside County, and curation shall be guided by California State Historical Resources Commission's Guidelines for the Curation of Archaeological Collections. The Applicant/Owner shall be responsible for all curation costs and provide the City written documentation from the curation facility that the curation have been completed.

5 ~~Native American~~Tribal Cultural resources (i.e., prehistoric or ethnohistoric-period artifacts, food remains, or features associated with Native Americans) are exposed during proposed project-related ground disturbance, the actions identified by the Agua Caliente Band of Cahuilla Indians in a preexisting agreement for unanticipated discovery shall be followed ~~contacted~~. 6 This agreement may require ~~group shall be asked to provide the services of a trained~~ the Native American Monitor to return to site ~~consultant~~ to monitor ground-disturbing work in the area containing the Native American cultural resources. This monitoring would occur on an as-needed basis and would be intended to ensure that Native American concerns are taken into account during the construction process.

T2-2 Cont.

**MM-CUL-2** If human remains are discovered during construction of the proposed project, California Health and Safety Code, Section 7050.5, states that further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner shall be contacted. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within two working days of notification of discovery, the appropriate treatment and disposition of the human remains.

Pursuant to California Public Resources Code, Section 5097.98, if the remains are thought to be Native American, the County Coroner will notify the Native American Heritage Commission, which will then notify the most likely descendent. At this time, the person who discovered the remains will contact the City of Rancho Mirage (City) so that they may work with the most likely descendent on the respectful treatment and disposition of the remains. Further provisions of the California Public Resources Code, Section 5097.98, are to be followed as applicable.

## Page: 98

Number: 1 Author: xmadrigal Subject: Highlight Date: 8/19/2024 4:47:42 PM
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Number: 2 Author: xmadrigal Subject: Highlight Date: 8/19/2024 4:47:35 PM
This sentence is not necessary and does not make sense - it should be removed.

Number: 3 Author: xmadrigal Subject: Highlight Date: 8/19/2024 4:47:53 PM
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Number: 4 Author: xmadrigal Subject: Highlight Date: 8/19/2024 4:47:28 PM
In what scenario would curation be required by the superseding regulatory agency? And who is that, the city? This section should be removed or changed. Historics may be curated but Tribal cultural Resources should be given to the Tribe.

Number: 5 Author: xmadrigal Subject: Highlight Date: 8/19/2024 4:50:16 PM
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Number: 6 Author: xmadrigal Subject: Highlight Date: 8/19/2024 4:52:11 PM
The rest of this should be deleted. This predicts what will be written in the preexisitng agreement - which can not be known at this time.

6. ENERGY

| ENERGY -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation? | ☐ | ☐ | ☒ | ☐ |
| b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency? | ☐ | ☐ | ☒ | ☐ |

### 6.1 Setting

This section is based upon the Air Quality and Greenhouse Gas Technical Report prepared by Dudek (~~Appendix A~~Appendix A-1). Background and methodologies regarding the air quality analysis can be found in ~~Appendix A~~Appendix A-1. The short-term construction and long-term operation of the proposed project will require the consumption of energy resources in several forms at the site and within the proposed project area. An overview of the forms of energy consumption for construction and operation is provided as follows:

T2-2 Cont.

**Construction Energy Consumption**

1. Temporary Direct Electrical Service: Energy Provided by Southern California Edison (SCE).
   - Construction site lighting;
   - Computer equipment; and
   - Temporary construction trailer operation
2. Fossil Fuels (Diesel and Gasoline)
   - Off-road construction equipment
   - Diesel-fired electric generators
   - Worker vehicles, vender trucks, and haul trucks

**Operational Energy Consumption**

1. Direct electrical Service: Energy Provided by SCE
   - Building heating, ventilation, and air-conditioning (HVAC)
   - Lighting: interior and exterior facilities

- Swimming pool and water feature operation
- Computer, audio and video equipment; and
- Appliances
- Supply, distribution, and treatment of water, wastewater; and solid waste

2. Fossil Fuels (Diesel, Gasoline, and Natural Gas)
   - Residential vehicles and hotel guests and visitors;
   - Employees, delivery, and customers; and
   - Restaurant and venue employees, delivery, and customers
   - Emergency Generator Maintenance

## 6.2 Discussion of Impacts

a) ***Less-than-Significant Impact.***

**Construction**

***Electricity***

Temporary electric power for as-necessary lightning and electronic equipment (such as computers inside temporary construction trailers) would be provided by SCE. The electricity used for such activities would be temporary and would be substantially less than that required for proposed project operation and would have a negligible contribution to the proposed project's overall energy consumption.

T2-2 Cont.

***Natural Gas***

Natural gas is not anticipated to be required during construction of the proposed project. Fuels used for construction would primarily consist of diesel and gasoline, which are discussed below under the "petroleum" subsection. Any minor amounts of natural gas that may be consumed as a result of proposed project construction would be substantially less than required for operation and would have a negligible contribution to the proposed project's overall energy consumption.

***Petroleum***

Heavy-duty construction equipment associated with construction activities would rely on diesel fuel, as would vendor trucks involved in delivery of materials to the project site. Construction workers would travel to and from the project site throughout the duration of construction. It is assumed in this analysis that construction workers would travel in gasoline-powered light-duty vehicles.

Heavy-duty construction equipment of various types would be used during each phase of proposed project construction. ~~Appendix A~~Appendix A-1 lists the assumed equipment

usage for each phase of construction. The proposed project's construction equipment is estimated to operate a total combined 35,520 hours.

Fuel consumption from construction equipment was estimated by converting the total carbon dioxide ($CO_2$) emissions from each construction phase to gallons using the conversion factors for $CO_2$ to gallons of gasoline or diesel.

The conversion factor for gasoline is 8.78 kilograms per metric ton $CO_2$ per gallon, and the conversion factor for diesel is 10.21 kilograms per metric ton $CO_2$ per gallon (The Climate Registry 2018). The estimated diesel fuel usage from construction equipment is shown in Table 6-1, Construction Equipment Diesel Demand (Off-Road Equipment).

**Table 6-1. Construction Equipment Diesel Demand (Off-Road Equipment)**

| Phase | Pieces of Equipment | Equipment $CO_2$ (MT) | kg/$CO_2$/ Gallon | Gallons |
|---|---|---|---|---|
| Grading | 8 | 296.87 | 10.21 | 29,076.51 |
| Building Construction | 9 | 431.43 | 10.21 | 42,255.92 |
| Paving | 6 | 22.21 | 10.21 | 2,175.05 |
| Architectural Coating / Finish Phase | 1 | 8.57 | 10.21 | 838.92 |
| | | | **Total** | **74,346.41** |

**Sources:** ~~Appendix A~~Appendix A-1
**Notes:** $CO_2$ = carbon dioxide; MT = metric ton; kg = kilogram.

Fuel consumption from worker, vendor, and haul truck trips are estimated by converting the total $CO_2$ emissions from each construction phase to gallons using the conversion factors for $CO_2$ to gallons of gasoline or diesel. Worker vehicles are assumed to be gasoline and vendor/hauling vehicles are assumed to be diesel. Calculations for total worker, vendor, and haul truck fuel consumption are provided in Tables 6-2 (Construction worker Gasoline Demand), 6-3 (Construction Vendor Diesel Demand), and 6-4 (Construction Haul Truck Diesel Demand).

**Table 6-2. Construction Worker Gasoline Demand**

| Phase | Trips | Vehicle MT $CO_2$ | kg/$CO_2$/ Gallon | Gallons |
|---|---|---|---|---|
| Grading | 1,100 | 6.10 | 8.78 | 694.27 |
| Building Construction | 18,550 | 102.25 | 8.78 | 11,645.77 |
| Paving | 440 | 2.40 | 8.78 | 273.80 |
| Architectural Coating | 4,690 | 25.62 | 8.78 | 2,918.46 |
| | | | **Total** | **15,532.31** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** MT = metric ton; $CO_2$ = carbon dioxide; kg = kilogram.



T2-2 Cont.

T2-2
Cont.

**Table 6-3. Construction Vendor Diesel Demand**

| Phase | Trips | Vehicle MT $CO_2$ | kg/$CO_2$/Gallon | Gallons |
|---|---|---|---|---|
| Trenching | 854 | 8.58 | 10.21 | 840.44 |
| Building Construction | 17,020 | 167.34 | 10.21 | 16,390.01 |
| Paving | 440 | 4.30 | 10.21 | 421.39 |
| Architectural Coating | 4,020 | 39.31 | 10.21 | 3,849.97 |
| | | | **Total** | **21,501.81** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** MT = metric ton; $CO_2$ = carbon dioxide; kg = kilogram.

**Table 6-4. Construction Haul Truck Diesel Demand**

| Phase | Trips | Vehicle MT $CO_2$ | kg/$CO_2$/Gallon | Gallons |
|---|---|---|---|---|
| Trenching | 692 | 19.30 | 10.21 | 1,890.58 |
| Building Construction | 60 | 1.66 | 10.21 | 162.18 |
| Paving | 197 | 5.41 | 10.21 | 529.44 |
| Architectural Coating | 380 | 10.43 | 10.21 | 1,021.25 |
| | | | **Total** | **3,603.46** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** MT = metric ton; $CO_2$ = carbon dioxide; kg = kilogram.

In summary, construction of the proposed project is conservatively anticipated to consume 15,532 gallons of gasoline and 99,452 gallons of diesel over the construction period. By comparison, California's consumption of petroleum is approximately 78.6 million gallons per day. Based on these assumptions, approximately 44.62 billion gallons of petroleum would be consumed in California over the course of the construction period. Therefore, impacts associated during construction would be **less than significant**.

**Operation**

***Electricity***

Operation of the proposed project upon buildout would require electricity for multiple purposes, including cooling, lighting, appliances, and various equipment. Additionally, the supply, conveyance, treatment, and distribution of water and wastewater would indirectly result in electricity usage. Electricity consumption associated with proposed project operation is based on CalEEMod outputs presented in ~~Appendix A~~Appendix A-1.

CalEEMod default values for energy consumption for each land use were applied for the proposed project analysis. The proposed project involves residential and non-residential uses. The energy use from non-residential land uses is calculated in CalEEMod based on the



T2-2 Cont.

California Commercial End-Use Survey database. For parking lots, CalEEMod includes calculation of energy use from lighting, ventilation and elevators in parking lots and structures and is based on the type of parking lot selected by the user, see CalEEMod outputs presented in ~~Appendix A~~Appendix A-1 for all land uses and energy calculations. Energy use in buildings (both natural gas and electricity) is divided by the program into end use categories subject to California Building Standards Code (Title 24) requirements (end uses associated with the building envelope, such as the HVAC system, water heating system, and integrated lighting) and those not subject to California Building Standards Code requirements (such as appliances, electronics, and miscellaneous "plug-in" uses).

Title 24 of the California Code of Regulations serves to enhance and regulate California's building standards. The most recent amendments to Title 24, Part 6, referred to as the 2022 Title 24 updated became effective on January 1, 2023. Although not accounted for in the modeling, energy consumption of the proposed project would also be reduced through installation of high-efficiency lighting. According to these estimations, the proposed project would consume approximately 1,847,175 kilowatt-hours (kWh) per year during operation. For comparison, in 2017 the total residential and non-residential electricity demand in Riverside County was 16,256,705,411 kWh (CEC 2018). Additionally, the Ritz Carlton Rancho Mirage is enrolled in the Rancho Mirage Energy Authority (RMEA). The RMEA supplies power to homes and businesses with an opportunity to opt up to 100% renewable energy. For these reasons, the electricity consumption of the proposed project would not be considered inefficient or wasteful, and impacts would be **less than significant**.

T2-2
Cont.

***Natural Gas***

Project operation would require natural gas for various purposes, including water heating, natural gas appliances and emergency generator routing testing. Natural gas consumption associated with operation is based on the CalEEMod outputs (see ~~Appendix A~~Appendix A-1). According to these estimations, the proposed project would consume approximately 4,273447 kilo-British Thermal Units (kBtu) per year. For comparison, in 2017 the non-residential natural gas use within Riverside County was 39,844,317,732 kBtu (CEC 2018). Since the proposed project would comply with applicable Title 24 requirements the proposed project would not be considered inefficient or wasteful, and impacts would be **less than significant**.

***Petroleum***

During operations, the majority of fuel consumption resulting from the proposed project would involve the use of motor vehicles traveling to and from the project site including hotel guests, retail and restaurant customers, deliveries, and employees. In addition, fuel would be consumed for the maintenance operations of the emergency.

Petroleum fuel consumption associated with motor vehicles traveling to and from the project site is a function of the vehicle miles traveled (VMT) as a result of proposed project operation. The annual VMT attributable to the proposed project is expected to be 4,593,965 (~~Appendix A~~Appendix A-1). Similar to the construction worker and vendor trips, fuel consumption from operational trips is estimated by converting the total $CO_2$ emissions from operation of the proposed project to gallons using the conversion factors for $CO_2$ to gallons of gasoline or diesel. Based on the annual fleet mix provided in CalEEMod, 89% of the fleet range

from light-duty to medium-duty vehicles and motorcycles are assumed to run on gasoline. The remaining 11% of vehicles represent medium-heavy duty to heavy-duty vehicles and buses and are assumed to run on diesel.

Calculations for annual mobile source fuel consumption are provided in Tables 6-5, Annual Mobile Source Gasoline Demand, and 6-6, Annual Diesel Demand.

**Table 6-5. Annual Mobile Source Gasoline Demand**

| | Vehicle MT $CO_2$ | kg/$CO_2$/Gallon | Gallons |
|---|---|---|---|
| Operation | 1362.85 | 8.78 | 155,222.11 |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** MT = metric ton; $CO_2$ = carbon dioxide; kg = kilogram.

**Table 6-6. Annual Diesel Demand**

| Operation | Vehicle MT $CO_2$ | kg/$CO_2$/Gallon | Gallons |
|---|---|---|---|
| Vehicle | 168.96 | 10.21 | 16,548.67 |
| Emergency Generator | 3,895.00 | — | 3,895.00 |
| | | **Total** | **20,443.67** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** MT = metric ton; $CO_2$ = carbon dioxide; kg = kilogram.

T2-2 Cont.

Over the lifetime of the proposed project, the fuel efficiency of on-road vehicles of hotel guests, retail and restaurant customers, deliveries, and employees, commuting to the site is expected to increase. As such, the amount of petroleum consumed as a result of vehicular trips to and from the project site during operation would decrease over time. There are numerous regulations in place that require and encourage increased fuel efficiency. For example, the California Air Resources Board (CARB) has adopted an approach to passenger vehicles by combining the control of smog-causing pollutants and greenhouse gas (GHG) emissions into a single, coordinated package of standards. The approach also includes efforts to support and accelerate the number of plug-in hybrids and zero-emissions vehicles in California (CARB 2013). Additionally, in response to Senate Bill 375, CARB adopted the goal of reducing per-capita GHG emissions from 2005 levels by 8% by 2020, and 18% by 2035 for light-duty passenger vehicles in the planning area for the Southern California Association of Governments (SCAG). As such, operation of the proposed project is expected to use decreasing amounts of petroleum over time due to advances in fuel economy.

In summary, although the proposed project would increase petroleum use during operation as a result of residences, restaurant customers, venue attendees, deliveries, and employees commuting to the site, the use would be a fraction of the state- and County-wide use and, due to efficiency increases, would diminish over time. Given these considerations, petroleum consumption associated with the proposed project would not be considered inefficient or wasteful and would result in a **less-than-significant impact**.

b) ***Less-than-Significant Impact.*** Part 6 of Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. Part 6

establishes energy efficiency standards for residential and non-residential buildings constructed in California to reduce energy demand and consumption. Part 6 is updated periodically (every 3 years) to incorporate and consider new energy efficiency technologies and methodologies. Title 24 also includes Part 11, the California Green Building Standards Code (CALGreen). CALGreen institutes mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential, and state-owned buildings, as well as schools and hospitals. The 2022 CALGreen standards became effective on January 1, 2023. The proposed project would meet Title 24 and CALGreen standards to reduce energy demand and increase energy efficiency.

***City of Rancho Mirage Energy Action Plan***

The City's 2013 Energy Action Plan (ePlan) provides a roadmap of actions within the City's Municipal operations, to help reduce energy consumption, to reduce operation costs and increase energy awareness. The ePlan's goals focuses on three areas: retrofit and expansion of municipal facilities, upgrading the municipal fleet and consideration of municipal programs and actions that will help reduce municipal and community-wide energy use and GHG emissions. The proposed project will not obstruct the City from achieving energy efficiency ePlan goals.

The proposed project would follow applicable energy standards and regulations during construction. In addition, the proposed project would be built and operated in accordance with all existing, applicable regulations at the time of construction. As such, the proposed project would not conflict with existing energy standards and regulations; therefore, impacts during construction and operation of the proposed project would be **less than significant**. No mitigation is required.

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Cont.

## 6.3 Mitigation Measures

No mitigation measures required.





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Cont.

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7. GEOLOGY AND SOILS

| **GEOLOGY AND SOILS** -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: | | | | |
| i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. | ☐ | ☐ | ☐ | ☒ |
| ii) Strong seismic ground shaking? | ☐ | ☐ | ☒ | ☐ |
| iii) Seismic-related ground failure, including liquefaction? | ☐ | ☐ | ☒ | ☐ |
| v) Landslides? | ☐ | ☐ | ☒ | ☐ |
| b) Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ☒ | ☐ |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | ☐ | ☐ | ☒ | ☐ |
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property? | ☐ | ☐ | ☒ | ☐ |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? | ☐ | ☐ | ☐ | ☒ |

T2-2
Cont.

| GEOLOGY AND SOILS – Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ☐ | ☐ | ☒ |

## 7.1 Setting

This section is based upon the Geotechnical Report prepared by Earth Systems Southwest. The geotechnical report is included as Appendix H to this Initial Study. Background and methodologies regarding the geotechnical analysis are found in Appendix H.

The project site is situated in an area of rugged foothills and canyons near the base of the Santa Rosa Mountains. The area's site topography is generally dominated by northeast to southwest trending ridges and canyons. Total relief at the project site is on the order of approximately 60 feet. The field exploration conducted in 2006 covered portions of the Residences at Ritz Carlton project site but does not cover the Sky Mesa Recreational Site.

The site from the 2006 geotechnical report is located at the northern edge of the Santa Rosa Mountains, which border the southwest part of the Coachella Valley. The site is located within the Peninsular Ranges geomorphic province, at the boundary of the Colorado Desert geomorphic province. The Peninsular Ranges are characterized by fault-controlled, elongated northwest-trending valleys and ranges. These ranges and valleys extend from the southern end of Baja California to the Los Angeles basin. The rocks underlying this province consist of ancient sedimentary and metasedimentary (partially metamorphosed sedimentary rocks) that mantle a core of granitic rocks that comprise the Southern California Batholith.

The on-site geology reflects a typical contact metamorphic zone along an igneous/sedimentary contact. The metamorphic contact zone contains pegmatitic marble and various calc-silicates. These rocks were formed by the modification of previously existing sediments by the intense heat associated with the intrusion of the igneous rocks. Several baked zones and feldspar and quartz rich gneiss mark the contact zone. Minor quartzite and schist were found; however, marble and marbleized limestone dominate the area. In the vicinity of the project site, the predominant rocks were strongly folded metasediments. Towards the east, the metamorphism grades into foliated migmatites. The faults near the site are pre-Holocene and inactive.

The field exploration indicates that site materials consist generally of outcropping pre-Cretaceous metasedimentary rocks overlain by an approximately 1- to 5-foot layer of gravelly sand with silt to silty sand with gravel. The soil matrix is visually classified to be in the very low expansion (EI < 20) category.



T2-2 Cont.

The depth of groundwater in the vicinity of the project site is believed to be greater than 200 feet. Groundwater levels may fluctuate with precipitation, irrigation, drainage, regional pumping from wells, and site grading. The absence of shallow groundwater levels may not represent an accurate or permanent condition; minor localized and seasonal perched groundwater conditions may occur within the adjacent to well defined drainages on the site. The bedrock that underlies the site is considered to be essentially non-water bearing and does not form a continuous aquifer. However, some groundwater is likely to be contained at depth within intermittent joints and fractures of the bedrock. No seeps or springs were observed at the site during the field reconnaissance.

## 7.2 Discussion of Impacts

a) (i) ***No Impact.*** According to the City's General Plan Safety Element, the project site is not located on an Alquist-Priolo Earthquake Fault Zoning Map. Exhibit 21, Faults in the Rancho Mirage General Plan Area, in the City's General Plan Safety Element, indicates that closest faults in the broad project region include Santa Ana Thrust Fault and Deep Canyon Fault (City of Rancho Mirage 2017). None of these faults underlie the project site (City of Rancho Mirage 2017). Although the proposed project could experience strong seismic ground shaking, the proposed project is not susceptible to surface rupture. Therefore, **no impacts** associated with fault rupture would occur.

a) (ii) ***Less-than-Significant Impact.*** Similar to other areas located in seismically active Southern California regions, the City is susceptible to ground shaking during an earthquake. However, as addressed in Threshold 7(a(i)), the project site is locate located on an active fault zone and the site would not be affected by ground shaking more than any other area in the seismically active region. Conformance with the most recent California Building Code, which includes building design standards intended to minimize risk to people and structures from potential seismic ground shaking, would ensure that impacts would be **less than significant**.

a) (iii) ***Less-than-Significant Impact.*** According to the Geotechnical Report, the potential for liquefaction to occur on the project site is very low because the site is underlain by non-water crystalline bedrock, and the site does not lie within a County or State liquefaction hazard zone. Additionally, the City's General Plan Safety Element's Exhibit 22 shows that the project site's liquefaction susceptibility is "none" (City of Rancho Mirage 2017). Therefore, impacts would be **less than significant**.

a) (iv) ***Less-than-Significant Impact.*** According to Exhibit 24 of the City's General Plan Safety Element, the project site is located in an area where "numerous rock falls and landslides expected to occur during an earthquake" (City of Rancho Mirage 2017). In compliance with the City's General Plan, Safety Element, and the California Building Code (CBC), prior to the issuance of a grading permit the Applicant shall prepare an updated geotechnical analysis for areas subject to rockfall or landslide hazards. With compliance to all relevant policies, the proposed project would have a **less than significant** impact.

b) ***Less-than-Significant Impact.*** According to Exhibit 25 in the City's General Plan Safety Element, the project site is located in a site with only "slight wind erosion hazard". The project site is undeveloped and has been previously graded. Project construction would involve site preparation, some additional grading, and trenching, which may temporarily expose soils to increased erosion potential. The proposed project would be required to comply with the

T2-2 Cont.

National Pollutant Discharge Elimination System Construction General Permit, which requires the implementation of a stormwater pollution prevention plan. The stormwater pollution prevention plan would employ various BMPs intended to minimize soil erosion during construction. BMPs may include measures such as watering the exposed areas to reduce erosion potential. Upon completion of construction, the project site would be fully developed with structures, parking, and landscaped areas, which would minimize any long-term erosions potential. Therefore, impacts would be **less than significant**.

The proposed project would expand the existing hotel area and because the expansion would mainly be paved or landscaped, the potential for soil erosion and topsoil loss is reduced during operation. The structural and paved improvements would be impervious areas lacking any exposed soils. The landscape areas, although pervious, would contain various trees, shrubs, and groundcover that would help stabilize any surface soils and contain these soils on the project site. Therefore, impacts associated with soil erosion and topsoil loss would be **less than significant**.

c) ***Less-than-Significant Impact.*** As addressed in Threshold 7(a)(iii), the potential for liquefaction is very low. Prior to the issuance of the grading permit, the applicant shall verify that the applicable recommendations of the of the City engineer. Recommendations shall be held to performance standards Geotechnical Evaluation have been incorporated into the proposed project design and construction documents to the satisfaction within the applicable ordinances (including grading, construction, and landscaping regulations) of the City and the standards provided in the most recent California Building Code that are intended to reduce risk related to geologic hazards. Therefore, with implementation of these recommendations, impacts would be **less than significant**.

T2-2
Cont.

d) ***Less-than-Significant Impact.*** Expansive soils are characterized by their potential "shrink/swell" behavior. Shrink/swell is the cyclic change in volume (expansion and contraction) that occurs in certain fine-grained clay sediments from the process of wetting and drying. Clay minerals such as smectite, bentonite, montmorillonite, beidellite, vermiculite, and others are known to expand with changes in moisture content. The higher the percentage of expansive minerals present in near-surface soils, the higher the potential for substantial expansion.

According to the Geotechnical Report, the field exploration indicated that the soil matrix would be classified within the very low expansion index. Therefore, impacts would **be less than significant**.

e) ***No Impact.*** The proposed project would connect to the existing municipal sewer system and would not require a septic or alternative wastewater disposal system. Therefore, **no impacts** associated with the ability of soils to support septic tanks would occur.

f) ***No Impact.*** The project site has been highly disturbed by previous grading activities. There are no unique paleontological resources or sites or unique geologic features on the project site. Therefore, there would be **no impact**.

## 7.3 Mitigation Measures

No mitigation measures required.

8. GREENHOUSE GAS EMISSIONS

| GREENHOUSE GAS EMISSIONS -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | ☐ | ☐ | ☒ | ☐ |
| b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | ☐ | ☐ | ☒ | ☐ |

## 8.1 Setting

This section is based on the Air Quality and Greenhouse Gas Technical Report prepared by Dudek, incorporated in this Initial Study as ~~Appendix A~~Appendix A-1.

T2-2 Cont.

### Global Inventories

Anthropogenic GHG emissions worldwide in 2017 (the most recent year for which data is available) totaled approximately 50,860 MMT of CO2e, excluding land use change and forestry (PBL 2018). Six countries—China, the United States, the Russian Federation, India, Japan, and Brazil—and the European community accounted for approximately 65% of the total global emissions, or approximately 33,290 MMT $CO_2e$ (PBL 2018).

### National and State Inventories

Per the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2021, total U.S. GHG emissions were approximately 6,340.2 MMT $CO_2e$ in 2021 (EPA 2023). The largest source of $CO_2$, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 92.2% of $CO_2$ emissions in 2021 (4,639 MMT $CO_2e$). From 1990 to 2021, total emissions of $CO_2$ decreased by 88.7 MMT $CO_2$ Eq. (1.7 percent), total emissions of $CH_4$ decreased by 141.2 MMT CO2 Eq. (16.3 percent), and emissions of $N_2O$ decreased by 13.0 MMT CO2 Eq. (3.2 percent). (EPA 2023).

According to California Greenhouse Gas Emissions for 2000–2020, Trends of Emissions and Other Indicators (CARB 2022a), California emitted 369.2 MMT $CO_2e$ in 2020, including emissions resulting from out-of-state electrical generation (CARB 2018). The sources of GHG emissions in California include transportation, industrial uses, electric power production from both in-state and out-of-state sources, commercial and residential uses, agriculture, high-GWP substances, and recycling and waste. The California GHG emission source categories (as defined in CARB's 2008 Scoping Plan) and their relative contributions in 2020 are presented in Table 8-1, Greenhouse Gas Emissions Sources in California.

**Table 8-1. Greenhouse Gas Emissions Sources in California**

| Source Category | Annual GHG Emissions (MMT $CO_2e$) | Percent of Total[a] |
|---|---|---|
| Transportation | 136.60 | 37% |
| Industrial uses | 73.84 | 20% |
| Electricity generation[b] | 59.07 | 16% |
| Residential and commercial uses | 36.92 | 10% |
| Agriculture and Forestry | 33.22 | 9% |
| High GWP substances | 22.15 | 6% |
| Recycling and waste | 7.38 | 2% |
| **Totals** | **369.2** | **100%** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** GHG = greenhouse gas; MMT $CO_2e$ = million metric tons of carbon dioxide equivalent; GWP = global warming potential.
Emissions reflect 2020 California GHG inventory.
[a] Percentage of total has been rounded and total may not sum due to rounding.

[b] Includes emissions associated with imported electricity, which account for 18.46 MMT $CO_2e$.

The City developed a GHG emission inventory in March 2013 as part of the Rancho Mirage Sustainability Plan. The inventory provides a detailed analysis of the City's carbon footprint showing the sources and sectors of emissions. In 2010, the City emitted 277,698 metric tons of $CO_2e$. The largest portion of the emission, over 43%, came from the electricity used to power the City's homes, businesses, resorts, fountains and streetlights. The transportation sector made up approximately 33% of the emissions.

T2-2 Cont.

## 8.2 Discussion of Impacts

a) ***Less-than-Significant Impact:*** Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind patterns, lasting for an extended period of time (decades or longer). The Earth's temperature depends on the balance between energy entering and leaving the planet's system, and many factors (natural and human) can cause changes in Earth's energy balance. The greenhouse effect is the trapping and build-up of heat in the atmosphere near the Earth's surface (the troposphere). The greenhouse effect is a natural process that contributes to regulating the Earth's temperature, and it creates a livable environment on Earth. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and causing the Earth's surface temperature to rise. Global climate change is a cumulative impact; a project contributes to this impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. Thus, GHG impacts are recognized exclusively as cumulative impacts.

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. As defined in California Health and Safety Code Section 38505(g) for purposes of administering many of the state's primary GHG emissions reduction programs, GHGs include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride (see also

CEQA Guidelines Section 15364.5).[7] The three GHGs evaluated herein are $CO_2$, $CH_4$, and $N_2O$ because these are the only GHG gases would be emitted during project construction and/or operations.

The Intergovernmental Panel on Climate Change developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The reference gas used is $CO_2$; therefore, GWP-weighted emissions are measured in metric tons (MT) of $CO_2$ equivalent ($CO_2e$). Consistent with CalEEMod Version 2020.04.0, this GHG emissions analysis assumed the GWP for $CH_4$ is 25 (i.e., emissions of 1 MT of $CH_4$ are equivalent to emissions of 25 MT of $CO_2$), and the GWP for $N_2O$ is 298, based on the Intergovernmental Panel on Climate Change Assessment Report (IPCC 2007).

As discussed in Section 3 of this Initial Study, the proposed project is located within the jurisdictional boundaries of the SCAQMD. In October 2008, the SCAQMD proposed recommended numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development projects as presented in its *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold* (SCAQMD 2008). This document, which builds on the previous guidance prepared by the California Air Pollution Control Officers Association, explored various approaches for establishing a significance threshold for GHG emissions. The draft interim CEQA thresholds guidance document was not adopted or approved by the Governing Board.

T2-2
Cont.

The SCAQMD formed a GHG CEQA Significance Threshold Working Group to work with SCAQMD staff on developing GHG CEQA significance thresholds until statewide significance thresholds or guidelines are established. From December 2008 to September 2010, the SCAQMD hosted working group meetings and revised the draft threshold proposal several times, although it did not officially provide these proposals in a subsequent document. The SCAQMD has continued to consider adoption of significance thresholds for residential and general land use development projects. The most recent proposal issued by SCAQMD, issued in September 2010, uses the following tiered approach to evaluate potential GHG impacts from various uses (SCAQMD 2010):

**Tier 1:** Determine if CEQA categorical exemptions are applicable. If not, move to Tier 2.

**Tier 2:** Consider whether or not the project is consistent with a locally adopted GHG reduction plan that has gone through public hearing and CEQA review, that has an approved inventory, includes monitoring, etc. If not, move to Tier 3.

**Tier 3:** Consider whether the project generates GHG emissions in excess of screening thresholds for individual land uses. The 10,000 MT $CO_2e$ per-year threshold for industrial uses would be recommended for use by all lead agencies. Under option 1, separate screening thresholds are proposed for residential projects (3,500 MT $CO_2e$ per year), commercial projects (1,400 MT $CO_2e$

[7] Climate-forcing substances include GHGs and other substances such as black carbon and aerosols. This discussion focuses on the GHGs identified in the California Health and Safety Code Section 38505 applicable to the project including $CO_2$, $CH_4$, and $N_2O$; impacts associated with other climate-forcing substances are not evaluated herein.

per year), and mixed-use projects (3,000 MT $CO_2e$ per year). Under option 2, a single numerical screening threshold of 3,000 MT $CO_2e$ per year would be used for all non-industrial projects. If the project generates emissions in excess of the applicable screening threshold, move to Tier 4.

**Tier 4:** Consider whether the project generates GHG emissions in excess of applicable performance standards for the project service population (population plus employment). The efficiency targets were established based on the goal of Assembly Bill (AB) 32 to reduce statewide GHG emissions to 1990 levels by 2020. The 2020 efficiency targets are 4.8 MT $CO_2e$ per-service population for project-level analyses and 6.6 MT $CO_2e$ per-service population for plan-level analyses. If the project generates emissions in excess of the applicable efficiency targets, move to Tier 5.

**Tier 5:** Consider the implementation of CEQA mitigation (including the purchase of GHG offsets) to reduce the project efficiency target to Tier 4 levels.

However, neither SCAQMD or Rancho Mirage adopted these thresholds and therefor the quantitative analysis provided herein is provided for informational purposes only. In the absence of an adopted quantitative thresholds, GHGs are evaluated in the context of policy consistency.

**Construction Emissions**

Construction of the proposed project would result in GHG emissions primarily associated with the use of off-road construction equipment, on-road trucks, and worker vehicles. A depiction of expected construction schedules (including information regarding phasing, equipment used during each phase, truck trips, and worker vehicle trips) assumed for the purposes of emissions estimation is provided in Table 3-6 and in ~~Appendix A~~Appendix A-1. On-site sources of GHG emissions include off-road equipment; off-site sources include trucks and worker vehicles. Table 8-2, Estimated Annual Construction GHG Emissions, presents construction GHG emissions for the proposed project from on-site and off-site emissions sources.

T2-2
Cont.

**Table 8-2. Estimated Annual Construction GHG Emissions**

| Year | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
|---|---|---|---|---|
| | *Metric Tons per Year* | | | |
| 2023 | 571.69 | 0.13 | 0.01 | 579.09 |
| 2024 | 562.96 | 0.08 | 0.03 | 572.69 |
| | | | **Total** | **1151.78** |
| | | | **Amortized Over 30 Years** | **38.39** |

**Source:** ~~Appendix A~~Appendix A-1.
**Notes:** GHG = greenhouse gas; $CO_2$ = carbon dioxide; $CH_4$ = methane; $N_2O$ = nitrous oxide; $CO_2e$ = carbon dioxide equivalent.

As shown in Table 8-2, Estimated Annual Construction GHG Emissions, the estimated total GHG emissions in 2023 through 2024 would be approximately 1,152 MT $CO_2e$. Amortized over 30 years, construction GHG emissions would be approximately 38 MT $CO_2e$ per year. In addition, as with proposed project-generated construction criteria air pollutant emissions, GHG emissions generated during proposed construction activities would be short

term, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions.

**Operational Emissions**

Operation of the proposed project would generate GHG emissions through motor vehicle trips to and from the project site; landscape maintenance equipment operation; energy use (natural gas and generation of electricity consumed by the proposed project); solid waste disposal; and generation of electricity associated with water supply, treatment, and distribution; wastewater treatment; and natural gas consumed by the emergency generator. GHG emissions would also be generated through intermittent maintenance and testing of the diesel emergency generator, limited to 50 hours per year. CalEEMod was used to calculate the annual GHG emissions. GHG emission estimates were based on the mobile source, area source, and energy (natural gas) operational assumptions described in Section 3(b), within the air quality analysis. CalEEMod default values were used to estimate GHG emissions associated with energy (electricity) consumption, solid waste, and water and wastewater.

The estimated operational (2023) project-generated GHG emissions from area sources, energy usage, motor vehicles, solid waste generation, water usage and wastewater generation, and stationary sources are shown in Table 8-3, Estimated Annual Operational GHG Emissions.

T2-2
Cont.

**Table 8-3. Estimated Annual Operational GHG Emissions**

| Emission Source | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
|---|---|---|---|---|
| | *metric tons per year* | | | |
| *Proposed Project* | | | | |
| Area | 1.80 | 0.00 | 0.00 | 1.85 |
| Energy | 555.64 | 0.03 | 0.01 | 558.68 |
| Mobile | 1,507.92 | 0.08 | 0.07 | 1,531.81 |
| Stationary | 22.85 | 0.00 | 0.00 | 22.93 |
| Solid waste | 38.80 | 2.29 | 0.00 | 96.13 |
| Water supply and wastewater | 66.95 | 0.03 | 0.02 | 72.63 |
| | | | **Total** | **2,284.03** |
| | | | *Amortized Construction Emissions* | *38* |
| | | | **Operation + Amortized Construction Total** | **2,322.42** |

**Notes:** $CO_2$ = carbon dioxide; $CH_4$ = methane; $N_2O$ = nitrous oxide; $CO_2e$ = carbon dioxide equivalent
See ~~Appendix A~~Appendix A-1 for detailed results.
These emissions reflect operational year 2023.

As shown in Table 8-3, Estimated Annual Operational GHG Emissions, and provided for informational purposes, the estimated annual net proposed project-generated GHG emissions would be approximately 2,284 MT $CO_2e$ per year as a result of proposed project operations only. Estimated annual proposed project-generated operational emissions in 2024 (2,284 MT $CO_2e$ per year) plus amortized proposed project construction emissions (38 MT $CO_2e$ per year) would be approximately 2,332 MT $CO_2e$ per year. Because no quantitative threshold has been adopted, impacts related to GHGs are discussed in the context of policy consistency below. Therefore, as discussed below, in relation to the generation of GHGs, the proposed project's impact would be **less than significant**. No mitigation is required.

T2-2 Cont.

b) ***Less-than-Significant Impact:*** The City has not adopted a comprehensive climate action plan, and there is currently no local guidance that would be applicable to the proposed project. The City addresses GHG-reducing goals in the March 2013, Sustainability Plan and Energy Action Plan. However, while the Sustainability Plan provides GHG reduction goals, they do not extend beyond year 2020. At this time, no mandatory GHG plans, policies, regulations, or finalized agency guidelines would apply to the proposed project. Nonetheless, the proposed project consistency with the SCAG 2020 RTP/SCS, CARB's Scoping Plan, and statewide GHG reduction goals for 2030 or 2045 identified in identified in Senate Bill 32 and Assembly Bill 1279, respectively.

**City of Rancho Mirage Energy Action Plan**

The City's Energy Action Plan (ePlan) provides a roadmap of actions within the City's Municipal operations, to help reduce energy consumption, to reduce operation costs and increase energy awareness. The ePlan's goals focuses on three areas: retrofit and expansion of municipal facilities, upgrading the municipal fleet and consideration of municipal programs and actions that will help reduce municipal and community-wide energy use and GHG emissions.

**City of Rancho Mirage Sustainability Plan**

In March 2013, the City adopted the 2013 Sustainability Action Plan: Leadership in Energy Efficiency (Sustainability Plan) in order to set GHG reduction goals and measures. The Sustainability Plan is a framework for the documenting and implementation of policies and programs that will reduce the City's GHG emissions, working towards the Statewide target of 1990 levels by 2020, set by AB 32.

The City addresses GHG-reducing goals in the March 2013, Sustainability Plan and Energy Action Plan. However, while the Sustainability Plan provides GHG reduction goals, they do not extend beyond year 2020. In addition, the proposed project does not prevent the City from promoting sustainability and energy efficiency goals to reduce the City's carbon footprint.

**Southern California Association of Governments RTP/SCS**

SCAG has developed Connect SoCal, the 2020-2045 RTP/SCS, which is a long-range visioning plan that balances future mobility and housing needs with economic, environmental and public health goals. Connect SoCal charts a path toward a more mobile, sustainable and prosperous region by making connections between transportation networks, between planning strategies and between the people whose collaboration can improve the quality of life for Southern Californians. Connect SoCal embodies a collective vision for the region's future and is developed with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura.

On September 3, 2020, Connect SoCal was adopted by SCAG's Regional Council. Connect SoCal is a long-range visioning plan that builds upon and expands land use and transportation strategies established over several planning cycles to increase mobility options and achieve a more sustainable growth pattern. The major goals of the Connect SoCal are outlined in Table 8-4, Project Consistency with the SCAG Connect SoCal RTP/SCS, along with the proposed project's consistency with them.

T2-2
Cont.

**Table 8-4**
**Project Consistency with the SCAG Connect SoCal RTP/SCS**

| RTP/SCS Measure | Proposed Project Potential to Conflict |
|---|---|
| Encourage regional economic prosperity and global competitiveness. | *Not applicable.* The proposed project would not inhibit SCAG from encouraging regional economic prosperity and global competitiveness. |
| Improve mobility, accessibility, reliability, and travel safety for people and goods. | *Not applicable.* The proposed project would not inhibit SCAG from strengthening the regional transportation network for goods movement. |
| Enhance the preservation, security, and resilience of the regional transportation system. | *Not applicable.* The proposed project would not inhibit SCAG from enhancing the resilience of the regional transportation system. |
| Increase person and goods movement and travel choices within the transportation system. | *Not applicable.* The proposed project would not inhibit SCAG from increasing person and goods movement and travel choices within the transportation system. |
| Reduce greenhouse gas emissions and improve air quality. | *No conflict.* The proposed project would result in criteria air pollutant and GHG emissions during construction and operation. However, as presented in Section 3.2, the proposed project would not exceed the SCAQMD mass daily significance thresholds during construction or operation. GHG emissions would be reduced through compliance with applicable CALGreen standards. |
| Support healthy and equitable communities. | *No conflict.* A desert landscape design is proposed throughout the project site including water cascades, multiple pools, rock escarpments, and fountains. Landscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network. |
| Adapt to a changing climate and support an integrated regional development pattern and transportation network. | *Not applicable.* The proposed project would not inhibit SCAG from supporting an integrated regional development pattern and transportation network. |
| Leverage new transportation technologies and data-driven solutions that result in more efficient travel. | *Not applicable.* The proposed project would not inhibit SCAG from leveraging technology for the transportation system. |
| Encourage development of diverse housing types in areas that are supported by multiple transportation options. | *Not applicable.* The proposed project does not include traditional housing, but rather would operate as time-share properties, and would not inhibit SCAG from encouraging development of diverse housing types. |
| Promote conservation of natural and agricultural lands and restoration of habitats. | *No conflict.* The project site is vacant with dirt covering the majority of the site. The proposed project will provide approximately 35% open space made up of landscape areas, pools, water features, and paths. A desert landscape design is proposed throughout the |



T2-2
Cont.

**Table 8-4**
**Project Consistency with the SCAG Connect SoCal RTP/SCS**

| RTP/SCS Measure | Proposed Project Potential to Conflict |
|---|---|
| | project site including water cascades, multiple pools, rock escarpments, and fountains. Landscaping would be located throughout the project site and between proposed buildings with pedestrian access provided by the on-site pedestrian network. The proposed plant palette would comprise of native, drought-tolerant plantings, consistent with the existing hotel landscaping and surrounding areas. |

**Source:** SCAG 2020.

As shown in Table 8-4, the proposed project would be consistent with all applicable measures within the SCAG Connect SoCal RTP/SCS.

**California Air Resources Board Scoping Plan and Reduction Goals**

The Climate Change Scoping Plan, approved by CARB in 2008 and updated in 2014 2017, and 2022, provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs.

T2-2
Cont.

The 2022 Scoping Plan outlines the state's plan to reach carbon neutrality by 2045 or earlier, while also assessing the progress the state is making toward achieving GHG reduction goals by 2030. Per the Legislative Analyst's Office, the 2022 Scoping Plan identifies a more aggressive 2030 GHG goal. As it relates to the 2030 goal, perhaps the most significant change in the 2022 plan (as compared to previous Scoping Plans) is that it identifies a new GHG target of 48% below the 1990 level, compared to the current statutory goal of 40% below. Current law requires the state to reduce GHG emissions by at least 40% below the 1990 level by 2030 but does not specify an alternative goal. According to CARB, a focus on the lower target is needed to put the state on a path to meeting the newly established 2045 goal, consistent with the overall path to 2045 carbon neutrality. The carbon neutrality goal requires CARB to expand proposed actions from only the reduction of anthropogenic sources of GHG emissions to also include those that capture and store carbon (e.g., through natural and working lands, or mechanical technologies). The carbon reduction programs build on and accelerate those currently in place, including moving to zero-emission transportation; phasing out use of fossil gas use for heating homes and buildings; reducing chemical and refrigerants with high GWP; providing communities with sustainable options for walking, biking, and public transit; displacement of fossil-fuel fired electrical generation through use of renewable energy alternatives (e.g., solar arrays and wind turbines); and scaling up new options such as green hydrogen (CARB 2022b.

The 2022 Scoping Plan details "Local Actions" in Appendix D. The Local Actions includes recommendations intended to build momentum for local government actions that align with the State's climate goals, with a focus on local GHG reduction strategies (commonly referred to as climate action planning) and approval of new land use development projects, including through environmental review under CEQA. The recommendations provided in Appendix D are

non-binding and should not be interpreted as a directive to local governments, but rather as evidence-based analytical tools to assist local governments with their role as essential partners in achieving California's climate goals. Appendix D recognizes consistency with a CEQA-qualified GHG reduction plan such as a Climate Action Plan as a preferred option for evaluating potential GHG emission impacts under CEQA. Absent a qualified GHG reduction plan, Appendix D provides recommendations for key attributes that residential and mixed-use projects should achieve that would align with the State's climate goals including EV charging infrastructure, infill location, no loss or conversion of natural and working lands, transit-supportive densities or proximity to transit stops, reducing parking requirements, provision of affordable housing (20% of units), and all-electric appliances with no natural gas connection (CARB 2022i). Projects that achieve all key attributes are considered clearly consistent with the State's climate and housing goals and would have a less-than-significant GHG impact under CEQA. However, projects that do not achieve all attributes are not considered to result in a potentially significant GHG emission impact (CARB 2022i). A net-zero threshold and use of air district recommended thresholds of significance were two other CEQA thresholds Appendix D recommends.

The 2022 Scoping Plan reflects the 2030 target of a 40% reduction below 1990 levels codified by SB 32, and the 2045 target of carbon neutrality established by EO B-55-18 (AB 1279), as detailed in Section 4.6.2, Regulatory Requirements, above. Per the 2022 Scoping Plan, empirical evidence shows that residential development projects that are consistent with these project attributes to reduce GHG emissions will accommodate growth in a manner that aligns with the GHG and equity goals of SB 32. As detailed above, absent a qualified GHG reduction plan, Appendix D of the CARB Scoping Plan provides recommendations for key attributes that residential and mixed-use projects should achieve that would align with the State's climate goals. (CARB 2022b. The proposed project would involve the construction of 106 residential suites, hotel villas, event spaces, commercial spaces, and an amenity space totaling 236,748 square feet. However, the 106 residential suites are anticipated to be treated as a time-share home in which residents are allowed to live at the residence only during a specified time frame. Therefore, the project's operation is more in line with a commercial hotel use than a traditional residential project. As such the Scoping Plan Appendix D recommendations for residential and mixed-use projects are not appropriate for the project.

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Nevertheless, many of the measures and programs included in the Scoping Plan would result in the reduction of project-related GHG emissions with no action required at the project-level, including GHG emission reductions through increased energy efficiency and renewable energy production (SB 350), reduction in carbon intensity of transportation fuels (LCFS), and the accelerated efficiency and electrification of the statewide vehicle fleet (Mobile Source Strategy).

The Project would provide EV charging infrastructure that, meets the California Green Building Standards Code. The Project site is surrounded by the existing Ritz Carlton facilities to the north and existing residential single-family homes to the south. The site has nearby access through Frank Santra Drive and access to existing utilities and essential public services. As discussed in the Utilities and Service Systems section of the Initial Study, the proposed project would connect to existing electric, natural gas, and telecommunication lines and facilities within and adjacent to the project site. The proposed project does not propose uses that would be expected to

generate an excessive need for these facilities such that construction or relocation would be required.

Overall, the Project would comply will all regulations adopted in furtherance of the Scoping Plan to the extent applicable and required by law. As demonstrated above, the proposed Project would not conflict with CARB's 2022 Scoping Plan updates and with the state's ability to achieve the GHG reduction and carbon neutrality goals. Further, the Project's consistency with the applicable measures and programs would assist in meeting the City's contribution to GHG emission reduction targets in California. Based on the considerations previously outlined, the Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

The proposed project would not interfere with implementation of GHG reduction goals for 2030 or 2045 because it would not conflict with the SCAG RTP/SCS or with the state's trajectory toward future GHG reductions. Therefore, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs; therefore, impact would be **less than significant**.

### 8.3 Mitigation Measures

No mitigation measures required.

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9. HAZARDS AND HAZARDOUS MATERIALS

| HAZARDS AND HAZARDOUS MATERIALS -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☐ | ☐ | ☒ | ☐ |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | ☐ | ☐ | ☒ | ☐ |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ☐ | ☐ | ☐ | ☒ |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | ☐ | ☐ | ☒ | ☐ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area? | ☐ | ☐ | ☐ | ☒ |

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| HAZARDS AND HAZARDOUS MATERIALS -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☒ | ☐ |
| g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires? | ☐ | ☐ | ☒ | ☐ |

### 9.1 Setting

The analysis in this section of the Initial Study is based on a Phase I Environmental Site Assessment for the project site, included as Appendix I of this Initial Study.

**Current Operational Activities**

T2-2 Cont.

The proposed project is currently a vacant full service hospitality facility and is undergoing renovation and new construction activities. No noteworthy tenants occupy the proposed project and no environmentally significant operations are conducted at the proposed project. Considering the current operations assessed at the proposed project, no environmental permits, registrations, or notifications appear to be required.

An inactive dry-cleaning machine is located in the commercial laundry at the project site. The dry-cleaning machine is identified as an Aero-Tech Green Jet Dry-Wetcleaning Machine, Model #DWC-45. The dry-cleaning machine uses DWX-44 Dry-Cleaning Solution, a water-based, non-toxic solution, instead of perchloroethylene (PCE). Currently available information indicates the use of DWX-44 Dry-Cleaning Solution is highly unlikely to impact the proposed project when properly used. DWX-44 Dry-Cleaning Solution does not contain chlorinated hydrocarbons (such as PCE) and wastes generated in the process would not be classified as hazardous. Material Safety Data Sheet (MSDS) information for DWX-44 confirms that this substance contains no ingredients identified as Hazardous Substances according to SARA Hazard Title III, Section 313 - CFR-355. The existing dry-cleaning machine is associated with the ongoing renovation, is new equipment which has never been used, and appeared to be empty at the time of EMG's site visit. Copies of a specification sheet and brochure for the Green jet Dry-Wetcleaning Machine, as well as the MSDS sheet for DWX-44 and a Laundry Plan showing the location of the dry cleaning machine, have been appended as supporting documents (Appendix I).

No information was identified to confirm whether dry cleaning was previously conducted on-site between 1988 and the time of closure in 2006. Based on the historical use as a full-service Ritz Carlton, it is somewhat likely that a dry cleaning plant, which possibly operated an older PCE machine, was formerly located on-site. By its chemical nature, PCE has the potential to penetrate through concrete

and impact subsurface conditions. However, any such dry cleaning facility would have operated since the promulgation of RCRA in 1986, the legislation that regulates the handling and disposal of hazardous materials and wastes. As such, waste handling and disposal practices would have been regulated since the facility's inception. Furthermore, because the laundry is underlain by two levels of parking garage and not the earth, it is unlikely that subsurface conditions would have been impacted as a result of any historical dry cleaning plant operations in this area.

***Hazardous Materials/Petroleum Products Storage and Handling***

Visual observation for the use and/or storage of hazardous materials and petroleum products was performed. The following hazardous materials and petroleum products were identified:

- Routine construction and maintenance supplies (i.e. adhesives, sealants, paints, etc. were observed at the proposed project in retail-sized containers.
- Diesel fuel is stored in an integral belly tank associated with the backup generator.
- Cooling system water treatment chemicals are maintained in poly drums located in the central plant and cooling tower areas in association with routine operation and upkeep of the cooling equipment.

The identified chemicals, materials, and products were observed in their sealed, original containers and in designated storage areas. Materials appeared to be properly stored. No evidence of spills or staining was observed. In addition, the concrete surfaces appeared intact, and no cracks were observed in the areas of product storage/usage.

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***Waste Generation, Treatment, Storage, and Disposal***

Visual observation for the generation, treatment, storage, and disposal of wastes was performed. The following wastes were identified:

- Municipal trash is stored in the compactor or roll-off debris boxes (when appropriate) and disposed of by contracted waste haulers.
- Domestic sewage is disposed of to the municipal sanitary sewer system.

No evidence of spills or staining was observed in the area of waste generation or pre-disposal storage. In addition, the concrete surfaces appeared intact, and no cracks were observed in the areas of waste generation or pre-disposal storage. No excessive odors or overflowing/excessive ground trash were noted in the vicinity of the compactor or debris boxes. No hazardous, regulated, or medical wastes were noted in the compactor or debris boxes. No wastewater discharge that would require permitting through local or state regulator agencies was identified at the proposed project. No current or former septic systems or drywells were identified at the proposed project.

## 9.2 Discussion of Impacts

a) ***Less-than-Significant Impact.*** Construction of the proposed project would require the transport of potentially hazardous materials including but not limited to fuels, lubricants, and various other liquids needed for operation of construction equipment. Proper BMPs and hazardous materials handling protocols would be prepared and implemented to ensure safe storage, handling,

transport, use, and disposal of all hazard materials during the construction phase of the proposed project. Construction would also adhere to any local standards set forth by the City, as well as state and federal health and safety requirements that are intended to minimize hazardous materials risk to the public, such as the California Occupational Safety and Health requirements, Hazardous Waste Control Act, California Accidental Release Prevention Program, and the California Health and Safety Code. Furthermore, all construction waste, including trash, litter, garbage, solid waste, petroleum products, and any other potentially hazardous materials would be removed and transported to a permitted waste facility for treatment, storage, or disposal. Use of these materials during construction for their intended purpose would not pose a significant risk to the public or the environment. Therefore, impacts related to routine transport, use, or disposal of hazardous materials during construction would be **less than significant**.

The proposed project would involve development of residential land uses, event space, restaurant, and associated landscaping and facilities. During operation of the proposed project, use of hazardous materials would primarily involve the private use of commercially available cleaning products, landscaping chemicals and fertilizers, and various other commercially available substances. According to the 2006 DEIR for the Lodge Expansion Project, the existing hotel site operates an approximately 825 square foot dry cleaning facility on-site, and stores approximately 20 to 30 gallons on average of dry-cleaning chemicals on-site. Wastes generated from this facility are also limited to an average of approximately 20 to 30 gallons and are stored on-site for approximately three months until hauled off-site by a licensed waste management hauler.

These substances are required to comply with relevant federal, state, and local health and safety laws, which are intended to minimize health risk to the public associated with hazardous materials. Therefore, impacts related to routine transport, use, or disposal of hazardous materials during operation would be **less than significant**.

b) ***Less-than-Significant Impact:*** As discussed in Threshold 9 (a), a variety of hazardous substances and wastes typical to standard construction projects would be stored and used on the project site during construction of the proposed project. Accidental spills, leaks, fires, explosions, or pressure releases involving hazardous materials represent a potential threat to human health and the environment. During both construction and operation of the proposed project, there is potential for release of hazardous materials related to storage, transport, use, and disposal from construction debris, landscaping, and commercial products. However, the proposed project would be required to adhere to federal, state, and local laws, such as the California Occupational Safety and Health requirements, Hazardous Waste Control Act, California Accidental Release Prevention Program, and the California Health and Safety Code, which are intended to minimize risk to public health associated with hazardous materials. Therefore, impacts would be **less than significant**.

c) ***No Impact.*** No schools are located within 0.25 miles of the project site. The nearest school, Cathedral City Elementary, is located approximately 2.5 mile north of the project site. **No impact** would occur.

d) ***Less-than-Significant Impact.*** The 2012 Phase I ESA of the project site discusses the regulatory database report from Environmental Data Resources, Inc. (EDR), which determines if the

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Cont.

proposed project is a listed regulatory site and whether there are any mappable regulatory database sites. The following databases were reviewed for this assessment: NPL, Proposed NPL, NPL LIENS, Delisted NPL, CERCLIS, CERCLIS-NFRAP, CORRACTS, RCRA-TSDF, RCRA-LQG, RCRA-SQG, RCRA-CESQG, US ENG CONTROLS, US INST CONTROL, ERNS, FINDS, SWF, LUST, INDIAN LUST, UST, AST, US BROWNFIELDS, ENVIROSTOR, SLIC, RESPONSE, VCP, HIST CAL-SITES, TOXIC PITS, Notify 65, and Indian Reserve. Details on each of these databases can be found in Appendix I.

According to the database report, the project site is listed on the CHMIRS and RCRA-SQG databases. The CHMIRS listing does not constitute a Recognized Environmental Condition (REC) because of the small-scale nature of the incident. The Riverside County Fire Department responded to a solo vehicle accident on the road in front of the project site that resulted in the release of approximately one gallon of diesel fuel from a truck's saddle tank.

Information on the RCRA-Generators database indicates that the proposed project was identified as a Small Quantity Generator of hazardous wastes in 1992, likely related to wastes generated during construction or renovation activities. The type of hazardous waste generated was not identified in the database listing. The database indicates that there are no violations associated with the RCRA-Generator listing. The RCRA-Generator database is a listing of facilities that are required to register for tracking purposes due to the amount of hazardous waste generated and are not necessarily sites with reported contamination incidents.

There are no EnviroStor facilities listed within a 0.5-mile distance of the project site. Based on the databased report discussed above, the proposed project would not create a significant to the public or the environment, and impacts would be **less than significant**.

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e) ***No Impact.*** The proposed project is not located within 2 miles of a public airport, nor is it located within an airport land use plan. The nearest airport is Palm Springs International Airport, located approximately 6 miles away. Therefore, because the site is not located within an airport land use plan or within 2 miles of a public/public use airport, there would be **no impacts**.

f) ***Less-than-Significant Impact.*** The City participates in the Riverside County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). The proposed project would not interfere with the City's emergency plans. The City's main evacuation routes are the Interstate 10 (I-10) and Highway 111 (City of Rancho Mirage 2017). Access to these evacuation routes and all local roads would be maintained during construction and operation of the proposed project. Emergency procedures or design features required by federal, state, or City regulations would be implemented as appropriate during construction and/or operation. Maintaining access along all local roads during construction would minimize the potential for traffic conflicts with designated evacuation routes, and implementation of emergency procedures would minimize the potential for interference with an adopted emergency response plan. The proposed project would be constructed over the course of three years and would not impede access to local roadways or evacuation routes. The operation of the hotel would not induce a substantial increase in traffic, as none of the newly constructed residences will have permanent year-round residents and special events at the event spaces would abide by the special events traffic and parking plan to be prepared by the applicant. Therefore, impacts resulting from the proposed project would be **less than significant**.

g) ***Less-than-Significant Impact.*** According to Exhibit 27 of the City's General Plan Safety Element, the project site is located within a moderate fire threat zone and is adjacent to a high fire threat zone (City of Rancho Mirage 2017). However, the City's General Plan Safety Element also notes that "the historical record indicates that the wildland fire hazard in Rancho Mirage is relatively low" (City of Rancho Mirage 2017).

The types of potential ignition sources that currently exist in the area include vehicle and roadway, electrical transmission line, and machinery associated with various land uses in the vicinity, as well as off-site residential neighborhoods. The proposed project would introduce potential ignition sources but would also include conversion of fuels to lower flammability landscape and include better access throughout the site, managed and maintained landscapes, higher site awareness/monitoring, and generally a reduction in the receptiveness of the areas landscape to ignition. Fires from off-site would not have continuous fuels across this site, and therefore, would be expected to burn around and/or over the site through spotting. Burning vegetation embers may land on project structures but are not likely to result in ignition based on ember decay rates and the types of non-combustible and ignition resistant materials that will be used on site.

The proposed project would comply with ignition resistant fire and building codes and would include a layered fire protection system designed to current codes and inclusive of site-specific measures that will result in a project that is less susceptible to wildfire than surrounding landscapes and that would facilitate fire fighter and medical aid response. Further, modern infrastructure will be provided along with implementation for the latest ignition resistant construction methods and materials. All structures are required to include interior sprinklers consistent with City of Rancho Mirage and County of Riverside Fire and Building Codes. Fuel modification areas receive fuel reduction treatments initially, and then maintenance over time includes removing all dead and dying materials and maintaining appropriate horizontal and vertical spacing.

By complying with all fire-related codes, the proposed project would not expose people or structures to a significant risk, injury, or death involving wildland fires. As such, impacts would be **less than significant**.

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Cont.

### 9.3 Mitigation Measures

No mitigation measures required.

10. HYDROLOGY AND WATER QUALITY

| HYDROLOGY AND WATER QUALITY - - Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality? | ☐ | ☐ | ☒ | ☐ |
| b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin? | ☐ | ☐ | ☒ | ☐ |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: | ☐ | ☐ | ☒ | ☐ |
| i) result in substantial erosion or siltation on or off site; | ☐ | ☐ | ☒ | ☐ |
| ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site; | ☐ | ☐ | ☒ | ☐ |
| iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or | ☐ | ☐ | ☒ | ☐ |
| iv) impede or redirect flood flows? | ☐ | ☐ | ☒ | ☐ |

T2-2 Cont.

| HYDROLOGY AND WATER QUALITY - - Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation? | ☐ | ☐ | ☐ | ☒ |
| e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan? | ☐ | ☐ | ☒ | ☐ |

## 10.1 Setting

Part of the following analysis is based on the information provided in the Preliminary Drainage Study for Ritz Carlton Rancho Mirage report, prepared by Tory R. Walker Engineering. The report is included as Appendix D to the Initial Study.

**Summary of Existing Conditions**

***The Residences***

The majority of the existing site is mass graded and there is little to no vegetative cover. The total drainage area of the project site is approximately 14 acres with Hydrologic Soil Group Type B soils. The soil type was assumed based on the proposed project's geotechnical study (the proposed project is not mapped by the Riverside County hydrology manual or the NRCS Web Soil Survey). Hydrologic Soil Group Type B soils have moderately low runoff potential when thoroughly wet. They also have between 10% and 20% clay and 50% to 90% sand and have loamy sand or sandy loam textures (USDA 2007).

On-site runoff is conveyed via sheet flow and shallow drainage courses to the proposed project's discharge points along the western and eastern property boundary (Figure 10-1a). The existing site is divided into three basins, Basin 100 (denoted by 100 series nodes), Basin 200 (denoted by 200 series nodes), and Basin 300 (denoted by 300 series nodes). Basin 100 drains generally west to the gutter on Frank Sinatra Drive (Discharge Point 1) (Figure 10-1a). From Discharge Point 1, flow is conveyed north in the Frank Sinatra Drive gutter to an existing inlet and storm drain system, which eventually discharges to a natural drainage channel. Basin 200 drains generally east to Discharge Point 2 in the natural drainage channel located east of the site. Basin 300 drains west to Discharge Point 3 at the Mirada Circle gutter, which flows west and eventually discharges to a natural drainage channel.

***Sky Mesa Recreational Area***

The existing site is partially graded with generally poor desert vegetative cover. The total drainage area of the project site is approximately 2.6 acres with Hydrologic Soil Group Type B soils. The soil type was



T2-2 Cont.

assumed based on the proposed project's geotechnical study (the proposed project is not mapped by the Riverside County hydrology manual or the NRCS Web Soil Survey).

On-site runoff is conveyed via sheet flow and shallow drainage courses to the proposed project's discharge points along the western property boundary (Figure 10-1b). The existing site is divided into two basins, Basin 400 (denoted by 400 series nodes), and Basin 500 (denoted by 500 series nodes). Basin 400 drains generally west to the existing Ritz Carlton development (Discharge Point 4). Basin 500 drains northwest to Discharge Point 5 in the existing natural drainage channel west of the site.

## 10.2 Discussion of Impacts:

a) ***Less-than-Significant Impact:*** Construction activities associated with the proposed project could result in wind and water erosion of the disturbed area leading to sediment discharges. Similarly, as described in Section 9, Hazards and Hazardous Materials, fuels, oils, lubricants, and other hazardous substances used during construction could be released and impact water quality. The proposed project is required to comply with the NPDES State Water Resources Control Board Construction General Permit Order No. 2009-0009-DWQ for stormwater discharges and general construction activities and incorporate standard BMPs such as regular cleaning or sweeping of construction areas and impervious areas, and various stormwater BMPs such as filtration media screens. In compliance with the Construction General Permit, a SWPPP would be prepared that specifies BMPS that would be implemented during construction to minimize impacts to water quality. Therefore, impacts would be **less than significant**.

b) ***Less-than-Significant Impact:*** The proposed project would not utilize groundwater during construction or operation. According to the 2006 Geotechnical Report, the depth of groundwater in the vicinity of the project site is believed to be greater than 200 feet. As such, impacts to groundwater supplies would be **less than significant**.

c) i. ***Less-than-Significant Impact:*** The majority of the existing site is mass graded and there is little to no vegetative cover. The total drainage area of the project site is approximately 14 acres with Hydrologic Soil Group Type B soils. The soil type was assumed based on the proposed project's geotechnical study (the proposed project is not mapped by the Riverside County hydrology manual or the NRCS Web Soil Survey). On-site runoff is conveyed via sheet flow and shallow drainage courses to the proposed project's discharge points along the western and eastern property boundary (see Existing Condition Hydrology Map in Appendix D). As shown on the Existing Condition Hydrology Map, the site is divided into three drainage basins, one draining west to the gutter and storm drain system on Frank Sinatra Drive, one draining east to the natural drainage channel located east of the site, and one draining west to the Mirada Circle gutter, which flows west and eventually discharges to a natural drainage channel.

The proposed project includes residential condo and townhome type buildings, road, driveway, parking, patio, and landscaped areas. The project site will be divided into three major drainage basins such that the overall site drainage patterns will remain similar to the existing condition (Proposed Condition Hydrology Map in Appendix D). The development will increase the impervious area and the drainage area; therefore, underground detention vaults are proposed to manage the increase in peak flow to below existing levels.

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Cont.

The Sky Mesa Recreation Area includes a restaurant with roof top garden (built into the natural hillside), driveway, patio, pool, sidewalk, lawn, and desert landscape areas. The project site will be divided into two major drainage basins such that the overall site drainage patterns will remain similar to the existing condition. The proposed project reduces the average on-site slope, maximizes pervious area by incorporating roof top garden areas for the restaurant, and provides extensive landscape areas throughout the site. Therefore, no increase in peak flow rates is anticipated in the proposed condition.

As such, the proposed project would not substantially alter the existing drainage pattern such that substantial erosion would occur on or off site. Therefore, impacts would be **less than significant**.

c) ii. ***Less-than-Significant Impact:*** With implementation of the proposed project, the flow patterns of the site will largely stay the same. The proposed project would implement underground detention vaults. Detention basin analysis was conducted for each of the detention vaults. The Drainage study found that the outflows for 100-year storm events at the discharge points will be reduced by 0.13 cubic feet per second, offsetting the 1.52 cubic feet per second increase that would have occurred without detention. As such, the proposed project would not substantially alter the existing drainage patterns such that it would increase flooding on or off site. Impacts would be **less than significant**.

c) iii. ***Less-than-Significant Impact:*** Refer to responses in Threshold 10(c)(ii) and 10(c)(iii). The Drainage Study (Appendix D) that was prepared for the proposed project concluded that, during operation, the flow patterns of the site will largely stay the same with implementation of the proposed project. Although the proposed project would increase the amount of impervious surface at the site compared to existing conditions, this increase would not be significant. Further, underground detention vaults would be implemented as part of the proposed project to ensure runoff from large storm events would not exceed the capacity of the stormwater drainage system. As such, impacts would be **less than significant**.

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c) iv. ***Less-than-Significant Impact:*** According to Exhibit 26 of the City's General Plan Safety Element (City of Rancho Mirage 2017), the project site is not located in any type of flood zone as defined by the Flood Emergency Management Agency (FEMA). According to FEMA, the project site is located within Zone X, or an area of minimal flood hazard (FEMA n.d.). Refer to the responses above regarding proposed stormwater facilities per the Drainage Study. Impacts would be **less than significant**.

d) ***No Impact:*** Refer to response to Threshold 10(c)(iv). The proposed project would not be located within a 100-year flood hazard area (City of Rancho Mirage 2017). The project site is located approximately 100 miles inland from the Pacific Ocean and therefore would not be subject to tsunami inundation. Further, the project site is not located near a large standing body of water. The closest body of water is the Whitewater River, located approximately 0.66 miles to the northwest. Thus, inundation by seiche (or standing wave) is considered negligible. As such, **no impact** would occur.

e) ***Less-than-Significant Impact:*** A drainage study has been prepared for the proposed project and incorporated into project design, as discussed previously. The drainage study and project designs has been prepared consistent with the requirements of the City's BMP Design Manual, consistent with the requirements of the Santa Ana Regional Water Quality Control Board

(RWQCB) Order No. R8-2010-003 (Regional MS4 Permit). The City of Rancho Mirage, along with other Riverside County cities within the Santa Ana RWQCB and Riverside County, voluntarily applied for and received a permit to discharge stormwater to the Santa Ana River (Order No. R8-2002-0011, NPDES No. CAS 618033). This MS4, originally approved in 1990, is currently under review for its fourth term re-issuance by the Santa Ana RWQCB. The City's MS4 permit regulates activities related to the quality of discharge through the stormwater management program.

The proposed project would be required to comply with all applicate plans, including policies and programs referred in the City's General Plan Safety element, such as establishing and enforcing regulations and guidelines for the development and maintenance of project-specific on-site retention/detention basin that implement the NPDES program, enhance groundwater recharge, complement regional flood control facilities, and address applicable community design policies. The proposed project would not conflict of obstruct with the applicable water quality plans. Additionally, as described above, the proposed project would not interfere with groundwater recharge or use. Therefore, impacts would be **less than significant**.

### 10.3 Mitigation Measures

No mitigation measures required.

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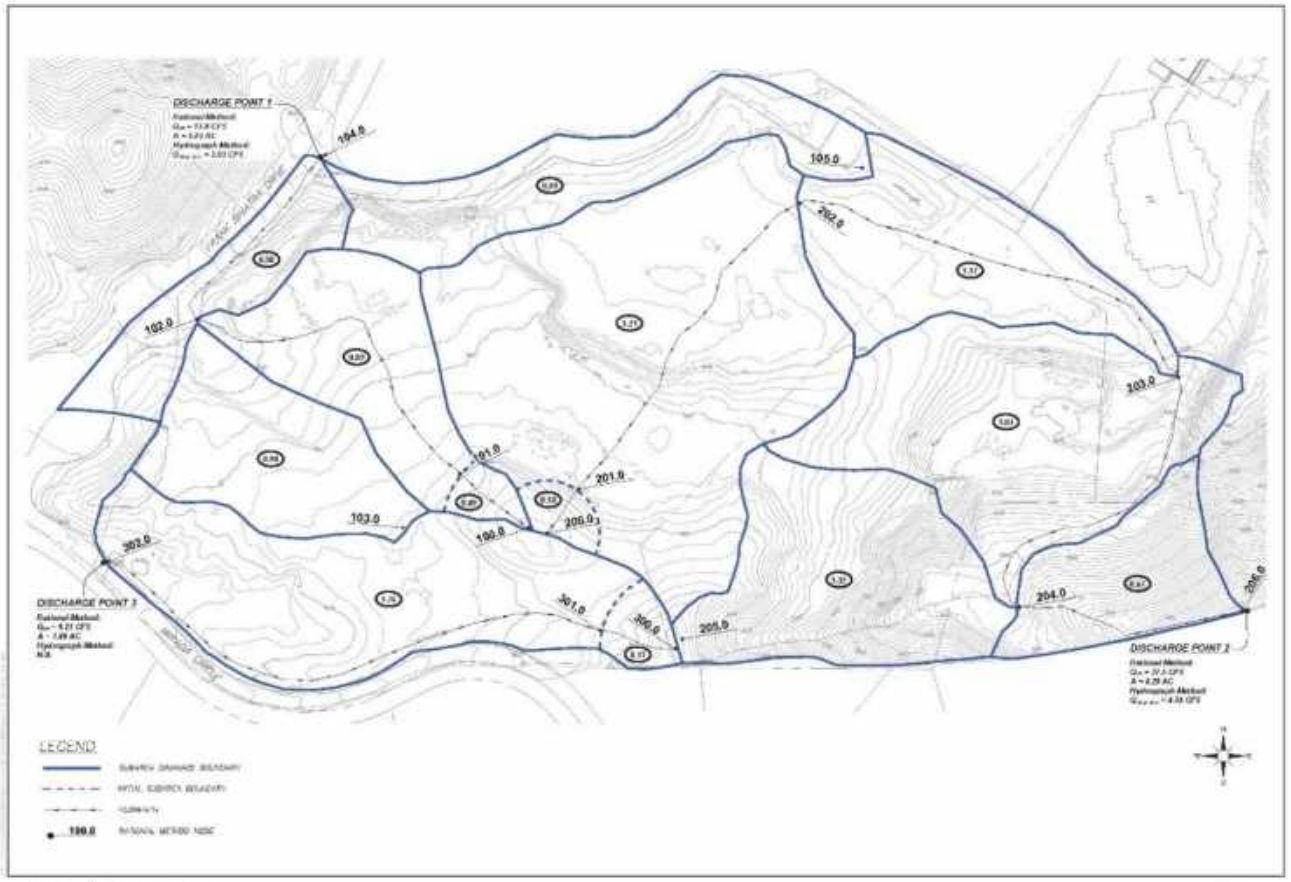


SOURCE: Tory R. Walker Engineering 2019

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FIGURE 10-1a
Existing Conditions Hydrology Map for Residences at Ritz Carlton
Ritz-Carlton Rancho Mirage Initial Study

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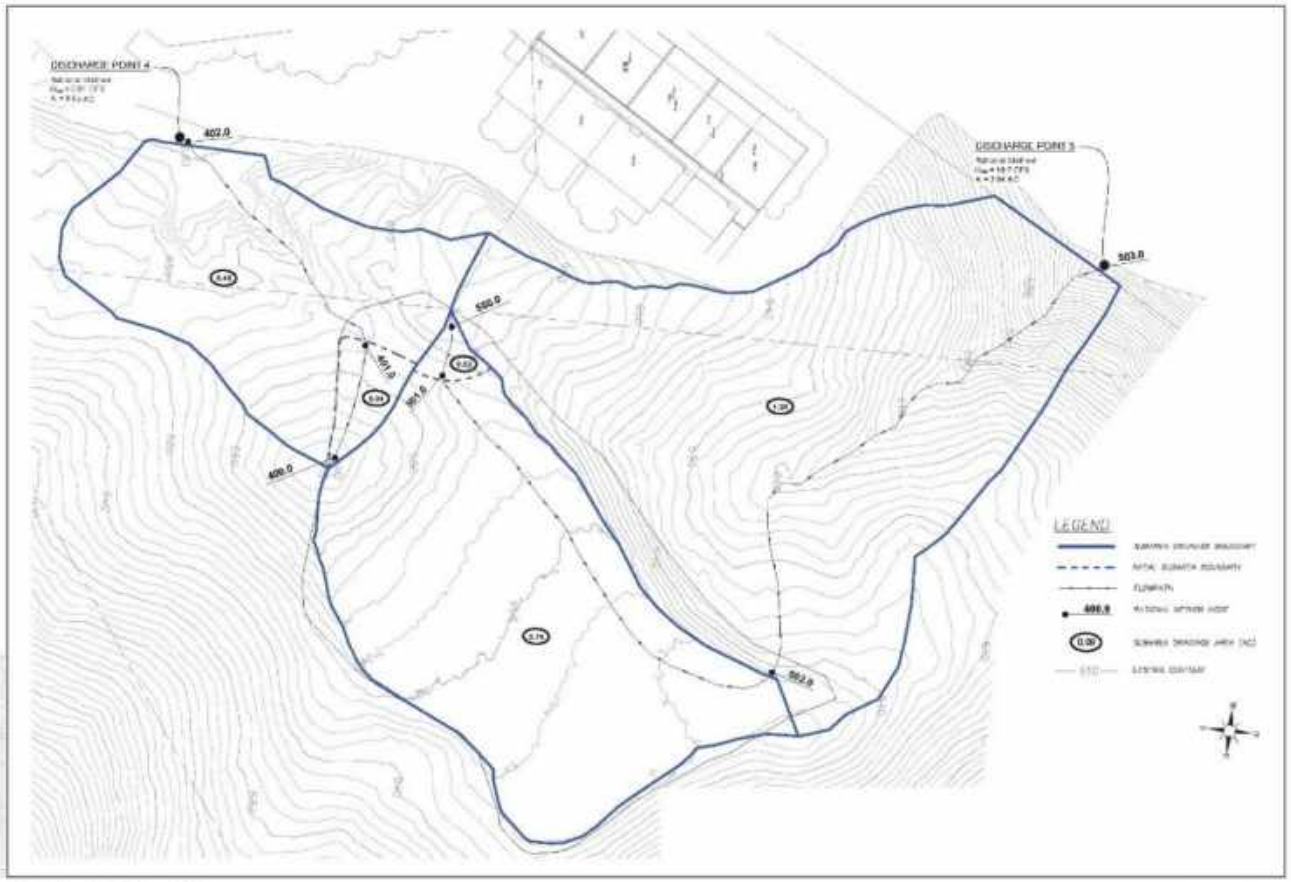


SOURCE: Tory R. Walker Engineering 2019

DUDEK

FIGURE 10-1b

Existing Conditions Hydrology Map for Sky Mesa Recreational Area

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T2-2
Cont.

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T2-2
Cont.

11. LAND USE AND PLANNING

| LAND USE AND PLANNING - Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Physically divide an established community? | ☐ | ☐ | ☐ | ☒ |
| b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect? | ☐ | ☐ | ☒ | ☐ |

### 11.1 Setting

The project site is situated on all or portions of Assessor parcel numbers 689-330-026, -28, -32 which have a General Plan Land Use designation of Commercial: Resort Hotel (Rs-H) and also on parcels 689-020-012, -14 carrying an Open Space: Mountain Reserve (MR) designation.

The project site is surrounded open space to the north, northeast, east, and west and residential to the south and northwest.

### 11.2 Discussion of Impacts

a) ***No Impact:*** The proposed project would be located entirely within the 16.13-acre project site, which is currently vacant. None of the proposed project components would potentially block or impede movements between surrounding established communities. **No impact** would occur.

b) ***Less-than-Significant Impact:*** The project site is currently zoned Resort Hotel (Rs-H) and Open Space: Mountain Reserve (MR) in the General Plan (City of Rancho Mirage 2017). The proposed hotel suites and villas are located on the Rs-H zoned property and therefore consistent with the General Plan designation. This designation allows for the development of hotels and destination resorts with limited, ancillary commercial uses, such as spas, recreational facilities, restaurants, lounges, and small retail shops that directly support the primary use. The

Sky Mesa is located on the MR zoned portion of the project site which is assigned to public lands or property subject to conservation easements in the Santa Rosa Mountains. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation. Under existing conditions, the Sky Mesa portion of the project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning to encompass the Sky Mesa portion of

T2-2 Cont.

the site, which is a privately owned property and not public land. As noted above, the MR zone was adopted for the purposed of avoiding or mitigating possible impacts on sensitive biological resources. As discussed In Section 4, Biological Resources, the proposed project could result in significant impacts sensitive biological resources related to the Sky Mesa Recreation Area; implementation of mitigation measures **MM-BIO-1** through **MM-BIO-6** would reduce potentially significant impacts related to burrowing owl, sensitive reptiles and other wildlife, and compliance with the CVMSHCP, to a level below significance. As such, rezoning the Sky Mesa site from MR to Rs-H would not conflict with the City's land use policy of protecting sensitive biological resources.

Per the description of allowable uses for Rs-H outlined above, the Sky Mesa Recreation Area would be consistent with Rs-H zone. With future approval and adoption of the zone change by City Council, the proposed project would not conflict with the City's General Plan with regard to allowable land uses.

The project site is surrounded open space to the north, northeast, east, and west and residential to the south and northwest. Additionally, the existing Ritz Carlton Resort is located directly north of the site proposed for the Ritz Carlton residences and directly west of the site proposed for the Sky Mesa Recreation Area. As such, the project's proposed uses would be compatible with nearby land uses. The proposed project would be required to comply with the goals and policies of the General Plan and the City's zoning codes.

The General Plan, Land Use Element contains several goals applicable to the proposed project, including providing a resort residential community of desirable neighborhoods, a variety of community facilities, and high-quality development, meeting the City's future needs by providing high-quality commercial land uses distributed throughout Rancho Mirage, preserving the scenic viewsheds from adjoining properties and public rights-of-ways, and utilizing flexible development policies to provide quality amenities within open space. The proposed project would place residential suites, hotel villas, event space, commercial, and amenity space on a previously disturbed site with similar surrounding land uses. The proposed project would include high quality design for resort living, quality commercial uses, and open space amenities while preserving existing viewsheds and scenic resources. Thus, the proposed project would not conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Project implementation would not result in significant physical environmental impacts related to land use plan or zoning inconsistencies. Impacts would be **less than significant.**

T2-2
Cont.

### 11.3 Mitigation Measures

No mitigation measures required.

12. MINERAL RESOURCES

| MINERAL RESOURCES -- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | ☐ | ☐ | ☐ | ☒ |
| b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | ☐ | ☐ | ☐ | ☒ |

### 12.1 Setting

The City is located in the Palm Springs Production-Consumption (P-C) Zone according to the Department of Conservation (DOC 2007). The project site is located on Mineral Resource Zone (MRZ)-3.

T2-2
Cont.

### 12.2 Discussion of Impacts

a, b) ***No Impact:*** The project site is located on MRZ-3, which is defined as areas containing known or inferred mineral occurrences of undetermined mineral resource significance. Additionally, no mineral resource recovery site is delineated in the City's General Plan. Therefore, **no impact** to locally important mineral resources would occur.

### 12.3 Mitigation Measures

No mitigation measures required.

T2-2
Cont.

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13. NOISE

| NOISE – Would the project result in: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☐ | ☒ | ☐ |
| b) Generation of excessive groundborne vibration or groundborne noise levels? | ☐ | ☒ | ☐ | ☐ |
| c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |

T2-2 Cont.

### 13.1 Setting

This section is based upon the Ritz-Carlton Residences Noise Impact Analysis (noise report) prepared by Urban Crossroads. The noise report is included as Appendix E to this Initial Study. Background and methodologies regarding the noise analysis are found in Appendix E.

To assess the existing noise level environment, 24-hour noise level measurements were taken at five locations in the project site (Figure 13-1). The noise level measurements were collected by Urban Crossroads, Inc. on Thursday, December 5, 2019.

**Significance Criteria Summary**

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. While the City of Rancho Mirage General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at

which increases are considered substantial for use under Guideline A. CEQA Appendix G Guideline C applies to nearby public and private airports, if any, and the proposed project's land use compatibility.

Noise Impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 13.1, Significance Criteria Summary, shows the significance criteria summary matrix.

**Table 13-1. Significance Criteria Summary**

| Analysis | Receiving Land Use | Condition(s) | Significance Criteria | |
|---|---|---|---|---|
| | | | *Daytime* | *Nighttime* |
| Off-Site Traffic | Noise-Sensitive | If ambient is < 60 dBA CNEL | ≥ 5 dBA CNEL Project increase | |
| | | If ambient is 60 - 65 dBA CNEL | ≥ 3 dBA CNEL Project increase | |
| | | If ambient is > 65 dBA CNEL | ≥ 1.5 dBA CNEL Project increase | |
| | Non-Noise Sensitive | If ambient is < 70 dBA CNEL | ≥ 5 dBA CNEL Project increase | |
| | | If ambient is > 70 dBA CNEL | ≥ 3 dBA CNEL Project increase | |
| Operational | Residential | Exterior Noise Level Standards | See Table 3-1 | |
| | | If ambient is < 60 dBA $L_{eq}$ | ≥ 5 dBA $L_{eq}$ Project increase | |
| | | If ambient is 60 - 65 dBA $L_{eq}$ | ≥ 3 dBA $L_{eq}$ Project increase | |
| | | If ambient is > 65 dBA $L_{eq}$ | ≥ 1.5 dBA $L_{eq}$ Project increase | |
| Construction | Noise Sensitive | Permitted between 7:00 a.m. to 6:00 p.m. Monday to Saturdays; with no activity allowed on Sundays or holidays. | | |
| | | Noise Level Threshold | 85 dBA $L_{eq}$ | n/a |
| | | Vibration Level Threshold | 80 VdB | n/a |

**Source:** Appendix E

**Existing Noise Level Measurements**

To assess the existing noise level environment, 24-hour noise level measurements were taken at three locations in the project site (L1, L2, and L3) (Figure 13-1). The receiver locations were selected to describe and document the existing noise environment within the project site. Figure 13-1 provides the boundaries of the proposed project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Thursday, December 5th, 2019. Appendix E includes study area photos.



T2-2 Cont.

***Measurement Procedure and Criteria***

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013.

***Noise Measurement Locations***

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources. Further, FTA guidance states, that it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the proposed project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community.

T2-2
Cont.

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after proposed project noise levels and is necessary to assess potential noise impacts due to the proposed project's contribution to the ambient noise levels.

***Noise Measurement Results***

The noise measurements presented below focus on the average or equivalent sound levels ($L_{eq}$). The equivalent sound level ($L_{eq}$) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 13-1, Significance Criteria Summary, identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Appendix E provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels north of the project site near existing Villas of Mirada single-family homes and dirt parking lot. The noise levels at this location consist primarily of parking lot vehicle movements from dirt lot to the south. The energy (logarithmic) average

daytime noise level was calculated at 49.7 dBA $L_{eq}$ with an average evening noise level of 46.7 dBA $L_{eq}$ and an average nighttime noise level of 44.1 dBA $L_{eq}$.

- Location L2 represents the noise levels near the eastern boundary of the project site near the existing Ritz-Carlton hotel and vacant land. The energy (logarithmic) average daytime noise level was calculated at 53.4 dBA $L_{eq}$ with an average evening noise level of 48.0 dBA $L_{eq}$ and an average nighttime noise level of 48.1 dBA $L_{eq}$. The noise levels at this location consist primarily of walkway activity around the Ritz-Carlton Rancho Mirage.
- Location L3 represents the noise levels by the western boundary of the project site near to the gated entrance of the Mirada Estates. The energy (logarithmic) average daytime noise level was calculated at 50.4 dBA $L_{eq}$ with an average evening noise level of 46.6 dBA $L_{eq}$ and an average nighttime noise level of 41.7 dBA $L_{eq}$. Traffic on Frank Sinatra Drive represents the primary source of noise at this location.

Table 13-1, Significance Criteria Summary, provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix E provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, $L_1$, $L_2$, $L_5$, $L_8$, $L_{25}$, $L_{50}$, $L_{90}$, $L_{95}$, and $L_{99}$ percentile noise levels observed during the daytime and nighttime periods.

The background ambient noise levels in the project site are dominated by surface street and parking lot activity. This includes the auto and heavy truck activities on study area roadway segments near the noise level measurement locations. The 24-hour existing noise level measurement results are shown on Table 13-2, 24-Hour ambient Noise Level Measurements.

T2-2
Cont.

**Table 13-2, 24-Hour Ambient Noise Level Measurements**

| Location[1] | Description | Energy Average Noise Level dBA $L_{eq}$[2] | | |
|---|---|---|---|---|
| | | *Daytime* | *Evening* | *Nighttime* |
| L1 | Located north of the project site near the existing Villas of Mirada single-family homes and an open dirt parking lot. | 49.7 | 46.7 | 44.1 |
| L2 | Located near the eastern boundary of the project site near the existing Ritz-Carlton hotel and vacant land. | 53.4 | 48.0 | 48.1 |
| L3 | Located by the western boundary of the project site near to the gated entrance of the Mirada Estates. | 50.4 | 46.6 | 41.7 |

**Source:** Appendix E.
**Notes:**
1 See Figure 13-1 for the noise level measurement locations.
2 Energy (logarithmic) average levels. The long-term 24-hour measurement worksheets are included in Appendix E. "Day" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.

**Sensitive Receiver Locations**

To assess the potential for long-term short-term construction noise impacts, the following sensitive receiver locations, as shown on Figure 13-2, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Receiver locations are located in outdoor living areas (e.g., backyards) at 10 feet from any existing or proposed barriers or at the building façade, whichever is closer to the project site, based on FHWA guidance, and consistent with additional guidance provided by Caltrans and the FTA. Sensitive receiver locations in the proposed project study area include the nearby residential uses, as described below. Other sensitive land uses in the project site that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

**R1**: Located approximately 591 feet north of the project site, R1 represents existing residential homes (1 Santa Rosa Mountain Lane) west of Frank Sinatra Drive. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

**R2**: Location R2 represents the Ritz-Carlton Rancho Mirage located northeast of the project site at roughly 66 feet. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

**R3**: Location R3 represents the existing residential homes (29 Grande View Court) on the south side of Mirada Circle at approximately 21 feet from the project site.

**R4**: Location R4 represents the existing residential home located at 30 Grande View Court approximately 33 feet from the project site boundary.

**R5**: Location R5 represents the existing residential home located at 31 Mirada Circle approximately 69 feet from the project site boundary.

**R6**: Location R6 represents the existing residential home located at 46 Mirada Circle approximately 108 feet from the project site boundary.

**R7**: Location R7 represents the existing residential home located 45 Mirada Circle approximately 125 feet from the project site boundary.

**R8**: Location R8 represents the existing residential home located at 1 Mirada Circle approximately 160 feet from the project site boundary.

T2-2
Cont.

## 13.2 Discussion of Impacts

a) ***Less-than-Significant Impact.*** Per Chapter 8.45 of the City's Municipal Code, the exterior noise limits for Resort commercial space is 65 CNEL from 7:00am to 6:00pm, 60 CNEL from 6:00pm to 10:0pm. And 55 CNEL from 10:00pm to 7:00am (City of Rancho Mirage 2021). The noise limits for Recreation space is 70 CNEL from 7:00am to 6:00pm, 65 CNEL from 6:00pm to 10:00pm, and 60 CNEL from 10:00pm to 7:00am (City of Rancho Mirage 2021). The noise limits for Residential land uses is 55 CNEL from 7:00am to 6:00pm, 50 CNEL from 6:00pm to 10:00pm, and 45 CNEL from 10:00pm to 7:00am (City of Rancho Mirage 2021).

**Construction Noise Impact**

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the proposed project. Noise generated by the proposed project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment are expected to occur in the following stages:

- Demolition
- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of proposed project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e. construction equipment). For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver.

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the proposed project construction noise level impacts at the nearby sensitive receiver locations were completed. To assess the worst-case construction noise levels, the proposed project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of construction activity area for each stage of construction to the nearest receiver location. Appendix E includes the detailed CadnaA construction noise model inputs.

T2-2
Cont.

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the closest point from the edge of the construction activity areas to each of the nearby receiver locations. As detailed in Appendix E, the unmitigated construction noise levels are expected to range from 42.1 to 70.6 dBA $L_{eq}$ at the nearby receiver locations. Proposed project construction noise levels are considered exempt if activities occur within the hours specified in the City of Rancho Mirage Municipal Code Section 15.04.030 of 7:00 a.m. to 7:00 p.m. on weekdays.

As stated in Appendix E, to evaluate whether the proposed project will generate potentially significant short-term noise levels at nearby receiver locations, a construction-related noise level threshold is adopted from the *Criteria for Recommended Standard: Occupational Noise Exposure* prepared by the National Institute for Occupational Safety and Health (NIOSH). The threshold of 85 dBA $L_{eq}$ is used as acceptable thresholds for construction noise at the nearby sensitive receiver locations. The construction noise analysis presented in Appendix E, shows that the noise sensitive residential receiver locations will satisfy the 85 dBA $L_{eq}$ significance threshold during proposed project construction activities as shown on Table 13-3, Construction Noise Level Compliance. Therefore, the noise impacts due to proposed project construction noise is considered **less than significant** at all noise sensitive receiver locations.

**Table 13-3. Construction Noise Level Compliance**

| | Construction Noise Levels (dBA $L_{eq}$) | | |
|---|---|---|---|
| Receiver Location[1] | *Highest Construction Noise Levels*[2] | *Threshold*[3] | *Threshold Exceeded?*[4] |
| R1 | 52.2 | 85 | No |
| R2 | 69.6 | 85 | No |
| R3 | 70.3 | 85 | No |
| R4 | 70.6 | 85 | No |
| R5 | 70.2 | 85 | No |
| R6 | 65.2 | 85 | No |
| R7 | 66.5 | 85 | No |
| R8 | 56.1 | 85 | No |

**Source:** Appendix E.
**Notes:**
1 Noise Receiver locations are shown on Figure 13-2.
2 Highest construction noise level calculations based on distance from the construction noise source activity to nearby receiver locations as shown in Appendix E.
3 Construction noise level thresholds as shown in Table 13-1, Significance Criteria Summary.
4 Do the estimated project construction noise levels exceed the construction noise level threshold?

T2-2 Cont.

### Operational Noise Impacts

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Figure 13-2 and defined in Section 13.1.3, Sensitive Receiver Locations, resulting from the operation of the proposed project.

It is expected the on-site project-related noise sources will include: air conditioning units, pool activity and outdoor courtyard activity. This noise analysis is intended to describe noise level impacts associated with the typical operational activities at the project site.

Using the reference noise levels to represent the proposed project operations that include, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the project site and the proposed project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 13-4, Project Operational Noise Levels, shows the calculated proposed project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m., evening hours of 7:00 p.m. to 10:00 p.m. and the nighttime hours of 10:00 p.m. to 7:00 a.m. Table 13-4, Project Operational Noise Levels, shows that the proposed project operational noise levels will range from 26.7 to 47.2 dBA $L_{eq}$.

**Table 13-4. Project Operational Noise Levels**

| Receiver Location[1] | Project Operational Noise Levels (dBA $L_{eq}$)[2] | | | Noise Level Standards (dBA Leq)[3] | | | Threshold Exceeded?[4] | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Day* | *Eve.* | *Night* | *Day* | *Eve.* | *Night* | *Day* | *Eve.* | *Night* |
| R1 | 29.6 | 30.3 | 26.7 | 55 | 50 | 45 | No | No | No |
| R2 | 41.9 | 42.9 | 37.3 | 55 | 50 | 45 | No | No | No |
| R3 | 46.8 | 47.2 | 44.6 | 55 | 50 | 45 | No | No | No |
| R4 | 43.7 | 43.7 | 42.2 | 55 | 50 | 45 | No | No | No |
| R5 | 43.5 | 43.6 | 42.0 | 55 | 50 | 45 | No | No | No |
| R6 | 43.1 | 43.5 | 40.8 | 55 | 50 | 45 | No | No | No |
| R7 | 42.3 | 42.3 | 40.7 | 55 | 50 | 45 | No | No | No |
| R8 | 35.3 | 35.4 | 33.7 | 55 | 50 | 45 | No | No | No |

**Source**: Appendix E.
**Notes**:
1 See Figure 13-2 for the noise source and receiver locations.
2 Project operational noise level calculations included in Appendix E.
3 City of Rancho Mirage exterior noise level standards for residential land use, as shown in Table 13-1, Significance Criteria Summary.
4 Do the estimated Project operational noise source activities exceed the noise level standards?
"Day" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.

To demonstrate compliance with local noise regulations, the project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Rancho Mirage exterior noise level standards at nearby noise-sensitive receiver locations. Table 13-4, Project Operational Noise Levels, shows that the operational noise levels associated with project will satisfy the City of Rancho Mirage 55 dBA $L_{eq}$ daytime, 50 dBA $L_{eq}$ evening and 45 dBA $L_{eq}$ nighttime exterior noise level standards at all nearby receiver locations. Therefore, the operational noise impacts are considered less than significant at the nearby noise-sensitive receiver locations.

To describe the proposed project operational noise level contributions, the proposed project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by proposed project operational noise sources.



T2-2 Cont.

Tables (9-3 through 9-5) and calculations in Appendix E show that the proposed project operational noise level increase ranging from 0.0 to 4.7 dBA $L_{eq}$; as such, project operational noise level contributions satisfy the operational noise level increase significance criteria presented in Table 13-1, Significance Criteria Summary. Therefore, the proposed project related operational noise level increases at all sensitive receiver locations will be **less than significant**.

**Off-Site Transportation Noise Impact**

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed project, noise contours were developed based on Ritz-Carlton Residences Traffic Impact Analysis (Appendix E). Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Without / With Project: This scenario refers to the existing present-day 2019 noise conditions, without and with the development of the full Project. The existing with Project scenario will not actually occur since the Project would not be fully constructed and operational until 2023 conditions.
- Existing plus Ambient (EA) 2023 Without / With Project: This scenario refers to the existing noise conditions plus the estimated 4 years of background growth in ambient traffic conditions without and with the development of the full Project.
- Existing plus Ambient plus Cumulative (EAC) 2023 Without / With Project: This scenario refers to the existing plus ambient plus cumulative noise conditions at 2023 without and with the proposed Project.
- Horizon Year 2040 Without / With Project: This scenario refers to the future Horizon Year conditions at Year 2040 without and with the proposed Project. This scenario represents buildout of the General Plan land use and includes all cumulative projects identified in the Traffic Impact Analysis.

T2-2
Cont.

Noise contours were used to assess the proposed project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying proposed project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the project site. Appendix E present a summary of the exterior traffic noise levels for each traffic condition, and also includes the traffic noise level contours worksheets for each traffic condition.

An analysis of existing traffic noise levels plus traffic noise generated by the proposed project has been included in this report for informational purposes and to fully analyze all the existing traffic scenarios identified in the Ritz-Carlton Residences Traffic Impact Analysis prepared by Urban Crossroads, Inc (Appendix F). However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the project scenario will not actually occur since the proposed project would not be fully constructed and operational until future year 2023 plus cumulative

conditions. Therefore, no mitigation measures are considered to reduce the Existing Plus Project traffic noise level increases. The EAC 2023 and Horizon Year 2040 traffic noise conditions that include all cumulative projects are used to determine the significance of the proposed project off-site traffic noise level increases on the study area roadway segments.

The Existing 2019 without Project exterior noise levels are expected to range from 62.0 to 76.9 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. The Existing 2019 with Project conditions range from 63.6 to 76.9 dBA CNEL. The Project off-site traffic noise level increases range from 0.0 to 1.6 dBA CNEL on the study area roadway segments.

The EA 2023 without Project exterior noise levels are expected to range from 62.4 to 77.2 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. The EA 2023 with Project conditions range from 63.8 to 77.2 dBA CNEL. The Project off-site traffic noise level increases range from 0.0 to 1.4 dBA CNEL.

The EAC 2023 without Project exterior noise levels are expected to range from 62.7 to 77.4 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. The EAC 2023 with Project conditions range from 64.0 to 77.4 dBA CNEL. The Project off-site traffic noise level increases range from 0.0 to 1.3 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 13-1, Significance Criteria Summary, land uses adjacent to the project site roadway segments would experience **less-than-significant** noise level impacts due to proposed project-related traffic noise levels.

T2-2
Cont.

The Horizon Year 2040 without Project exterior noise levels are expected to range from 63.1 to 77.8 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. The Horizon Year 2040 with Project conditions range from 64.3 to 77.8 dBA CNEL. The Project off-site traffic noise level increases range from 0.0 to 1.2 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 13-1, Significance Criteria Summary, land uses adjacent to the study area roadway segments would experience **less-than-significant** noise level impacts due to unmitigated proposed project-related traffic noise levels.

**Summary**

The proposed project would not generate substantial temporary or permanent increase in ambient noise levels in the vicinity of the proposed project in excess of standards established in local plans or by other agencies. The proposed project would comply with all State of California noise requirements, the California Building Code, and policies and programs outlined in the City's General Plan Noise Element. Therefore, impacts would be **less than significant**.

b) ***Less-than-Significant Impact with Mitigation Incorporated.*** Construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized in Table 13-5, Vibration Source Levels for Construction Equipment. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA.

**Table 13-5. Vibration Source Levels for Construction Equipment**

| Equipment | Vibration Decibels (VdB) at 25 feet |
|---|---|
| Small bulldozer | 58 |
| Jackhammer | 79 |
| Loaded Trucks | 86 |
| Large Bulldozer | 87 |

**Source:** Appendix E.

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from proposed project construction activities would cause only intermittent, localized intrusion. The proposed project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

T2-2
Cont.

Ground-borne vibration levels resulting from construction activities occurring within the project site were estimated by data published by the Federal Transit Administration (FTA). Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site during various stages of construction. Using the vibration source level of construction equipment provided on Table 13-5, Vibration Source Levels for Construction Equipment, and the construction vibration assessment methodology published by the FTA, it is possible to estimate the project vibration impacts. Table 13-6, Unmitigated Construction Equipment Vibration Levels, presents the expected project related vibration levels at the nearby receiver locations.

**Table 13-6. Unmitigated Construction Equipment Vibration Levels**

| Receiver[1] | Distance to Const. Activity (Feet)[2] | Receiver Vibration Levels (VdB)[3] | | | | | Threshold (VdB)[4] | Threshold Exceeded?[5] |
|---|---|---|---|---|---|---|---|---|
| | | *Small Bulldozer* | *Jack-hammer* | *Loaded Trucks* | *Large Bulldozer* | *Highest Vibration Levels* | | |
| R1 | 591 | 16.8 | 37.8 | 44.8 | 45.8 | 45.8 | 80 | No |
| R2 | 66 | 45.4 | 6.4 | 73.4 | 74.4 | 74.4 | 80 | No |
| **R3** | **21** | **60.3** | **81.3** | **88.3** | **89.3** | **89.3** | **80** | **Yes** |
| **R4** | **33** | **54.4** | **75.4** | **82.4** | **83.4** | **83.4** | **80** | **Yes** |
| R5 | 69 | 44.8 | 65.8 | 72.8 | 73.8 | 73.8 | 80 | No |
| R6 | 108 | 38.9 | 59.9 | 66.9 | 67.9 | 67.9 | 80 | No |

**Table 13-6. Unmitigated Construction Equipment Vibration Levels**

| Receiver[1] | Distance to Const. Activity (Feet)[2] | Receiver Vibration Levels (VdB)[3] | | | | | Threshold (VdB)[4] | Threshold Exceeded?[5] |
|---|---|---|---|---|---|---|---|---|
| | | *Small Bulldozer* | *Jack-hammer* | *Loaded Trucks* | *Large Bulldozer* | *Highest Vibration Levels* | | |
| R7 | 125 | 37.0 | 58.0 | 65.0 | 66.0 | 66.0 | 80 | No |
| R8 | 160 | 33.8 | 54.8 | 61.8 | 62.8 | 62.8 | 80 | No |

**Source:** Appendix E.
**Notes:**
1 Receiver locations are shown on Figure 13-2.
2 Distance from receiver locations to the source of the nearest construction activity.
3 Based on the Vibration Source Levels of Construction Equipment in Appendix E.
4 Does the peak vibration exceed the vibration thresholds?
5 Does the vibration level exceed the FTA acceptable vibration level?

At distances ranging from 21 to 591 feet from the project construction activity, construction vibration velocity levels are expected to range from 45.8 to 89.3 VdB and will exceed the FTA 80 VdB threshold for human annoyance at receiver locations R3 and R4 (Figure 13-2). These impacts would be potentially significant, however implementation of a 50-foot vibration buffer zone from sensitive receiver locations R3 and R4 (**MM-NOI-1**) would reduce vibration levels to R3 and R4 to 78.0 VdB and would not exceed the FTA 80 VdB threshold.

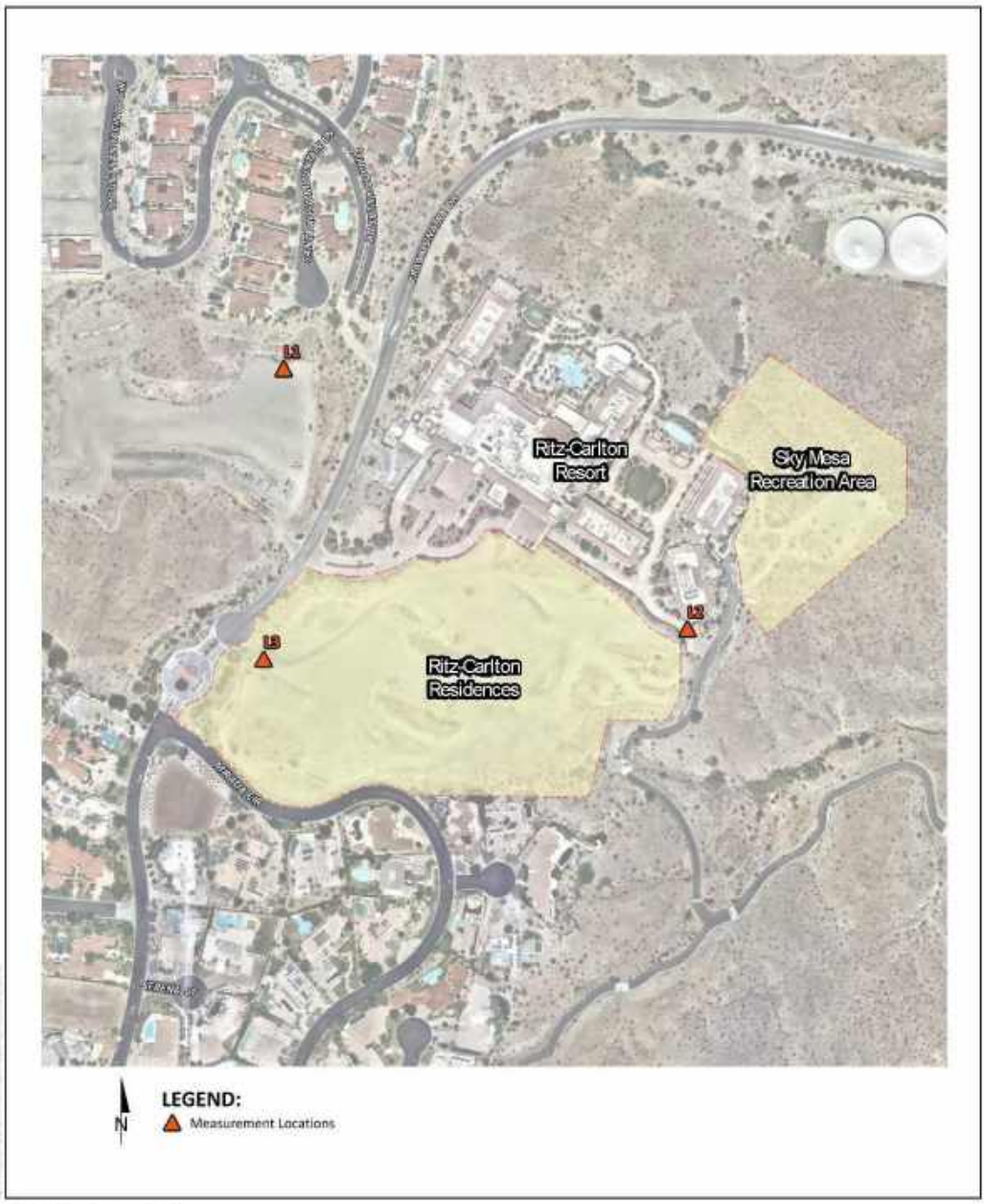
Vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the project site perimeter. Additionally, construction of the project site would be restricted the daytime hours between 7:00 a.m. and 6:00 p.m. Monday to Saturday with City of Rancho Mirage requirements thereby eliminating potential vibration impacts during the sensitive evening and nighttime hours. With this in consideration in addition to the implementation of **MM-NOI-1**, impacts would be **less than significant**.

c). ***No Impact.*** The project site is not located within the vicinity of a private airstrip or an airport land use plan, nor is it located within 2 miles of a public airport or public use airport. The closest airport to the project site is Palm Springs Airport, which is located approximately 4 miles north of the project site. The people residing or working in the project area would not be subject to excessive airport- or plane-related noise levels. Therefore, there would be **no impact**.

## 13.3 Mitigation Measures

**MM-NOI-1** During proposed project construction, the applicant shall require that large-loaded trucks and dozers (greater than 80,000 pounds) shall not be used within 50 feet along the entire southern property line. Instead, small rubber-tired or alternative equipment shall be used within this area during proposed project construction to reduce vibration effects. If all mobile equipment used during proposed project construction are less than 80,000 pounds, then the 50-foot buffer mitigation is not required.

T2-2 Cont.




SOURCE: Urban Crossroads 2020

FIGURE 13-1

Noise Measurement Locations

Ritz-Carlton Rancho Mirage Initial Study

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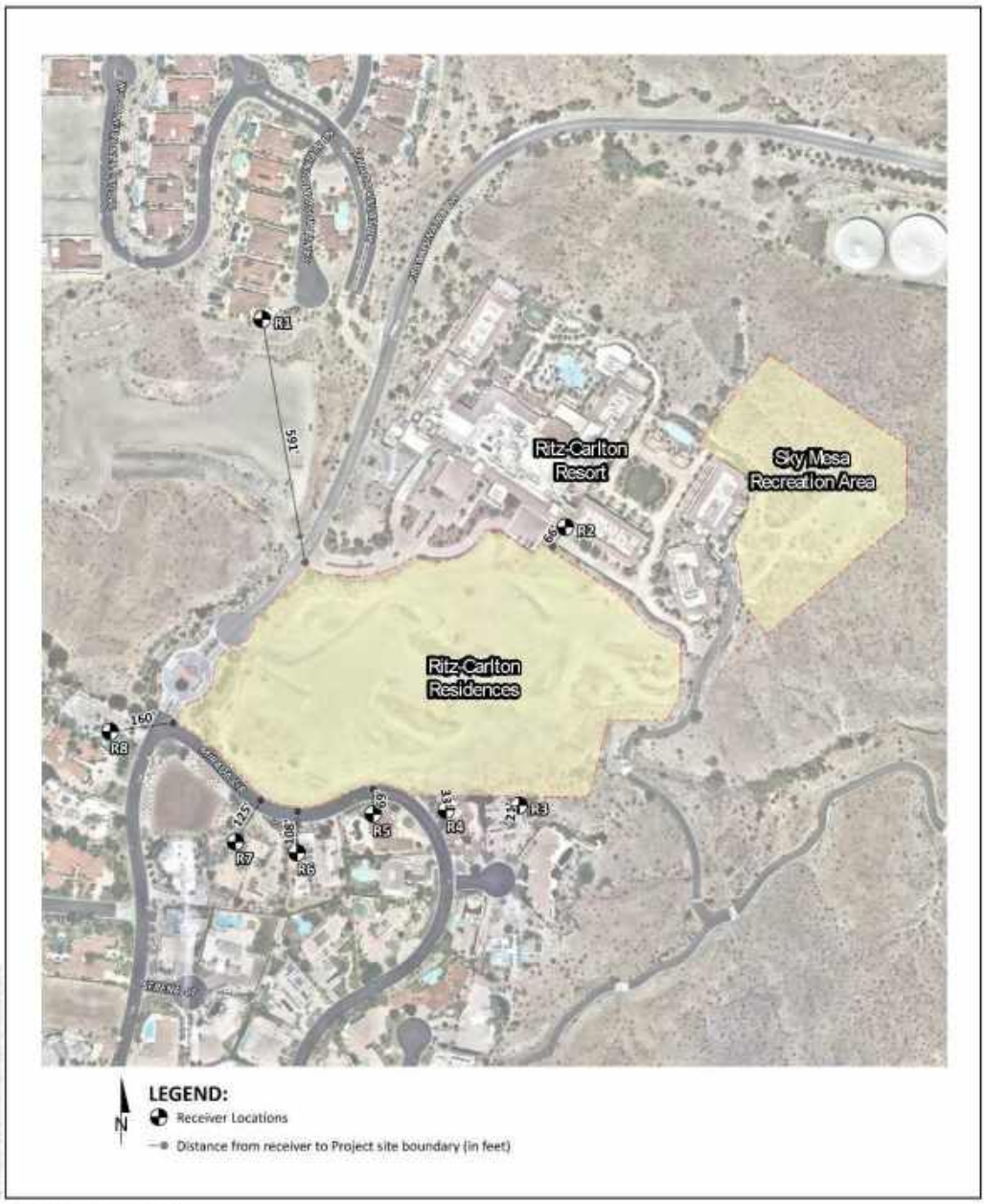


SOURCE: Urban Crossroads 2020

FIGURE 13-2

Noise Measurement Locations

Ritz-Carlton Rancho Mirage Initial Study

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Cont.

14. POPULATION AND HOUSING

| POPULATION AND HOUSING – Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | ☐ | ☐ | ☒ | ☐ |
| b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |

T2-2 Cont.

### 14.1 Setting

This section evaluates the proposed project's consistency with applicable plans, policies, and regulations as they relate to population and housing. Data sources for this section include Southern California Association of Governments (SCAG) and the City of Rancho Mirage General Plan – Housing Element.

### 14.2 Discussion of Impacts

a) ***Less-than-Significant Impact:*** The proposed project would involve the construction of 106 residential suites, hotel villas, event spaces, commercial spaces, and an amenity space totaling 236,748 square feet. Although the 106 residential suites are anticipated to be treated as a condo hotel unit in which residents are allowed to live at the residence only during a specified time frame, the residential units will be analyzed as typical dwelling units would for the purpose of this analysis.

The Southern California Association of Governments (SCAG) is a metropolitan planning organization that represents the Counties of Ventura, Los Angeles, San Bernardino, Orange, Riverside, and Imperial. SCAG reported the City's population to be 18,739 persons as of 2018 (SCAG 2019a). In 2018 the City had a total of 14,492 housing units, and in 2017 the City had a total of 16,902 jobs (SCAG 2019a). By 2045, SCAG projected the City to have a population of 25,200 persons and 21,200 jobs (SCAG 2020). These numbers are reflected in Table 14-1, Existing and Projected Population, Household, and Employment Growth in the City of Rancho Mirage. According to the City of Rancho Mirage's General Plan – Housing Element (City of Rancho Mirage 2022), the 2021 - 2029 Regional Housing Needs Allocation (RHNA) determined that the City has been assigned a total of 1,746 housing units.

The proposed project would construct 106 residential units. As stated earlier, these residential units would operate similar to time-share properties and therefore future residents would not be in the proposed residential units year-round. Because the proposed residential units are not typical residential units and residents cannot occupy them year-round, theses housing units do not count towards the RHNA housing unit determination.

SCAG's Local Profile Report for the City of Rancho Mirage indicated that the City's average household size was two persons per dwelling unit as of 2018 (SCAG 2019a). Using these assumptions, implementation of the proposed project would have the potential to increase the City's population by 216 persons. This population increase would comply with SCAG's projected population increase for the City (Table 14-1, Existing and Projected Population, Household, and Employment Growth in the City of Rancho Mirage).

The proposed project involves the construction of residential suites, hotel villas, event space, a commercial area, restaurant, and amenities such as a pool terrace. Additionally, the proposed project is not a large employment center that would encourage people to move to the area for work.

**Table 14-1. Existing and Projected Population, Household, and Employment Growth in the City of Rancho Mirage**

| | 2016 | 2045 |
|---|---|---|
| Population | 18,200 | 25,200 |
| Households | 9,000 | 13,000 |
| Employment | 16,600 | 21,200 |

**Source:** SCAG 2020.

T2-2 Cont.

The anticipated population growth and employment growth as a result of the proposed project are aligned with the City's growth projects. Further, the proposed project would generally connect to existing utilities and infrastructure located adjacent to the project site. The proposed project would not construct new or extend existing utilities or infrastructure into areas not currently served by such improvements (see Section 19, Utilities and Service Systems, for a detailed analysis of potential utilities or infrastructure related to the project). Thus, the proposed project would not indirectly induce substantial unplanned population growth and impacts would be **less than significant.**

c) ***No Impact:*** The project site is a vacant, graded plot of land with no existing structures present. The proposed project would neither displace existing housing nor necessitate the construction of replacement housing. Therefore, **no impacts** would occur.

## 14.3 Mitigation Measures

No mitigation measures required.

15. PUBLIC SERVICES

| PUBLIC SERVICES – | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | | | | |
| Fire protection? | ☐ | ☐ | ☒ | ☐ |
| Police protection? | ☐ | ☐ | ☒ | ☐ |
| Schools? | ☐ | ☐ | ☒ | ☐ |
| Parks? | ☐ | ☐ | ☐ | ☒ |
| Other public facilities? | ☐ | ☐ | ☐ | ☒ |

T2-2 Cont.

## 15.1 Setting

***Fire Protection***

Fire services for the City of Rancho Mirage are provided through a cooperative agreement with the State of California (Cal-Fire) and the County of Riverside Fire Department (RCFD) (City of Rancho Mirage n.d.a.). Cal-Fire/Riverside County Fire Department is an all risk, full-service fire department and has two fire stations located in City of Rancho Mirage (City of Rancho Mirage 2017).

***Police Protection***

Twenty-four hour police protection is provided to the City of Rancho Mirage on a contractual basis by the Riverside County Sheriff's Department (RCSD) (City of Rancho Mirage 2017). As of 2017, the City had one officer per 786 resident, which exceeds the commonly accepted ratio of one officer per 1,000 residents (City of Rancho Mirage 2017).

***Schools***

The City is located in the Palm Springs Unified School District (PSUSD) and the Desert Sands Unified School District (DSUSD) (City of Rancho Mirage 2006). There is one public school and three private schools in the City (City of Rancho Mirage 2006). The public school is Rancho Mirage Elementary School. The three private schools are Palm Valley school (pre-kindergarten through 12th grade), Marywood Country Day School (pre-kindergarten to 6th grade), and Rancho Mirage Children's School (pre-kindergarten to 4th grade).

***Parks***

Guided by the Parks Master Plan, the City has expanded its parks and trail system throughout Rancho Mirage to adapt to the growing population. Currently, there are six parks, including a mix of mini and local parks (City of Rancho Mirage 2017). There are no existing recreational opportunities on site.

## 15.2 Discussion of Impacts

a) ***Fire protection?***

***Less-than-Significant Impact:*** The closest fire station to the project site is Fire Station No. 50 (70801 Highway 111), located approximately 2.7 miles southeast of the site. In addition to the two fire stations, five other County operated fire stations are located close to the City (City of Rancho Mirage 2017).

Once operational, Cal-Fire/RCFD would continue to serve the project site. Additionally, as discussed in Threshold 14(a), the proposed project would not result in substantial unplanned population growth in the City. Although the proposed project would potentially result in a slight increase in calls for service to the project site in comparison to the existing conditions, this increase is expected to be nominal and not to result in the need for new facilities. Additionally, the proposed project would pay the City's fire tax to help fund fire protection services and development impact fees per Section 3.29.120 of the City's Municipal Code (City of Rancho Mirage 2017). Overall, it is anticipated that the proposed project would be adequately served by existing Cal-Fire/RCFD facilities, equipment, and personnel. Therefore, the proposed project would require the construction nor expansion of fire protection service facilities and impacts would be **less than significant**.

***Police protection?***

***Less-than-Significant Impact:*** Although the proposed project would potentially result in a slight increase in calls for service to the project site in comparison to existing conditions, this increase is expected to be nominal and not result in the need for new police facilities. Overall, it is anticipated that the proposed project would be adequately served by existing police facilities, equipment, and personnel. Therefore, the proposed project would not require the construction nor expansion of police protection facilities and impacts would be **less than significant**.

***Schools?***

***Less-than-Significant Impact:*** The project site is located within the boundaries of the PSUSD. Buildout of the proposed project would result in expanded hotel facilities, commercial space,

T2-2 Cont.

event space, and amenity space. The proposed Residences at Ritz Carlton only allows a limited and non-permanent (not year-round) stay for potential residences, and the proposed residence units are expected to serve as vacation and second homes. Because the residences do not function as typical dwelling units, the proposed project is not expected to result in student generation.

The proposed project would pay all applicable statutory school developer fees, which would be used for the potential construction and reconstruction of school facilities to accommodate students from new developments (PSUSD 2022). However, because the proposed project would not generate students the project would result in the need for expanded or new school facilities. Therefore, impacts would be **less than significant**.

***Parks?***

***No Impact:*** As further discussed in Section 16, Recreation, the proposed project would not result in substantial population growth in the City. The number of employees hired to construct and operate the proposed hotel would be minimal. As such, an increase in patronage at park facilities is not expected. In addition, the number of hotel guests visiting existing parks would be minimal, as the proposed project would provide open space and recreation facilities. Future hotel patrons would be more inclined to use hotel facilities rather than community parks. **No impacts** associated with the construction or expansion of park facilities would occur.

***Other public facilities?***

***No Impact:*** The proposed project would not result in substantial population growth in the City. The number of employees hired to construct and operate the proposed hotel would be minimal. As such, a substantial increase in patronage at libraries, community centers, and other public facilities is not expected. Therefore, **no impacts** associated with the construction or expansion of public facilities would occur.

T2-2
Cont.

## 15.3 Mitigation Measures

No mitigation measures required.

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16. RECREATION

| RECREATION – | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☒ | ☐ |
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment? | ☐ | ☐ | ☒ | ☐ |

T2-2
Cont.

### 16.1 Setting

The majority of the 16.13-acre project site is currently vacant and lies south and east of the existing Ritz-Carlton Rancho Mirage Hotel. Guided by the Parks Master Plan, the City has expanded its parks and trail system throughout Rancho Mirage to adapt to the growing population. There are no existing recreational opportunities on site.

### 16.2 Discussion of Impacts

a) ***Less-than-Significant Impact:*** As discussed earlier, the proposed project will provide approximately 35% open space made up of landscape areas, pools, water features, and paths. Figure 1-9a and 1-9b shows the proposed landscape plan for the Residences at Ritz Carlton and the Sky Mesa Recreational Area, respectively. A desert landscape design is proposed throughout the project site including water cascades, multiple pools, rock escarpments, and fountains. Visitors and residents would be using the proposed and existing hotel facilities provided on site.

As discussed in Section 14, Population and Housing, the proposed project would not result in substantial population growth in the City that would increase the use of existing parks and recreational facilities such that substantial physical deterioration of recreational facilities would occur or be accelerated. Therefore, substantial physical deterioration of these facilities would not occur or be accelerated with implementation of the proposed project; impacts would be **less than significant**.

b) ***Less-than-Significant Impact:*** The proposed project would not result in substantial population growth in the City. Further, the proposed project would not promote or indirectly induce new development that would require the construction or expansion of recreational facilities. Because

the proposed project would not result in substantial population growth in the City, it would not increase the demand for recreational facilities. As such, impacts would be **less than significant**.

### 16.3 Mitigation Measures

No mitigation measures required.

T2-2
Cont.

17. TRANSPORTATION

| TRANSPORTATION – Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities? | ☐ | ☒ | ☐ | ☐ |
| b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)? | ☐ | ☐ | ☒ | ☐ |
| c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☐ | ☐ | ☒ | ☐ |
| d) Result in inadequate emergency access? | ☐ | ☐ | ☒ | ☐ |

T2-2 Cont.

### 17.1 Setting

This section is based upon the Ritz-Carlton Residences Traffic Impact Analysis (traffic report) and Vehicle Miles Travelled (VMT) Analysis (VMT analysis) prepared by Urban Crossroads. The traffic report is included as Appendix F1 and F2 to this Initial Study, respectively. Additionally, a parking assessment was prepared by Urban Crossroads. The parking assessment is included as Appendix G of this Initial Study. Background and methodologies regarding the traffic analysis and the parking assessment are found in Appendix F and G, respectively.

As discussed in the Traffic Report prepared for this Initial Study (Appendix F), consistent with County of Riverside traffic study guidelines, the study area includes any intersection of "Collector" or higher classification street, with "Collector" or higher classification streets, at which the project will add 50 or more peak hours trips. There are three main intersections analyzed in the Traffic Report. A map of the three intersections is presented in Figure 17-1.

1. Frank Sinatra Dr. and Dwy. 1
2. Frank Sinatra Dr. and Dwy. 2
3. Highway 111 and Frank Sinatra Dr.

Frank Sinatra Drive is an east-west major collector running through the City. Most of the Frank Sinatra Drive is constructed to its ultimate design standards with a 100-foot right-of-way. However, Frank Sinatra Drive, west of Highway 111, is designated as a two-lane roadway in the General Plan. Highway 111 is the major

arterial connecting most of the commercial centers of the Coachella Valley. As a major arterial, the route runs north-west to south-east diagonally within the study area. Highway 111 provides three through travel lines in each direction. Highway 111 is designated as a Riverside County CMP roadway.

The Traffic Report analyzed six different scenarios: Existing (2019) Conditions, E + P (Existing plus Project) Conditions, Existing plus Ambient Growth plus Project (EAP) (2023) Conditions, Existing plus Ambient Growth plus Project Plus Cumulative (EAPC) (2023) Conditions, Horizon Year (2040) Without Project, Horizon Year (2040) With Project. Each scenario are described further below:

- Existing Conditions: Existing physical conditions have been disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared. Existing conditions are discussed in Section 17.1.2.
- E+P Conditions: The E+P analysis determines circulation system deficiencies that would occur on the existing roadway system in the scenario of the project being placed upon Existing conditions. The E+P scenario is analyzed in Section 17.2.2.
- EAP Conditions: The EAP (2023) traffic conditions analyses determine potential traffic impacts based on a comparison of the EAP traffic conditions to Existing conditions. To account for background traffic growth, an ambient growth factor from Existing conditions of 6.12% (2 percent per year over 3 years, compounded annually) for 2023 conditions is included for EAP traffic conditions. Consistent with County of Riverside traffic study guidelines, the EAP analysis is intended to identify "Opening Year" deficiencies associated with the development of the project based on the expected background growth within the study area. The EAP (2023) traffic conditions are analyzed in Section 17.2.3.
- EAPC Conditions: The EAPC (2023) traffic conditions analyses determine the potential near-term cumulative circulation system deficiencies. Background traffic for these analysis scenarios follow the same ambient growth methodology described above for EAP traffic conditions. However, EAPC traffic conditions also include the addition of cumulative development traffic. The comprehensive list of cumulative development projects was compiled from information provided by the City of Rancho Mirage and Cathedral City. The EAPC (2023) traffic conditions are analyzed in Section 17.2.4.
- Horizon Year (2040) Conditions: Traffic projections for Horizon Year (2040) with project conditions were derived from the Riverside Transportation Analysis Model (RivTAM) modified to represent buildout of the City of Rancho Mirage. The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the City's Development Impact Fee (DIF) program, or other approved funding mechanisms can accommodate the long-range cumulative traffic at the target level of service (LOS) identified by the City of Rancho Mirage. The Horizon Year (2040) traffic conditions are analyzed in Section 17.2.5.

  The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the Transportation Uniform Mitigation Fee (TUMF), or other approved funding mechanism (e.g., Community Facilities District, etc.) can accommodate the long-range cumulative traffic at the target Level of Service (LOS) identified in the City of Rancho Mirage General Plan. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-TUMF) are identified as such. Each of these regional transportation fee programs are discussed in more detail in Appendix F.



T2-2
Cont.

**Methodologies**

***Level of Service***

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

***Intersection Capacity Analysis***

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control.

***Signalized Intersections***

The City of Rancho Mirage require signalized intersection operations analysis based on the methodology described in the HCM 6th Edition. Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 17-1, Signalized Intersection Description of LOS.

T2-2
Cont.

**Table 17-1. Signalized Intersection Description of LOS**

| Description | Average Control Delay (Seconds), V/C ≤ 1.0 | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Operations with very low delay occurring with favorable progression and/or short cycle length. | 0 to 10.00 | A | F |
| Operations with low delay occurring with good progression and/or short cycle lengths. | 10.01 to 20.00 | B | F |
| Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. | 20.01 to 35.00 | C | F |
| Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable. | 35.01 to 55.00 | D | F |

**Table 17-1. Signalized Intersection Description of LOS**

| Description | Average Control Delay (Seconds), V/C ≤ 1.0 | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay. | 55.01 to 80.00 | E | F |
| Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths | 80.01 and up | F | F |

**Source**: Appendix F.

Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network. All signalized study area intersections have also utilized the Synchro software.

***Unsignalized Intersections***

The City of Rancho Mirage require the operations of unsignalized intersections be evaluated using the methodology described in the HCM 6th Edition. The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 17-2, Unsignalized Intersection Description of LOS).

T2-2
Cont.

**Table 17-2. Unsignalized Intersection Description of LOS**

| Description | Average Control Delay Per Vehicle (Seconds) | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Little or no delays. | 0 to 10.00 | A | F |
| Short traffic delays. | 10.01 to 15.00 | B | F |
| Average traffic delays. | 15.01 to 25.00 | C | F |
| Long traffic delays. | 25.01 to 35.00 | D | F |
| Very long traffic delays. | 35.01 to 50.00 | E | F |
| Extreme traffic delays with intersection capacity exceeded. | > 50.00 | F | F |

**Source:** Appendix F.

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

***Traffic Signal Warrant Analysis Methodology***

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TIA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD), for all study area intersections.

The signal warrant criteria for existing conditions are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CAMUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing study area intersections for all analysis scenarios. Warrant 3 is appropriate to use for this TIA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets.

Traffic signal warrant analyses were performed for all of the following unsignalized study area intersections: Frank Sinatra Drive and Driveway 1, and Frank Sinatra Drive and Driveway 2 (see Figure 17-1).

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Cont.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

***Queuing Analysis***

A queuing analysis has been conducted for all intersections and project driveways. The 95th percentile queuing of vehicles has been assessed along these roadways to determine potential queuing issues at the intersections.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential impacts/needs of the intersections with traffic added from the proposed project. The 50th percentile maximum queue is the maximum back of queue on a typical cycle during the peak hour, while the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes during the peak hour. In other words, if traffic were observed for 100 cycles, the 95th percentile queue would be the queue experienced with the 95th busiest cycle (or 5% of the time). The 50th percentile or average queue represents the typical queue length for peak hour traffic conditions, while the 95th percentile queue is derived from the average queue plus 1.65 standard deviations. The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations.

***Minimum Level of Service (LOS)***

Per Goal 1, Policy 1 of the City of Rancho Mirage General Plan (City of Rancho Mirage 2017g), the following LOS will be utilized for study area intersections located within the City: Require development to achieve a peak hour LOS D or better at intersections and roadway segments.

***Deficiency Criteria***

To determine whether the addition of project traffic at a study intersection would result in a deficiency, the following will be utilized:

- A deficiency occurs at study area intersections if the pre-project condition is at or better than LOS D (i.e., acceptable LOS), and the addition of project trips causes the peak hour LOS of the study area intersection to operate at unacceptable LOS (i.e., LOS E or F). Per the County of Riverside traffic study guidelines, for intersections currently operating at unacceptable LOS (LOS E or F), a deficiency would occur if the project contributes 50 or more peak hour trips to pre-project traffic conditions.

**Existing Conditions**

This section provides a summary of the existing circulation network, the City of Rancho Mirage General Plan Circulation Network, and a review of existing peak hour intersection operations, traffic signal warrant, and queuing analyses.

T2-2
Cont.

***Existing Circulation Network***

The study area analyzed in Appendix F includes a total of three intersections as shown in Figure 17-1. Exhibit 3-1 in Appendix F illustrates the study area intersections and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

***City of Rancho Mirage General Plan Circulation Element***

A brief description of each roadway including existing and planned roadway width is provided below:

- Frank Sinatra Drive is an east-west major collector running through the City of Rancho Mirage. Most of Frank Sinatra Drive is constructed to its ultimate design standards with a 100-foot right-of-way. However, Frank Sinatra Drive, west of Highway 111, is designated as a two-lane roadway in the General Plan (City of Rancho Mirage 2017g).
- Highway 111 is the major arterial connecting most of the commercial centers of the Coachella Valley. As a major arterial, the route runs north-west to south-east diagonally within the study area. Highway 111 provides three through travel lanes in each direction. Highway 111 is designated as a Riverside County CMP roadway.

***Truck Routes***

The City of Rancho Mirage designated truck route map is shown on Exhibit 3-4 in Appendix F. Highway 111 is identified as designated truck route.

***Transit Service***

The City of Rancho Mirage and is currently served by the SunLine Transit Agency (STA), a public transit agency serving various jurisdictions throughout Coachella Valley. Transit service is reviewed and updated by STA periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. It should also be noted that SunDial service provides special services for the disabled and seniors (60+).

***Bicycle and Pedestrian Facilities***

Existing bicycle and pedestrian facilities within City are shown on Exhibit 3-6 in Appendix F. The General Plan identifies that Pedestrian and other non-motor circulation is encouraged in the City wherever possible (City of Rancho Mirage 2017g).

***Existing (2019) Traffic Counts***

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in December 2019. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)
- Saturday Mid-day Peak Hour (peak hour between 10:00 AM and 2:00 PM)

The weekday AM, weekday PM, and Saturday mid-day peak hour count data is representative of typical peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix F. These raw turning volumes have been flow conserved between intersections with limited access, no access and where there are currently no uses generating traffic.

Existing weekday average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-7 in Appendix F. Existing ADT volumes are based upon factored intersection peak hour counts collected by Urban Crossroads, Inc.

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 16.06 percent. As such, the above equation utilizing a factor of 6.23 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 16.06 percent (i.e.,

T2-2
Cont.

1/0.01606 = 6.23) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses.

***Existing Conditions Intersection Operations Analysis***

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented above. The intersection operations analysis results are summarized in Table 17-3, Intersection Analysis for Existing (2019) Conditions, which indicates that all existing study area intersections are currently operating at an acceptable LOS (i.e., LOS D or better) during one or more of the peak hours. The intersection operations analysis worksheets are included in Appendix F.

***Existing Conditions Traffic Signal Warrants Analysis***

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. For Existing (2019) traffic conditions, no existing study area intersections appear to currently warrant a traffic signal based on peak hour traffic flows (see Appendix F).

***Queuing Analysis***

A queuing analysis was performed for study area intersection to assess vehicle queues along the roadways. Existing (2019) queuing analysis findings are presented in Table 17-4, Peak Hour Queuing Summary for Existing (2019) Conditions.

As shown on Table 17-4, Peak Hour Queuing Summary for Existing (2019) Conditions, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the 95$^{th}$ percentile peak hour traffic flows. Worksheets for Existing (2019) conditions queuing analysis are provided in Appendix F.

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Cont.

Table 17-3. Intersection Analysis for Existing (2019) Conditions

| # | Intersection | Traffic Control | Intersection approach Lanes[1] | | | | | | | | | | | | Delay[2] (secs.) | | | Level of Service | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | NB | | | SB | | | EB | | | WB | | | Weekday | | | Weekday | | |
| | | | L | T | R | L | T | R | L | T | R | L | T | R | AM | PM | SAT | AM | PM | SAT |
| 1 | Frank Sinatra Dr. and Dwy. 1 | — | Future Intersection | | | | | | | | | | | | — | — | — | — | — | — |
| 2 | Frank Sinatra Dr. and Dwy. 2 | CSS | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 9.0 | 9.4 | 9.7 | A | A | A |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 1 | 3 | 1 | 2 | 3 | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 19.9 | 19.2 | 18.1 | B | B | B |

**Source:** Appendix F.
**Notes:**
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; CSS = Cross-street Stop; TS = Traffic Signal.
L = Left; T = Through; R = Right
1 When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
2 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.



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**Table 17-4. Peak Hour Queuing Summary for Existing (2019) Conditions**

| Intersection | Movement | Available Stacking Distance (Feet) | 90th Percentile Queue (Feet)[1] | | | Acceptable?[2] | | |
|---|---|---|---|---|---|---|---|---|
| | | | AM | PM | SAT | AM | PM | SAT |
| Frank Sinatra Dr. and Dwy. 1 | — | — | *Future Intersection* | | | | | |
| Frank Sinatra Dr. and Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes |
| | WBL/R | 200 | 34 | 28 | 45 | Yes | Yes | Yes |
| Hwy. 111 and Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes |
| | EBT/R | 270 | 41 | 74 | 51 | Yes | Yes | Yes |

**Source:** Appendix F.
**Notes:**
1 Minimum queue length for the approach reported.
2 Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

## 17.2 Discussion of Impacts

T2-2 Cont.

a) ***Less-than-Significant Impact with Mitigation.*** As discussed above in Section 17.1.1, Methodologies, roadways in Rancho Mirage must operate at an LOS of D or higher. The TIA (Appendix F) analyzed six traffic conditions, described in detail under 17.1, Setting.

Analysis of Existing (2019) Traffic Conditions, E+P Traffic Conditions, EAP (2023) Traffic Conditions, EAPC (2023) Traffic Conditions, and Horizon Year (2040) With and Without Project Traffic Conditions indicate that the study area intersections are currently operating at an acceptable LOS during one or more of the peak hours.

For E+P Traffic Conditions, EAP (2023) Traffic Conditions, EAPC (2023) Traffic Conditions, and Horizon Year (2040) With and Without Project Traffic Conditions, there are no deficient intersections that require improvement because there are no weekday peak hour queuing issues.

However, for E+P Traffic Conditions, EAP (2023) Traffic Conditions, and Horizon Year (2040) With Project Traffic Conditions, the Highway 111 and Frank Sinatra Drive study intersection would operate at unacceptable weekend special event 95th percentile traffic flows and therefore would require improvements to northbound lane movements and eastbound lane movements at the Highway 111 and Frank Sinatra Drive intersection (**MM-TRA-1**; **MM-TRA-2**). The proposed project would have a **less-than-significant impact with mitigation incorporated.** The analysis for these conclusions are presented below.

### Project Trip Generation

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific proposed project is therefore based

upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

Weekday trip generation rates used to estimate project traffic and a summary of the proposed project's weekday trip generation are shown in Table 17-5, Project Trip Generation Summary – Typical Operations. The weekend special event trip generation summary is shown in Table 17-6, Project Trip Generation Summary – Weekend Special Event. The trip generation rates are based upon data collected by the Institute of Transportation Engineers (ITE) for Multifamily Housing (Low-Rise) (ITE Land Use Code 220) and Quality Restaurant (ITE Land Use Code 931) land uses in their published Trip Generation Manual, 10th Edition, 2017. The ITE Trip Generation Manual does not provide trip generation rates for a venue since the use is very specific. As such, vehicle trips are calculated based on a maximum allowable occupancy of 0.8 per parking space.

**Table 17-5. Project Trip Generation Summary – Typical Operations**

| Land Use | ITE LU Code | Units[1] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* | |
| ***Project Trip Generation Rates:[2]*** | | | | | | | | | |
| Multifamily House (Low-Rise) | 220 | DU | 0.11 | 0.35 | 0.46 | 0.35 | 0.21 | 0.56 | 7.32 |
| Quality Restaurant | 931 | TSF | 0.49 | 0.24 | 0.73 | 5.23 | 2.57 | 7.80 | 83.84 |

| Land Use | Quantity | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* | |
| ***Project Trip Generation Summary:*** | | | | | | | | | |
| Ritz-Carlton Residences | 106 | DU | 11 | 38 | 49 | 37 | 22 | 59 | 776 |
| Sky Mesa Restaurant | 6.966 | TSF | 3 | 2 | 5 | 36 | 18 | 54 | 586 |
| Internal Capture (50%)[3] | | | -2 | -1 | -3 | -18 | -9 | -27 | -294 |
| | | **Total** | **12** | **39** | **51** | **55** | **31** | **86** | **1,068** |

**Source**: Appendix F.
**Notes**:
1 DU = Dwelling Units; TSF = Thousand Square Feet.
2 Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).
3 Internal capture reduction of 50% has been applied as a significant portion of the patrons would be internal to the existing hotel.

**Table 17-6. Project Trip Generation Summary – Weekend Special Event**

| Land Use | ITE LU Code | Units[2] | Arrival Peak Hour | | | Departure Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* |
| ***Project Trip Generation Rates:[1]*** | | | | | | | | |
| Multifamily Housing (Low-Rise) | 220 | DU | 0.35 | 0.35 | 0.70 | 0.35 | 0.35 | 0.70 |
| Quality Restaurant | 931 | TSF | 6.30 | 4.38 | 10.68 | 6.30 | 4.38 | 10.68 |
| Venue | Not Available | | | | | | | |

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| Land Use | Quantity | Units[2] | Arrival Peak Hour | | | Departure Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* |
| ***Project Trip Generation Summary:*** | | | | | | | | |
| Ritz-Carlton Residences | 106 | DU | 37 | 37 | 74 | 37 | 37 | 74 |
| Sky Mesa Restaurant | 6.966 | TSF | 44 | 31 | 75 | 44 | 31 | 75 |
| Internal Capture (50%)[3] | | | -22 | -16 | -38 | -22 | -16 | -38 |
| Venue[4] | 381 | Spaces | 295 | 10 | 305 | 10 | 295 | 305 |
| | | **Total** | **354** | **62** | **416** | **69** | **347** | **416** |

**Source:** Appendix F.
**Notes:**
1 Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).
2 DU = Dwelling Units; TSF = thousand Square Feet
3 Internal capture reduction of 50% has been applied as a significant portion of the patrons would be internal to the existing hotel.
4 Vehicle trips are calculated based on a maximum allowable occupancy of 0.8 per parking space.

As shown on Table 17-5, Project Trip Generation Summary – Typical Operations, the project is anticipated to generate a net total of 1,068 trip-ends per day, 51 AM peak hour trips and 86 PM peak hour trips.

It should be noted that the venue will generate trips outside the weekday AM and PM peak hours. As shown on Table 17-6, Project Trip Generation Summary – Weekend Special Event, the proposed project (special event) is anticipated to generate a net total of 416 weekend peak hour trips.

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Cont.

**Project Trip Distribution**

The trip distributions have been developed based on past work experience in the vicinity of the project site and refined to reflect the roadway network and the surrounding uses in the vicinity of the project as they exist today. Trip distribution patterns for the proposed project are shown in Appendix F.

**Modal Split**

Although the use of public transit, walking, and/or bicycling have the potential to reduce project-related traffic, such reductions have not been taken into considerations in this traffic study in order to provide a conservative analysis of the proposed project's potential to contribute to circulation system deficiencies.

**Trip Assignment**

The assignment of traffic from the proposed project area to the adjoining roadway system is based upon the proposed project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the proposed project. Based on the identified project traffic generation and trip distribution patterns, proposed project weekday ADT, weekday AM peak hour, and weekday PM peak hour peak hour intersection turning movement volumes are shown in Appendix F. Proposed

project (Special Event) weekend arrival and departure peak hour intersection turning movement volumes are also shown in Appendix F.

**Cumulative Growth Traffic**

***Ambient Growth Rate***

Future year traffic forecasts have been based upon background (ambient) growth at 8.24 percent (2 percent per year over 4 years) for EAP and EAPC traffic conditions. The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies, for EAPC traffic conditions.

***Cumulative Development Traffic***

California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Rancho Mirage.

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Cont.

Appendix F contains the cumulative development location map, and a summary of cumulative development projects and their proposed land uses are shown. If applicable, the traffic generated by individual cumulative projects was manually added to the Opening Year Cumulative forecasts to ensure that traffic generated by the listed cumulative development projects in Appendix F are reflected as part of the background traffic. Trip generation rates used to estimate cumulative development project traffic and a summary of the cumulative development project's weekday trip generation are shown in Table 17-7, Cumulative Development Project Trip Generation Summary.

**Table 17-7. Cumulative Development Project Trip Generation Summary**

| Land Use | ITE LU Code | Units[1] | AM Peak Hour | | | PM Peak Hour | | | Weekday Daily | SAT Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* | | *In* | *Out* | *Total* |
| ***Project Trip Generation Rates:[2]*** | | | | | | | | | | | | |
| Single-Family Detached Housing | 210 | DU | 0.19 | 0.56 | 0.74 | 0.62 | 0.37 | 0.99 | 9.44 | 0.50 | 0.43 | 0.93 |
| Hotel | 310 | Rooms | 0.28 | 0.19 | 0.47 | 0.31 | 0.29 | 0.60 | 8.36 | 0.40 | 0.32 | 0.72 |
| Shopping Center | 820 | TSF | 0.58 | 0.36 | 0.94 | 1.83 | 1.98 | 3.81 | 37.75 | 2.34 | 2.16 | 4.50 |
| **Land Use** | **Quantity** | **Units[1]** | **AM Peak Hour** | | | **PM Peak Hour** | | | **Weekday Daily** | **SAT Peak Hour** | | |
| | | | *In* | *Out* | *Total* | *In* | *Out* | *Total* | | *In* | *Out* | *Total* |
| ***Project Trip Generation Summary:*** | | | | | | | | | | | | |
| **Mirada Villas – SFDU (75% Built)** | 9 | DU | 2 | 5 | 7 | 6 | 3 | 9 | 86 | 5 | 4 | 9 |
| ***Horizon Pacific Rancho Cove MSA Consulting*** | | | | | | | | | | | | |
| Commercial | 20,000 | TSF | 12 | 7 | 19 | 37 | 40 | 77 | 756 | 47 | 43 | 90 |
| Hotel | 100 | Rooms | 28 | 19 | 47 | 31 | 29 | 60 | 836 | 40 | 32 | 72 |
| SFDU | 35 | DU | 6 | 19 | 25 | 22 | 13 | 35 | 332 | 18 | 15 | 33 |
| | | **Total** | **46** | **45** | **91** | **90** | **82** | **172** | **1,924** | **105** | **90** | **195** |
| **Ken Cafanzarite – SFDU** | 20 | DU | 4 | 11 | 15 | 12 | 7 | 19 | 190 | 10 | 9 | 19 |
| | | **Total** | **52** | **61** | **113** | **108** | **92** | **200** | **2,200** | **120** | **103** | **223** |

**Source:** Appendix F.
**Notes:**
1 DU = Dwelling Units; TSF = Thousand Square Feet.
2 Trip Generation Source: Institute of Transportation Engineers (ITE). Trip Generation Manual, 10th Edition (2017).



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***Near-Term Traffic Forecasts***

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast EAP (2023) and EAPC (2023) traffic conditions. An ambient growth factor of 2% per year accounts for background (area-wide) traffic increases that occur over time up to the year 2023 from the year 2019 (compounded 2% per year growth over a 4-year period). Proposed project traffic is added to assess both forecast EAP (2023) and EAPC (2023) traffic conditions. Traffic volumes generated by cumulative development projects are not included in the EAP (2023) traffic conditions.

The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- EAP (2023)
  - Existing 2019 volumes
  - Ambient growth traffic (8.24%)
- EAPC (2023)
  - Existing 2019 volumes
  - Ambient growth traffic (8.24%)
  - Cumulative Development Traffic
  - Typical Weekday or Saturday Special Event Project Traffic

T2-2
Cont.

The average growth rate is estimated at approximately 3.44%, compounded annually between Existing (2019) and EAPC (2023) traffic conditions. The annual growth rate at each individual intersection is not lower than 3.24% compounded annually to as high as 3.63% compounded annually over the same time period. Therefore, the annual growth rate utilized for the purposes of this analysis would appear to conservatively approximate the anticipated regional growth in traffic volumes in the City of Rancho Mirage for EAPC (2023) traffic conditions, especially when considered along with the addition of project-related traffic.

**Horizon Year (2040) Volume Development**

Traffic projections for Horizon Year (2040) without proposed project conditions were derived from the Riverside Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing for study area intersections located within the County of Riverside. The version of the RivTAM used for traffic reflects the local input in the adopted 2016 SCAG RTP within the County of Riverside.

The traffic forecasts reflect the area-wide growth anticipated between Existing (2019) conditions and Horizon Year (2040) traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year (2040) peak hour forecasts were refined using the model derived long range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location in December 2019. The RivTAM has a base (validation) year of 2012 and

a horizon (future forecast) year of 2040. The difference in model volumes (2040-2012) defines the growth in traffic over the 28-year period.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year (2040) forecasts. Horizon Year (2040) turning volumes were compared to EAPC (2023) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between EAPC (2023) and Horizon Year (2040) traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2019) and EAPC (2023) conditions. Adjustments have not been made to study area intersections that may be affected by new future roadway connections, where travel patterns would likely get affected and forecasts may potentially decrease from the EAPC conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year (2040) peak hour forecasts.

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Cont.

The future Horizon Year (2040) Without Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis. Post-processing worksheets for Horizon Year (2040) without Project traffic conditions are provided in Appendix F.

**E+P Traffic Conditions**

This section discusses the traffic forecasts for Existing Plus Project (E+P) traffic conditions and the resulting peak hour intersection operations, traffic signal warrant, and queuing analyses.

**Roadway Improvements**

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1 in Appendix F, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the proposed project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

**E+P Traffic Volume Forecasts**

This scenario includes Existing traffic volumes plus project traffic. E+P weekday ADT, weekday AM and weekday PM peak hour intersection turning movement volumes are shown on Appendix F. Weekend special event peak hour intersection turning movement volumes are shown in Appendix F, as well.

**E+P Intersection Operations Analysis**

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 17.1.1 Methodologies of this Initial Study. The intersection analysis results are summarized in Table 17-8, Intersection Analysis for E+P Conditions, which indicate that there are no intersections operating at an unacceptable LOS with the addition of Project traffic. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix F.

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Cont.

Table 17-8. Intersection Analysis for E+P Conditions

| # | Intersection | Traffic Control[1] | Existing (2019) | | | | | | E+P | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. and Dwy. 1 | --/CSS | Future Intersection | | | | | | 8.5 | 8.5 | 8.6 | 10.3 | A | A | A | B |
| 2 | Frank Sinatra Dr. and Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.2 | 10.2 | 15.5 | 15.8 | A | B | C | C |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 20.6 | 20.0 | 23.0 | 26.1 | C | C | C | C |

**Source:** Appendix F.

**Notes:**

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = Cross-street Stop; TS = Traffic Signal.

3 Arr = Arrival Peak Hour; Dep = Departure Peak Hour.

T2-2 Cont.

**E+P Traffic Signal Warrants Analysis**

Traffic signal warrants for E+P traffic conditions are based on planning level (ADT) and peak hour intersection volumes. For E+P traffic conditions, no study area intersections are anticipated to warrant a traffic signal (Appendix F).

**E+P Queuing Analysis**

A queuing analysis was performed for study area intersections to assess vehicle queues that may potentially impact peak hour operations. Queuing analysis findings are presented in Table 17-9, Peak Hour Queuing Summary for E+P Conditions. It is important to note that lengths are consistent with the measured distance between the intersection and the end of the storage area.

T2-2
Cont.

**Table 17-9. Peak Hour Queuing Summary for E+P Conditions**

| # | Intersection | Traffic Control[1] | Existing (2019) Delay[2] (secs.) Weekday AM | Existing (2019) Delay[2] (secs.) Weekday PM | Existing (2019) Delay[2] (secs.) Weekday SAT | Existing (2019) Level of Service Weekday AM | Existing (2019) Level of Service Weekday PM | Existing (2019) Level of Service Weekday SAT | E+P Delay[2] (secs.) Weekday AM | E+P Delay[2] (secs.) Weekday PM | E+P Delay[2] (secs.) Saturday Arr[3] | E+P Delay[2] (secs.) Saturday Dep[3] | E+P Level of Service Weekday AM | E+P Level of Service Weekday PM | E+P Level of Service Saturday Arr[3] | E+P Level of Service Saturday Dep[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Frank Sinatra Dr. and Dwy. 1 | —/CSS | *Future Intersection* | | | | | | 8.5 | 8.5 | 8.6 | 10.3 | A | A | A | B |
| 2 | Frank Sinatra Dr. and Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.2 | 10.2 | 15.5 | 15.8 | A | B | C | C |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 20.6 | 20.0 | 23.0 | 26.1 | C | C | C | C |

| Intersection | Movement | Available Stacking Distance (Feet) | Existing (2019) 95th Percentile Queue (Feet)[4] Weekday AM | Existing (2019) 95th Percentile Queue (Feet)[4] Weekday PM | Existing (2019) 95th Percentile Queue (Feet)[4] Weekday SAT | Existing (2019) Acceptable?[5] Weekday AM | Existing (2019) Acceptable?[5] Weekday PM | Existing (2019) Acceptable?[5] Weekday SAT | E+P 95th Percentile Queue (Feet)[4] Weekday AM | E+P 95th Percentile Queue (Feet)[4] Weekday PM | E+P 95th Percentile Queue (Feet)[4] Saturday Arr[3] | E+P 95th Percentile Queue (Feet)[4] Saturday Dep[3] | E+P Acceptable?[5] Weekday AM | E+P Acceptable?[5] Weekday PM | E+P Acceptable?[5] Saturday Arr[3] | E+P Acceptable?[5] Saturday Dep[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frank Sinatra Dr. and Dwy. 1 | SBL/T | 200 | *Future Intersection* | | | | | | 0 | 0 | 36 | 0 | Yes | Yes | Yes | Yes |
| | WBL/R | 100 | | | | | | | 46 | 46 | 44 | 89 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. and Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes | 0 | 14 | 9 | 39 | Yes | Yes | Yes | Yes |
| | WBL/R | 200 | 34 | 28 | 45 | Yes | Yes | Yes | 37 | 34 | 45 | 37 | Yes | Yes | Yes | Yes |
| Hwy. 111 and Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes | 72 | 1012 | **368[2]** | 118 | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 0 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes | 51 | 70 | 67 | **233[2]** | Yes | Yes | Yes | **No** |
| | EBT/R | 270 | 41 | 74 | 51 | Yes | Yes | Yes | 151 | 92 | 101 | **325** | Yes | Yes | Yes | **No** |

**Source**: Appendix F.
**Notes**:
1. Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.



T2-2 Cont.

2 CSS = Cross-street Stop; TS = Traffic Signal.
3 Arr = Arrival Peak Jour; Dep = Departure Peak Hour.
4 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

As shown on Table 17-9, Peak Hour Queuing Summary for E+P Conditions, and consistent with Existing (2019) conditions, there are no potential queuing issues anticipated during the weekday peak 95th percentile traffic flows for E+P traffic conditions. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 and Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 and Frank Sinatra Dr. (#3) – EBL movement

Worksheets for E+P conditions queuing analysis are provided in Appendix F. No improvement strategies have been recommended for study area intersections as there no deficient intersections for E+P traffic conditions. As shown previously on Table 17-9, there are no weekday peak hour queuing issues anticipated at the study area intersections for E+P traffic conditions. However, it is recommended that the following improvements be implemented to accommodate E+P weekend special event 95th percentile traffic flows (**MM-TRA-1, MM-TRA-2**). Therefore, impacts would be **less than significant with mitigation incorporated**.

T2-2
Cont.

**EAP (2023) Traffic Conditions**

This section discusses the methods used to develop Existing plus Ambient Growth plus Project (EAP) (2023) traffic conditions and the resulting peak hour intersection operations, traffic signal warrant, and queuing analyses.

**Roadway Improvements**

The lane configurations and traffic controls assumed to be in place for EAP conditions are consistent with those shown in Appendix F, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the proposed project to provide site access are also assumed to be in place for EAP conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

**EAP (2023) Traffic Volume Forecasts**

To account for background traffic growth, an ambient growth from Existing conditions of 8.24% (2 percent per year over 4 years, compounded annually) is included for EAP traffic conditions. Cumulative development projects are not included as part of the EAP analysis. EAP weekday ADT, weekday AM, and weekday PM peak hour intersection turning movement volumes are shown in Appendix F. Weekend special event peak hour intersection turning movement volumes are also shown in Appendix F.

**EAP (2023) Intersection Operations Analysis**

EAP peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 17.1.1, Methodologies, of this Initial Study. The intersection analysis results are summarized in Table 17-10, Intersection Analysis for EAP (2023) Conditions, which indicate that there are no intersections operating at an unacceptable LOS with the addition of ambient growth and proposed project traffic. The intersection operations analysis worksheets for EAP traffic conditions are included in Appendix F

**EAP (2023) Traffic Signal Warrants Analysis**

Traffic signal warrants for EAP traffic conditions are based on planning level (ADT) and peak hour intersection volumes. For EAP traffic conditions, no study area intersections are anticipated to warrant a traffic signal (Appendix F).

**EAP (2023) Queuing Analysis**

A queuing analysis was performed for study area intersections that may potentially impact peak hour operations. Queuing analysis findings are presented in Table 17-11. It is important to note that lengths are consistent with the measured distance between the intersection and the end of the storage area. As shown on Table 17-11 and consistent with Existing (2019) conditions, there are no potential queuing issues anticipated during the peak 95th percentile traffic flows for EAP (2023) traffic conditions. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 and Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 and Frank Sinatra Dr. (#3) – EBL movement

Worksheets for EAP (2023) conditions queuing analysis are provided in Appendix F.

T2-2
Cont.

Table 17-10. Intersection Analysis for EAP (2023) Conditions

| # | Intersection | Traffic Control[1] | Existing (2019) | | | | | | EAP (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. and Dwy. 1 | --/CSS | *Future Intersection* | | | | | | 8.6 | 8.5 | 8.7 | 10.3 | A | A | A | B |
| 2 | Frank Sinatra Dr. and Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.2 | 10.3 | 15.8 | 16.1 | A | B | C | C |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 21.5 | 20.8 | 24.1 | 28.3 | C | C | C | C |

**Source:** Appendix F.
**Notes:**
1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
2 CSS = Cross-street Stop; TS = Traffic Signal.
3 Arr = Arrival Peak Hour; Dep = Departure Peak Hour.



T2-2 Cont.

Table 17-11. Peak Hour Queuing Summary for EAP (2023) Conditions

| Intersection | Movement | Available Stacking Dist. (Feet) | Existing (2019) 95th Percentile Queue (Feet)[1] Weekday AM | Existing (2019) 95th Percentile Queue (Feet)[1] Weekday PM | Existing (2019) 95th Percentile Queue (Feet)[1] SAT | Existing (2019) Acceptable?[2] Weekday AM | Existing (2019) Acceptable?[2] Weekday PM | Existing (2019) Acceptable?[2] SAT | EAP (2023) 95th Percentile Queue (Feet)[1] Weekday AM | EAP (2023) 95th Percentile Queue (Feet)[1] Weekday PM | EAP (2023) 95th Percentile Queue (Feet)[1] Saturday Arr[3] | EAP (2023) 95th Percentile Queue (Feet)[1] Saturday Dep[3] | EAP (2023) Acceptable?[2] Weekday AM | EAP (2023) Acceptable?[2] Weekday PM | EAP (2023) Acceptable?[2] Saturday Arr[3] | EAP (2023) Acceptable?[2] Saturday Dep[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frank Sinatra Dr. and Dwy. 1 | SBL / R | 200 | Future Intersection | | | | | | 0 | 18 | 27 | 9 | Yes | Yes | Yes | Yes |
| | WBL / R | 100 | | | | | | | 44 | 44 | 48 | 96 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. and Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes | 10 | 22 | 0 | 33 | Yes | Yes | Yes | Yes |
| | WBL / R | 200 | 34 | 28 | 45 | Yes | Yes | Yes | 24 | 32 | 54 | 42 | Yes | Yes | Yes | Yes |
| Hwy. 111 and Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes | 75 | 108[4] | 376[4] | 125[4] | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 39 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes | 53 | 74 | 70 | 238[4] | Yes | Yes | Yes | **No** |
| | EBT / R | 270 | 41 | 74 | 51 | Yes | Yes | Yes | 62 | 96 | 106 | 330 | Yes | Yes | Yes | **No** |

**Source:** Appendix F.

**Notes:**

1. 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
2. Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
3. Arr = Arrival Peak Hour; Dep = Departure Peak Hour.



T2-2 Cont.

No improvement strategies have been recommended for study area intersections as there no deficient intersections for EAP (2023) traffic conditions. As shown previously on Table 17-11, there are no weekday peak hour queuing issues anticipated at the study area intersections for EAP (2023) traffic conditions. However, it is recommended that the following improvements be implemented to accommodate EAP (2023) weekend special event 95th percentile traffic flows (**MM-TRA-1**; **MM-TRA-2**). Therefore, impacts would be **less than significant** with **mitigation incorporated**.

**EAPC (2023) Traffic Conditions**

This section discusses the methods used to develop Existing Plus Ambient Growth Plus Cumulative Projects Plus Project (EAPC) (2023) traffic conditions and the resulting peak hour intersection operations, traffic signal warrant, and queuing analyses.

**Roadway Improvements**

The lane configurations and traffic controls assumed to be in place for EAPC conditions are consistent with those shown previously on Exhibit 3-1 in Appendix F, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the proposed project to provide site access are also assumed to be in place for EAPC conditions only (e.g., intersection and roadway improvements at the proposed project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for EAPC conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

T2-2
Cont.

**EAPC (2023) Traffic Volume Forecasts**

To account for background traffic growth, other known cumulative development projects in the study area were included in addition to an ambient growth from Existing conditions of 8.24% (2 percent per year over 4 years, compounded annually) for EAPC traffic conditions. EAPC weekday ADT, weekday AM, and weekday PM peak hour intersection turning movement volumes, as well as weekend peak hour intersection turning movement volumes are shown in Appendix F.

**EAPC (2023) Intersection Operations Analysis**

EAPC peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 17.1.1, Methodologies, of this Initial Study. The intersection analysis results are summarized in Table 17-12, Intersection Analysis for EACP (2023) Conditions, which indicate that there are no intersections operating at an unacceptable LOS with the addition of ambient growth, cumulative projects, and proposed project traffic. The intersection operations analysis worksheets for EAPC traffic conditions is included in Appendix F.

Table 17-12. Intersection Analysis for EACP (2023) Conditions

| # | Intersection | Traffic Controls[1] | Existing (2019) | | | | | | EAPC (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. and Dwy. 1 | – / CSS | Future Intersection | | | | | | 8.6 | 8.6 | 8.7 | 10.4 | A | A | A | B |
| 2 | Frank Sinatra Dr. Dwy. 2 | CSS | 9.0 | 9.4 | 9.7 | A | A | A | 9.3 | 10.4 | 16.0 | 16.3 | A | B | C | C |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 19.9 | 19.2 | 18.1 | B | B | B | 21.7 | 21.3 | 24.9 | 30.5 | C | C | C | C |

**Source:** Appendix F.
**Notes:**
1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
2 CSS = Cross-street Stop; TS = Traffic Signal.
3 Arr = Arrival Peak Hour; Dep = Departure Peak Hour.

T2-2 Cont.

**EAPC (2023) Traffic Signal Warrants Analysis**

Traffic signal warrants for EAPC traffic conditions are based on planning level (ADT) and peak hour intersection volumes. For EAPC traffic conditions, no study area intersections are anticipated to warrant a traffic signal (Appendix F).

**EAPC (2023) Queuing Analysis**

A queuing analysis was performed for study area intersections that may potentially impact peak hour operations. Queuing analysis findings are presented in Table17-13, Peak Hour Queuing Summary for EAPC (2023) Conditions. It is important to note that lengths are consistent with the measured distance between the intersection and the end of the storage area. As shown on Table 17-13, Peak Hour Queuing Summary for EAPC (2023) Conditions, and consistent with Existing (2019) conditions, there are no potential queuing issues anticipated during the peak weekday 95th percentile traffic flows for EAPC (2023) traffic conditions. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 and Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 and Frank Sinatra Dr. (#3) – EBL movement

Worksheets for EAPC (2023) conditions queuing analysis are provided in Appendix F.

T2-2 Cont.

Table 17-13. Peak Hour Queuing Summary for EAPC (2023) Conditions

| Intersection | Movement | Available Stacking Dist. (Feet) | Existing (2019) | | | | | | EAPC (2023) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet)[1] | | | Acceptable?[2] | | | 95th Percentile Queue (Feet)[1] | | | | Acceptable?[2] | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| Frank Sinatra Dr. and Dwy. 1 | SBL / R | 200 | Future Intersection | | | | | | 9 | 0 | 30 | 0 | Yes | Yes | Yes | Yes |
| | WBL / R | 100 | | | | | | | 44 | 45 | 43 | 79 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. and Dwy. 2 | SBL | 220 | 0 | 10 | 10 | Yes | Yes | Yes | 0 | 0 | 21 | 34 | Yes | Yes | Yes | Yes |
| | WBL / R | 200 | 34 | 28 | 45 | Yes | Yes | Yes | 28 | 29 | 40 | 48 | Yes | Yes | Yes | Yes |
| Hwy. 111 and Frank Sinatra Dr. | NBL | 260 | 66 | 59 | 82 | Yes | Yes | Yes | 77 | 113[1] | 3379[1] | 131[1] | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 0 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 35 | 60 | 43 | Yes | Yes | Yes | 57 | 86[2] | 82[2] | 251[2] | Yes | Yes | Yes | **No** |
| | EBT / R | 270 | 41 | 74 | 51 | Yes | Yes | Yes | 64 | 99 | 109 | 336 | Yes | Yes | Yes | **No** |

**Source:** Appendix F.
**Notes:**
1. 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
2. Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
3. Arr = Arrival Peak Hour; Dep = Departure Peak Hour.



T2-2 Cont.

No improvement strategies have been recommended for study area intersections as there no deficient intersections for EAPC (2023) traffic conditions. As shown previously on Table 17-13, Peak Hour Queuing Summary for EAPC (2023) Conditions, there are no weekday peak hour queuing issues anticipated at the study area intersections for EAPC (2023) traffic conditions. However, it is recommended that the following improvements be implemented to accommodate EAPC (2023) weekend special event 95th percentile traffic flows (**MM-TRA-1; MM-TRA-2**). Therefore, impacts would be **less than significant with mitigation incorporated**.

**Horizon Year (With and Without Project) (2040) Traffic Analysis**

This section discusses the methods used to develop Horizon Year Without and With Project and the resulting intersection operations, traffic signal warrants, and queuing analysis.

**Roadway Improvements**

The lane configurations and traffic controls assumed to be in place for Horizon Year conditions are consistent with those shown previously on Exhibit 3-1 in Appendix F, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the proposed project to provide site access are also assumed to be in place for Horizon Year With Project conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

T2-2
Cont.

**Horizon Year Without Project Traffic Volume Forecasts**

This scenario includes the refined post-process volumes obtained from the RivTAM (see Appendix F for a detailed discussion on the post-processing methodology). The weekday ADT, weekday AM, and weekday PM peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions, as well as the weekend peak hour intersection turning movement volumes are shown in Appendix F.

**Intersection Operation Analysis**

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) Without Project conditions with roadway and intersection geometrics consistent with Existing conditions. As shown in Table 17-14, Intersection Analysis for Horizon Year (2020) Conditions, no study area intersections are anticipated to operate at unacceptable levels of service under Horizon Year (2040) Without and With Project conditions. With the addition of proposed project traffic, no additional study area intersections are anticipated to operate at unacceptable levels of service.

Table 17-14. Intersection Analysis for Horizon Year (2040) With and Without Project Conditions

| # | Intersection | Traffic Controls[1] | 2040 Without Project | | | | | | 2040 With Project | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[2] (secs.) | | | Level of Service | | | Delay[2] (secs.) | | | | Level of Service | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| 1 | Frank Sinatra Dr. and Dwy. 1 | — / CSS | Future Intersection | | | | | | 8.6 | 8.6 | 8.7 | 10.4 | A | A | A | B |
| 2 | Frank Sinatra Dr. Dwy. 2 | CSS | 9.1 | 9.7 | 10.0 | A | A | B | 9.3 | 10.5 | 16.3 | 16.7 | A | B | C | C |
| 3 | Hwy. 111 and Frank Sinatra Dr. | TS | 22.7 | 22.6 | 20.3 | C | C | C | 23.2 | 23.2 | 27.1 | 34.1 | C | C | C | C |

**Source:** Appendix F.

**Notes:**

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = Cross-street Stop; TS = Traffic Signal.

3 Arr = Arrival Peak Hour; Dep = Departure Peak Hour.

T2-2
Cont.

The intersection operations analysis worksheets for Horizon Year (2040) Without Project conditions are included in Appendix F of this Initial Study. The intersection operations analysis worksheets for Horizon Year (2040) With Project conditions are included in Appendix F of this Initial Study.

**Traffic Signal Warrants Analysis**

A traffic signal warrant analysis was performed at the unsignalized driveways for Horizon Year (2040) Without and With Project traffic conditions. No study area intersections are anticipated to warrant a traffic signal under Horizon Year (2040) Without and With Project traffic conditions. Traffic signal warrants worksheets for Horizon Year (2040) Without and With Project conditions are provided in Appendix F.

**Queuing Analysis**

A queuing analysis was performed for the study area intersections to assess vehicle queues along the roadways. Horizon Year (2040) Without and With Project queuing analysis findings are presented in Table 17-15, Peak Hour Queuing Summary for Horizon Year (2040) Conditions.

As shown on Table 17-15, Peak Hour Queuing Summary for Horizon Year (2040) Conditions, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday and weekend 95th percentile peak hour traffic flows for Horizon Year (2040) Without Project.

With the addition of proposed project traffic, no intersection turning movements are anticipated to experience periodic queuing issues during one or both peak hours based on the weekday 95th percentile peak hour traffic flows. However, the following movements are anticipated to exceed the available storage lengths based on the weekend special event 95th percentile peak hour traffic flow:

- Hwy. 111 and Frank Sinatra Dr. (#3) – NBL movement
- Hwy. 111 and Frank Sinatra Dr. (#3) – EBL movement

Worksheets for Horizon Year (2040) Without and With Project conditions queuing analysis are provided in Appendix F. The study area intersections are anticipated to operate at an acceptable LOS for Horizon Year (2040) Without Project conditions. The study area intersections are anticipated to continue to operate at an acceptable LOS with the addition of proposed project traffic. As such, no improvements have been recommended for Horizon Year (2040) traffic conditions.

T2-2
Cont.

Table 17-15. Peak Hour Queuing Summary for Horizon Year (2040) Conditions

| Intersection | Movement | Available Stacking Dist. (Feet) | 2040 Without Project | | | | | | 2040 With Project | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet)[1] | | | Acceptable?[2] | | | 95th Percentile Queue (Feet)[1] | | | | Acceptable?[2] | | | |
| | | | Weekday | | | Weekday | | | Weekday | | Saturday | | Weekday | | Saturday | |
| | | | AM | PM | SAT | AM | PM | SAT | AM | PM | Arr[3] | Dep[3] | AM | PM | Arr[3] | Dep[3] |
| Frank Sinatra Dr. and Dwy. 1 | SBL / R | 200 | Future Intersection | | | | | | 10 | 24 | 37 | 15 | Yes | Yes | Yes | Yes |
| | WBL / R | 100 | | | | | | | 47 | 49 | 46 | 89 | Yes | Yes | Yes | Yes |
| Frank Sinatra Dr. and Dwy. 2 | SBL | 220 | 0 | 0 | 14 | Yes | Yes | Yes | 0 | 10 | 14 | 51 | Yes | Yes | Yes | Yes |
| | WBL / R | 200 | 31 | 36 | 40 | Yes | Yes | Yes | 37 | 31 | 44 | 46 | Yes | Yes | Yes | Yes |
| Hwy. 111 and Frank Sinatra Dr. | NBL | 260 | 75 | 68 | 97 | Yes | Yes | Yes | 83 | 121[4] | 392[4] | 146[4] | Yes | Yes | **No** | Yes |
| | SBR | 300 | 0 | 0 | 0 | Yes | Yes | Yes | 0 | 0 | 43 | 0 | Yes | Yes | Yes | Yes |
| | EBL | 170 | 46 | 75 | 51 | Yes | Yes | Yes | 61 | 97[4] | 74 | 246[4] | Yes | Yes | Yes | **No** |
| | EBT / R | 270 | 48 | 89 | 75 | Yes | Yes | Yes | 68 | 107 | 115 | 343 | Yes | Yes | Yes | **No** |

**Source:** Appendix F.

**Notes:**

1 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

2 Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

3 Arr = Arrival Peak Hour; Dep = Departure Peak Hour.



T2-2 Cont.

As shown previously on Table 17-15, there are no weekday peak hour queuing issues anticipated at the study area intersections for Horizon Year (2040) traffic conditions. However, it is recommended that the following improvements be implemented to accommodate Horizon Year (2040) With Project Traffic Conditions weekend special event 95th percentile traffic flows (**MM-TRA-1; MM-TRA-2**). Therefore, impacts would be **less than significant with mitigation incorporated**.

b) ***Less-than-Significant Impact.*** On June 18, 2020, the City adopted its own set of VMT thresholds and guidelines titled *Transportation Analysis Policy for the City of Rancho Mirage* (City VMT Guidelines). The guidelines were updated on February 18, 2021 by the City to remain consistent with County and State policies regarding criteria for determining the significance of transportation impacts of projects. The City VMT Guidelines Section I.A, Project Screening, provides details on appropriate screening thresholds that can be used to identify when a proposed land use project is anticipated to result in a less than significant impact without conducting a more detailed VMT analysis. Screening thresholds are broken into three types:

- Project Type Screening
- Low VMT Area Screening
- Transit Priority Area (TPA) Screening

A land use project need only meet one of the above screening thresholds to result in a less-than-significant impact. Refer to Appendix F2 for additional details regarding VMT screening thresholds.

T2-2 Cont.

The proposed 6,273 square foot restaurant within the Sky Mesa Recreation Area component of the proposed project is well within the 50,000 square foot threshold for local serving retail and anticipated to provide an additional dining option to hotel guests and the local community. The swimming pool and adjacent open space within the Sky Mesa Recreation Area are also expected to be complementary components to hotel guests and would therefore also meet the intent of the local serving screening criteria. Therefore, the Sky Mesa Recreation Area meets the Project Type Screening criteria and impacts would be **less than significant**.

The Ritz Carlton Residences component of the proposed project would not be deemed as a local serving use, and would generate daily vehicle trips in excess of the 110 trips per day threshold for project type screening as described in the City VMT Guidelines. It also does not meet the Low VMT Area or Transit Priority Area Screening criteria. Therefore, further analysis of potential VMT impacts is provided.

**Project Generated VMT**

The Riverside Transportation Analysis Model (RIVTAM) is a useful tool to estimate VMT as it considers interaction between different land uses based on socio-economic data such as population, households, and employment. The City Guidelines state that both proposed project generated VMT and proposed project effect on VMT should be calculated for the traffic analysis zone (TAZ) in which the proposed project is located.

Proposed project generated VMT was calculated using the City of Rancho Mirage General Plan Update version of RIVTAM, with adjustments to socio-economic data. As detailed in

Appendix F2, the proposed project generated VMT per resident is calculated to be 8.60 for baseline conditions.

The thresholds of significance used to measure a potential VMT impact are described by project type in Section I.B., Thresholds of Significance, of the City VMT Guidelines. Thresholds for determination of significant transportation impact for residential uses are described as VMT per resident which is:

- 15 percent below the Citywide per resident VMT, OR
- 15 percent below the regional VMT per resident.

As the City is currently still in development of their Citywide per resident VMT value for purposes of determining a proposed project generated VMT impact, the regional VMT per resident value (15.2) was utilized instead. At 8.60 VMT per resident, the proposed project generated VMT per resident would not exceed the City's threshold of 15 percent below the regional VMT per resident. Proposed project generated VMT is **less than significant**.

**Project Effect on VMT**

Consistent with City VMT Guidelines Section I.B., VMT Analysis for Non-Screened Projects, in addition to project generated VMT, there is also a requirement to evaluate a project's effect on VMT. A project's effect on VMT is calculated using the "boundary method", which includes all vehicle trips with one or both trip-ends within the designated boundary of interest (e.g., the City of Rancho Mirage). As detailed in Appendix F2 and shown on Table 17-16, the proposed project is not forecast to cause an increase in citywide VMT per service population as compared to without the proposed project. Therefore, impacts would be **less than significant**.

T2-2
Cont.

**Table 17-16. Rancho Mirage Citywide Vehicle Miles Travelled per Service Population**

| | Cumulative Year 2040 Without Project | Cumulative Year 2040 With Project |
|---|---|---|
| Population | 26,821 | 27,049 |
| Employment | 21,694 | 21,694 |
| Service Population | 48,515 | 48,733 |
| Vehicle Miles Travelled | 838,759 | 840,179 |
| Vehicle Miles Travelled per Service Population | 17.29 | 17.22 |

**Source:** Appendix F2.

c) ***Less-than-Significant Impact.*** All proposed project circulation improvements would be designed and constructed to City standards, and therefore, would not result in design hazards. Site access improvements are shown on Figure 17-2. Therefore, it would not increase hazards due to an incompatible use, and impacts would be **less than significant**.

d) ***Less-than-Significant Impact.*** Fire apparatus access throughout the development would include roads that meet the Fire Code requirements for width, grade, clearance, dead-end length, and turnarounds. Therefore, the proposed project's access is considered consistent with City Fire Code requirements. Impacts to emergency access would be **less than significant**.

*17.3 Mitigation Measures:*

**MM-TRA-1** **Hwy. 111 and Frank Sinatra Dr. (#3) –** Prior to operation of the proposed project, the Applicant shall increase the turn lane capacity from 260' to 400' for the North Bound Lane movement.

**MM-TRA-2** **Hwy. 111 and Frank Sinatra Dr. (#3) –** Prior to operation of the proposed project, the Applicant shall increase turn lane capacity from 170' to 250' for the East Bound Lane movement.

T2-2
Cont.

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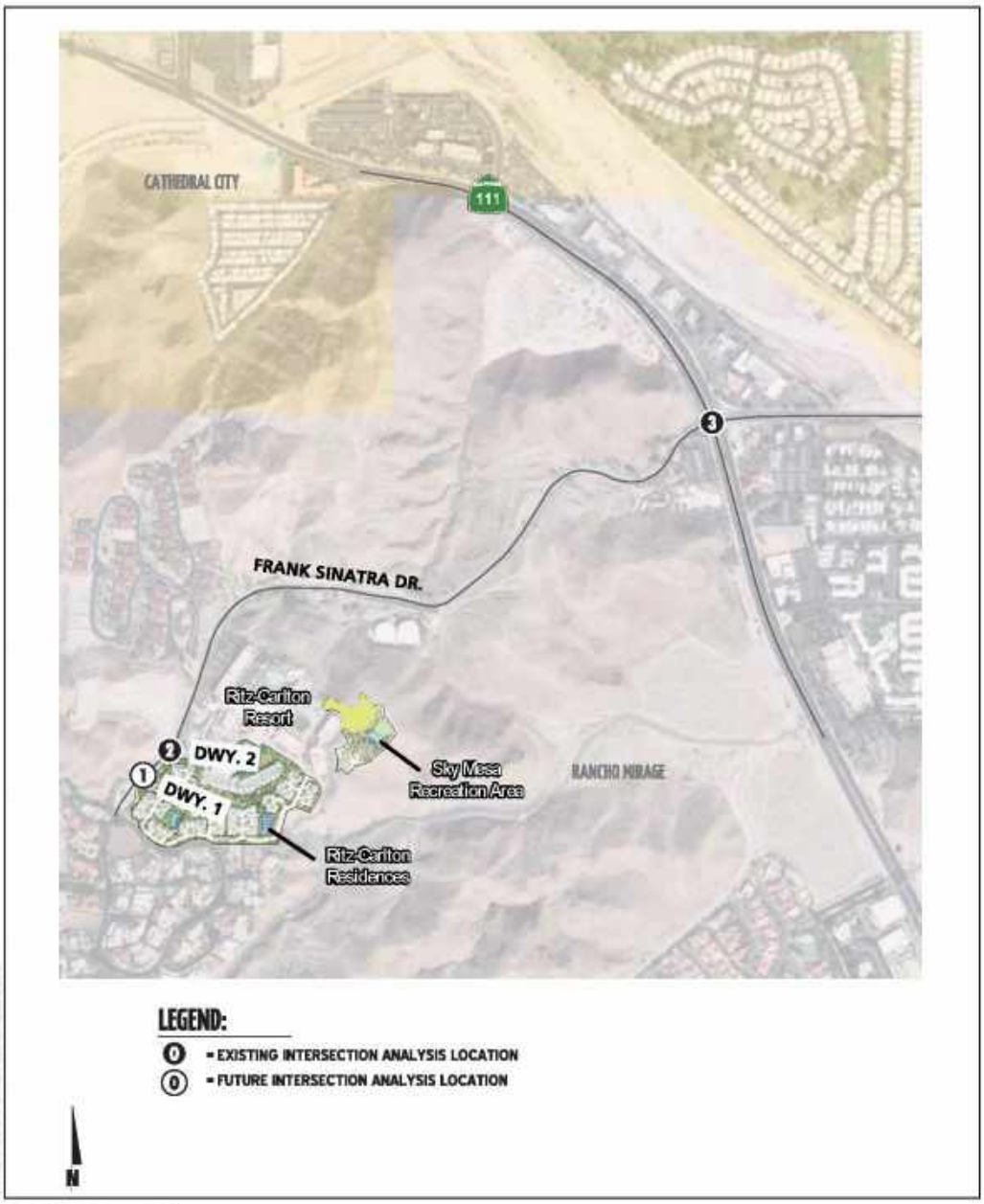


SOURCE: Urban Crossroads 2020

FIGURE 17-1

Traffic Impact Analysis (TIA) Study Intersections

Ritz-Carlton Rancho Mirage Initial Study

DUDEK

T2-2 Cont.

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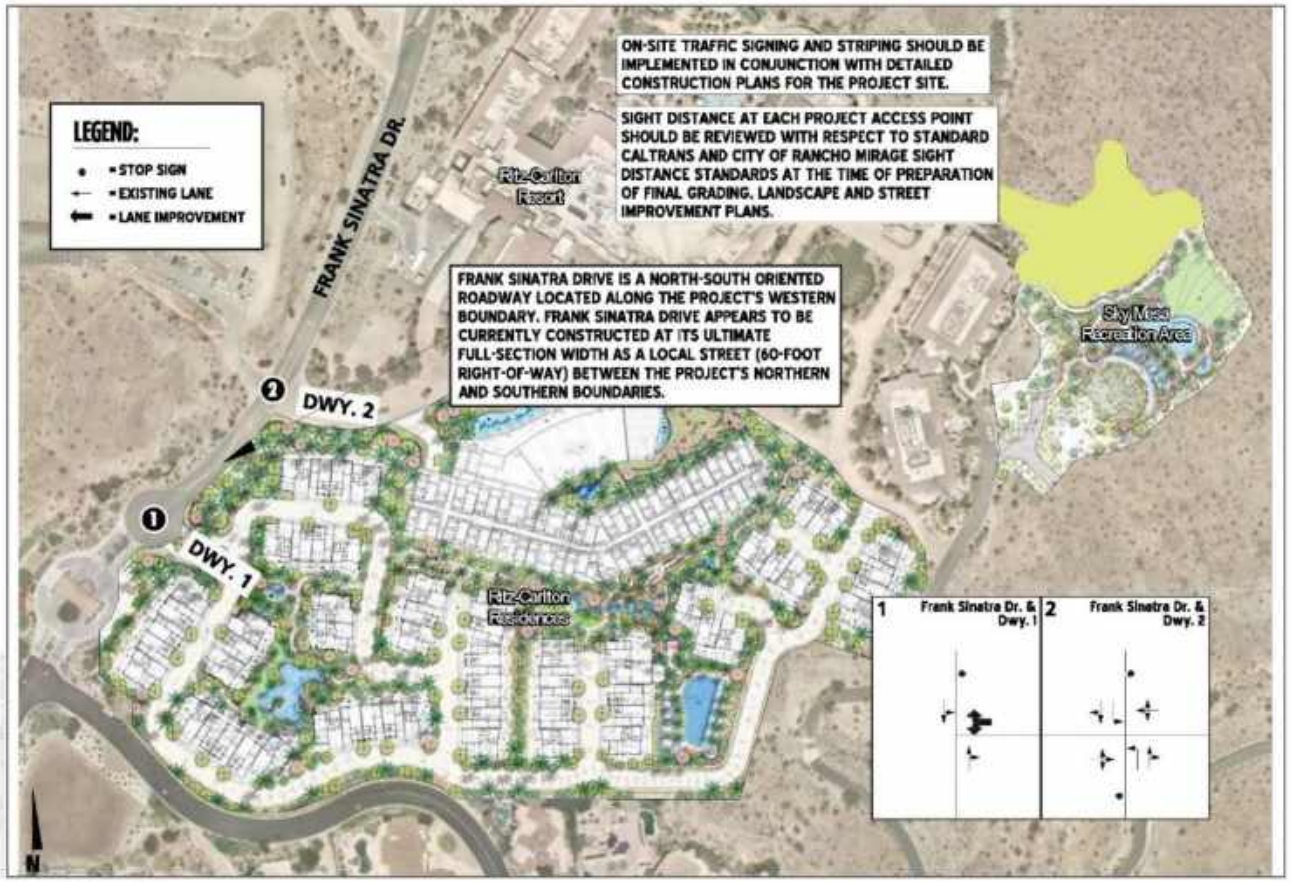
T2-2
Cont.




SOURCE: Urban Crossroads 2020

DUDEK

FIGURE 17-2
Site Adjacent Roadway and Site Access Recommendations
Ritz-Carlton Rancho Mirage IS/MND

T2-2 Cont.

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T2-2
Cont.

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18. TRIBAL CULTURAL RESOURCES

| **TRIBAL CULTURAL RESOURCES** – Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or | ☐ | ☒ | ☐ | ☐ |
| b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe? | ☐ | ☒ | ☐ | ☐ |

T2-2 Cont.

### 18.1 Setting

The Residences at Ritz Carlton portion of the project site was previously included in a cultural resources survey completed by CRM TECH in 2006. The 2006 study consisted of a historical/archaeological resources records search, historical background research, Native American consultation, and a systematic field survey. The records search determined that a segment of a prehistoric trail has been recorded in 1979 as extending into the 39-acre area covered in the 2006 study, however a field survey revealed that the segment of the original trail was no longer extant. The 2006 study concluded that there were no cultural resources in the area surveyed, and no evidence of archaeological deposits were found during the monitoring program.

An updated historical/archaeological resources survey was prepared by CRM TECH in September of 2019. The 2019 study includes a survey and analysis on both the proposed Residences at Ritz Carlton and Sky Mesa Recreational Area, updates to the 2006 records search and the historical background research, further consultation with Native American representatives, and a systematic field survey at intensive and reconnaissance levels as appropriate. This section is based upon the 2019 Historical/Archaeological Resources Survey (cultural report) prepared by CRM TECH in September 2019. The cultural report is included as Appendix C to this Initial Study. Background and methodologies regarding the cultural resources analysis are found in Appendix C.

## 18.2 Discussion of Impacts

a) ***Less-than-Significant Impact with Mitigation Incorporated.*** Refer to Section 5, Cultural Resources, for a discussion on historical resources. Impacts would be less than significant with the incorporation of mitigation measure **MM-CUL-1** and **MM-CUL-2**.

b) ***Insert Impact Statement.*** On November 21, 2021, pursuant to Senate Bill (SB 18) and Assembly Bill (AB) 52, the City sent letters initiating consultation processes to tribal groups identified by the NAHC as having or potentially having traditional lands or cultural places located within the boundaries of the City and/or have formally requested notification under AB 52. To date, the City has received the following responses:

- The Quechan Indian Tribe responded on December 1, 2021, deferring to other tribes.
- The Morongo Band of Mission Indians responded on January 26, 2022, indicating that the proposed project is not located within their traditionally affiliated boundaries and encouraged consultation with other tribes.
- The Agua Caliente Band of Cahuilla Indians (ACBCI) responded on January 24, 2022, requested formal consultation under AB 52. The City engaged in government to government consultation with ACBCI concerning tribal cultural resources. On March 1, 2022, ACBCI sent a letter to the City stating that their concerns have been addressed and formally concluded AB 52 consultation.

As a result of consultation, the City has determined that potentially significant impacts to tribal cultural resources would be reduced to a level below significance with the incorporation of mitigation measures **MM-CUL-1** and **MM-CUL-2**.

T2-2
Cont.

## 18.3 Mitigation Measures

**MM-CUL-1** Prior to the issuance of a grading permit or ground disturbing activities, the Applicant/Owner shall enter into a Tribal Cultural Resources Agreement and Repatriation Agreement with Agua Caliente Band of Cahuilla Indians (ACBCI). The purpose of the agreement shall be to formalize protocols and procedures between the Applicant/Owner and the Tribe for protection, treatment, and repatriation of Native American human remains, funerary objects, cultural and /or religious, ceremonial items, and other Tribal Cultural resources.

A Qualified Archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, and an ACBCI Native American monitor shall be present for

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Same comments as previous section.

initial ground-disturbing activities associated with the current proposed project that may occur in areas of native soil. Both the Qualified Archaeologist and ACBCI Native American monitors may temporally halt or divert ground disturbing activities if potential archaeological or Tribal Cultural resources are discovered during construction activities in order to assess any discoveries in the field. The monitors may stop ground-distrubing activities in order to assess any discoveries in the field.

In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 50 feet of the find shall immediately stop until a Qualified Archaeologist can evaluate the significance of the find and determine whether additional study is warranted. Depending on the significance of the find under the California Environmental Quality Act (CEQA) and the CEQA Guidelines (California Public Resources Code, Section 21082; 14 CCR 15064.5(f)), the Qualified Archaeologist may exhaust the data potential of the find through the process of field level recordation and then allow work to continue. Isolates are clearly non-significant archaeological resources (as determined by the Qualified archaeologist, in consultation with the Native American monitor) will be minimally documented in the field. -If the discovery proves significant under CEQA, additional work such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted. In the event that curation of archaeological resources is required by the superseding regulatory agency, curation shall be conducted by an approved local facility in Riverside County, and curation shall be guided by California State Historical Resources Commission's Guidelines for the Curation of Archaeological Collections. The Applicant/Owner shall be responsible for all curation costs and provide the City written documentation from the curation facility that the curation have been completed.

If ~~Native American c~~ Tribal Cultural resources (i.e., prehistoric or ethnohistoric-period artifacts, food remains, or features associated with Native Americans) are exposed during proposed project-related ground disturbance, the actions identified by the Agua Caliente Band of Cahuilla Indians in a preexisting agreement for unanticipated discovery shall be followed~~contacted~~. This agreement may require ~~group shall be asked to provide the services of a trained~~ the Native American Monitor to return to site ~~consultant~~ to monitor ground-disturbing work in the area containing the Native American cultural resources. This monitoring would occur on an as-needed basis and would be intended to ensure that Native American concerns are taken into account during the construction process.

**MM-CUL-2** If human remains are discovered during construction of the proposed project, California Health and Safety Code, Section 7050.5, states that further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner shall be contacted. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within two working days of notification of discovery, the appropriate treatment and disposition of the human remains.

T2-2
Cont.

Pursuant to California Public Resources Code, Section 5097.98, if the remains are thought to be Native American, the County Coroner will notify the Native American Heritage Commission, which will then notify the most likely descendent. At this time, the person who discovered the remains will contact the City of Rancho Mirage (City) so that they may work with the most likely descendent on the respectful treatment and disposition of the remains. Further provisions of the California Public Resources Code, Section 5097.98, are to be followed as applicable.

T2-2
Cont.

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19. UTILITIES AND SERVICE SYSTEMS

| UTILITIES AND SERVICE SYSTEMS – Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects? | ☐ | ☐ | ☒ | ☐ |
| b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years? | ☐ | ☐ | ☒ | ☐ |
| c) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ☒ | ☐ |
| d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals? | ☐ | ☐ | ☒ | ☐ |
| e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste? | ☐ | ☐ | ☐ | ☒ |

T2-2 Cont.

## 19.1 Setting

According to The Lodge at Rancho Mirage Hotel Expansion Project 2006 DEIR, the project site is located the boundaries of the following providers: Coachella Valley Water District (CVWD), Southern California Edison (SCE), the Southern California Gas Company (SCG). The City contracts with Burrtec for waste and recycling services. Additionally, telephone service is provided to the proposed project by Verizon, and cable television service is provided by Spectrum. Both Verizon and Spectrum have facilities located in the proposed project vicinity and on the existing hotel property that can be extended to serve the proposed project.

The facilities, infrastructure, and capacity of each of these service providers to provide services to the proposed project are discussed below.

A portion of this section is based upon the Drainage Study prepared by Tory R. Walker Engineering in September 2019. The Drainage Study is included as Appendix D to his Initial Study. Background and methodologies regarding the drainage analysis are found be Appendix D.

## 19.2 Discussion of Impacts

a, b, c) ***Less-than-Significant Impact.***

**Water**

The CVWD would provide domestic water services to the proposed project (City of Rancho Mirage 2017). The CVWD's service area encompasses approximately 640,000 acres within Riverside County and in portions of northern Imperial and northeastern San Diego counties (CVWD 2016). As of 2015, the CVWD's domestic water system provided approximately 93,000 acre-feet of water per year to 212,871 residents through 107,358 active meters (CVWD 2016).

According to the City's General Plan – Public Services and Facilities Element, all drinking or domestic water comes from the Whitewater River Subbasin, which is shared by the CVWD, the Desert Water Agency (DWA), Myoma Dunes Mutual Water Company, the cities of Indio and Coachella, and multiple private groundwater producers (CVWD 2016). The CVWD domestic water system serving Rancho Mirage includes 57 wells and nine reservoir tanks (City of Rancho Mirage 2017). The average urban water use in Coachella Valley by CVWD was 800 gallons per day (gpd) per connection (City of Rancho Mirage 2017). In 1964, the DWA estimated that approximately 28.8 million acre-feet (AF) of water was stored in Whitewater River subbasin.

The proposed project totals 236,748 square feet, or approximately 5.5 acres. According to CalEEMod calculations provided in ~~Appendix A~~Appendix A-1, the proposed project is anticipated to use approximately 21 Mgal/year, equivalent to 64.5 AF per year (1 Mgal = 3.07 AF). The proposed project's projected water demand would not exceed the 28.8 million AF capacity of the Whitewater River Subbasin (CVWD 2016) and the proposed project would be aligned with the projected water demands for Coachella Valley (Table 19-1, Water Demand Projections).

T2-2
Cont.

The proposed project would be adequately served by the CVWD and the proposed project would not require or result in the relocation or construction of new or expanded water facilities. Therefore, impacts would be **less than significant.**

**Table 19-1. Water Demand Projections**

| | 2015 | 2025 | 2035 | 2045 |
|---|---|---|---|---|
| **Total Urban Water Demand (AFY)** | 263,200 | 348,900 | 440,800 | 539,300 |

**Source:** CVWMP 2012.

### Wastewater

The CVWD would provide sewer services to the proposed project (City of Rancho Mirage 2017). Existing sewer lines 6- to 10-inches in diameter would serve the project site (City of Rancho Mirage 2017). The CVWD wastewater reclamation system collects and treats approximately 18.3 million gallons per day (MGD). There are five water reclamation plants (WRP) that are owned and operated by the CVWD (CVWD 2019). Rancho Mirage is served by the closest WRP, located on 43-000 Cook Street, Palm Desert, Riverside County, California 92211 (CVWD 2019). This WRP treatment facility provides a secondary level of wastewater treatment and has a design capacity of 150,000 gallons per day (gpd), and the existing average influent flow is 20,000 gpd (CVWD 2019).

According to the City's General Plan Public Services and Utility Element, approximately 6.3 billion gallons of wastewater are treated yearly and the CVWD would be able to increase its wastewater treatment capacity as the Coachella Valley's population grows. As discussed in Section 14, Population and Housing, the proposed project is not anticipated to substantially increase population in Coachella Valley because it would expand existing hotel facilities and would not construct permanent homes. The proposed project is not anticipated to require or result in the relocation of construction of new or expanded wastewater facilities. The influent flows as reported in the 2019 Sanitary Sewer Management Plan are approximately 20,000 gpd, which is well below the treatment capacity of 150,000 gpd. Additionally, there are current expansion and improvement plants to the wastewater collection system and reclamation plants, which would increase the system's capacity to treat wastewater (City of Rancho Mirage 2017). Therefore, wastewater generation from the proposed project would be adequately served by existing treatment facilities and infrastructure and impacts would be **less than significant.**

### Stormwater

The proposed project would develop a site with existing hardscape and engineered drainage facilities. While the proposed project would alter the amount of impervious surfaces on the project site compared to the existing condition, the increase would not be substantial. The proposed project would include landscaped areas that would allow for infiltration. The site would be designed to mimic existing drainage patterns and would not substantially alter the existing drainage pattern such that it would necessitate the construction of new stormwater drainage facilities. Therefore, impacts would be **less than significant.**

T2-2
Cont.

**Electric, Natural Gas, and Telecommunication Facilities**

Southern California Edison (SCE) provides electric power services to the City (City of Rancho Mirage 2017). Southern California Gas (SCG) provides natural gas services to the City (City of Rancho Mirage 2017). Multiple companies, such as AT&T and Spectrum, provide telecommunication services to the City (City of Rancho Mirage 2017).

***Construction***

As discussed in Section 6, Energy, temporary electric power would be used during construction for as-necessary lighting and electric equipment. A substantial amount of natural gas would not be required during the construction phase of the proposed project. Petroleum usage via diesel usage from generated trips during construction would consume 15,773 gallons of gasoline and 108,282 gallons of diesel over the construction period, which is negligible when compared to the 44.62 billion gallons of petroleum that would be consumed in California over the course of the construction period.

***Operation***

Energy consumption for proposed project operation are presented in the CalEEMod outputs in ~~Appendix A~~Appendix A-1. According to these estimations, the proposed project would consume approximately 1,999,034 kilowatt-hours (kWh) per year during operation. For comparison, in 2017 the total residential and non-residential electricity demand in Riverside County was 16,256,705,411 kWh (CEC 2018). Although not accounted for in the modeling, energy consumption of the proposed project would also be reduced through installation of high-efficiency lighting. For these reasons, electricity consumption during operation would not be considered substantial enough to warrant new or expanded electrical facilities.

T2-2
Cont.

Proposed project operation would require natural gas for various purposes, including water heating, natural gas appliances and energy generator routing testing. Natural gas consumption associated with operation is based on the CalEEMod outputs (see ~~Appendix A~~Appendix A-1). According to these estimations, the proposed project would consume approximately 4,330,242 kilo-British Thermal Units (kBtu) per year. For comparison, in 2017 the non-residential natural gas use within Riverside County was 39,844,317,732 kBtu (CEC 2018). Since the proposed project would comply with applicable Title 24 requirements the proposed project would not require a substantial amount of natural gas that would require new or expanded facilities.

Petroleum use would increase during proposed project operation as a result of residences, restaurant customers, venue attendees, deliveries, and employees commuting to the site, although the use would not be substantial and would diminish over time due to efficiency increases.

***Summary***

The proposed project would connect to existing electric, natural gas, and telecommunication lines and facilities within and adjacent to the project site. The proposed project does not propose uses that would be expected to generate an excessive need for these facilities such that construction or relocation would be required. Therefore, impacts would be **less than significant**.

d) ***Less-than-Significant Impact***: The proposed project would produce waste during construction and operation, typical of a normal hotel expansion development. The proposed project does not include any uses that would otherwise generate excessive solid waste during either construction or the operational life of the proposed project. Construction would be a short-term and a temporary source of waste. Operation would result in a long-term source for solid waste (per the project's CalEEMod output, the project is estimated to generate approximately 191 tons of solid waste per year).

The City contracts Burrtec to manage and dispose of solid waste (City of Rancho Mirage 2017). The solid waste would be taken to Edom Hill Transfer Station, located in Cathedral City approximately 3 miles north of the City of Rancho Mirage (City of Rancho Mirage 2017). The Edom Hill transfer station has a maximum permitted throughput of 3,500 tons per day and a permitted capacity of 3,500 tons per day for general waste (City of Rancho Mirage 2017). The solid waste is transferred from Edom Hill transfer station to Lamb Canyon Sanitary Landfill, which has a maximum permitted throughput of 500 tons per day, a maximum permitted capacity of approximately 38 million cubic yards, and a remaining capacity of approximately 19 million cubic yards (CalRecycle n.d.a.). Given the estimated remaining capacity and the continued state and local efforts and regulations to reduce waste streams to landfills, the proposed project would be adequately served by existing landfills. Impacts would be **less than significant.**

d) ***No Impact***: During construction and operation, the proposed project would be required to comply with applicable federal, state, and local regulations regarding the proper disposal of solid waste, including the City of Rancho Mirage Municipal Code as it relates to solid waste and recycling. Therefore, **no impact** would occur.

T2-2 Cont.

## 19.3 Mitigation Measures

No mitigation measures required.

T2-2
Cont.

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20. WILDFIRE

| WILDFIRE – If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Substantially impair an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☐ | ☒ |
| b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire? | ☐ | ☐ | ☒ | ☐ |
| c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment? | ☐ | ☐ | ☒ | ☐ |
| d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes? | ☐ | ☐ | ☒ | ☐ |

T2-2 Cont.

### 20.1 Setting

The project site is not located in or near state responsibility areas (SRA), and near lands are also not located in or near SRAs. The project site is located within a local responsibility area (LRA). According to Exhibit 27 of the City's General Plan Safety Element, the project site is located within a moderate fire threat zone and is adjacent to a high fire threat zone (City of Rancho Mirage 2017). However, the City's General Plan Safety Element also notes that "the historical record indicates that the wildland fire hazard in Rancho Mirage is relatively low" (City of Rancho Mirage 2017).

### 20.2 Discussion of Impacts:

a) ***No Impact.*** The City of Rancho Mirage operates an Emergency Preparedness Commission that provides resources to reduce future disaster damages and enhance disaster

preparedness, response, and recovery (City of Rancho Mirage n.d.b.). Additionally, the City of Rancho Mirage participates in the Riverside County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) (City of Rancho Mirage 2017). The City of Rancho Mirage has two main evacuation routes, I-10 and Highway 111 (City of Rancho Mirage 2017). Multiple fire hazard goals, policies and programs presented in the general plan would establish emergency preparedness and procedure in the case of wildfires. The proposed project would not impair access to identified evacuation routes, as discussed in Section 17 Transportation. The proposed project would not substantially impair adopted emergency responses plans or emergency evacuation plans and therefore there would be **no impact**.

b) ***Less-than-significant Impact.*** As discussed earlier, the project site is not located in or near an SRA and is located within a moderate fire threat zone (City of Rancho Mirage 2017). The project site is not located within the Santa Ana Wildfire Threat Index map, and therefore proposed project occupants would not be exposed to potential pollutant concentrations originating from uncontrolled spread of wildfire due to prevailing Santa Ana Winds (Santa Ana Wildfire Treat Index n.d.a.). All fire protection codes present in the City of Rancho Mirage's municipal code would be adhered to and would lessen potential exposure of proposed project occupants to pollutants resulting from wildfire spread. Therefore, impacts would be **less than significant**.

c) ***Less-than-significant Impact.*** The proposed project would not require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risks or that may result in temporary or ongoing impacts to the environment. As discussed in Section 19, Utilities and Service Systems, the proposed project would connect to existing infrastructure. New inlet roads would be constructed as part of the proposed project and would follow all setback and fire code regulations established by the City of Rancho Mirage and the County of Riverside. Therefore, impacts would be **less than significant**.

d) ***Less-than-significant Impact.*** As discussed in Section 10, Hydrology and Water Quality, the proposed project would not be located within a 100-year flood hazard area (City of Rancho Mirage 2017). Additionally, although the proposed project would increase the amount of impervious surface at the site compared to existing conditions, this increase would not be significant. According to Exhibit 24 of the City's General Plan Safety Element, the project site is located in an area where "numerous rock falls and landscapes expected to occur during an earthquake" (City of Rancho Mirage 2017); however, compliance with the City's General Plan policies and the California Building Code (CBC) (discussed in Section 7, Geology and Soils) would mitigate the potential landslide impacts to a level less than significant. Therefore, the proposed project would not expose people or structures to significant risks, including downslope or downstream flooding or landsides, as a result of runoff, post-fire slope instability, or drainage changes. Impacts would be **less than significant**.

T2-2
Cont.

### 20.3 Mitigation Measures:

No mitigation measures required.

21. MANDATORY FINDINGS OF SIGNIFICANCE

| MANDATORY FINDINGS OF SIGNIFICANCE | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | ☐ | ☒ | ☐ | ☐ |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? | ☐ | ☒ | ☐ | ☐ |
| c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☒ | ☐ | ☐ |

T2-2
Cont.

### 21.1 Discussion of Impacts

a) ***Less-than-Significant Impact with Mitigation Incorporated.*** As discussed in Section 4, Biological Resources, the proposed project would cause potential significant impacts to special status wildlife. However, with incorporation of **MM-BIO-1 through MM-BIO-6**, all potentially significant

impacts would be reduced to a level below significance. The proposed project would not substantially degrade the quality of the environment as it would be developed in land that has already been graded. Additionally, the proposed project would not substantially degrade the quality of the environment, impact fish or wildlife species, or plant communities.

As discussed in Section 5, Cultural Resources, potential impacts regarding inadvertent discovery of cultural resources could occur during construction of the proposed project. However, implementation of **MM-CUL-1** and **MM-CUL-2** would ensure that impacts would be less then significant. Overall, impacts would be **less than significant with the incorporation of mitigation**.

b) ***Less-than-Significant Impact with Mitigation Incorporated.*** As provided in the analysis of this Initial Study, the proposed project would not result in significant impacts to aesthetics, agriculture and forestry resources, air quality, biological resources, cultural resources, energy, geology and soils, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation, tribal cultural resources, utilities and service systems, and wildfire. Mitigation measures recommended for biological resources, cultural resources, traffic, geology and soils, and noise would reduce impacts to below a level of significance.

The proposed project would incrementally contribute to cumulative impacts for projects occurring within the City. With mitigation, however, implementation of the proposed project would not result in any residual significant impacts that could contribute to a cumulative impact. In addition, other related projects would presumably be bound by their applicable lead agency to (1) comply with the all applicable federal, state, and local regulatory requirements; and (2) incorporate all feasible mitigation measures, consistent with CEQA, to further ensure that their potentially cumulative impacts would be reduced to less-than-significant levels.

In the absence of residually significant impacts, the incremental accumulation of effects would not be cumulatively considerable and would be **less than significant with incorporation of mitigation**.

c) ***Less-than-Significant Impact with Mitigation Incorporated.*** The potential for adverse direct or indirect impacts to human beings was considered throughout the above analysis in this Initial Study. Based on this evaluation, there is no substantial evidence that construction or operation of the proposed project with the proposed mitigation measures incorporated would result in a substantial adverse effect on human beings.

## 21.2 Mitigation Measures

Refer to **MM-BIO-1 through MM-BIO-6, MM-CUL-1, MM-CUL-2, MM-NOI-1, MM-TRA-1**, and **MM-TRA-2**.

| Table 21.2-1: Mitigation Monitoring and Reporting Program | | | |
|---|---|---|---|
| Mitigation Measure | Responsible Agency | Timing | Verification |



T2-2 Cont.

| | | | |
|---|---|---|---|
| | | | (Date and Initials) |
| **AESTHETICS** | | | |
| N/A | | | |
| **AGRICULTURAL RESOURCES** | | | |
| N/A | | | |
| **AIR QUALITY** | | | |
| **MM-AQ-1 Construction Equipment – Use of Tier 4 Engines** Prior to the commencement of construction activities for the project, the applicant shall require its construction contractor to use California Air Resources Board (CARB)-certified Tier 4 engines for all diesel-powered equipment pieces that are 75 horsepower or greater throughout all phases of construction.<br><br>In the event of changed circumstances (e.g., changes in the availability of specific types of construction equipment), the applicant may submit a request to the City to apply an equivalent method of achieving project-generated construction emissions that fall below the numeric cancer risk standards established by the South Coast Air Quality Management District (SCAQMD). Documentation using industry-standard emission estimation methodologies shall be furnished to the City demonstrating that estimated project-generated construction emissions would not exceed the applicable SCAQMD cancer risk threshold with the alternate construction method(s). If the documentation demonstrates that project-generated construction emissions will remain below the applicable SCAQMD cancer risk threshold, then the City may approve the alternate construction method(s), at the City's discretion.<br><br>Required construction equipment fleet and methodologies approved by the City shall be included in the contract specifications for the applicant's construction contractor. | Project Applicant, City of Rancho Mirage- Planning Division | Prior to and during project constructio n | |
| **BIOLOGICAL RESOURCES** | | | |
| **MM-BIO-1: Coachella Valley Multiple Species Habitat Conservation Plan Fee Payment.** As a | Project Applicant, City | Prior to constructio | |

T2-2 Cont.

| | | | |
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| signatory to the Coachella Valley Multiple Species Habitat Conservation Plan, the City of Rancho Mirage shall require a local development mitigation fee prior to the issuance of building permits for the proposed use on the project site at the rates applicable at the time of payment of the fee as set forth in the most recent fee schedule. The project applicant shall be required to provide documentation to the City of Rancho Mirage confirming the payment of the local development mitigation fee. | of Rancho Mirage- Building/Planning Division, Coachella Valley Conservation Commission | n and issuance of grading permit | |
| **MM-BIO-2: Coachella Valley Multiple Species Habitat Conservation Plan Land Use Adjacency Guidelines.** The project applicant shall implement the following Land Use Adjacency Guidelines (Coachella Valley Multiple Species Habitat Conservation Plan [CVMSHCP], Section 4.5) to minimize and avoid indirect effects from development adjacent to conservation areas (i.e., Santa Rosa and San Jacinto Mountains Conservation Area), where applicable:<br>• **Drainage**: Proposed Development adjacent to or within a Conservation Area shall incorporate plans to ensure that the quantity and quality of runoff discharged to the adjacent Conservation Area is not altered in an adverse way when compared with existing conditions. Stormwater systems shall be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials, or other elements that might degrade or harm biological resources or ecosystem processes within the adjacent Conservation Area.<br>• **Toxics**: Land uses proposed adjacent to or within a Conservation Area that use chemicals or generate | Project Applicant, City of Rancho Mirage- Planning Division, Coachella Valley Conservation Commission | During project construction and operation | |

T2-2 Cont.

bioproducts such as manure that are potentially toxic or may adversely affect wildlife and plant species, habitat, or water quality shall incorporate measures to ensure that application of such chemicals does not result in any discharge to the adjacent Conservation Area.

- **Lighting**: For proposed development adjacent to or within a Conservation Area, lighting shall be shielded and directed toward the developed area. Landscape shielding or other appropriate methods shall be incorporated in project designs to minimize the effects of lighting adjacent to or within the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual. The City of Rancho Mirage and Project proponent shall avoid or limit the use of artificial lighting at night during the hours of dawn and dusk when many wildlife species are most active, and ensure use of LED lighting with a correlated color temperature of 3,000 Kelvins or less.
- **Noise**: Proposed development adjacent to or within a Conservation Area that generates noise in excess of 75 A-weighted decibels sound equivalent level hourly shall incorporate setbacks, berms, or walls, as appropriate, to minimize the effects of noise on the adjacent Conservation Area in accordance with the

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guidelines to be included in the Implementation Manual.

- **Invasives**: Invasive, non-native plant species shall not be incorporated in the landscape for land uses adjacent to or within a Conservation Area. Landscape treatments within or adjacent to a Conservation Area shall incorporate native plant materials to the maximum extent feasible; recommended native species are listed in Table 4-112 [CVMSHCP, Section 4.5.5]. The plants listed in Table 4-113 shall not be used within or adjacent to a Conservation Area. This list may be amended from time to time through a Minor Amendment with Wildlife Agency Concurrence.
- **Barriers**: Land uses adjacent to or within a Conservation Area shall incorporate barriers in individual project designs to minimize unauthorized public access, domestic animal predation, illegal trespass, or dumping in a Conservation Area. Such barriers may include native landscaping, rocks/boulders, fencing, walls and/or signage. Existing fencing separating the Big Horn Reserve Land (i.e., adjacent Conservation Area) from the proposed Project site was previously installed to prevent Peninsular bighorn sheep from entering and grazing on the Ritz Carlton Hotel property (i.e., Project). The project shall maintain a fence, or functionally equivalent structure throughout

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| the lifetime of the project. Therefore, necessary barriers (i.e., fencing) is currently in place.<br>• **Grading/Land Development**: Manufactured slopes associated with site development shall not extend into adjacent land in a Conservation Area. | | | |
| **MM-BIO-3**: **Nesting Birds**. To maintain compliance with the Migratory Bird Treaty Act and California Fish and Game Code, regardless of the time of year, if ground-disturbing and/or vegetation clearance activities are scheduled to occur ~~during the avian nesting season (typically February 15 through August 31)~~, a qualified biologist shall conduct a pre-construction nesting bird survey within the project impact footprint and a 500-foot buffer where legal access is granted around the disturbance footprint. Surveys shall be conducted within 3 days prior to initiation of ground-disturbing activities.<br><br>If an active nest is detected during the nesting bird survey, avoidance buffers shall be implemented as determined by a qualified biologist (typically 300 feet for passerines and 500 feet for raptors and special-status species). The buffer shall be of a distance to ensure avoidance of adverse effects to the nesting bird by accounting for topography, ambient conditions, species, nest location, and activity type. All nests shall be monitored as determined by the qualified biologist until nestlings have fledged and dispersed or it is confirmed that the nest has been unsuccessful or abandoned. The qualified biologist shall halt all construction activities within proximity to an active nest if it is determined that the activities are harassing the nest and may result in nest abandonment or take. The qualified biologist shall also have the authority to require implementation of avoidance measures related to noise, vibration, or light pollution if indirect impacts are resulting in harassment of the nest. | Project Applicant, City of Rancho Mirage -Planning Divisions, a Qualified Biologist | Three days prior to initiation of ground-disturbing activities | |

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| **MM-BIO-4: Burrowing Owl.** Pre-construction surveys for burrowing owls shall be completed within areas of suitable habitat (i.e., flatter portions of the site) in accordance with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012), with the first survey no less than 14 days prior to initiation of project-related activities, and the second within 24 hours of project-related activities. If ~~an~~burrowing owls or~~—~~active burrowing owl burrows are~~it~~ detected, ~~the~~ qualified biologist shall coordinate with CDFW and prepare a Burrowing Owl Plan that shall be submitted to CDFW and USFWS for review and approval prior to commencing Project activities. The Burrowing Owl Plan shall describe proposed avoidance, minimization, mitigation, and monitoring actions. The Burrowing Owl Plan shall include the number and location of occupied burrow sites, acres of burrowing owl habitat that will be impacted, details of site monitoring, and details on proposed buffers and other avoidance measures if avoidance is proposed. If impacts to occupied burrowing owl habitat or burrow cannot be avoided, the Burrowing Owl Plan shall also describe minimization and relocation actions that will be implemented. Proposed implementation of burrow exclusion and closure should only be considered as a last resort, after all other options have been evaluated as exclusion is not in itself an avoidance, minimization, or mitigation method and has the possibility to result in take. If impacts to occupied burrows cannot be avoided, information shall be provided regarding adjacent or nearby suitable habitat available to owls along with proposed relocation actions. The Project proponent shall implement the Burrowing Owl Plan following CDFW and USFWS review and approval. ~~within 500 feet of the impact footprint, avoidance and minimization measures shall be implemented in accordance with the *Staff Report on Burrowing Owl Mitigation* guidelines or agreed upon by the California Department of Fish and Wildlife, including implementation of a non-disturbance buffer and monitoring of the nest to ensure activities are not adversely affecting the nest. If the project will occur within this zone, then work must occur outside the nesting season, or until it can be shown that the birds have finished nesting, at which point passive relocation may occur.~~ | Project Applicant, City of Rancho Mirage- Planning Division, a Qualified Biologist | The first survey no less than 14 days prior to initiation of project-related activities, and the second within 24 hours of project-related activities. | |

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| **MM-BIO-5: General Avoidance and Minimization Measures.** The following avoidance and minimization measures shall be implemented during project construction activities:<br>• To prevent inadvertent entrapment of special-status wildlife during construction, all excavated steep-walled holes or trenches more than 2 feet deep shall be covered with plywood or similar materials at the close of each working day, or be provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped wildlife. If trapped animals are observed, escape ramps or structures shall be installed immediately to allow escape. | Project Applicant, City of Rancho Mirage - Planning Division, | During construction | |
| **MM-BIO-6: Desert Tortoise.** Because the project is located outside of a Conservation Area but within the 50,272 acres of naturally occurring desert tortoise habitat anticipated to be impacted under the Coachella Valley Multiple Species Habitat Conservation Plan, the project applicant shall notify the U.S. Fish and Wildlife Service 45 days prior to the issuance of a grading permit to allow for the potential salvage of adult tortoises within this notification time period. | Project Applicant, City of Rancho Mirage- Planning Division, and a Qualified Biologist | 45 days prior to the issuance of a grading permit | |
| **CULTURAL RESOURCES** | | | |
| **MM-CUL-1:** Prior to the issuance of a grading permit or ground disturbing activities, the Applicant/Owner shall enter into a Tribal Cultural Resources Agreement and Repatriation Agreement with Agua Caliente Band of Cahuilla Indians (ACBCI). The purpose of the agreement shall be to formalize protocols and procedures between the Applicant/Owner and the Tribe for protection, treatment, and repatriation of Native American human remains, funerary objects, cultural and /or religious, ceremonial items, and other Tribal Cultural resources. A Qualified Archaeologist, meeting the Secretary of the | Project Applicant, City of Rancho Mirage- Planning Division, A Qualified Archaeologist, a Native American monitor | During project construction | |

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Number: 1 Author: xmadrigal Subject: Highlight Date: 8/19/2024 4:54:32 PM
Same comments as previous section.

Interior's Professional Qualification Standards, and an ACBCI Native American monitor shall be present for initial ground-disturbing activities associated with the current proposed project that may occur in areas of native soil. Both the Qualified Archaeologist and ACBCI Native American monitors may temporally halt or divert ground disturbing activities if potential archaeological or Tribal Cultural resources are discovered during construction activities in order to assess any discoveries in the field. ~~in the event unanticipated discoveries are made.~~ The monitors may stop ground-disturbing activities in order to assess any discoveries in the field.

In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 50 feet of the find shall immediately stop until a Qualified Archaeologist can evaluate the significance of the find and determine whether additional study is warranted. Depending on the significance of the find under the California Environmental Quality Act (CEQA) and the CEQA Guidelines (California Public Resources Code, Section 21082; 14 CCR 15064.5(f)), the Qualified Archaeologist may exhaust the data potential of the find through the process of field level recordation and then allow work to continue. Isolates are clearly non-significant archaeological resources [as determined by the Qualified archaeologist, in consultation with the Native American monitor] will be minimally documented in the field. If the discovery proves significant under CEQA, additional work such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted. In the event that curation of archaeological resources is required by the superseding regulatory agency, curation shall be conducted by an approved local facility in Riverside County, and curation shall be guided by California State Historical Resources Commission's Guidelines for the Curation of Archaeological Collections. The Applicant/Owner shall be responsible for all curation costs and provide the City written documentation

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| from the curation facility that the curation have been completed.<br><br>If ~~Native American c~~ Tribal Cultural resources (i.e., prehistoric or ethnohistoric-period artifacts, food remains, or features associated with Native Americans) are exposed during proposed project-related ground disturbance, the actions identified by the Agua Caliente Band of Cahuilla Indians in a preexisting agreement for unanticipated discover shall be followed~~contacted~~. This agreement may require ~~group shall be asked to provide the services of a trained~~ the Native American Monitor to return to the site ~~consultant~~ to monitor ground-disturbing work in the area containing the Native American cultural resources. This monitoring would occur on an as-needed basis and would be intended to ensure that Native American concerns are taken into account during the construction process. | | | |
| **MM-CUL-2**: If human remains are discovered during construction of the proposed project, California Health and Safety Code, Section 7050.5, states that further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner shall be contacted. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within two working days of notification of discovery, the appropriate treatment and disposition of the human remains.<br><br>Pursuant to California Public Resources Code, Section 5097.98, if the remains are thought to be Native American, the County Coroner will notify the Native American Heritage Commission, which will then notify the most likely descendent. At this time, the person who discovered the remains will contact the City of Rancho Mirage (City) so that they may work with the most likely descendent on the respectful treatment and disposition of the remains. Further provisions of the California Public Resources Code, Section 5097.98, are to be followed as applicable. | Project Applicant, City of Rancho Mirage, A Qualified Archaeologist, County Coroner (if applicable) | During project constructio n | |
| **GEOLOGY AND SOILS** | | | |
| N/A | | | |
| **GREENHOUSE GAS EMISSIONS** | | | |

T2-2 Cont.

| | | | |
|---|---|---|---|
| N/A | | | |
| **HAZARDS AND HAZARDOUS MATERIALS** | | | |
| N/A | | | |
| **HYDROLOGY AND WATER QUALITY** | | | |
| N/A | | | |
| **LAND USE AND PLANNING** | | | |
| N/A | | | |
| **MINERAL RESOURCES** | | | |
| N/A | | | |
| **NOISE** | | | |
| **MM-NOI-1:** During proposed project construction, the applicant shall require that large-loaded trucks and dozers (greater than 80,000 pounds) shall not be used within 50 feet along the entire southern property line. Instead, small rubber-tired or alternative equipment shall be used within this area during proposed project construction to reduce vibration effects. If all mobile equipment used during proposed project construction are less than 80,000 pounds, then the 50 foot buffer mitigation is not required. | Project Applicant, City of Rancho Mirage- Planning Division | During project construction | |
| **POPULATION AND HOUSING** | | | |
| N/A | | | |
| **PUBLIC SERVICES** | | | |
| N/A | | | |
| **RECREATION** | | | |
| N/A | | | |
| **TRANSPORTATION/TRAFFIC** | | | |
| **MM-TRA-1: Hwy. 111 and Frank Sinatra Dr. (#3) –** Prior to operation of the proposed project, the Applicant shall increase the turn lane capacity from 260' to 400' for the North Bound Lane movement. | Project Applicant, City of Rancho Mirage- City Engineer | Prior to operation | |
| **MM-TRA-2: Hwy. 111 and Frank Sinatra Dr. (#3) –** Prior to operation of the proposed project, the Applicant shall increase turn lane capacity from 170' to 250' for the East Bound Lane movement. | Project Applicant, City of Rancho Mirage- City Engineer | Prior to operation | |
| **TRIBAL CULTURAL RESOURCES** | | | |
| See **MM-CUL-1** and **MM-CUL-2** above. | | | |

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Cont.

| UTILITIES AND SERVICE SYSTEMS |
| --- |
| N/A |

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Cont.

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**Appendix A-1**
Air Quality and GHG Technical Report

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Cont.

**Appendix A-2**
Health Risk Assessment Memorandum

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Cont.

**Appendix B**
Biological Resources Report

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Cont.

**Appendix C**
Cultural Report

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Cont.

**Appendix D**
Drainage Study

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Cont.

**Appendix E**
Noise Study

T2-2
Cont.

**Appendix F1**
Traffic Report

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Cont.

**Appendix F2**
Vehicle Miles Travelled Analysis

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Cont.

**Appendix G**
Parking Evaluation

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Cont.

**Appendix H**
Geotechnical Report

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Cont.

**Appendix I**
Phase I ESA

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Cont.

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# Response to Comment Letter T2

**Tribal Government**
**Agua Caliente Band of Cahuilla Indians**
**August 20, 2024**

**T2-1** The City acknowledges the comment as an introduction to comments that follow. This comment is included in the Final MND for review and consideration by the decision-makers prior to a final decision on the project. No further response is required.

**T2-2** The comment includes suggested edits to MM-CUL-1. Please see revised MND-CUL-1 in the Final MND. These changes merely clarify or amplify information already found in the Draft MND, and do not raise important new issues about significant effects on the environment. Revisions are presented in strikeout/<u>underline</u> format in the Final MND.

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Comment Letter O1

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April 9, 2024

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**RE: March 1, 2024 Initial Study / Mitigated Negative Declaration – City of Rancho Mirage's Ritz-Carlton Phase II Expansion Project.**

Dear Mr. Torres:

On behalf of the Western States Regional Council of Carpenters ("**WSRCC**"), our firm is submitting these comments in connection with the City of Rancho Mirage's ("**City**" or "**Lead Agency**") March 1, 2024 Initial Study / Mitigated Negative Declaration ("**MND**") pertaining to the Ritz-Carlton Phase II Expansion Project (Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004) ("**Project**"). O1-1

The Project involves the construction of the Ritz-Carlton Residences Rancho Mirage and the Sky Mesa Recreation Center on a 35.07-acre site located at 68900 Frank Sinatra Drive, Rancho Mirage, CA 92270 (APNs: 689-330-026, -028, -032, -034; 689-020-012, -014; 689-331-001, -018) in Riverside County. Nestled in the foothills of the Santa Rosa Mountains 650 feet above the Coachella Valley below, the 150,000-square-foot Project will consist of a one-to three-story apartment and condominium complex, along with a parking garage, hotel, 28,843 square feet of event space, 6,273 square feet of restaurant space, and 5,513 square feet for amenities. The overall Project Site includes an existing hotel that opened as a Ritz-Carlton in 1988 and was later rebranded. The Project would provide a total of 106 new units and 381 vehicle parking spaces. O1-2

WSRCC is a labor union representing over 63,000 union carpenters in 10 states, including California, and has a strong interest in well-ordered land use planning and in addressing the environmental impacts of development projects. Some WSRCC O1-3

members live, work, and recreate in the City and the surrounding communities and would be directly affected by the Project's environmental impacts.

WSRCC expressly reserves the right to supplement these comments at or prior to hearings on the Project, and at any later hearing and proceeding related to this Project. Gov. Code, § 65009(b); PRC, § 21177(a); see *Bakersfield Citizens for Local Control v. Bakersfield* (2004) 124 Cal.App.4th 1184, 1199-1203; see also *Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal.App.4th 1109, 1121.

WSRCC incorporates by reference all comments raising issues regarding the Project and its environmental review and associated documents and reports (including the City's Staff Report), or lack thereof. See *Citizens for Clean Energy v. City of Woodland* (2014) 225 Cal.App.4th 173, 191 (finding that any party who has objected to the project's environmental documentation may assert any issue timely raised by other parties).

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Moreover, WSRCC requests that the City provide notice for any and all notices referring or related to the Project issued under the California Environmental Quality Act ("**CEQA**") (Public Resources Code, § 21000 et seq.), and the California Planning and Zoning Law ("**Planning and Zoning Law**") (Gov. Code, §§ 65000–65010). California Public Resources Code, sections 21092.2 and 21167, subsection (f) and California Government Code, section 65092 require agencies to mail such notices to any person who has filed a written request for them with the clerk of the agency's governing body.

## I. THE CITY SHOULD REQUIRE THE USE OF A LOCAL WORKFORCE TO BENEFIT THE COMMUNITY'S ECONOMIC DEVELOPMENT AND ENVIRONMENT.

The City should require that the Project be built using local workers who have graduated from a Joint Labor-Management Apprenticeship Program approved by the State of California, have at least as many hours of on-the-job experience in the applicable craft which would be required to graduate from such a program, or are registered apprentices in such a program.

O1-4

Community benefits such as local hire can also be helpful to reduce environmental impacts and improve the positive economic impacts of the Project. Local hire provisions requiring that a certain percentage of workers reside within 10 miles or less of the Project site can reduce the length of vendor trips, reduce greenhouse gas

emissions, and provide localized economic benefits. As environmental consultants Matt Hagemann and Paul E. Rosenfeld note:

> [A]ny local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

March 8, 2021, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling.

Workforce requirements promote the development of skilled trades that yield sustainable economic development. As the California Workforce Development Board and the University of California, Berkeley Center for Labor Research and Education concluded:

> [L]abor should be considered an investment rather than a cost—and investments in growing, diversifying, and upskilling California's workforce can positively affect returns on climate mitigation efforts. In other words, well-trained workers are key to delivering emissions reductions and moving California closer to its climate targets.[1]

Furthermore, workforce policies have significant environmental benefits given that they improve an area's jobs-housing balance, decreasing the amount and length of job commutes and the associated greenhouse gas ("**GHG**") emissions. In fact, on May 7, 2021, the South Coast Air Quality Management District found that that the "[u]se of a local state-certified apprenticeship program" can result in air pollutant reductions.[2]

Locating jobs closer to residential areas can have significant environmental benefits. As the California Planning Roundtable noted in 2008:

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[1] California Workforce Development Board (2020) Putting California on the High Road: A Jobs and Climate Action Plan 2030 at p. ii, *available at* https://laborcenter.berkeley.edu/wp-content/uploads/2020/09/Putting-California-on-the-High-Road.pdf.

[2] South Coast Air Quality Management District (May 7, 2021) Certify Final Environmental Assessment and Adopt Proposed Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions Program, and Proposed Rule 316 – Fees for Rule 2305, Submit Rule 2305 for Inclusion Into the SIP, and Approve Supporting Budget Actions, *available at* http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-May7-027.pdf?sfvrsn=10.

> People who live and work in the same jurisdiction would be more likely to take transit, walk, or bicycle to work than residents of less balanced communities and their vehicle trips would be shorter. Benefits would include potential reductions in both vehicle miles traveled and vehicle hours traveled.[3]

Moreover, local hire mandates and skill-training are critical facets of a strategy to reduce vehicle miles traveled ("**VMT**"). As planning experts Robert Cervero and Michael Duncan have noted, simply placing jobs near housing stock is insufficient to achieve VMT reductions given that the skill requirements of available local jobs must match those held by local residents.[4] Some municipalities have even tied local hire and other workforce policies to local development permits to address transportation issues. Cervero and Duncan note that:

> In nearly built-out Berkeley, CA, the approach to balancing jobs and housing is to create local jobs rather than to develop new housing. The city's First Source program encourages businesses to hire local residents, especially for entry- and intermediate-level jobs, and sponsors vocational training to ensure residents are employment-ready. While the program is voluntary, some 300 businesses have used it to date, placing more than 3,000 city residents in local jobs since it was launched in 1986. When needed, these carrots are matched by sticks, since the city is not shy about negotiating corporate participation in First Source as a condition of approval for development permits.

Recently, the State of California verified its commitment towards workforce development through the Affordable Housing and High Road Jobs Act of 2022, otherwise known as Assembly Bill No. 2011 (AB2011). AB2011 amended the Planning and Zoning Law to allow ministerial, by-right approval for projects being built alongside commercial corridors that meet affordability and labor requirements.

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[3] California Planning Roundtable (2008) Deconstructing Jobs-Housing Balance at p. 6, *available at* https://cproundtable.org/static/media/uploads/publications/cpr-jobs-housing.pdf

[4] Cervero, Robert and Duncan, Michael (2006) Which Reduces Vehicle Travel More: Jobs-Housing Balance or Retail-Housing Mixing? Journal of the American Planning Association 72 (4), 475-490, 482, *available at* http://reconnectingamerica.org/assets/Uploads/UTCT-825.pdf.

The City should consider utilizing local workforce policies and requirements to benefit the local area economically and to mitigate GHG emissions, improve air quality, and reduce transportation impacts.

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## II. THE CITY SHOULD INCORPORATE LANGUAGE IMPOSING TRAINING REQUIREMENTS FOR CONSTRUCTION ACTIVITIES TO PREVENT COMMUNITY SPREAD OF COVID-19 AND OTHER INFECTIOUS DISEASES INTO THE DEVELOPMENT AGREEMENT.

Construction work has been defined as a Lower to High-risk activity for COVID-19 spread by the Occupations Safety and Health Administration. Recently, several construction sites have been identified as sources of community spread of COVID-19.[5]

Western Carpenters recommend that the City adopt additional requirements to mitigate public health risks from various residential, commercial and mixed-use development construction activities. Western Carpenters requests that the City require safe on-site construction work practices as well as training and certification for any construction workers on residential, commercial and mixed-use developments within the City's General Plan Area.

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In particular, based upon Western Carpenters' experience with safe construction site work practices, Western Carpenters recommends that the City require that while construction activities are being conducted at the proposed Project ("**Project Site**"):

**Construction Site Design:**

- The Project Site will be limited to two controlled entry points.
- Entry points will have temperature screening technicians taking temperature readings when the entry point is open.
- The Temperature Screening Site Plan shows details regarding access to the Project Site and Project Site logistics for conducting temperature screening.

[5] Santa Clara County Public Health (June 12, 2020) COVID-19 CASES AT CONSTRUCTION SITES HIGHLIGHT NEED FOR CONTINUED VIGILANCE IN SECTORS THAT HAVE REOPENED, *available at* https://www.sccgov.org/sites/covid19/Pages/press-release-06-12-2020-cases-at-construction-sites.aspx.

- A 48-hour advance notice will be provided to all trades prior to the first day of temperature screening.
- The perimeter fence directly adjacent to the entry points will be clearly marked indicating the appropriate 6-foot social distancing position for when you approach the screening area. Please reference the Apex temperature screening site map for additional details.
- There will be clear signage posted at the project site directing you through temperature screening.
- Provide hand washing stations throughout the construction site.

**Testing Procedures:**

- The temperature screening being used are non-contact devices.
- Temperature readings will not be recorded.
- Personnel will be screened upon entering the testing center and should only take 1-2 seconds per individual.
- Hard hats, head coverings, sweat, dirt, sunscreen or any other cosmetics must be removed on the forehead before temperature screening.
- Anyone who refuses to submit to a temperature screening or does not answer the health screening questions will be refused access to the Project Site.
- Screening will be performed at both entrances from 5:30 am to 7:30 am.; main gate [ZONE 1] and personnel gate [ZONE 2]
- After 7:30 am only the main gate entrance [ZONE 1] will continue to be used for temperature testing for anybody gaining entry to the project site such as returning personnel, deliveries, and visitors.
- If the digital thermometer displays a temperature reading above 100.0 degrees Fahrenheit, a second reading will be taken to verify an accurate reading.
- If the second reading confirms an elevated temperature, DHS will instruct the individual that he/she will not be allowed to enter the

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Project Site. DHS will also instruct the individual to promptly notify his/her supervisor and his/her human resources (HR) representative and provide them with a copy of Annex A.

**Planning**

- Require the development of an Infectious Disease Preparedness and Response Plan that will include basic infection prevention measures (requiring the use of personal protection equipment), policies and procedures for prompt identification and isolation of sick individuals, social distancing (prohibiting gatherings of no more than 10 people including all-hands meetings and all-hands lunches) communication and training and workplace controls that meet standards that may be promulgated by the Center for Disease Control, Occupational Safety and Health Administration, Cal/OSHA, California Department of Public Health or applicable local public health agencies.[6]

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The United Brotherhood of Carpenters and Carpenters International Training Fund has developed COVID-19 Training and Certification to ensure that Carpenter union members and apprentices conduct safe work practices. The City should require that all construction workers undergo COVID-19 Training and Certification before being allowed to conduct construction activities at the Project Site.

Western Carpenters has also developed a rigorous Infection Control Risk Assessment ("**ICRA**") training program to ensure it delivers a workforce that understands how to identify and control infection risks by implementing protocols to protect themselves and all others during renovation and construction projects in healthcare environments.[7]

[6] *See also* The Center for Construction Research and Training, North America's Building Trades Unions (April 27 2020) NABTU and CPWR COVIC-19 Standards for U.S Constructions Sites, *available at* https://www.cpwr.com/sites/default/files/NABTU_CPWR_Standards_COVID-19.pdf; Los Angeles County Department of Public Works (2020) Guidelines for Construction Sites During COVID-19 Pandemic, *available at* https://dpw.lacounty.gov/building-and-safety/docs/pw_guidelines-construction-sites.pdf.

[7] For details concerning Western Carpenters' ICRA training program, *see* https://icrahealthcare.com/.

ICRA protocols are intended to contain pathogens, control airflow, and protect patients during the construction, maintenance and renovation of healthcare facilities. ICRA protocols prevent cross contamination, minimizing the risk of secondary infections in patients at hospital facilities.

The City should incorporate language in the Development Agreement requiring that the Project be built using a workforce trained in ICRA protocols.

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## III. THE CALIFORNIA ENVIRONMENTAL QUALITY ACT.

### A. Background Concerning Environmental Impacts Reports Under CEQA.

CEQA is a California statute designed to inform decision-makers and the public about the potential significant environmental effects of a project. 14 Cal. Code of Regulations ("**CEQA Guidelines**"), § 15002(a)(1).[8] At its core, its purpose is to "inform the public and its responsible officials of the environmental consequences of their decisions *before* they are made." *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564.

CEQA directs public agencies to avoid or reduce environmental damage, when possible, by requiring alternatives or mitigation measures. CEQA Guidelines, § 15002(a)(2)-(3); see also *Berkeley Keep Jets Over the Bay Committee v. Board of Port Comes* (2001) 91 Cal.App.4th 1344, 1354; *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553; *Laurel Heights Improvement Assn.*, 47 Cal.3d at p. 400. The Environmental Impact Report ("**EIR**") serves to provide public agencies and the public in general with information about the effect that a proposed project is likely to have on the environment and to "identify ways that environmental damage can be avoided or significantly reduced." CEQA Guidelines, § 15002, subd. (a)(2). If the project has a significant effect on the environment, the agency may approve the project only upon finding that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns" specified in Public Resources Code section 21081. See CEQA Guidelines, §§ 15092, subds. (b)(2)(A)-(B).

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[8] The CEQA Guidelines, codified in Title 14 of the California Code of Regulations, section 15000 et seq., are regulatory guidelines promulgated by the state Natural Resources Agency for the implementation of CEQA. PRC, § 21083. The CEQA Guidelines are given "great weight in interpreting CEQA except when . . . clearly unauthorized or erroneous." *Center for Biological Diversity v. Dept. of Fish & Wildlife* (2015) 62 Cal.4th 204, 217.

While the courts review an EIR using an 'abuse of discretion' standard, the reviewing court is not to *uncritically* rely on every study or analysis presented by a project proponent in support of its position. *Berkeley Jets*, 91 Cal.App.4th at p. 1355 (quoting *Laurel Heights Improvement Assn.*, 47 Cal.3d at pp. 391, 409 fn. 12) (internal quotations omitted). A clearly inadequate or unsupported study is entitled to no judicial deference. *Id.* Drawing this line and determining whether the EIR complies with CEQA's information disclosure requirements presents a question of law subject to independent review by the courts. *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 515; *Madera Oversight Coalition, Inc. v. County of Madera* (2011) 199 Cal.App.4th 48, 102, 131. As the court stated in *Berkeley Jets*, prejudicial abuse of discretion occurs if the failure to include relevant information precludes informed decision-making and informed public participation, thereby thwarting the statutory goals of the EIR process. 91 Cal.App.4th at p. 1355 (internal quotations omitted).

The preparation and circulation of an EIR is more than a set of technical hurdles for agencies and developers to overcome. *Communities for a Better Environment v. Richmond* (2010) 184 Cal.App.4th 70, 80 (quoting *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 449-450). The EIR's function is to ensure that government officials who decide to build or approve a project do so with a full understanding of the environmental consequences and, equally important, that the public is assured those consequences have been considered. *Id.* For the EIR to serve these goals it must present information so that the foreseeable impacts of pursuing the project can be understood and weighed, and the public must be given an adequate opportunity to comment on that presentation before the decision to go forward is made. *Id.* The EIR requirement "is the heart of CEQA." CEQA Guidelines, § 15003(a).

Thus, a strong presumption in favor of requiring preparation of an EIR is built into CEQA. This presumption is reflected in what is known as the "fair argument" standard under which an EIR must be prepared whenever substantial evidence in the record supports a fair argument that a project may have a significant effect on the environment. *Quail Botanical Gardens Found., Inc. v. City of Encinitas* (1994) 29 Cal.App.4th 1597, 1602; *Friends of "B" St.* v. *City of Hayward* (1980) 106 Cal.3d 988, 1002.

The fair argument test stems from the statutory mandate that an EIR be prepared for any project that "may have a significant effect on the environment." PRC, § 21151;

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see *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.App.3d 68, 75; accord *Jensen v. City of Santa Rosa* (2018) 23 Cal.App.5th 877, 884. Under this test, if a proposed project is not exempt and may cause a significant effect on the environment, the lead agency must prepare an EIR. PRC, §§ 21100, subd. (a), 21151; CEQA Guidelines, §§ 15064, subds. (a)(1), (f)(1). An EIR may be dispensed with only if the lead agency finds no substantial evidence in the initial study or elsewhere in the record that the project may have a significant effect on the environment. *Parker Shattuck Neighbors v. Berkeley City Council* (2013) 222 Cal.App.4th 768, 785. In such a situation, the agency must adopt a negative declaration. PRC, § 21080, subd. (c)(1); CEQA Guidelines, §§ 15063, subd. (b)(2), 15064, subd. (f)(3).

"Significant effect upon the environment" is defined as "a substantial or potentially substantial adverse change in the environment." PRC, § 21068; CEQA Guidelines, § 15382. A project "may" have a significant effect on the environment if there is a "reasonable probability" that it will result in a significant impact. *No Oil, Inc.*, 13 Cal.3d at p. 83 fn. 16; see *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 309. If any aspect of the project may result in a significant impact on the environment, an EIR must be prepared even if the overall effect of the project is beneficial. CEQA Guidelines, § 15063(b)(1); see *County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1580.

This standard sets a "low threshold" for preparation of an EIR. *Consolidated Irrigation Dist. v. City of Selma* (2012) 204 Cal.App.4th 187, 207; *Nelson v. County of Kern* (2010) 190 Cal.App.4th 252; *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 928; *Bowman v. City of Berkeley* (2004) 122 Cal.App.4th 572, 580; *Citizen Action to Serve All Students v. Thornley* (1990) 222 Cal.App.3d 748, 754; *Sundstrom*, 202 Cal.App.3d at p. 310. If substantial evidence in the record supports a fair argument that the project may have a significant environmental effect, the lead agency must prepare an EIR even if other substantial evidence before it indicates the project will have no significant effect. See *Jensen*, 23 Cal.App.5th at p. 886; *Clews Land & Livestock v. City of San Diego* (2017) 19 Cal.App.5th 161, 183; *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 150; *Brentwood Assn. for No Drilling, Inc. v. City of Los Angeles* (1982) 134 Cal.App.3d 491; *Friends of "B" St.*, 106 Cal.App.3d 988; CEQA Guidelines, § 15064(f)(1). Substantial evidence includes "enough relevant information and reasonable inferences from this information that a fair argument can be made to

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support a conclusion, even though other conclusions might also be reached." CEQA Guidelines, § 15384(a).

### B. Background Concerning Initial Studies, Negative Declarations, and Mitigated Negative Declarations.

CEQA and CEQA Guidelines are strict and unambiguous about when an MND may be used. A lead agency may adopt an MND only if "there is no substantial evidence that the project will have a significant effect on the environment." CEQA Guidelines, § 15074(b).

Evidence supporting a fair argument of a significant environmental impact triggers preparation of an EIR regardless of whether the record contains contrary evidence. *League for Protection of Oakland's Architectural and Historical Resources v. City of Oakland* (1997) 52 Cal.App.4th 896, 904-905. "Where the question is the sufficiency of the evidence to support a fair argument, deference to the agency's determination is not appropriate[.]" *County Sanitation*, 127 Cal.App.4th at 1579 (quoting *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th 1307, 1317-1318).

Further, it is the duty of the lead agency, not the public, to conduct the proper environmental studies. "The agency should not be allowed to hide behind its own failure to gather relevant data." *Sundstrom*, 202 Cal.App.3d at p. 311. "Deficiencies in the record may actually enlarge the scope of fair argument by lending a logical plausibility to a wider range of inferences." *Id*; see also *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1382 (lack of study enlarges the scope of the fair argument which may be made based on the limited facts in the record).

Thus, refusal to complete recommended studies lowers the already low threshold to establish a fair argument. The court may not exercise its independent judgment on the omitted material by determining whether the ultimate decision of the lead agency would have been affected had the law been followed. *Environmental Protection Information Center v. Cal. Dept. of Forestry* (2008) 44 Cal.4th 459, 486 (internal citations and quotations omitted). The remedy for this deficiency would be for the trial court to issue a writ of mandate. *Id.*

Both the review for failure to follow CEQA's procedures and the fair argument test are questions of law, thus, the de novo standard of review applies. *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 435. "Whether the agency's record contains substantial evidence that would support a fair

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argument that the project may have a significant effect on the environment is treated as a question of law. *Consolidated Irrigation Dist.*, 204 Cal.App.4th at p. 207; Kostka and Zischke, Practice Under the Environmental Quality Act (2017, 2d ed.) at § 6.76.

In the MND context, courts give no deference to the agency. The agency or the court should not weigh expert testimony or decide on the credibility of such evidence—this is the EIR's responsibility. As stated in *Pocket Protectors v. City of Sacramento*:

> Unlike the situation where an EIR has been prepared, neither the lead agency nor a court may "weigh" conflicting substantial evidence to determine whether an EIR must be prepared in the first instance. Guidelines section 15064, subdivision (f)(1) provides in pertinent part: if a lead agency is presented with a fair argument that a project may have a significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect. Thus, as *Claremont* itself recognized, [c]onsideration is not to be given contrary evidence supporting the preparation of a negative declaration.

(2004) 124 Cal.App.4th 903, 935 (internal citations and quotations omitted).

In cases where it is not clear whether there is substantial evidence of significant environmental impacts, CEQA requires erring on the side of a "preference for resolving doubts in favor of environmental review." *Mejia v. City of Los Angeles* (2005) 130 Cal.App.4th 322, 332. "The foremost principle under CEQA is that the Legislature intended the act to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language. *Friends of Mammoth v. Bd. of Supervisors* (1972) 8 Cal.3d 247, 259.

## IV. THE PROJECT WOULD BE APPROVED IN VIOLATION OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

### A. The City Must Prepare an Environmental Impact Report for the Project.

It would be unlawful for the City to approve the Project in reliance on the incomplete and flawed MND. As explained below, the MND fails to support all of its findings with sufficient analysis and substantial evidence and fails to incorporate adequate mitigation measures. Moreover, there is substantial evidence on the face of the MND that the Project will, in fact, have a significant impact on the surrounding environment.

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O1-8

Indeed, the Project involves the new construction, use, and maintenance of a 150,000-square-foot structure with 106 units, subterranean parking for 381 automobiles, 28,843 square feet of event space, 6,273 square feet of restaurant space, and 5,513 square feet for amenities, and the alteration and removal of existing landscaping on a 35.07-acre site, a significant portion of which is currently zoned as protected Mountain Reserve land. Considering these details, along with the pristine and natural surroundings of the Site, the City must prepare and circulate a thorough, Project-specific EIR. As set forth in greater detail below, there is a fair argument that the Project will have a significant effect on the environment, triggering the "low threshold" standard for the City's preparation and circulation of an EIR for the Project.

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1. The MND Fails to Adequately Analyze the Project and Omits Information

If a project has a significant effect on the environment, an agency may approve the project only upon finding that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns." CEQA Guidelines § 15092(b)(2)(A–B).

CEQA mitigation measures proposed and adopted are required to describe what actions will be taken to reduce or avoid an environmental impact. (CEQA Guidelines § 15126.4(a)(1)(B) [providing "[f]ormulation of mitigation measures should not be deferred until some future time."].) While the same Guidelines section 15126.5(a)(1)(B) acknowledges an exception to the rule against deferrals, such exception is narrowly proscribed to situations where it is impractical or infeasible to include those details during the project's environmental review.

Here, the MND's mitigation measures fail to adequately analyze and/or mitigate the Project's impacts and are improperly deferred, such that an EIR is required.

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*i. Biological Resources*

CEQA requires that an environmental document identify and discuss the significant effects of a Project, alternatives and how those significant effects can be mitigated or avoided. CEQA Guidelines § 15126.2; PRC §§ 21100(b)(1), 21002.1(a). An environmental document's discussion of potentially significant effects must "provide an adequate analysis to inform the public how its bare numbers translate to create potential adverse impacts, or it must adequately explain what the agency does know

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and why, given existing scientific constraints, it cannot translate potential [environmental] impacts further." *Sierra Club v. County of Fresno* (2018) 6 Cal. 5th 502, 521; *see also* citing *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 405; *see also* PRC §§ 21002.1(e), 21003(b). An EIR may not set an impermissibly narrow threshold of significance for biological impacts. *Endangered Habitats League, Inc. v. County of Orange* (2005) 131 Cal.App.4th 777.

Here, the MND fails to provide analysis on the Project's biological resource impacts in accordance with the above, and admits that, despite the documented potential for occurrence of special-status wildlife species within the vicinity of the Project Site, no focused special-status wildlife surveys were conducted. (Appendix B to MND, p. 9, Attachment F, pp. 1-3.) Indeed, the MND's biological resources study found potential for the occurrence of several special status species, including Peninsular bighorn sheep (moderate potential to occur), red diamondback rattlesnake (moderate potential to occur), burrowing owl (low potential to occur), loggerhead shrike (low potential to occur), LeConte's thrasher (moderate potential to forage), and pocketed free-tailed bat (moderate potential to forage within Project site). (Appendix B to MND, pp. 14-15.) Despite this likelihood of occurrence, the MND made no provision for specific studies to confirm whether any special-status species are inhabiting the proposed Project Area. The MND cannot properly conclude that its proposed mitigation measures will reduce biological resource impacts to less than significant without first conducting field surveys and subsequent comprehensive analysis regarding these special status species.

Given the overall potential for the occurrence of special-status species in the proposed Project area, the Project should be subject to more comprehensive EIR review. In the alternative, and at a minimum, the pre-construction biological survey specifications that WSRCC contends should be incorporated are necessary to ensure the overall adequacy of the MND's proposed mitigation measure. Absent inclusion of such specifications in the mitigation measures, there is a fair argument that the Project may have a significant environmental impact.

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*ii. Cultural Resources*

In order to mitigate impacts related to the inadvertent discovery of yet unknown historical/cultural resources, the MND requires implementation of MM-CUL-1 and MM-CUL-2. (MND at 93-94.) However, it is patently ambiguous from the language of MM-CUL-1 whether the Qualified Archaeologist and Native American monitor are

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required to be present at the commencement of, and continuously during, any ground-disturbing activities, or whether said professionals will only be called to the Project in the event of an unanticipated discovery. (*Id.* ["A Qualified Archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, and a Native American monitor *shall be present for initial ground-disturbing activities associated with the current proposed project in the event unanticipated discoveries are made.*"]) This measure must be revised to clearly set forth a requirement that the Qualified Archaeologist and Native American monitor shall be present for all initial ground-disturbing activities at the Project for the purpose of evaluating and addressing any unanticipated discoveries that are made. Indeed, if a Qualified Archaeologist and Native American monitor were only called out to the Project after an unanticipated discovery was made, the mitigation measure would do little to safeguard against significant impacts occurring to archaeological resources. Similarly, for MM-CUL-2, the same requirement of a monitoring presence should apply, in that the Qualified Archaeologist and Native American monitor will be better positioned than the Project's laborers to appropriately identify and manage the initial discovery of any human remains that may occur during the Project.

O1-11 Cont.

Additionally, the MND's proposed mitigation measures do not provide for any pre-construction training for the Project's construction workers that will otherwise permit laborers on the Project to properly identify and address any sensitive cultural resources or human remains that may be encountered during course of construction. Further, the MND does not specify any due diligence that has been performed to reach out to any tribes potentially impacted by the Project's proposed development. Accordingly, the MND's analysis with regard to the potential impacts on cultural resources and the scope of the contemplated mitigation measures are inadequate. The proposed mitigation measures MM-CUL-1 and MM-CUL-2 remain deficient in their current form and must, at a minimum, be revised to adequately mitigate against any potentially significant impacts to cultural resources.

O1-12

*iii. Noise*

WSRCC submits that there is also a fair argument that the Project may have a significant noise impact, such that an EIR must be prepared for the Project. To that end, the MND has wholly failed to measure ambient noise levels near the proposed Project's most sensitive uses/receptors at the southern edge of the proposed Project Site. (See MND, Figure 13-1, p. 151; see also MND, p. 140-42, Table 13-2.) Instead, the MND only measured ambient noise levels at three locations: L1 - located in a

O1-13

graded area where no construction work is being contemplated for the project; L2 – at the southeastern corner of the existing Ritz-Carlton hotel property; and L3 – on the central west edge of the primary villa/residences development site and adjacent to the primary roadway for the development. (*Id.*) Meanwhile, no noise measurements were taken along the southern border of the two parcels on the Project site designated for the resort villa development identified as the Ritz-Carlton Residences (APN 689-330-026 and 689-330-028), which are directly adjacent to numerous private residences. Thus, the MND has incomprehensibly declined to measure the ambient noise levels in the area adjacent to the most sensitive uses abutting the Project area, namely, numerous private residences. (*Id.*) Based on the current land uses proximate to this sensitive residential area, it is exceedingly likely that this zone at the southern edge of the proposed Project site would have the lowest ambient noise levels of any Project-adjacent area. In spite of these facts, however, the MND inaccurately claims that "The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the project site." (MND at p. 141.)

O1-13 Cont.

The MND then used the faulty and incomplete ambient noise survey data to conclude that there will be no significant impact to the surrounding sensitive receptors from the Project's construction noise. In that regard, the MND adopts the Criteria for Recommended Standard: Occupational Noise Exposure prepared by the National Institute for Occupational Safety and Health (NIOSH) as the threshold for whether the anticipated construction noise from the Project will have a significant impact upon the Project nearby sensitive receptors. (MND at p. 145.) The MND then concludes that the threshold of 85 dBA Leq qualifies as an "acceptable threshold[] for construction noise at the nearby sensitive receiver locations," and the "noise sensitive residential receiver locations will satisfy the 85 dBA Leq significance threshold," such that the Project will have a less than significant construction noise impact upon the sensitive receiver locations. (*Id.*)

O1-14

Notably, the NIOSH Occupational Noise Exposure standard has no proper place in evaluating the significance of construction noise impacts on nearby sensitive receptors. Rather, the NIOSH standard is aimed at protecting workers/laborers exposed to noise during the course job duties and preventing occupational harm/injury from occurring. It has no bearing upon external noise levels that would be suitable for maintaining the quiet enjoyment of an individual's private property. In that regard, the MND's

selection of 85 dBA Leq as an acceptable threshold of significant construction noise impact is not only arbitrary, but it is also entirely unfounded.

The Federal Transit Administration's ("FTA") Transit Noise and Vibration Impact Assessment provides superior source of federal regulatory authority regarding a project's noise impacts and their significance on sensitive receptors. To that end, the FTA guidance on noise level impacts notes that the impacts should be assessed as a function of their increase over existing noise exposure, and that any noise increase of 15 dBA or greater for a residence is considered a "severe impact." (See Exhibit D - FTA Transit Noise and Vibration Impact Assessment, pp. 17-18, 23-31.) The MND has arbitrarily elected to use the inapplicable NIOSH standard to assess the noise impacts of the Project, without considering the widely accepted guidance on noise impacts put forth by the FTA. This added lack of study and analysis enlarges the scope of the fair argument that the Project may have significant noise impacts on the environment.

O1-14 Cont.

Applying the FTA noise impact guidance, the MND's dBA estimates for anticipated Project-attributed construction noise exposure levels at the inadequately selected survey locations (L1, L2, and L3) still have the potential to exceed an FTA guidance-based threshold of "severe impact" and thereby cause a significant noise impact in the surrounding environment. (MND at p. 142, Table 13-2; compare MND at p. 145, Table 13-3.) Indeed, comparison of the dBA values set forth in Table 13-2 and Table 13-3 confirm that the construction noise levels nearest to the vast majority of the Project's adjacent sensitive residential receptors are anticipated to increase by greater than 15 dBA from the ambient levels detected at L1, L2, and L3. (See *id.*) Put simply, after applying the FTA guidance to the MND noise data, there is a fair argument that the Project will have a significant noise impact on nearby sensitive residential receptors.

Notwithstanding these demonstrable noise impacts posed by the Project, the MND's only mitigation measure in this category pertains to vibration, requiring that large-loaded trucks and dozers not be used within 50 feet of the southern edge of the property line, substituting instead "small rubber-tired or alternative equipment...to reduce vibration effects." The mitigation measure, on its face, appears to address primarily vibration concerns, and would have little to no mitigating effect on the exposure of nearby sensitive receptors to overall project construction noise. Indeed, the southern border of the two parcels designated for the resort villa development

O1-15

identified as the Ritz-Carlton Residences (APN 689-330-026 and 689-330-028) are directly adjacent to numerous private residences.

As such, the MND provides no tangible accommodation for the burden of construction noise exposure to be borne by the Project's adjacent residential properties. In cases where construction noise impacts are anticipated to affect nearby sensitive uses (i.e., residents, schools, hospitals, etc.) noise barriers are routinely implemented as a CEQA mitigation measure during construction in order to minimize the impingement on nearby residents' use and enjoyment of their property. The Project in this case necessitates, at a minimum, the same level of consideration and accommodation for the property owners adjacent to the Project site's southern edge. Currently, however, MM-NOI-1 makes no provision for the placement of noise barriers of any kind at any location. The failure of the MND's mitigation measure to consider and incorporate the sensitive residential use into its scope is a critical deficiency that undermines any potential efficacy it may otherwise have in mitigating the Project's noise impacts. Absent such a provision, the mitigation measure is legally inadequate as it cannot support a finding that the Project's noise impacts will not be significant.

O1-15
Cont.

The MND's current lack of proper analysis and mitigation regarding construction noise impacts violates CEQA and warrants full environmental review via the preparation of an EIR. Alternatively, and at a minimum, the MND must be revised and supplemented to include noise mitigation measures that will in fact protect nearby residents from the impacts of the Project's construction noise.

*iv. Greenhouse Gas Emissions and Energy Use*

The Project requires additional measures aimed at reducing operational GHG emissions and energy use that are not specified in the MND. Specifically, the Project is slated to develop the second of two hotel buildings with 106 rooms and 381 vehicle parking spaces, yet the MND provides no specification or associated mitigation measures identifying how many or which of those parking spaces must be capable of supporting electric vehicle charging stations ("**EVCS**") and ready to be compliant with the 2022 Green Building Code ("**GBC**"). In fact, the MND provides no specifics regarding any electric vehicle ("**EV**") accommodations to be constructed in connection with the Project.

O1-16

The GBC, which became effective January 1, 2023, requires new buildings to designate 20% of the total number of parking spaces as EV-capable. See GBC 5.106.5.31. Therefore, if the Project develops 381 additional parking spaces, 77 of those spaces must have electrical panel space and load capacity to support EV charging. Additionally, this must all be set forth in sufficient detail for the City and the public to thoroughly review, assess, and provide comments thereon.

Further, the GBC requires new buildings to designate 25% of the total number of EV-capable parking spaces as EV spaces with level 2 EV supply equipment ("**EVSE**"). *Ibid.* Hence, if the Project develops 381 additional parking spaces, 96 of those spaces must be equipped with a 208/240 volt 40-ampere branch circuit with the electric vehicle charging connectors, attachment plugs, and all other fittings, devices, and power outlets installed. The GBC also requires that new residential construction with more than nine units be GPR certified at minimum 50 points, hold LEED Silver certification, or have Alternate Reference Standard[9] per Section 101.10.2.

The foregoing analysis is entirely absent from the MND, thereby exposing the inherent flaws in the MND's conclusions that the Project's will have a "less than significant impact" with regard to (1) the Project's generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment, (2) the Project's conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of GHGs (e.g., the 2022 GBC), (3) the Project's potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project operation, and (4) the Project's conflict with or obstruction of a state plan for renewable energy/energy efficiency. (See MND, pp. 95, 107.) Indeed, the MND states only in vague and inconclusive fashion that (1) the "project will be required to provide compliant … electric vehicle charging spaces" (pursuant to CAL Green Code §§ 5.106.4, 5.106.5.2,

O1-16
Cont.

[9] According to Section 101.10.2 of the GBC, Applicant may request to apply an alternate green building standard for the Project in lieu of the minimum standards per Table 101.10. In making a determination in response to an application under this section, the Building Official may allow an alternate standard if they find that the proposed alternative standard complies with all of the following: (A) Addresses a comprehensive scope of green building issues including energy efficiency, water efficiency, resource efficient materials, and healthy building practices; (B) applies standards that are, when taken as a whole, as stringent as the GPR and LEED standards; (C) includes a formalized certification process that incorporates third party verification; and, (D) the project will advance the purposes of this Chapter. See Ord. 22-2245, part, 2022; Ord. 19-2193, § 2 (part), 2019.

and 5.106.5.3), and (2) "[t]he Project would provide EV charging infrastructure that, meets the California Green Building Standards Code," while simultaneously concluding without justification or analysis that the Project's use will be more akin to a commercial hotel than traditional residential housing. (See Appendix A to MND at 64; see also MND at 116.) Upon reaching this factually and legally unsupported conclusion regarding the Project's future use, the MND then determines that the EVCS guidance set forth in Appendix D to CARB's 2022 Scoping Plan is therefore "not appropriate" for the Project, and the Project should be relieved of the residential development requirements for EVCS under the GCB. (MND at 116.)

These alleged findings in the MND, and the grossly deficient information and analysis underpinning them, leave other stakeholder agencies and the general public with virtually no ability to assess the adequacy of the EVCS measures to be implemented in connection with the Project. Under the current framework in the MND, the Applicant could very well construct no EVCS's whatsoever in connection with the Project while proclaiming it has provided "compliant…electric vehicle charging spaces" and met the Green Building Standards Code. Such an outcome has clear potential to result in significant impacts on the environment in the form of generating GHG emissions and conflict with the 2022 CARB Scoping Plan and the GBC.

Additionally, the MND also provides no comparative analysis of the energy use and GHG emissions impacts of the inclusion and operation of the EVCS infrastructure in the completed Project relative to the operational energy use and GHG emissions that would arise from the omission of the EVCS infrastructure from the project. As such, and absent revision of the Project to incorporate an impact analysis of the inclusion and omission of the EVCS infrastructure, the Project as currently proposed violates the 2022 GBC and therefore result in a potentially significant impact on the issue of GHG emissions. In that regard, an EIR for the Project is currently required to be prepared and circulated before any approval by the City can ultimately be granted.

In sum, allowing the Project to commence without consideration and analysis of the EVCS issue and its associated energy use and GHG emissions considerations would result in significant and unavoidable impacts on the local community and environment as well as on global climate change due to cumulative GHG emissions from vehicle exhaust. Further, the Project would be out of compliance with the 2022 GBC and could provoke extensive litigation and unnecessary turbulence for both the Applicant and the City.

O1-16
Cont.

*v. Land Use and Planning*

Each California city and county must adopt a comprehensive, long-term general plan governing development. *Napa Citizens for Honest Gov. v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 352, *citing* Gov. Code §§ 65030, 65300. The general plan sits at the top of the land use planning hierarchy and serves as a "constitution" or "charter" for all future development. *DeVita v. County of Napa* (1995) 9 Cal.4th 763, 773; *Lesher Communications, Inc. v. City of Walnut Creek* (1990) 52 Cal.3d 531, 540.

General plan consistency is "the linchpin of California's land use and development laws; it is the principle which infused the concept of planned growth with the force of law." *Debottari v. Norco City Council* (1985) 171 Cal.App.3d 1204, 1213. It is well established that development projects may not be approved if they interfere with, or frustrate, the general plan's policies and objectives. *See Napa Citizens*, 91 Cal.App.4th at 378-79; *see also Lesher*, 52 Cal.3d at 544.

Here, the MND admits the Project's direct conflict with the land use consistency prescribed by the City's General plan, in that the Project calls for approximately 4.5 acres of dedicated Mountain Reserve Land to be re-zoned and re-purposed for Resort/Hotel use. (MND at p. 135.) Despite that, the MND then draws the perfunctory conclusion that the proposed development's conflict with the existing land use plan will not have significant environmental impacts because of the biological resources mitigation measures already proposed in the MND. This conclusion is wholly unsupported, and the analysis underpinning it is irreparably flawed.

01-17

Th MND's rationale is misplaced and unsupported for purposes of CEQA analysis, as the City cannot properly justify the repurposing and destruction of natural reserve lands by claiming that its biological mitigation measures have already ameliorated any environmental impacts such that the land use impacts are "less than significant." By taking this position in the MND, the City is acknowledging that, in fact, the re-zoning does have a significant impact that requires EIR review and substantial mitigation. Moreover, the City cannot permissibly conflate its mitigation measures aimed at limiting destruction of biological resources with preservation and/or creation of additional mountain reserve lands. Rather, the MND cannot support a claim of no significant impact without the Project first creating protections for other comparable natural lands multiple times larger than the Mountain Reserve lands being targeted for development. Only then could the land use planning impacts of the development of

the Mountain Reserve lands in question be properly mitigated to a less than significant level.

**B. The City Must, at a Minimum, Revise and Recirculate the MND.**

Section 15073.5 of the CEQA Guidelines provides that a negative declaration must be recirculated whenever the document must be substantially revised. A substantial revision includes the identification of new, avoidable significant effects requiring mitigation measures or project revisions to be added to reduce the effect to less than significant levels or upon the agency determining that a proposed mitigation measure or project change would not reduce a potential impact to insignificance. *Id.*

Additionally, when new information is brought to light showing that an impact previously discussed in an MND and found to be insignificant with or without mitigation in the MND's analysis has the potential for a significant environmental impact supported by substantial evidence, the MND must consider and resolve the conflict in the evidence. See *Visalia Retail, L.P. v. City of Visalia* (2018) 20 Cal. App. 5th 1, 13, 17; see also *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal. App. 4th 1099, 1109.

Considering the MND's failure to substantiate all of its findings, provide adequate mitigation measures, and fully analyze and assess all relevant factors as discussed in detail above, at a minimum, the Project requires significant revisions and resolution of conflicts in evidence. Therefore, even if the City refuses to prepare an EIR for the Project against WSRCC's objections, the City must at least revise and recirculate the MND if it does not prepare an EIR for the Project.

## IV. THE PROJECT APPLICATION MATERIALS MUST INCLUDE AN ADEQUATE DESCRIPTION OF THE PROJECT.

A project description must be stable and finite in order to afford a lead agency and the public an adequate opportunity to assess and comment on the project and its impacts. "[A]n accurate, stable and finite project description is the sine qua non of an informative and legally sufficient" environmental document. *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 200. "A curtailed or distorted project description may stultify the objectives of the reporting process" as an accurate, stable, and finite project description is necessary to allow "affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider

O1-17 Cont.

O1-18

O1-19

mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance. *Ibid.* at pp. 192-93.

CEQA Guidelines, § 15124 requires that a description describe the project in enough detail to allow for evaluation of its potential environmental impacts: (a) the project's precise location and boundaries; (b) a clearly written statement of objectives sought by the proposed project; (c) a description of the project's technical, economic, and environmental characteristics; and, (d) a statement describing a list of agencies, permits, and approval which the project expects to use.

Here, WSRCC respectfully requests that the Project application includes an adequate and compliant Project description with the details listed above. Should the materials fail to comply with the CEQA Guidelines, the City should demand that the Applicant resubmit its application materials with CEQA-compliant parameters.

01-19 Cont.

## V. ULTIMATE APPROVAL OF THE PROJECT CAN ONLY OCCUR VIA A TWO-THIRDS VOTE BY THE RANCHO MIRAGE ELECTORATE.

The City's Code of Ordinances § 7.06.010 provides as follows:

> All discretionary approvals, including but not limited to development agreements, general plan amendments, zone changes, development permits, grading permits and use permits approved by the city council on or after July 3, 1992 and having no building permit issued, shall require the approval of the city council, and thereafter a two-thirds vote of the electorate of the city to be considered an approved application, if the approval is an application on property located within the city "mountainous lands" area of the Santa Rosa and San Jacinto Mountains, as described within the Coachella Valley Mountains Conservancy legislative map, as of November 3, 1992.

01-20

(Rancho Mirage Code of Ordinances § 7.06.010.) The Project site sits within the boundary of the Coachella Valley Mountains Conservancy territory map. (Exhibit E – Coachella Valley Mountains Conservancy Territory Map.) As confirmed in the MND, the portion of the Project proposed for parcels 689-020-012 and 689-020-014 (the Sky Mesa Recreational Area) has a General Plan Land Use designation of "Open Space: Mountain Reserve (MR)." (See MND, Figure 1-12, at p. 46; See also Exhibit F – Rancho Mirage Land Use and Zoning Map.) Moreover, the Rancho Mirage General

Plan sets forth the following stated goal for the land use(s) applicable to the Mountain Reserve (MR) zone:

> ***This designation is assigned to*** public lands or ***property subject to conservation easements in the Santa Rosa Mountains***. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation.

(See Rancho Mirage 2017 General Plan, p. 10.) Accordingly, given the location of the Project site, coupled with the established boundaries of the Coachella Valley Mountains Conservancy and the site's land use designation under the City's General Plan, the site falls within the definition of the "city 'mountainous lands' area of the Santa Rosa…Mountains" and is therefore subject to the approval proscriptions of Code of Ordinances § 7.06.010.

As such, the Project as contemplated must ultimately be approved by a two-thirds vote of the Rancho Mirage electorate. WSRCC's comments in this regard should not be construed as a waiver of its prior arguments regarding the inadequacies identified in the MND and the need for the City to complete a legally-compliant EIR, nor should it be construed as a recommendation that the Project be approved via the MND by the Planning Commission and the City Council. Rather, WSRCC is providing comments on this particular issue out of an abundance of caution to ensure that the City's proper approval procedures are followed, particularly given the Project's stated intention to re-zone and develop mountainous lands within the Santa Rosa Mountains that are currently zoned as Mountain Reserve and located within the boundaries of the Coachella Valley Mountains Conservancy.

01-20 Cont.

## VI. CONCLUSION.

In sum, WSRCC requests that the City require a local workforce, that the City impose training requirements for the Project's construction activities to prevent community spread of COVID-19 and other infectious diseases, and that the City prepare and circulate a thorough EIR for the Project or, at a minimum, revise and recirculate the MND for the Project to address the aforementioned concerns. Should the City have any questions regarding this correspondence, please do not hesitate to contact my Office.

01-21

Sincerely,

Jeremy Herwitt
Attorneys for Western States
Regional Council of Carpenters

Attached:

March 8, 2021, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling (Exhibit A);

Air Quality and GHG Expert Paul Rosenfeld CV (Exhibit B);

Air Quality and GHG Expert Matt Hagemann CV (Exhibit C);

FTA Transit Noise and Vibration Impact Assessment (Exhibit D);

Coachella Valley Mountains Conservancy Territory Map (Exhibit E); and

City of Rancho Mirage Land Use and Zoning Map (Exhibit F).

**EXHIBIT A**

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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March 8, 2021

Mitchell M. Tsai
155 South El Molino, Suite 104
Pasadena, CA 91101

**Subject: Local Hire Requirements and Considerations for Greenhouse Gas Modeling**

Dear Mr. Tsai,

Soil Water Air Protection Enterprise ("SWAPE") is pleased to provide the following draft technical report explaining the significance of worker trips required for construction of land use development projects with respect to the estimation of greenhouse gas ("GHG") emissions. The report will also discuss the potential for local hire requirements to reduce the length of worker trips, and consequently, reduced or mitigate the potential GHG impacts.

## Worker Trips and Greenhouse Gas Calculations

The California Emissions Estimator Model ("CalEEMod") is a "statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects."[1] CalEEMod quantifies construction-related emissions associated with land use projects resulting from off-road construction equipment; on-road mobile equipment associated with workers, vendors, and hauling; fugitive dust associated with grading, demolition, truck loading, and on-road vehicles traveling along paved and unpaved roads; and architectural coating activities; and paving.[2]

The number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[3]

01-22

[1] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[2] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[3] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.

Specifically, the number and length of vehicle trips is utilized to estimate the vehicle miles travelled ("VMT") associated with construction. Then, utilizing vehicle-class specific EMFAC 2014 emission factors, CalEEMod calculates the vehicle exhaust, evaporative, and dust emissions resulting from construction-related VMT, including personal vehicles for worker commuting.[4]

Specifically, in order to calculate VMT, CalEEMod multiplies the average daily trip rate by the average overall trip length (see excerpt below):

> "$VMT_d = \Sigma(\text{Average Daily Trip Rate}_i * \text{Average Overall Trip Length}_i)_n$
>
> Where:
>
> n = Number of land uses being modeled."[5]

Furthermore, to calculate the on-road emissions associated with worker trips, CalEEMod utilizes the following equation (see excerpt below):

> "$\text{Emissions}_{pollutant} = VMT * EF_{running,pollutant}$
>
> Where:
>
> $\text{Emissions}_{pollutant}$ = emissions from vehicle running for each pollutant
>
> VMT = vehicle miles traveled
>
> $EF_{running,pollutant}$ = emission factor for running emissions."[6]

Thus, there is a direct relationship between trip length and VMT, as well as a direct relationship between VMT and vehicle running emissions. In other words, when the trip length is increased, the VMT and vehicle running emissions increase as a result. Thus, vehicle running emissions can be reduced by decreasing the average overall trip length, by way of a local hire requirement or otherwise.

O1-22 Cont.

### Default Worker Trip Parameters and Potential Local Hire Requirements

As previously discussed, the number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[7] In order to understand how local hire requirements and associated worker trip length reductions impact GHG emissions calculations, it is important to consider the CalEEMod default worker trip parameters. CalEEMod provides recommended default values based on site-specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California Environmental Quality Act ("CEQA") requires that such changes be justified by substantial evidence.[8] The default number of construction-related worker trips is calculated by multiplying the

[4] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14-15.
[5] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 23.
[6] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[7] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[8] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 1, 9.

number of pieces of equipment for all phases by 1.25, with the exception of worker trips required for the building construction and architectural coating phases.[9] Furthermore, the worker trip vehicle class is a 50/25/25 percent mix of light duty autos, light duty truck class 1 and light duty truck class 2, respectively."[10] Finally, the default worker trip length is consistent with the length of the operational home-to-work vehicle trips.[11] The operational home-to-work vehicle trip lengths are:

> "[B]ased on the *location* and *urbanization* selected on the project characteristic screen. These values were *supplied by the air districts or use a default average for the state*. Each district (or county) also assigns trip lengths for urban and rural settings" (emphasis added).[12]

Thus, the default worker trip length is based on the location and urbanization level selected by the User when modeling emissions. The below table shows the CalEEMod default rural and urban worker trip lengths by air basin (see excerpt below and Attachment A).[13]

**Worker Trip Length by Air Basin**

| Air Basin | Rural (miles) | Urban (miles) |
|---|---|---|
| Great Basin Valleys | 16.8 | 10.8 |
| Lake County | 16.8 | 10.8 |
| Lake Tahoe | 16.8 | 10.8 |
| Mojave Desert | 16.8 | 10.8 |
| Mountain Counties | 16.8 | 10.8 |
| North Central Coast | 17.1 | 12.3 |
| North Coast | 16.8 | 10.8 |
| Northeast Plateau | 16.8 | 10.8 |
| Sacramento Valley | 16.8 | 10.8 |
| Salton Sea | 14.6 | 11 |
| San Diego | 16.8 | 10.8 |
| San Francisco Bay Area | 10.8 | 10.8 |
| San Joaquin Valley | 16.8 | 10.8 |
| South Central Coast | 16.8 | 10.8 |
| South Coast | 19.8 | 14.7 |
| **Average** | **16.47** | **11.17** |
| **Minimum** | **10.80** | **10.80** |
| **Maximum** | **19.80** | **14.70** |
| **Range** | **9.00** | **3.90** |

O1-22 Cont.

[9] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[10] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[11] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14.
[12] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 21.
[13] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-84 – D-86.

As demonstrated above, default rural worker trip lengths for air basins in California vary from 10.8- to 19.8-miles, with an average of 16.47 miles. Furthermore, default urban worker trip lengths vary from 10.8- to 14.7-miles, with an average of 11.17 miles. Thus, while default worker trip lengths vary by location, default urban worker trip lengths tend to be shorter in length. Based on these trends evident in the CalEEMod default worker trip lengths, we can reasonably assume that the efficacy of a local hire requirement is especially dependent upon the urbanization of the project site, as well as the project location.

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## Practical Application of a Local Hire Requirement and Associated Impact

To provide an example of the potential impact of a local hire provision on construction-related GHG emissions, we estimated the significance of a local hire provision for the Village South Specific Plan ("Project") located in the City of Claremont ("City"). The Project proposed to construct 1,000 residential units, 100,000-SF of retail space, 45,000-SF of office space, as well as a 50-room hotel, on the 24-acre site. The Project location is classified as Urban and lies within the Los Angeles-South Coast County. As a result, the Project has a default worker trip length of 14.7 miles.[14] In an effort to evaluate the potential for a local hire provision to reduce the Project's construction-related GHG emissions, we prepared an updated model, reducing all worker trip lengths to 10 miles (see Attachment B). Our analysis estimates that if a local hire provision with a 10-mile radius were to be implemented, the GHG emissions associated with Project construction would decrease by approximately 17% (see table below and Attachment C).

| Local Hire Provision Net Change | |
|---|---|
| **Without Local Hire Provision** | |
| Total Construction GHG Emissions (MT $CO_2e$) | 3,623 |
| Amortized Construction GHG Emissions (MT $CO_2e$/year) | 120.77 |
| **With Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,024 |
| Amortized Construction GHG Emissions (MT $CO_2e$/year) | 100.80 |
| ***% Decrease in Construction-related GHG Emissions*** | ***17%*** |

01-23

As demonstrated above, by implementing a local hire provision requiring 10 mile worker trip lengths, the Project could reduce potential GHG emissions associated with construction worker trips. More broadly, any local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

This serves as an example of the potential impacts of local hire requirements on estimated project-level GHG emissions, though it does not indicate that local hire requirements would result in reduced construction-related GHG emission for all projects. As previously described, the significance of a local hire requirement depends on the worker trip length enforced and the default worker trip length for the project's urbanization level and location.

[14] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-85.

## Disclaimer

SWAPE has received limited discovery. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

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Sincerely,

Matt Hagemann, P.G., C.Hg.

Paul E. Rosenfeld, Ph.D.

Attachment A

| Location Type | Location Name | Rural H-W (miles) | Urban H-W (miles) |
|---|---|---|---|
| Air Basin | Great Basin | 16.8 | 10.8 |
| Air Basin | Lake County | 16.8 | 10.8 |
| Air Basin | Lake Tahoe | 16.8 | 10.8 |
| Air Basin | Mojave Desert | 16.8 | 10.8 |
| Air Basin | Mountain | 16.8 | 10.8 |
| Air Basin | North Central | 17.1 | 12.3 |
| Air Basin | North Coast | 16.8 | 10.8 |
| Air Basin | Northeast | 16.8 | 10.8 |
| Air Basin | Sacramento | 16.8 | 10.8 |
| Air Basin | Salton Sea | 14.6 | 11 |
| Air Basin | San Diego | 16.8 | 10.8 |
| Air Basin | San Francisco | 10.8 | 10.8 |
| Air Basin | San Joaquin | 16.8 | 10.8 |
| Air Basin | South Central | 16.8 | 10.8 |
| Air Basin | South Coast | 19.8 | 14.7 |
| Air District | Amador County | 16.8 | 10.8 |
| Air District | Antelope Valley | 16.8 | 10.8 |
| Air District | Bay Area AQMD | 10.8 | 10.8 |
| Air District | Butte County | 12.54 | 12.54 |
| Air District | Calaveras | 16.8 | 10.8 |
| Air District | Colusa County | 16.8 | 10.8 |
| Air District | El Dorado | 16.8 | 10.8 |
| Air District | Feather River | 16.8 | 10.8 |
| Air District | Glenn County | 16.8 | 10.8 |
| Air District | Great Basin | 16.8 | 10.8 |
| Air District | Imperial County | 10.2 | 7.3 |
| Air District | Kern County | 16.8 | 10.8 |
| Air District | Lake County | 16.8 | 10.8 |
| Air District | Lassen County | 16.8 | 10.8 |
| Air District | Mariposa | 16.8 | 10.8 |
| Air District | Mendocino | 16.8 | 10.8 |
| Air District | Modoc County | 16.8 | 10.8 |
| Air District | Mojave Desert | 16.8 | 10.8 |
| Air District | Monterey Bay | 16.8 | 10.8 |
| Air District | North Coast | 16.8 | 10.8 |
| Air District | Northern Sierra | 16.8 | 10.8 |
| Air District | Northern | 16.8 | 10.8 |
| Air District | Placer County | 16.8 | 10.8 |
| Air District | Sacramento | 15 | 10 |

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| | | | |
|---|---|---|---|
| Air District | San Diego | 16.8 | 10.8 |
| Air District | San Joaquin | 16.8 | 10.8 |
| Air District | San Luis Obispo | 13 | 13 |
| Air District | Santa Barbara | 8.3 | 8.3 |
| Air District | Shasta County | 16.8 | 10.8 |
| Air District | Siskiyou County | 16.8 | 10.8 |
| Air District | South Coast | 19.8 | 14.7 |
| Air District | Tehama County | 16.8 | 10.8 |
| Air District | Tuolumne | 16.8 | 10.8 |
| Air District | Ventura County | 16.8 | 10.8 |
| Air District | Yolo/Solano | 15 | 10 |
| County | Alameda | 10.8 | 10.8 |
| County | Alpine | 16.8 | 10.8 |
| County | Amador | 16.8 | 10.8 |
| County | Butte | 12.54 | 12.54 |
| County | Calaveras | 16.8 | 10.8 |
| County | Colusa | 16.8 | 10.8 |
| County | Contra Costa | 10.8 | 10.8 |
| County | Del Norte | 16.8 | 10.8 |
| County | El Dorado-Lake | 16.8 | 10.8 |
| County | El Dorado- | 16.8 | 10.8 |
| County | Fresno | 16.8 | 10.8 |
| County | Glenn | 16.8 | 10.8 |
| County | Humboldt | 16.8 | 10.8 |
| County | Imperial | 10.2 | 7.3 |
| County | Inyo | 16.8 | 10.8 |
| County | Kern-Mojave | 16.8 | 10.8 |
| County | Kern-San | 16.8 | 10.8 |
| County | Kings | 16.8 | 10.8 |
| County | Lake | 16.8 | 10.8 |
| County | Lassen | 16.8 | 10.8 |
| County | Los Angeles- | 16.8 | 10.8 |
| County | Los Angeles- | 19.8 | 14.7 |
| County | Madera | 16.8 | 10.8 |
| County | Marin | 10.8 | 10.8 |
| County | Mariposa | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Merced | 16.8 | 10.8 |
| County | Modoc | 16.8 | 10.8 |
| County | Mono | 16.8 | 10.8 |
| County | Monterey | 16.8 | 10.8 |
| County | Napa | 10.8 | 10.8 |

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Cont.

| | | | |
|---|---|---|---|
| County | Nevada | 16.8 | 10.8 |
| County | Orange | 19.8 | 14.7 |
| County | Placer-Lake | 16.8 | 10.8 |
| County | Placer-Mountain | 16.8 | 10.8 |
| County | Placer- | 16.8 | 10.8 |
| County | Plumas | 16.8 | 10.8 |
| County | Riverside- | 16.8 | 10.8 |
| County | Riverside- | 19.8 | 14.7 |
| County | Riverside-Salton | 14.6 | 11 |
| County | Riverside-South | 19.8 | 14.7 |
| County | Sacramento | 15 | 10 |
| County | San Benito | 16.8 | 10.8 |
| County | San Bernardino- | 16.8 | 10.8 |
| County | San Bernardino- | 19.8 | 14.7 |
| County | San Diego | 16.8 | 10.8 |
| County | San Francisco | 10.8 | 10.8 |
| County | San Joaquin | 16.8 | 10.8 |
| County | San Luis Obispo | 13 | 13 |
| County | San Mateo | 10.8 | 10.8 |
| County | Santa Barbara- | 8.3 | 8.3 |
| County | Santa Barbara- | 8.3 | 8.3 |
| County | Santa Clara | 10.8 | 10.8 |
| County | Santa Cruz | 16.8 | 10.8 |
| County | Shasta | 16.8 | 10.8 |
| County | Sierra | 16.8 | 10.8 |
| County | Siskiyou | 16.8 | 10.8 |
| County | Solano- | 15 | 10 |
| County | Solano-San | 16.8 | 10.8 |
| County | Sonoma-North | 16.8 | 10.8 |
| County | Sonoma-San | 10.8 | 10.8 |
| County | Stanislaus | 16.8 | 10.8 |
| County | Sutter | 16.8 | 10.8 |
| County | Tehama | 16.8 | 10.8 |
| County | Trinity | 16.8 | 10.8 |
| County | Tulare | 16.8 | 10.8 |
| County | Tuolumne | 16.8 | 10.8 |
| County | Ventura | 16.8 | 10.8 |
| County | Yolo | 15 | 10 |
| County | Yuba | 16.8 | 10.8 |
| Statewide | Statewide | 16.8 | 10.8 |

O1-25
Cont.

| Worker Trip Length by Air Basin | | |
|---|---|---|
| **Air Basin** | **Rural (miles)** | **Urban (miles)** |
| Great Basin Valleys | 16.8 | 10.8 |
| Lake County | 16.8 | 10.8 |
| Lake Tahoe | 16.8 | 10.8 |
| Mojave Desert | 16.8 | 10.8 |
| Mountain Counties | 16.8 | 10.8 |
| North Central Coast | 17.1 | 12.3 |
| North Coast | 16.8 | 10.8 |
| Northeast Plateau | 16.8 | 10.8 |
| Sacramento Valley | 16.8 | 10.8 |
| Salton Sea | 14.6 | 11 |
| San Diego | 16.8 | 10.8 |
| San Francisco Bay Area | 10.8 | 10.8 |
| San Joaquin Valley | 16.8 | 10.8 |
| South Central Coast | 16.8 | 10.8 |
| South Coast | 19.8 | 14.7 |
| **Average** | **16.47** | **11.17** |
| **Mininum** | **10.80** | **10.80** |
| **Maximum** | **19.80** | **14.70** |
| **Range** | **9.00** | **3.90** |

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Cont.

Attachment B



# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

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| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

O1-25
Cont.

**2.1 Overall Construction**

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1713 | 1.8242 | 1.1662 | 2.4000e-003 | 0.4169 | 0.0817 | 0.4986 | 0.1795 | 0.0754 | 0.2549 | 0.0000 | 213.1969 | 213.1969 | 0.0601 | 0.0000 | 214.6993 |
| 2022 | 0.6904 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.682 6 | 1,721.682 6 | 0.1294 | 0.0000 | 1,724.918 7 |
| 2023 | 0.6148 | 3.3649 | 5.6747 | 0.0178 | 1.1963 | 0.0996 | 1.2959 | 0.3203 | 0.0936 | 0.4138 | 0.0000 | 1,627.529 5 | 1,627.529 5 | 0.1185 | 0.0000 | 1,630.492 5 |
| 2024 | 4.1619 | 0.1335 | 0.2810 | 5.9000e-004 | 0.0325 | 6.4700e-003 | 0.0390 | 8.6300e-003 | 6.0400e-003 | 0.0147 | 0.0000 | 52.9078 | 52.9078 | 8.0200e-003 | 0.0000 | 53.1082 |
| **Maximum** | **4.1619** | **4.1142** | **6.1625** | **0.0189** | **1.3058** | **0.1201** | **1.4259** | **0.3460** | **0.1128** | **0.4588** | **0.0000** | **1,721.682 6** | **1,721.682 6** | **0.1294** | **0.0000** | **1,724.918 7** |

O1-25 Cont.

## 2.1 Overall Construction

Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1713 | 1.8242 | 1.1662 | 2.4000e-003 | 0.4159 | 0.0817 | 0.4986 | 0.1795 | 0.0754 | 0.2549 | 0.0000 | 213.1967 | 213.1967 | 0.0601 | 0.0000 | 214.6991 |
| 2022 | 0.6904 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.682 3 | 1,721.682 3 | 0.1294 | 0.0000 | 1,724.918 3 |
| 2023 | 0.6148 | 3.3648 | 5.6747 | 0.0178 | 1.1963 | 0.0996 | 1.2959 | 0.3203 | 0.0936 | 0.4138 | 0.0000 | 1,627.529 1 | 1,627.529 1 | 0.1185 | 0.0000 | 1,630.492 1 |
| 2024 | 4.1619 | 0.1335 | 0.2810 | 5.9000e-004 | 0.0325 | 6.4700e-003 | 0.0390 | 8.6300e-003 | 6.0400e-003 | 0.0147 | 0.0000 | 52.9077 | 52.9077 | 8.0200e-003 | 0.0000 | 53.1082 |
| **Maximum** | **4.1619** | **4.1142** | **6.1625** | **0.0189** | **1.3058** | **0.1201** | **1.4259** | **0.3460** | **0.1128** | **0.4588** | **0.0000** | **1,721.682 3** | **1,721.682 3** | **0.1294** | **0.0000** | **1,724.918 3** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| 1 | 9-1-2021 | 11-30-2021 | 1.4103 | 1.4103 |
| 2 | 12-1-2021 | 2-28-2022 | 1.3613 | 1.3613 |
| 3 | 3-1-2022 | 5-31-2022 | 1.1985 | 1.1985 |
| 4 | 6-1-2022 | 8-31-2022 | 1.1921 | 1.1921 |
| 5 | 9-1-2022 | 11-30-2022 | 1.1918 | 1.1918 |
| 6 | 12-1-2022 | 2-28-2023 | 1.0774 | 1.0774 |
| 7 | 3-1-2023 | 5-31-2023 | 1.0320 | 1.0320 |
| 8 | 6-1-2023 | 8-31-2023 | 1.0260 | 1.0260 |

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| | | | | |
|---|---|---|---|---|
| 9 | 9-1-2023 | 11-30-2023 | 1.0265 | 1.0265 |
| 10 | 12-1-2023 | 2-29-2024 | 2.8857 | 2.8857 |
| 11 | 3-1-2024 | 5-31-2024 | 1.6207 | 1.6207 |
| | | Highest | 2.8857 | 2.8857 |

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1098 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.073 2 | 3,896.073 2 | 0.1303 | 0.0468 | 3,913.283 3 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,820.498 6 | 7,820.498 6 | 0.3407 | 0.0000 | 7,829.016 2 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.8420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Total | 6.8892 | 9.5223 | 30.3407 | 0.0914 | 7.7979 | 0.2260 | 8.0240 | 2.0895 | 0.2219 | 2.3114 | 236.9712 | 12,294.18 07 | 12,531.15 19 | 15.7904 | 0.1260 | 12,963.47 51 |

01-25 Cont.

## 2.2 Overall Operational

Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,886.0732 | 3,886.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9862 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7587 |
| Total | 6.8692 | 9.5223 | 30.3407 | 0.0914 | 7.7979 | 0.2260 | 8.0240 | 2.0895 | 0.2219 | 2.3114 | 236.9712 | 12,294.1807 | 12,531.1519 | 15.7904 | 0.1260 | 12,963.4751 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

Construction Phase

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

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Cont.

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

O1-25 Cont.

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0499 | 0.0000 | 0.0499 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0499** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0012** | **51.0012** | **0.0144** | **0.0000** | **51.3601** |

O1-25
Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.6000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.7000e-004 | 7.5000e-004 | 8.5100e-003 | 2.0000e-005 | 2.4700e-003 | 2.0000e-005 | 2.4900e-003 | 6.5000e-004 | 2.0000e-005 | 6.7000e-004 | 0.0000 | 2.2251 | 2.2251 | 7.0000e-005 | 0.0000 | 2.2267 |
| **Total** | **2.9000e-003** | **0.0641** | **0.0233** | **2.0000e-004** | **6.4100e-003** | **2.1000e-004** | **6.6200e-003** | **1.7300e-003** | **2.0000e-004** | **1.9300e-003** | **0.0000** | **19.6816** | **19.6816** | **1.2800e-003** | **0.0000** | **19.7136** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0011** | **51.0011** | **0.0144** | **0.0000** | **51.3600** |

01-25 Cont.

### 3.2 Demolition - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.6000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4568 | 17.4568 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.7000e-004 | 7.5000e-004 | 8.5100e-003 | 2.0000e-005 | 2.4700e-003 | 2.0000e-005 | 2.4900e-003 | 6.5000e-004 | 2.0000e-005 | 6.7000e-004 | 0.0000 | 2.2251 | 2.2251 | 7.0000e-005 | 0.0000 | 2.2267 |
| Total | 2.9000e-003 | 0.0641 | 0.0233 | 2.0000e-004 | 6.4100e-003 | 2.1000e-004 | 6.6200e-003 | 1.7300e-003 | 2.0000e-004 | 1.9300e-003 | 0.0000 | 19.6818 | 19.6818 | 1.2800e-003 | 0.0000 | 19.7136 |

01-25 Cont.

### 3.3 Site Preparation - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |
| Total | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | 0.1807 | 0.0204 | 0.2011 | 0.0993 | 0.0188 | 0.1181 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |
| **Total** | **7.7000e-004** | **6.0000e-004** | **6.8100e-003** | **2.0000e-005** | **1.9700e-003** | **2.0000e-005** | **1.9900e-003** | **5.2000e-004** | **1.0000e-005** | **5.4000e-004** | **0.0000** | **1.7801** | **1.7801** | **5.0000e-005** | **0.0000** | **1.7814** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7060** |

O1-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |
| **Total** | **7.7000e-004** | **6.0000e-004** | **6.8100e-003** | **2.0000e-005** | **1.9700e-003** | **2.0000e-005** | **1.9900e-003** | **5.2000e-004** | **1.0000e-005** | **5.4000e-004** | **0.0000** | **1.7801** | **1.7801** | **5.0000e-005** | **0.0000** | **1.7814** |

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3776 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5405** | **103.5405** | **0.0335** | **0.0000** | **104.3776** |

O1-25 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |
| **Total** | **1.6400e-003** | **1.2700e-003** | **0.0144** | **4.0000e-005** | **4.1600e-003** | **3.0000e-005** | **4.2000e-003** | **1.1100e-003** | **3.0000e-005** | **1.1400e-003** | **0.0000** | **3.7579** | **3.7579** | **1.1000e-004** | **0.0000** | **3.7607** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5403** | **103.5403** | **0.0335** | **0.0000** | **104.3775** |

O1-25 Cont.

### 3.4 Grading - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |
| **Total** | **1.6400e-003** | **1.2700e-003** | **0.0144** | **4.0000e-005** | **4.1600e-003** | **3.0000e-005** | **4.2000e-003** | **1.1100e-003** | **3.0000e-005** | **1.1400e-003** | **0.0000** | **3.7579** | **3.7579** | **1.1000e-004** | **0.0000** | **3.7607** |

### 3.4 Grading - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

O1-25 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |
| **Total** | **2.8000e-004** | **2.1000e-004** | **2.4400e-003** | **1.0000e-005** | **7.7000e-004** | **1.0000e-005** | **7.7000e-004** | **2.0000e-004** | **1.0000e-005** | **2.1000e-004** | **0.0000** | **0.6679** | **0.6679** | **2.0000e-005** | **0.0000** | **0.6684** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

01-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |
| **Total** | **2.8000e-004** | **2.1000e-004** | **2.4400e-003** | **1.0000e-005** | **7.7000e-004** | **1.0000e-005** | **7.7000e-004** | **2.0000e-004** | **1.0000e-005** | **2.1000e-004** | **0.0000** | **0.6679** | **0.6679** | **2.0000e-005** | **0.0000** | **0.6684** |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1324** | **293.1324** | **0.0702** | **0.0000** | **294.8881** |

O1-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.4088 | 0.3066 | 3.5305 | 0.0107 | 1.1103 | 8.8700e-003 | 1.1192 | 0.2949 | 8.1700e-003 | 0.3031 | 0.0000 | 966.8117 | 966.8117 | 0.0266 | 0.0000 | 967.4773 |
| **Total** | **0.4616** | **2.0027** | **3.9885** | **0.0152** | **1.2243** | **0.0121** | **1.2363** | **0.3278** | **0.0112** | **0.3390** | **0.0000** | **1,408.795 2** | **1,408.795 2** | **0.0530** | **0.0000** | **1,410.120 8** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1321** | **293.1321** | **0.0702** | **0.0000** | **294.8877** |

O1-25 Cont.

### 3.5 Building Construction - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.4088 | 0.3066 | 3.5305 | 0.0107 | 1.1103 | 8.8700e-003 | 1.1192 | 0.2949 | 8.1700e-003 | 0.3031 | 0.0000 | 966.8117 | 966.8117 | 0.0266 | 0.0000 | 967.4773 |
| **Total** | **0.4616** | **2.0027** | **3.9885** | **0.0152** | **1.2243** | **0.0121** | **1.2363** | **0.3278** | **0.0112** | **0.3390** | **0.0000** | **1,408.795 2** | **1,408.795 2** | **0.0530** | **0.0000** | **1,410.120 8** |

### 3.5 Building Construction - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2789** | **286.2789** | **0.0681** | **0.0000** | **287.9814** |

O1-25 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.3753 | 0.2708 | 3.1696 | 0.0101 | 1.0840 | 8.4100e-003 | 1.0924 | 0.2879 | 7.7400e-003 | 0.2957 | 0.0000 | 909.3439 | 909.3439 | 0.0234 | 0.0000 | 909.9291 |
| **Total** | **0.4135** | **1.5218** | **3.5707** | **0.0144** | **1.1953** | **9.8700e-003** | **1.2051** | **0.3200** | **9.1400e-003** | **0.3292** | **0.0000** | **1,327.336 9** | **1,327.336 9** | **0.0462** | **0.0000** | **1,328.491 6** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2785** | **286.2785** | **0.0681** | **0.0000** | **287.9811** |

O1-25 Cont.

### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.3753 | 0.2708 | 3.1696 | 0.0101 | 1.0840 | 8.4100e-003 | 1.0924 | 0.2879 | 7.7400e-003 | 0.2957 | 0.0000 | 909.3439 | 909.3439 | 0.0234 | 0.0000 | 909.9291 |
| Total | 0.4135 | 1.5218 | 3.5707 | 0.0144 | 1.1953 | 9.8700e-003 | 1.2051 | 0.3200 | 9.1400e-003 | 0.3292 | 0.0000 | 1,327.336 9 | 1,327.336 9 | 0.0462 | 0.0000 | 1,328.491 6 |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |

O1-25 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |
| **Total** | **3.7000e-004** | **2.7000e-004** | **3.1200e-003** | **1.0000e-005** | **1.0700e-003** | **1.0000e-005** | **1.0800e-003** | **2.8000e-004** | **1.0000e-005** | **2.9000e-004** | **0.0000** | **0.8963** | **0.8963** | **2.0000e-005** | **0.0000** | **0.8968** |

O1-25 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

### 3.6 Paving - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |
| **Total** | **3.7000e-004** | **2.7000e-004** | **3.1200e-003** | **1.0000e-005** | **1.0700e-003** | **1.0000e-005** | **1.0800e-003** | **2.8000e-004** | **1.0000e-005** | **2.9000e-004** | **0.0000** | **0.8963** | **0.8963** | **2.0000e-005** | **0.0000** | **0.8968** |

### 3.6 Paving - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

O1-25 Cont.

**3.6 Paving - 2024**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |
| **Total** | **5.9000e-004** | **4.1000e-004** | **4.9200e-003** | **2.0000e-005** | **1.8100e-003** | **1.0000e-005** | **1.8200e-003** | **4.8000e-004** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **1.4697** | **1.4697** | **4.0000e-005** | **0.0000** | **1.4706** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

O1-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |
| **Total** | **5.9000e-004** | **4.1000e-004** | **4.9200e-003** | **2.0000e-005** | **1.8100e-003** | **1.0000e-005** | **1.8200e-003** | **4.8000e-004** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **1.4697** | **1.4697** | **4.0000e-005** | **0.0000** | **1.4706** |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

O1-25 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |
| **Total** | **0.0101** | **6.9900e-003** | **0.0835** | **2.8000e-004** | **0.0307** | **2.3000e-004** | **0.0309** | **8.1500e-003** | **2.2000e-004** | **8.3700e-003** | **0.0000** | **24.9407** | **24.9407** | **6.1000e-004** | **0.0000** | **24.9558** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

O1-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |
| Total | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |

O1-25 Cont.

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.5657 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Unmitigated | 1.5657 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |

01-25
Cont.

**4.2 Trip Summary Information**

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

**4.3 Trip Type Information**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 46.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

O1-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6485 | 2,512.6485 | 0.1037 | 0.0215 | 2,521.6356 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6485 | 2,512.6485 | 0.1037 | 0.0215 | 2,521.6356 |
| NaturalGas Mitigated | 0.1388 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0266 | 0.0254 | 1,391.6478 |
| NaturalGas Unmitigated | 0.1388 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0266 | 0.0254 | 1,391.6478 |

O1-25 Cont.

**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9466 |
| Hotel | 1.74005e+006 | 9.3600e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.426 8** | **1,383.426 8** | **0.0265** | **0.0254** | **1,391.647 8** |

01-25 Cont.

**5.2 Energy by Land Use - NaturalGas**

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30513e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30738e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9466 |
| Hotel | 1.74005e+006 | 9.3600e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.426 8** | **1,383.426 8** | **0.0265** | **0.0254** | **1,391.647 8** |

O1-25 Cont.

**5.3 Energy by Land Use - Electricity**

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94687e+006 | 1,257.587 9 | 0.0519 | 0.0107 | 1,262.088 9 |
| General Office Building | 584500 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.646 5** | **0.1037** | **0.0215** | **2,521.835 6** |

O1-25
Cont.

### 5.3 Energy by Land Use - Electricity

Mitigated

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94597e+006 | 1,257.587 9 | 0.0519 | 0.0107 | 1,262.088 9 |
| General Office Building | 584500 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.646 5** | **0.1037** | **0.0215** | **2,521.835 6** |

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

O1-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Unmitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3086 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

O1-25
Cont.

### 6.2 Area by SubCategory

Mitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3698 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

O1-25 Cont.

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Unmitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |

O1-25
Cont.

**7.2 Water by Land Use**

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62585 / 1.02668 | 10.9086 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 8.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.0280 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

O1-25
Cont.

### 7.2 Water by Land Use

Mitigated

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62585 / 1.02668 | 10.9086 | 0.0536 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3834 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.0280 | 0.1363 | 3.4200e-003 | 31.9490 |
| Total | | 585.8052 | 3.0183 | 0.0755 | 683.7567 |

### 8.0 Waste Detail

#### 8.1 Mitigation Measures Waste

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Unmitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |

O1-25
Cont.

**8.2 Waste by Land Use**

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 426.4 | 86.5613 | 5.1163 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9386 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

O1-25
Cont.

**8.2 Waste by Land Use**

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 426.4 | 86.5613 | 5.1163 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9389 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**10.0 Stationary Equipment**

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

O1-25
Cont.

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

O1-25
Cont.

**Village South Specific Plan (Proposed)**

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

O1-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

O1-25
Cont.

| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

**2.0 Emissions Summary**

O1-25
Cont.

CalEEMod Version: CalEEMod.2016.3.2 Page 4 of 35 Date: 1/6/2021 1:54 PM

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

**2.1 Overall Construction (Maximum Daily Emission)**

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2769 | 46.4588 | 31.6840 | 0.0643 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,234.797 4 | 6,234.797 4 | 1.9466 | 0.0000 | 6,283.535 2 |
| 2022 | 5.3304 | 38.8967 | 49.5629 | 0.1517 | 9.8655 | 1.6366 | 10.7727 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 15,251.56 74 | 15,251.56 74 | 1.9503 | 0.0000 | 15,278.52 88 |
| 2023 | 4.8657 | 26.3317 | 46.7567 | 0.1472 | 9.8655 | 0.7794 | 10.6482 | 2.6361 | 0.7322 | 3.3702 | 0.0000 | 14,807.52 69 | 14,807.52 69 | 1.0250 | 0.0000 | 14,833.15 21 |
| 2024 | 237.1630 | 9.5575 | 15.1043 | 0.0244 | 1.7654 | 0.4656 | 1.8828 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,361.368 9 | 2,361.368 9 | 0.7177 | 0.0000 | 2,379.342 1 |
| **Maximum** | **237.1630** | **46.4588** | **49.5629** | **0.1517** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **15,251.56 74** | **15,251.56 74** | **1.9503** | **0.0000** | **15,278.52 88** |

O1-25 Cont.

**2.1 Overall Construction (Maximum Daily Emission)**

Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2769 | 46.4588 | 31.6840 | 0.0643 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,234.797 4 | 6,234.797 4 | 1.9466 | 0.0000 | 6,283.535 2 |
| 2022 | 5.3304 | 38.8967 | 49.5629 | 0.1517 | 9.8655 | 1.6366 | 10.7727 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 15,251.56 74 | 15,251.56 74 | 1.9503 | 0.0000 | 15,278.52 88 |
| 2023 | 4.8657 | 26.3317 | 46.7567 | 0.1472 | 9.8655 | 0.7794 | 10.6462 | 2.6361 | 0.7322 | 3.3702 | 0.0000 | 14,807.52 69 | 14,807.52 69 | 1.0250 | 0.0000 | 14,833.15 20 |
| 2024 | 237.1630 | 9.5575 | 15.1043 | 0.0244 | 1.7654 | 0.4656 | 1.8828 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,361.368 9 | 2,361.368 9 | 0.7177 | 0.0000 | 2,379.342 1 |
| **Maximum** | **237.1630** | **46.4588** | **49.5629** | **0.1517** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **15,251.56 74** | **15,251.56 74** | **1.9503** | **0.0000** | **15,278.52 88** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

O1-25 Cont.

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8788** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8788** |

O1-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

O1-25 Cont.

Page 87 of 548 in Comment Letter O1

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.944 9** | **3,747.944 9** | **1.0549** | | **3,774.317 4** |

O1-25 Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2689 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0677 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0643 | 0.0442 | 0.6042 | 1.7100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 170.8155 | 170.8155 | 5.0300e-003 | | 170.9413 |
| **Total** | **0.1916** | **4.1394** | **1.5644** | **0.0136** | **0.4366** | **0.0139** | **0.4485** | **0.1176** | **0.0133** | **0.1309** | | **1,463.0568** | **1,463.0568** | **0.0727** | | **1,465.3750** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

01-25 Cont.

### 3.2 Demolition - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2689 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0677 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0643 | 0.0442 | 0.6042 | 1.7100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 170.8155 | 170.8155 | 5.0300e-003 | | 170.9413 |
| Total | 0.1916 | 4.1394 | 1.5644 | 0.0136 | 0.4366 | 0.0139 | 0.4485 | 0.1176 | 0.0133 | 0.1309 | | 1,463.0568 | 1,463.0568 | 0.0727 | | 1,465.3750 |

### 3.3 Site Preparation - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |

O1-25 Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| **Total** | **0.0772** | **0.0530** | **0.7250** | **2.0600e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **204.9786** | **204.9786** | **6.0400e-003** | | **205.1296** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.656 9** | **3,685.656 9** | **1.1920** | | **3,715.457 3** |

O1-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| **Total** | **0.0772** | **0.0530** | **0.7250** | **2.0600e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **204.9786** | **204.9786** | **6.0400e-003** | | **205.1296** |

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.043 4** | **6,007.043 4** | **1.9428** | | **6,055.613 4** |

O1-25 Cont.

**3.4 Grading - 2021**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0857 | 0.0589 | 0.8056 | 2.2900e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 6.7100e-003 | | 227.9217 |
| **Total** | **0.0857** | **0.0589** | **0.8056** | **2.2900e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **227.7540** | **227.7540** | **6.7100e-003** | | **227.9217** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.043 4** | **6,007.043 4** | **1.9428** | | **6,055.613 4** |

01-25 Cont.

**3.4 Grading - 2021**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0857 | 0.0589 | 0.8056 | 2.2900e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 6.7100e-003 | | 227.9217 |
| **Total** | **0.0857** | **0.0589** | **0.8056** | **2.2900e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **227.7540** | **227.7540** | **6.7100e-003** | | **227.9217** |

**3.4 Grading - 2022**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.9248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.9248** | **38.8435** | **29.0415** | **0.0521** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

01-25 Cont.

**3.4 Grading - 2022**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 6.0600e-003 | | 219.8941 |
| **Total** | **0.0803** | **0.0532** | **0.7432** | **2.2100e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **219.7425** | **219.7425** | **6.0600e-003** | | **219.8941** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.9248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.9248** | **38.8435** | **29.0415** | **0.0521** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

01-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 6.0600e-003 | | 219.8941 |
| **Total** | **0.0803** | **0.0532** | **0.7432** | **2.2100e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **219.7425** | **219.7425** | **6.0600e-003** | | **219.8941** |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7082 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3338 | 2,554.3338 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7082** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3338** | **2,554.3338** | **0.6120** | | **2,569.6322** |

01-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 3.2162 | 2.1318 | 29.7654 | 0.0883 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,800.5887 | 8,800.5887 | 0.2429 | | 8,806.7582 |
| **Total** | **3.6242** | **15.3350** | **33.1995** | **0.1247** | **9.8688** | **0.0949** | **9.9637** | **2.6381** | **0.0883** | **2.7263** | | **12,697.2339** | **12,697.2339** | **0.4665** | | **12,708.8866** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7082 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3338 | 2,554.3338 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7082** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3338** | **2,554.3338** | **0.6120** | | **2,569.6322** |

01-25 Cont.

**3.5 Building Construction - 2022**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 3.2162 | 2.1318 | 29.7654 | 0.0883 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,800.6887 | 8,800.6887 | 0.2429 | | 8,806.7582 |
| **Total** | **3.6242** | **15.3350** | **33.1995** | **0.1247** | **9.8688** | **0.0949** | **9.9637** | **2.6381** | **0.0883** | **2.7263** | | **12,697.2339** | **12,697.2339** | **0.4665** | | **12,708.8866** |

**3.5 Building Construction - 2023**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

01-25 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 3.0203 | 1.9287 | 27.4113 | 0.0851 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 8,478.4408 | 8,478.4408 | 0.2190 | | 8,483.9160 |
| **Total** | **3.3229** | **11.9468** | **30.5127** | **0.1203** | **9.8688** | **0.0797** | **9.9485** | **2.6381** | **0.0738** | **2.7118** | | **12,252.3170** | **12,252.3170** | **0.4172** | | **12,262.7460** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

01-25 Cont.

### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.876 2 | 3,773.876 2 | 0.1982 | | 3,778.830 0 |
| Worker | 3.0203 | 1.9287 | 27.4113 | 0.0851 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 8,478.440 8 | 8,478.440 8 | 0.2190 | | 8,483.916 0 |
| Total | 3.3229 | 11.9468 | 30.5127 | 0.1203 | 9.8688 | 0.0797 | 9.9485 | 2.6381 | 0.0738 | 2.7118 | | 12,252.31 70 | 12,252.31 70 | 0.4172 | | 12,262.74 60 |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |

O1-25 Cont.

**3.6 Paving - 2023**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0566 | 0.0361 | 0.5133 | 1.5900e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |
| **Total** | **0.0566** | **0.0361** | **0.5133** | **1.5900e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **158.7723** | **158.7723** | **4.1000e-003** | | **158.8748** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

O1-25 Cont.

**3.6 Paving - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0566 | 0.0361 | 0.5133 | 1.5900e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |
| **Total** | **0.0566** | **0.0361** | **0.5133** | **1.5900e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **158.7723** | **158.7723** | **4.1000e-003** | | **158.8748** |

**3.6 Paving - 2024**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

01-25 Cont.

**3.6 Paving - 2024**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0535 | 0.0329 | 0.4785 | 1.5400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |
| **Total** | **0.0535** | **0.0329** | **0.4785** | **1.5400e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **153.8517** | **153.8517** | **3.7600e-003** | | **153.9458** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

O1-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0535 | 0.0329 | 0.4785 | 1.5400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |
| **Total** | **0.0535** | **0.0329** | **0.4785** | **1.5400e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **153.8517** | **153.8517** | **3.7600e-003** | | **153.9458** |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

O1-25 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5707 | 0.3513 | 5.1044 | 0.0165 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.0852 | 1,641.0852 | 0.0401 | | 1,642.0880 |
| **Total** | **0.5707** | **0.3513** | **5.1044** | **0.0165** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,641.0852** | **1,641.0852** | **0.0401** | | **1,642.0880** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

01-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5707 | 0.3513 | 5.1044 | 0.0165 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.0852 | 1,641.0852 | 0.0401 | | 1,642.0880 |
| Total | 0.5707 | 0.3513 | 5.1044 | 0.0165 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.0852 | 1,641.0852 | 0.0401 | | 1,642.0880 |

O1-25 Cont.

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| Unmitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |

**4.2 Trip Summary Information**

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

**4.3 Trip Type Information**

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 46.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

O1-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

01-25 Cont.

**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22758.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.8342 | 2,677.8342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4956 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

01-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6682 | 131.6682 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.8342 | 2,677.8342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.78972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4956 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 596.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

O1-25
Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3460 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

O1-25
Cont.

**6.2 Area by SubCategory**

Mitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2070 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| Total | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

01-25 Cont.

**7.0 Water Detail**

**7.1 Mitigation Measures Water**

**8.0 Waste Detail**

**8.1 Mitigation Measures Waste**

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**10.0 Stationary Equipment**

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

O1-25
Cont.

**Village South Specific Plan (Proposed)**

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

O1-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

O1-25
Cont.

| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

O1-25
Cont.

CalEEMod Version: CalEEMod.2016.3.2 Page 4 of 35 Date: 1/6/2021 1:49 PM

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

**2.1 Overall Construction (Maximum Daily Emission)**

Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2866 | 46.4651 | 31.6150 | 0.0642 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,221.493 7 | 6,221.493 7 | 1.9491 | 0.0000 | 6,270.221 4 |
| 2022 | 5.7218 | 38.9024 | 47.3319 | 0.1455 | 9.8655 | 1.6366 | 10.7736 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 14,630.30 99 | 14,630.30 99 | 1.9499 | 0.0000 | 14,657.26 63 |
| 2023 | 5.2705 | 26.4914 | 44.5836 | 0.1413 | 9.8655 | 0.7800 | 10.6488 | 2.6361 | 0.7328 | 3.3708 | 0.0000 | 14,210.34 24 | 14,210.34 24 | 1.0230 | 0.0000 | 14,235.91 60 |
| 2024 | 237.2328 | 9.5610 | 15.0611 | 0.0243 | 1.7854 | 0.4656 | 1.8828 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,352.417 8 | 2,352.417 8 | 0.7175 | 0.0000 | 2,370.355 0 |
| **Maximum** | **237.2328** | **46.4651** | **47.3319** | **0.1455** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **14,630.30 99** | **14,630.30 99** | **1.9499** | **0.0000** | **14,657.26 63** |

O1-25 Cont.

CalEEMod Version: CalEEMod.2016.3.2 Page 5 of 35 Date: 1/6/2021 1:49 PM

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

**2.1 Overall Construction (Maximum Daily Emission)**

Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2865 | 46.4651 | 31.6150 | 0.0642 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,221.493 7 | 6,221.493 7 | 1.9491 | 0.0000 | 6,270.221 4 |
| 2022 | 5.7218 | 38.9024 | 47.3319 | 0.1455 | 9.8655 | 1.6366 | 10.7736 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 14,630.30 99 | 14,630.30 99 | 1.9499 | 0.0000 | 14,657.26 63 |
| 2023 | 5.2705 | 26.4914 | 44.5836 | 0.1413 | 9.8655 | 0.7800 | 10.6468 | 2.6361 | 0.7328 | 3.3708 | 0.0000 | 14,210.34 24 | 14,210.34 24 | 1.0230 | 0.0000 | 14,235.91 60 |
| 2024 | 237.2328 | 9.5610 | 15.0611 | 0.0243 | 1.7854 | 0.4656 | 1.8828 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,352.417 8 | 2,352.417 8 | 0.7175 | 0.0000 | 2,370.355 0 |
| **Maximum** | **237.2328** | **46.4651** | **47.3319** | **0.1455** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **14,630.30 99** | **14,630.30 99** | **1.9499** | **0.0000** | **14,657.26 63** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

01-25 Cont.

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1963 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1963 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

O1-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

O1-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.944 9** | **3,747.944 9** | **1.0549** | | **3,774.317 4** |

O1-25 Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2689 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0906 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0715 | 0.0489 | 0.5824 | 1.6100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 160.8377 | 160.8377 | 4.7300e-003 | | 160.9560 |
| **Total** | **0.2019** | **4.1943** | **1.5706** | **0.0133** | **0.4366** | **0.0141** | **0.4487** | **0.1176** | **0.0135** | **0.1311** | | **1,430.8932** | **1,430.8932** | **0.0955** | | **1,433.0812** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

01-25 Cont.

### 3.2 Demolition - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2689 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0906 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0715 | 0.0489 | 0.5824 | 1.6100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 160.8377 | 160.8377 | 4.7300e-003 | | 160.9560 |
| Total | 0.2019 | 4.1943 | 1.5706 | 0.0133 | 0.4366 | 0.0141 | 0.4487 | 0.1176 | 0.0135 | 0.1311 | | 1,430.6932 | 1,430.6932 | 0.0955 | | 1,433.0812 |

### 3.3 Site Preparation - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |

01-25 Cont.

**3.3 Site Preparation - 2021**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| **Total** | **0.0858** | **0.0587** | **0.6629** | **1.9400e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **193.0052** | **193.0052** | **5.6800e-003** | | **193.1472** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.656 9** | **3,685.656 9** | **1.1920** | | **3,715.457 3** |

O1-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| **Total** | **0.0858** | **0.0587** | **0.6629** | **1.9400e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **193.0052** | **193.0052** | **5.6800e-003** | | **193.1472** |

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.043 4** | **6,007.043 4** | **1.9428** | | **6,055.613 4** |

01-25 Cont.

**3.4 Grading - 2021**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |
| **Total** | **0.0954** | **0.0652** | **0.7365** | **2.1500e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **214.4502** | **214.4502** | **6.3100e-003** | | **214.6080** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.043 4** | **6,007.043 4** | **1.9428** | | **6,055.613 4** |

01-25 Cont.

**3.4 Grading - 2021**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |
| **Total** | **0.0954** | **0.0652** | **0.7365** | **2.1500e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **214.4502** | **214.4502** | **6.3100e-003** | | **214.6080** |

**3.4 Grading - 2022**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.9248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.9248** | **38.8435** | **29.0415** | **0.0521** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

01-25 Cont.

**3.4 Grading - 2022**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0896 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |
| Total | 0.0896 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.9248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| Total | 3.9248 | 38.8435 | 29.0415 | 0.0521 | 8.6733 | 1.6349 | 10.3082 | 3.5965 | 1.5041 | 5.1006 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |

O1-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0896 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |
| **Total** | **0.0896** | **0.0589** | **0.6784** | **2.0800e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **206.9139** | **206.9139** | **5.7000e-003** | | **207.0563** |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7082 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.333 8 | 2,554.333 8 | 0.6120 | | 2,569.632 2 |
| **Total** | **1.7082** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.333 8** | **2,554.333 8** | **0.6120** | | **2,569.632 2** |

01-25 Cont.

**3.5 Building Construction - 2022**

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.075 0 | 3,789.075 0 | 0.2361 | | 3,795.028 3 |
| Worker | 3.5872 | 2.3593 | 27.1680 | 0.0832 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,286.901 3 | 8,286.901 3 | 0.2282 | | 8,292.605 8 |
| **Total** | **4.0156** | **15.5266** | **30.9685** | **0.1186** | **9.8688** | **0.0957** | **9.9645** | **2.6381** | **0.0891** | **2.7271** | | **12,075.97 63** | **12,075.97 63** | **0.4643** | | **12,087.63 41** |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7082 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.333 8 | 2,554.333 8 | 0.6120 | | 2,569.632 2 |
| **Total** | **1.7082** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.333 8** | **2,554.333 8** | **0.6120** | | **2,569.632 2** |

01-25 Cont.

### 3.5 Building Construction - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.075 0 | 3,789.075 0 | 0.2361 | | 3,795.028 3 |
| Worker | 3.5872 | 2.3593 | 27.1680 | 0.0832 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,286.901 3 | 8,286.901 3 | 0.2282 | | 8,292.605 8 |
| Total | 4.0156 | 15.5266 | 30.9685 | 0.1186 | 9.8688 | 0.0957 | 9.9645 | 2.6381 | 0.0891 | 2.7271 | | 12,075.97 63 | 12,075.97 63 | 0.4643 | | 12,087.63 41 |

### 3.5 Building Construction - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.406 1 |
| Total | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.406 1 |

01-25 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 3.3795 | 2.1338 | 24.9725 | 0.0801 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 7,983.7318 | 7,983.7318 | 0.2055 | | 7,988.8883 |
| **Total** | **3.6978** | **12.1065** | **28.3496** | **0.1144** | **9.8688** | **0.0803** | **9.9491** | **2.6381** | **0.0743** | **2.7124** | | **11,655.1325** | **11,655.1325** | **0.4151** | | **11,665.5099** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

O1-25 Cont.

### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 3.3795 | 2.1338 | 24.9725 | 0.0801 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 7,983.7318 | 7,983.7318 | 0.2055 | | 7,988.8683 |
| Total | 3.6978 | 12.1065 | 28.3496 | 0.1144 | 9.8688 | 0.0803 | 9.9491 | 2.6381 | 0.0743 | 2.7124 | | 11,655.1325 | 11,655.1325 | 0.4151 | | 11,665.5099 |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |

O1-25 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |
| **Total** | **0.0633** | **0.0400** | **0.4677** | **1.5000e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **149.5081** | **149.5081** | **3.8500e-003** | | **149.6043** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

O1-25 Cont.

**3.6 Paving - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |
| **Total** | **0.0633** | **0.0400** | **0.4677** | **1.5000e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **149.5081** | **149.5081** | **3.8500e-003** | | **149.6043** |

**3.6 Paving - 2024**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

O1-25 Cont.

**3.6 Paving - 2024**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0801 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |
| **Total** | **0.0801** | **0.0364** | **0.4354** | **1.4500e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **144.8706** | **144.8706** | **3.5300e-003** | | **144.9587** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

01-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0801 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |
| **Total** | **0.0801** | **0.0364** | **0.4354** | **1.4500e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **144.8706** | **144.8706** | **3.5300e-003** | | **144.9587** |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

O1-25 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2262 |
| **Total** | **0.5406** | **0.3886** | **4.6439** | **0.0155** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,545.2860** | **1,545.2860** | **0.0376** | | **1,546.2262** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

O1-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5408 | 0.3888 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2262 |
| Total | 0.5408 | 0.3888 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2262 |

O1-25 Cont.

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.5233 | 45.9914 | 110.0422 | 0.4661 | 45.9592 | 0.3373 | 46.2966 | 12.2950 | 0.3132 | 12.6083 | | 47,917.80 05 | 47,917.80 05 | 2.1953 | | 47,972.68 39 |
| Unmitigated | 9.5233 | 45.9914 | 110.0422 | 0.4661 | 45.9592 | 0.3373 | 46.2966 | 12.2950 | 0.3132 | 12.6083 | | 47,917.80 05 | 47,917.80 05 | 2.1953 | | 47,972.68 39 |

**4.2 Trip Summary Information**

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

**4.3 Trip Type Information**

01-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 46.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

O1-25
Cont.

**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.8682 | 131.8682 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22758.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.8342 | 2,677.8342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4956 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

O1-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.8342 | 2,677.8342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.78972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4956 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 596.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

O1-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

O1-25
Cont.

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3460 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

**6.2 Area by SubCategory**

Mitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2070 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| Total | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

01-25 Cont.

**7.0 Water Detail**

**7.1 Mitigation Measures Water**

**8.0 Waste Detail**

**8.1 Mitigation Measures Waste**

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**10.0 Stationary Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

01-25
Cont.

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

O1-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

O1-25
Cont.

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 83.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.06 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.96 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.66 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

**2.0 Emissions Summary**

O1-25 Cont.

**2.1 Overall Construction**

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1704 | 1.8234 | 1.1577 | 2.3800e-003 | 0.4141 | 0.0817 | 0.4958 | 0.1758 | 0.0754 | 0.2512 | 0.0000 | 210.7654 | 210.7654 | 0.0600 | 0.0000 | 212.2661 |
| 2022 | 0.5865 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.655 4 | 1,418.655 4 | 0.1215 | 0.0000 | 1,421.692 5 |
| 2023 | 0.5190 | 3.2850 | 4.7878 | 0.0147 | 0.8497 | 0.0971 | 0.9468 | 0.2263 | 0.0912 | 0.3166 | 0.0000 | 1,342.441 2 | 1,342.441 2 | 0.1115 | 0.0000 | 1,345.229 1 |
| 2024 | 4.1592 | 0.1313 | 0.2557 | 5.0000e-004 | 0.0221 | 6.3900e-003 | 0.0285 | 5.8700e-003 | 5.9700e-003 | 0.0118 | 0.0000 | 44.6355 | 44.6355 | 7.6300e-003 | 0.0000 | 44.8311 |
| **Maximum** | **4.1592** | **4.0240** | **5.1546** | **0.0155** | **0.9509** | **0.1175** | **1.0683** | **0.2518** | **0.1103** | **0.3621** | **0.0000** | **1,418.655 4** | **1,418.655 4** | **0.1215** | **0.0000** | **1,421.692 5** |

O1-25
Cont.

## 2.1 Overall Construction

Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1704 | 1.8234 | 1.1577 | 2.3800e-003 | 0.4141 | 0.0817 | 0.4958 | 0.1758 | 0.0754 | 0.2512 | 0.0000 | 210.7851 | 210.7851 | 0.0600 | 0.0000 | 212.2858 |
| 2022 | 0.5865 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.6550 | 1,418.6550 | 0.1215 | 0.0000 | 1,421.6921 |
| 2023 | 0.5190 | 3.2850 | 4.7878 | 0.0147 | 0.8497 | 0.0971 | 0.9468 | 0.2263 | 0.0912 | 0.3166 | 0.0000 | 1,342.4409 | 1,342.4409 | 0.1115 | 0.0000 | 1,345.2287 |
| 2024 | 4.1592 | 0.1313 | 0.2557 | 5.0000e-004 | 0.0221 | 6.3900e-003 | 0.0285 | 5.8700e-003 | 5.9700e-003 | 0.0118 | 0.0000 | 44.6354 | 44.6354 | 7.6300e-003 | 0.0000 | 44.8311 |
| **Maximum** | **4.1592** | **4.0240** | **5.1546** | **0.0155** | **0.9509** | **0.1175** | **1.0683** | **0.2518** | **0.1103** | **0.3621** | **0.0000** | **1,418.6550** | **1,418.6550** | **0.1215** | **0.0000** | **1,421.6921** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| 1 | 9-1-2021 | 11-30-2021 | 1.4091 | 1.4091 |
| 2 | 12-1-2021 | 2-28-2022 | 1.3329 | 1.3329 |
| 3 | 3-1-2022 | 5-31-2022 | 1.1499 | 1.1499 |
| 4 | 6-1-2022 | 8-31-2022 | 1.1457 | 1.1457 |
| 5 | 9-1-2022 | 11-30-2022 | 1.1415 | 1.1415 |
| 6 | 12-1-2022 | 2-28-2023 | 1.0278 | 1.0278 |
| 7 | 3-1-2023 | 5-31-2023 | 0.9868 | 0.9868 |
| 8 | 6-1-2023 | 8-31-2023 | 0.9831 | 0.9831 |

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| | | | | |
|---|---|---|---|---|
| 9 | 9-1-2023 | 11-30-2023 | 0.9798 | 0.9798 |
| 10 | 12-1-2023 | 2-29-2024 | 2.8757 | 2.8757 |
| 11 | 3-1-2024 | 5-31-2024 | 1.6188 | 1.6188 |
| | | Highest | 2.8757 | 2.8757 |

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1098 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.073 2 | 3,896.073 2 | 0.1303 | 0.0468 | 3,913.283 3 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,820.498 6 | 7,820.498 6 | 0.3407 | 0.0000 | 7,829.016 2 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.8420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Total | 6.8892 | 9.5223 | 30.3407 | 0.0914 | 7.7979 | 0.2260 | 8.0240 | 2.0895 | 0.2219 | 2.3114 | 236.9712 | 12,294.18 07 | 12,531.15 19 | 15.7904 | 0.1260 | 12,963.47 51 |

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## 2.2 Overall Operational

Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,886.0732 | 3,886.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9862 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7587 |
| Total | 6.8692 | 9.5223 | 30.3407 | 0.0914 | 7.7979 | 0.2260 | 8.0240 | 2.0895 | 0.2219 | 2.3114 | 236.9712 | 12,294.1807 | 12,531.1519 | 15.7904 | 0.1260 | 12,963.4751 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

Construction Phase

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

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Cont.

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0012** | **51.0012** | **0.0144** | **0.0000** | **51.3601** |

O1-25 Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.6000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4868 | 17.4868 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 5.3000e-004 | 6.0900e-003 | 2.0000e-005 | 1.6800e-003 | 1.0000e-005 | 1.6900e-003 | 4.5000e-004 | 1.0000e-005 | 4.6000e-004 | 0.0000 | 1.5281 | 1.5281 | 5.0000e-005 | 0.0000 | 1.5293 |
| **Total** | **2.6500e-003** | **0.0639** | **0.0209** | **2.0000e-004** | **5.6200e-003** | **2.0000e-004** | **5.8200e-003** | **1.5300e-003** | **1.9000e-004** | **1.7200e-003** | **0.0000** | **18.9847** | **18.9847** | **1.2600e-003** | **0.0000** | **19.0161** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0011** | **51.0011** | **0.0144** | **0.0000** | **51.3600** |

O1-25 Cont.

### 3.2 Demolition - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.6000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4568 | 17.4568 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 5.3000e-004 | 6.0900e-003 | 2.0000e-005 | 1.6800e-003 | 1.0000e-005 | 1.6900e-003 | 4.5000e-004 | 1.0000e-005 | 4.6000e-004 | 0.0000 | 1.5281 | 1.5281 | 5.0000e-005 | 0.0000 | 1.5293 |
| **Total** | **2.6500e-003** | **0.0639** | **0.0209** | **2.0000e-004** | **5.6200e-003** | **2.0000e-004** | **5.8200e-003** | **1.5300e-003** | **1.9000e-004** | **1.7200e-003** | **0.0000** | **18.9847** | **18.9847** | **1.2600e-003** | **0.0000** | **19.0161** |

### 3.3 Site Preparation - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7081 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7081** |

O1-25 Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3500e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |
| **Total** | **5.8000e-004** | **4.3000e-004** | **4.8700e-003** | **1.0000e-005** | **1.3400e-003** | **1.0000e-005** | **1.3500e-003** | **3.6000e-004** | **1.0000e-005** | **3.7000e-004** | **0.0000** | **1.2225** | **1.2225** | **4.0000e-005** | **0.0000** | **1.2234** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7060** |

O1-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3500e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |
| **Total** | **5.8000e-004** | **4.3000e-004** | **4.8700e-003** | **1.0000e-005** | **1.3400e-003** | **1.0000e-005** | **1.3500e-003** | **3.6000e-004** | **1.0000e-005** | **3.7000e-004** | **0.0000** | **1.2225** | **1.2225** | **4.0000e-005** | **0.0000** | **1.2234** |

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3776 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5405** | **103.5405** | **0.0335** | **0.0000** | **104.3776** |

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### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8500e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |
| **Total** | **1.2200e-003** | **9.0000e-004** | **0.0103** | **3.0000e-005** | **2.8300e-003** | **2.0000e-005** | **2.8500e-003** | **7.5000e-004** | **2.0000e-005** | **7.8000e-004** | **0.0000** | **2.5808** | **2.5808** | **8.0000e-005** | **0.0000** | **2.5828** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5403** | **103.5403** | **0.0335** | **0.0000** | **104.3775** |

O1-25 Cont.

### 3.4 Grading - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8600e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |
| **Total** | **1.2200e-003** | **9.0000e-004** | **0.0103** | **3.0000e-005** | **2.8300e-003** | **2.0000e-005** | **2.8600e-003** | **7.5000e-004** | **2.0000e-005** | **7.8000e-004** | **0.0000** | **2.5808** | **2.5808** | **8.0000e-005** | **0.0000** | **2.5828** |

### 3.4 Grading - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

O1-25 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |
| **Total** | **2.1000e-004** | **1.5000e-004** | **1.7400e-003** | **1.0000e-005** | **5.2000e-004** | **0.0000** | **5.3000e-004** | **1.4000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4587** | **0.4587** | **1.0000e-005** | **0.0000** | **0.4590** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

01-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |
| **Total** | **2.1000e-004** | **1.5000e-004** | **1.7400e-003** | **1.0000e-005** | **5.2000e-004** | **0.0000** | **5.3000e-004** | **1.4000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4587** | **0.4587** | **1.0000e-005** | **0.0000** | **0.4590** |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1324** | **293.1324** | **0.0702** | **0.0000** | **294.8881** |

O1-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.3051 | 0.2164 | 2.6233 | 7.3500e-003 | 0.7557 | 6.2300e-003 | 0.7619 | 0.2007 | 5.7400e-003 | 0.2065 | 0.0000 | 663.9936 | 663.9936 | 0.0187 | 0.0000 | 664.4604 |
| **Total** | **0.3578** | **1.9125** | **2.9812** | **0.0119** | **0.8696** | **9.4100e-003** | **0.8790** | **0.2336** | **8.7800e-003** | **0.2424** | **0.0000** | **1,105.977 1** | **1,105.977 1** | **0.0451** | **0.0000** | **1,107.103 9** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1321** | **293.1321** | **0.0702** | **0.0000** | **294.8877** |

O1-25 Cont.

### 3.5 Building Construction - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.3051 | 0.2164 | 2.6233 | 7.3500e-003 | 0.7557 | 6.2300e-003 | 0.7619 | 0.2007 | 5.7400e-003 | 0.2065 | 0.0000 | 663.9936 | 663.9936 | 0.0187 | 0.0000 | 664.4604 |
| **Total** | **0.3578** | **1.9125** | **2.9812** | **0.0119** | **0.8696** | **9.4100e-003** | **0.8790** | **0.2336** | **8.7800e-003** | **0.2424** | **0.0000** | **1,105.977 1** | **1,105.977 1** | **0.0451** | **0.0000** | **1,107.103 9** |

### 3.5 Building Construction - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2789** | **286.2789** | **0.0681** | **0.0000** | **287.9814** |

O1-25 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.2795 | 0.1910 | 2.2635 | 6.9100e-003 | 0.7377 | 5.9100e-003 | 0.7436 | 0.1960 | 5.4500e-003 | 0.2014 | 0.0000 | 624.5363 | 624.5363 | 0.0164 | 0.0000 | 624.9466 |
| **Total** | **0.3177** | **1.4420** | **2.6646** | **0.0112** | **0.8490** | **7.3700e-003** | **0.8564** | **0.2281** | **6.8500e-003** | **0.2349** | **0.0000** | **1,042.529 4** | **1,042.529 4** | **0.0392** | **0.0000** | **1,043.509 0** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2785** | **286.2785** | **0.0681** | **0.0000** | **287.9811** |

01-25 Cont.

### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.2795 | 0.1910 | 2.2635 | 6.9100e-003 | 0.7377 | 5.9100e-003 | 0.7436 | 0.1960 | 5.4500e-003 | 0.2014 | 0.0000 | 624.5363 | 624.5363 | 0.0164 | 0.0000 | 624.9466 |
| **Total** | **0.3177** | **1.4420** | **2.6646** | **0.0112** | **0.8490** | **7.3700e-003** | **0.8564** | **0.2281** | **6.8500e-003** | **0.2349** | **0.0000** | **1,042.529 4** | **1,042.529 4** | **0.0392** | **0.0000** | **1,043.509 0** |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

O1-25 Cont.

**3.6 Paving - 2023**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |
| **Total** | **2.8000e-004** | **1.9000e-004** | **2.2300e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.6156** | **0.6156** | **2.0000e-005** | **0.0000** | **0.6160** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

01-25 Cont.

**3.6 Paving - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |
| **Total** | **2.8000e-004** | **1.9000e-004** | **2.2300e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.6156** | **0.6156** | **2.0000e-005** | **0.0000** | **0.6160** |

**3.6 Paving - 2024**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

O1-25 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |
| **Total** | **4.4000e-004** | **2.9000e-004** | **3.5100e-003** | **1.0000e-005** | **1.2300e-003** | **1.0000e-005** | **1.2400e-003** | **3.3000e-004** | **1.0000e-005** | **3.4000e-004** | **0.0000** | **1.0094** | **1.0094** | **3.0000e-005** | **0.0000** | **1.0100** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

O1-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |
| **Total** | **4.4000e-004** | **2.9000e-004** | **3.5100e-003** | **1.0000e-005** | **1.2300e-003** | **1.0000e-005** | **1.2400e-003** | **3.3000e-004** | **1.0000e-005** | **3.4000e-004** | **0.0000** | **1.0094** | **1.0094** | **3.0000e-005** | **0.0000** | **1.0100** |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

O1-25 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |
| **Total** | **7.4800e-003** | **4.9300e-003** | **0.0596** | **1.9000e-004** | **0.0209** | **1.6000e-004** | **0.0211** | **5.5500e-003** | **1.5000e-004** | **5.7000e-003** | **0.0000** | **17.1287** | **17.1287** | **4.3000e-004** | **0.0000** | **17.1394** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

O1-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |
| Total | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |

O1-25 Cont.

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.5657 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Unmitigated | 1.5657 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |

O1-25 Cont.

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

### 4.3 Trip Type Information

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 46.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6485 | 2,512.6485 | 0.1037 | 0.0215 | 2,521.6356 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6485 | 2,512.6485 | 0.1037 | 0.0215 | 2,521.6356 |
| NaturalGas Mitigated | 0.1388 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0266 | 0.0254 | 1,391.6478 |
| NaturalGas Unmitigated | 0.1388 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0266 | 0.0254 | 1,391.6478 |

O1-25 Cont.

**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0446 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9466 |
| Hotel | 1.74005e+006 | 9.3600e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.426 8** | **1,383.426 8** | **0.0265** | **0.0254** | **1,391.647 8** |

01-25 Cont.

**5.2 Energy by Land Use - NaturalGas**

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0446 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9466 |
| Hotel | 1.74005e+006 | 9.3600e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.426 8** | **1,383.426 8** | **0.0265** | **0.0254** | **1,391.647 8** |

01-25 Cont.

**5.3 Energy by Land Use - Electricity**

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94597e+006 | 1,257.587 9 | 0.0519 | 0.0107 | 1,262.088 9 |
| General Office Building | 584500 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.646 5** | **0.1037** | **0.0215** | **2,521.835 6** |

O1-25 Cont.

### 5.3 Energy by Land Use - Electricity

Mitigated

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94597e+006 | 1,257.587 9 | 0.0519 | 0.0107 | 1,262.088 9 |
| General Office Building | 584500 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.646 5** | **0.1037** | **0.0215** | **2,521.835 6** |

01-25 Cont.

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Unmitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3086 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| Total | 5.1437 | 0.2950 | 10.3804 | 1.6600e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

O1-25
Cont.

### 6.2 Area by SubCategory

Mitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3698 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

O1-25 Cont.

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Unmitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |

O1-25
Cont.

**7.2 Water by Land Use**

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62585 / 1.02668 | 10.9086 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 8.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.0280 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

O1-25 Cont.

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### 7.2 Water by Land Use

Mitigated

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62585 / 1.02668 | 10.9086 | 0.0536 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3834 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.0280 | 0.1363 | 3.4200e-003 | 31.9490 |
| Total | | 585.8052 | 3.0183 | 0.0755 | 683.7567 |

### 8.0 Waste Detail

#### 8.1 Mitigation Measures Waste

O1-25
Cont.

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Unmitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |

O1-25
Cont.

**8.2 Waste by Land Use**

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 426.4 | 86.5613 | 5.1163 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9386 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

01-25 Cont.

**8.2 Waste by Land Use**

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 426.4 | 86.5613 | 5.1163 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9389 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**10.0 Stationary Equipment**

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

O1-25
Cont.

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

O1-25
Cont.

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

O1-25
Cont.

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.06 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.96 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.66 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

**2.0 Emissions Summary**

O1-25
Cont.

**2.1 Overall Construction (Maximum Daily Emission)**

Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2061 | 46.4415 | 31.4494 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,163.4166 | 6,163.4166 | 1.9475 | 0.0000 | 6,212.1039 |
| 2022 | 4.5441 | 38.8811 | 40.8776 | 0.1240 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,493.4403 | 12,493.4403 | 1.9485 | 0.0000 | 12,518.5707 |
| 2023 | 4.1534 | 25.7658 | 38.7457 | 0.1206 | 7.0088 | 0.7592 | 7.7679 | 1.8799 | 0.7136 | 2.5935 | 0.0000 | 12,150.4890 | 12,150.4890 | 0.9589 | 0.0000 | 12,174.4615 |
| 2024 | 237.0219 | 9.5478 | 14.9642 | 0.0239 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,313.1808 | 2,313.1808 | 0.7166 | 0.0000 | 2,331.0956 |
| **Maximum** | **237.0219** | **46.4415** | **40.8776** | **0.1240** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,493.4403** | **12,493.4403** | **1.9485** | **0.0000** | **12,518.5707** |

O1-25 Cont.

**2.1 Overall Construction (Maximum Daily Emission)**

Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2061 | 46.4415 | 31.4494 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,163.4166 | 6,163.4166 | 1.9475 | 0.0000 | 6,212.1039 |
| 2022 | 4.5441 | 38.8811 | 40.8776 | 0.1240 | 8.8255 | 1.6381 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,493.4403 | 12,493.4403 | 1.9485 | 0.0000 | 12,518.5707 |
| 2023 | 4.1534 | 25.7658 | 38.7457 | 0.1206 | 7.0088 | 0.7592 | 7.7679 | 1.8799 | 0.7136 | 2.5935 | 0.0000 | 12,150.4890 | 12,150.4890 | 0.9589 | 0.0000 | 12,174.4615 |
| 2024 | 237.0219 | 9.5478 | 14.9642 | 0.0239 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,313.1808 | 2,313.1808 | 0.7168 | 0.0000 | 2,331.0955 |
| **Maximum** | **237.0219** | **46.4415** | **40.8776** | **0.1240** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,493.4403** | **12,493.4403** | **1.9485** | **0.0000** | **12,518.5707** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8788** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8788** |

O1-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.944 9** | **3,747.944 9** | **1.0549** | | **3,774.317 4** |

O1-25 Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2689 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0677 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0487 | 0.0313 | 0.4282 | 1.1600e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 117.2799 | 117.2799 | 3.5200e-003 | | 117.3678 |
| **Total** | **0.1760** | **4.1265** | **1.3884** | **0.0131** | **0.3830** | **0.0135** | **0.3946** | **0.1034** | **0.0129** | **0.1163** | | **1,409.5212** | **1,409.5212** | **0.0912** | | **1,411.8015** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

01-25 Cont.

### 3.2 Demolition - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2689 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0677 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0487 | 0.0313 | 0.4282 | 1.1600e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 117.2799 | 117.2799 | 3.5200e-003 | | 117.3678 |
| Total | 0.1760 | 4.1265 | 1.3884 | 0.0131 | 0.3830 | 0.0135 | 0.3946 | 0.1034 | 0.0129 | 0.1163 | | 1,409.5212 | 1,409.5212 | 0.0912 | | 1,411.8015 |

### 3.3 Site Preparation - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |

01-25 Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |
| **Total** | **0.0584** | **0.0375** | **0.5139** | **1.4100e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **140.7359** | **140.7359** | **4.2200e-003** | | **140.8414** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.656 9** | **3,685.656 9** | **1.1920** | | **3,715.457 3** |

01-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0584 | 0.0375 | 0.0139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |
| Total | 0.0584 | 0.0375 | 0.0139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| Total | 4.1912 | 46.3998 | 30.8785 | 0.0620 | 8.6733 | 1.9853 | 10.6587 | 3.5965 | 1.8265 | 5.4230 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |

01-25 Cont.

**3.4 Grading - 2021**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 156.3732 | 156.3732 | 4.6900e-003 | | 156.4904 |
| **Total** | **0.0649** | **0.0417** | **0.5710** | **1.5700e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **156.3732** | **156.3732** | **4.6900e-003** | | **156.4904** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.043 4** | **6,007.043 4** | **1.9428** | | **6,055.613 4** |

01-25 Cont.

**3.4 Grading - 2021**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 156.3732 | 156.3732 | 4.6900e-003 | | 156.4904 |
| **Total** | **0.0649** | **0.0417** | **0.5710** | **1.5700e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **156.3732** | **156.3732** | **4.6900e-003** | | **156.4904** |

**3.4 Grading - 2022**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.9248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.9248** | **38.8435** | **29.0415** | **0.0521** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

01-25 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0807 | 0.0376 | 0.5263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |
| **Total** | **0.0807** | **0.0376** | **0.5263** | **1.5100e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **150.8754** | **150.8754** | **4.2400e-003** | | **150.9813** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.9248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.9248** | **38.8435** | **29.0415** | **0.0521** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

01-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0607 | 0.0376 | 0.5263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |
| Total | 0.0607 | 0.0376 | 0.5263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7082 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3338 | 2,554.3338 | 0.6120 | | 2,569.6322 |
| Total | 1.7082 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3338 | 2,554.3338 | 0.6120 | | 2,569.6322 |

01-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 2.4299 | 1.5074 | 21.0601 | 0.0607 | 6.0932 | 0.0483 | 6.1425 | 1.6183 | 0.0454 | 1.6637 | | 6,042.5585 | 6,042.5585 | 0.1897 | | 6,046.8000 |
| **Total** | **2.8378** | **14.7106** | **24.5142** | **0.0971** | **7.0087** | **0.0741** | **7.0828** | **1.8799** | **0.0691** | **1.9490** | | **9,939.1067** | **9,939.1067** | **0.3933** | | **9,948.9384** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7082 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3338 | 2,554.3338 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7082** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3338** | **2,554.3338** | **0.6120** | | **2,569.6322** |

O1-25 Cont.

**3.5 Building Construction - 2022**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 2.4299 | 1.5074 | 21.0601 | 0.0607 | 6.0932 | 0.0483 | 6.1425 | 1.6183 | 0.0454 | 1.6637 | | 6,042.5585 | 6,042.5585 | 0.1897 | | 6,046.8000 |
| **Total** | **2.8378** | **14.7106** | **24.5142** | **0.0971** | **7.0087** | **0.0741** | **7.0828** | **1.8799** | **0.0691** | **1.9490** | | **9,939.1067** | **9,939.1067** | **0.3933** | | **9,948.9384** |

**3.5 Building Construction - 2023**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

O1-25 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 2.2780 | 1.3628 | 19.4002 | 0.0584 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,821.4028 | 5,821.4028 | 0.1529 | | 5,825.2254 |
| **Total** | **2.5807** | **11.3809** | **22.5017** | **0.0936** | **7.0088** | **0.0595** | **7.0682** | **1.8799** | **0.0552** | **1.9350** | | **9,595.2790** | **9,595.2790** | **0.3511** | | **9,604.0554** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

O1-25 Cont.

### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 2.2780 | 1.3628 | 19.4002 | 0.0584 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,821.4028 | 5,821.4028 | 0.1529 | | 5,825.2254 |
| Total | 2.5807 | 11.3809 | 22.5017 | 0.0936 | 7.0088 | 0.0595 | 7.0682 | 1.8799 | 0.0552 | 1.9350 | | 9,595.2790 | 9,595.2790 | 0.3511 | | 9,604.0554 |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |

01-25 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0427 | 0.0255 | 0.3633 | 1.0600e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |
| **Total** | **0.0427** | **0.0255** | **0.3633** | **1.0600e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **109.0150** | **109.0150** | **2.8600e-003** | | **109.0866** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

01-25 Cont.

**3.6 Paving - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0427 | 0.0255 | 0.3633 | 1.0000e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8000e-003 | | 109.0866 |
| **Total** | **0.0427** | **0.0255** | **0.3633** | **1.0000e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **109.0150** | **109.0150** | **2.8000e-003** | | **109.0866** |

**3.6 Paving - 2024**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

O1-25 Cont.

**3.6 Paving - 2024**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0403 | 0.0233 | 0.3384 | 1.0600e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |
| **Total** | **0.0403** | **0.0233** | **0.3384** | **1.0600e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **105.6336** | **105.6336** | **2.6300e-003** | | **105.6992** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

O1-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0403 | 0.0233 | 0.3384 | 1.0600e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |
| **Total** | **0.0403** | **0.0233** | **0.3384** | **1.0600e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **105.6336** | **105.6336** | **2.6300e-003** | | **105.6992** |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

01-25 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,126.7583 | 1,126.7583 | 0.0280 | | 1,127.4583 |
| **Total** | **0.4296** | **0.2481** | **3.6098** | **0.0113** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,126.7583** | **1,126.7583** | **0.0280** | | **1,127.4583** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

O1-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,126.7583 | 1,126.7583 | 0.0280 | | 1,127.4583 |
| Total | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,126.7583 | 1,126.7583 | 0.0280 | | 1,127.4583 |

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

O1-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.60 34 | 50,306.60 34 | 2.1807 | | 50,361.12 08 |
| Unmitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.60 34 | 50,306.60 34 | 2.1807 | | 50,361.12 08 |

01-25 Cont.

**4.2 Trip Summary Information**

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

**4.3 Trip Type Information**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 46.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

O1-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

O1-25
Cont.

**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22758.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.8342 | 2,677.8342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4956 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

01-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.8342 | 2,677.8342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.78972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4956 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 596.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

01-25 Cont.

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

O1-25
Cont.

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3460 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

**6.2 Area by SubCategory**

Mitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2070 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3460 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| Total | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

**7.0 Water Detail**

**7.1 Mitigation Measures Water**

**8.0 Waste Detail**

**8.1 Mitigation Measures Waste**

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**10.0 Stationary Equipment**

O1-25 Cont.

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

01-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

## Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Winter**

### 1.0 Project Characteristics

#### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

#### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

#### 1.3 User Entered Comments & Non-Default Data

O1-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

O1-25
Cont.

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 83.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.06 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.96 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.66 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

**2.0 Emissions Summary**

O1-25
Cont.

**2.1 Overall Construction (Maximum Daily Emission)**

Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2621 | 46.4460 | 31.4066 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,154.337 7 | 6,154.337 7 | 1.9472 | 0.0000 | 6,203.018 6 |
| 2022 | 4.7996 | 38.8851 | 39.6338 | 0.1195 | 8.8255 | 1.6381 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,035.34 40 | 12,035.34 40 | 1.9482 | 0.0000 | 12,060.60 13 |
| 2023 | 4.3939 | 25.8648 | 37.5031 | 0.1162 | 7.0088 | 0.7568 | 7.7685 | 1.8799 | 0.7142 | 2.5840 | 0.0000 | 11,710.40 80 | 11,710.40 80 | 0.9517 | 0.0000 | 11,734.44 97 |
| 2024 | 237.0656 | 9.5503 | 14.9372 | 0.0238 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,307.051 7 | 2,307.051 7 | 0.7164 | 0.0000 | 2,324.662 7 |
| **Maximum** | **237.0656** | **46.4460** | **39.6338** | **0.1195** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,035.34 40** | **12,035.34 40** | **1.9482** | **0.0000** | **12,060.60 13** |

01-25 Cont.

**2.1 Overall Construction (Maximum Daily Emission)**

Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2621 | 46.4480 | 31.4068 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,154.337 7 | 6,154.337 7 | 1.9472 | 0.0000 | 6,203.018 6 |
| 2022 | 4.7996 | 38.8851 | 39.6338 | 0.1195 | 8.8255 | 1.6381 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,035.34 40 | 12,035.34 40 | 1.9482 | 0.0000 | 12,060.60 13 |
| 2023 | 4.3939 | 25.8648 | 37.5031 | 0.1162 | 7.0088 | 0.7568 | 7.7685 | 1.8799 | 0.7142 | 2.5840 | 0.0000 | 11,710.40 80 | 11,710.40 80 | 0.9517 | 0.0000 | 11,734.44 97 |
| 2024 | 237.0656 | 9.5503 | 14.9372 | 0.0238 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,307.051 7 | 2,307.051 7 | 0.7164 | 0.0000 | 2,324.662 7 |
| **Maximum** | **237.0656** | **46.4480** | **39.6338** | **0.1195** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,035.34 40** | **12,035.34 40** | **1.9482** | **0.0000** | **12,060.60 13** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

01-25 Cont.

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1963 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1963 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

O1-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

O1-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

01-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.944 9** | **3,747.944 9** | **1.0549** | | **3,774.317 4** |

O1-25 Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2689 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0906 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0532 | 0.0346 | 0.3963 | 1.1100e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 110.4707 | 110.4707 | 3.3300e-003 | | 110.5539 |
| **Total** | **0.1835** | **4.1800** | **1.4144** | **0.0128** | **0.3830** | **0.0137** | **0.3948** | **0.1034** | **0.0131** | **0.1165** | | **1,380.3262** | **1,380.3262** | **0.0941** | | **1,382.6791** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

01-25 Cont.

### 3.2 Demolition - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2689 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0906 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0532 | 0.0346 | 0.3963 | 1.1100e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 110.4707 | 110.4707 | 3.3300e-003 | | 110.5539 |
| Total | 0.1835 | 4.1800 | 1.4144 | 0.0128 | 0.3830 | 0.0137 | 0.3948 | 0.1034 | 0.0131 | 0.1165 | | 1,380.3262 | 1,380.3262 | 0.0941 | | 1,382.6791 |

### 3.3 Site Preparation - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |

01-25 Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0838 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |
| **Total** | **0.0838** | **0.0415** | **0.4755** | **1.3300e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **132.5649** | **132.5649** | **3.9900e-003** | | **132.6646** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.656 9** | **3,685.656 9** | **1.1920** | | **3,715.457 3** |

O1-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0838 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |
| **Total** | **0.0838** | **0.0415** | **0.4755** | **1.3300e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **132.5649** | **132.5649** | **3.9900e-003** | | **132.6646** |

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

O1-25 Cont.

**3.4 Grading - 2021**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |
| **Total** | **0.0709** | **0.0462** | **0.5284** | **1.4800e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **147.2943** | **147.2943** | **4.4300e-003** | | **147.4051** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.043 4** | **6,007.043 4** | **1.9428** | | **6,055.613 4** |

01-25 Cont.

**3.4 Grading - 2021**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |
| **Total** | **0.0709** | **0.0462** | **0.5284** | **1.4800e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **147.2943** | **147.2943** | **4.4300e-003** | | **147.4051** |

**3.4 Grading - 2022**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.9248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.9248** | **38.8435** | **29.0415** | **0.0521** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

O1-25 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |
| **Total** | **0.0665** | **0.0416** | **0.4861** | **1.4300e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **142.1207** | **142.1207** | **4.0000e-003** | | **142.2207** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.9248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.9248** | **38.8435** | **29.0415** | **0.0521** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

01-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |
| Total | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7082 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3338 | 2,554.3338 | 0.6120 | | 2,569.6322 |
| Total | 1.7082 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3338 | 2,554.3338 | 0.6120 | | 2,569.6322 |

O1-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.075 0 | 3,789.075 0 | 0.2361 | | 3,795.028 3 |
| Worker | 2.6620 | 1.6677 | 19.4099 | 0.0571 | 6.0932 | 0.0483 | 6.1425 | 1.6183 | 0.0454 | 1.6637 | | 5,691.935 4 | 5,691.935 4 | 0.1602 | | 5,695.940 8 |
| **Total** | **3.0904** | **14.8350** | **23.2704** | **0.0926** | **7.0087** | **0.0749** | **7.0836** | **1.8799** | **0.0699** | **1.9498** | | **9,481.010 4** | **9,481.010 4** | **0.3984** | | **9,490.969 1** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7082 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.333 8 | 2,554.333 8 | 0.6120 | | 2,569.632 2 |
| **Total** | **1.7082** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.333 8** | **2,554.333 8** | **0.6120** | | **2,569.632 2** |

01-25 Cont.

**3.5 Building Construction - 2022**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2361 | | 3,795.0283 |
| Worker | 2.6620 | 1.6677 | 19.4099 | 0.0571 | 6.0932 | 0.0483 | 6.1425 | 1.6183 | 0.0454 | 1.6637 | | 5,691.9354 | 5,691.9354 | 0.1602 | | 5,695.9408 |
| **Total** | **3.0904** | **14.8350** | **23.2704** | **0.0926** | **7.0087** | **0.0749** | **7.0836** | **1.8799** | **0.0699** | **1.9498** | | **9,481.0104** | **9,481.0104** | **0.3984** | | **9,490.9691** |

**3.5 Building Construction - 2023**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

O1-25 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 2.5029 | 1.5073 | 17.8620 | 0.0550 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,483.7974 | 5,483.7974 | 0.1442 | | 5,487.4020 |
| **Total** | **2.8211** | **11.4799** | **21.2391** | **0.0893** | **7.0088** | **0.0601** | **7.0688** | **1.8799** | **0.0557** | **1.9356** | | **9,155.1981** | **9,155.1981** | **0.3538** | | **9,164.0437** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

O1-25 Cont.

### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 2.5029 | 1.5073 | 17.8620 | 0.0550 | 6.0932 | 0.0479 | 6.1411 | 1.6183 | 0.0441 | 1.6624 | | 5,483.7974 | 5,483.7974 | 0.1442 | | 5,487.4020 |
| Total | 2.8211 | 11.4799 | 21.2391 | 0.0893 | 7.0088 | 0.0601 | 7.0688 | 1.8799 | 0.0557 | 1.9356 | | 9,155.1981 | 9,155.1981 | 0.3538 | | 9,164.0437 |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |

01-25 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |
| **Total** | **0.0469** | **0.0282** | **0.3349** | **1.0300e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **102.6928** | **102.6928** | **2.7000e-003** | | **102.7603** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

O1-25 Cont.

**3.6 Paving - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |
| **Total** | **0.0469** | **0.0282** | **0.3349** | **1.0300e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **102.6928** | **102.6928** | **2.7000e-003** | | **102.7603** |

**3.6 Paving - 2024**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

01-25 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0444 | 0.0257 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |
| **Total** | **0.0444** | **0.0257** | **0.3114** | **1.0000e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **99.5045** | **99.5045** | **2.4700e-003** | | **99.5663** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

01-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0444 | 0.0257 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |
| **Total** | **0.0444** | **0.0257** | **0.3114** | **1.0000e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **99.5045** | **99.5045** | **2.4700e-003** | | **99.5663** |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

01-25 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,061.3818 | 1,061.3818 | 0.0264 | | 1,062.0410 |
| **Total** | **0.4734** | **0.2743** | **3.3220** | **0.0107** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,061.3818** | **1,061.3818** | **0.0264** | | **1,062.0410** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

O1-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,061.3818 | 1,061.3818 | 0.0264 | | 1,062.0410 |
| Total | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,061.3818 | 1,061.3818 | 0.0264 | | 1,062.0410 |

O1-25 Cont.

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.5233 | 45.9914 | 110.0422 | 0.4661 | 45.9592 | 0.3373 | 46.2966 | 12.2950 | 0.3132 | 12.6083 | | 47,917.805 | 47,917.805 | 2.1953 | | 47,972.6839 |
| Unmitigated | 9.5233 | 45.9914 | 110.0422 | 0.4661 | 45.9592 | 0.3373 | 46.2966 | 12.2950 | 0.3132 | 12.6083 | | 47,917.805 | 47,917.805 | 2.1953 | | 47,972.6839 |

01-25 Cont.

**4.2 Trip Summary Information**

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

**4.3 Trip Type Information**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 46.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

O1-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

O1-25
Cont.

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**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.8682 | 131.8682 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22758.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.8342 | 2,677.8342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4956 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

01-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6682 | 131.6682 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.8342 | 2,677.8342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.78972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4956 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 596.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

01-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3460 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

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Cont.

**6.2 Area by SubCategory**

Mitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2070 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| Total | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

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**7.0 Water Detail**

**7.1 Mitigation Measures Water**

**8.0 Waste Detail**

**8.1 Mitigation Measures Waste**

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**10.0 Stationary Equipment**

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

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Cont.

Attachment C

| Local Hire Provision Net Change | |
|---|---|
| **Without Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,623 |
| Amortized (MT CO2e/year) | 120.77 |
| **With Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,024 |
| Amortized (MT CO2e/year) | 100.80 |
| ***% Decrease in Construction-related GHG Emissions*** | ***17%*** |

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**EXHIBIT B**

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

SOIL WATER AIR PROTECTION ENTERPRISE
2656 29th Street, Suite 201
Santa Monica, California 90405
Attn: Paul Rosenfeld, Ph.D.
Mobil: (310) 795-2335
Office: (310) 452-5555
Fax: (310) 452-5550
Email: prosenfeld@swape.com

## *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**Risk Assessment & Remediation Specialist**

## Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

## Professional Experience

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Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from unconventional oil drilling operations, oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, and many other industrial and agricultural sources. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at dozens of sites and has testified as an expert witness on more than ten cases involving exposure to air contaminants from industrial sources.

## Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex $H_2O$ Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

## Publications:

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P.**, (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

**Rosenfeld, P.E.** & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences.* 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health.* 73(6), 34-46.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry*. Amsterdam: Elsevier Publishing.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution,* 123 (17), 319-327.

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Cont.

Tam L. K., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

**Rosenfeld, P.E.,** J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

**Rosenfeld, P. E.,** M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities*. Boston Massachusetts: Elsevier Publishing.

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

**Rosenfeld P. E.,** J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004*. New Orleans, October 2-6, 2004.

**Rosenfeld, P.E.,** and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49( 9), 171-178.

**Rosenfeld, P. E.**, Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

**Rosenfeld, P.E.,** Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

**Rosenfeld, P.E.**, and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

**Rosenfeld, P.E.,** and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality*. 29, 1662-1668.

**Rosenfeld, P.E.,** C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

**Rosenfeld, P.E.,** and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

**Rosenfeld, P.E.,** and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

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Cont.

Chollack, T. and **P. Rosenfeld. (**1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

**Rosenfeld, P. E.** (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

**Rosenfeld, P. E.** (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

**Rosenfeld, P. E. (**1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

**Rosenfeld, P. E.** (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

**Rosenfeld, P. E. (**1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

## Presentations:

**Rosenfeld, P.E.,** Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society*. Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

**Rosenfeld, P.E**. (April 19-23, 2009). Perfluorooctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

**Rosenfeld, P.E.** (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

**Rosenfeld, P. E.** (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

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Cont.

**Rosenfeld, P. E.** (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld P. E.** (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

**Rosenfeld P. E.** (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting*. Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition*. Lecture conducted from Boston Massachusetts.

**Paul Rosenfeld Ph.D**. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference*. Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel in Irvine, California.

**Paul Rosenfeld Ph.D**. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference*. Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

**Paul Rosenfeld Ph.D**. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

**Paul Rosenfeld, Ph.D.** (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

01-26
Cont.

**Paul Rosenfeld, Ph.D.** (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association.* Lecture conducted from Radison Hotel, Sacramento, California.

**Rosenfeld, P. E.**, Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

**Paul Rosenfeld, Ph.D.** (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum.* Lecture conducted from Marriott Hotel, Anaheim California.

**Paul Rosenfeld, Ph.D**. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E.** and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association.* Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association.* Lecture conducted from Vancouver Washington..

**Rosenfeld, P.E**. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conference.* Lecture conducted from Indianapolis, Maryland.

**Rosenfeld. P.E.** (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

**Rosenfeld. P.E. (**October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

**Rosenfeld, P.E. (**2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association.* Lecture conducted from Sacramento California.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings.* Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America.* Lecture conducted from Salt Lake City Utah.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

**Rosenfeld, P.E.**, C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

01-26
Cont.

**Rosenfeld, P.E.,** C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

## Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

## Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993



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Cont.

**Deposition and/or Trial Testimony:**

In the United States District Court For The District of New Jersey
Duarte et al, *Plaintiffs*, vs. United States Metals Refining Company et. al. *Defendant.*
Case No.: 2:17-cv-01624-ES-SCM
Rosenfeld Deposition. 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk, *Plaintiffs*, vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" *Defendant.*
Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No.: No. BC615636
Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No.: No. BC646857
Rosenfeld Deposition, 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiff vs. The 3M Company et al., Defendants
Case: No 1:16-cv-02531-RBJ
Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No 1923
Rosenfeld Deposition, 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No C12-01481
Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 8-23-2017

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No.: LC102019 (c/w BC582154)
Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., *Plaintiffs*, vs. Meritor Inc., et al., *Defendants*
Case Number: 4:16-cv-52-DMB-JVM
Rosenfeld Deposition: July 2017

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In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No.: No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial, March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No.: RG14711115
Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No.: LALA002187
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Jerry Dovico, et al., Plaintiffs vs. Valley View Sine LLC, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Doug Pauls, et al.,, et al., Plaintiffs vs. Richard Warren, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action N0. 14-C-30000
Rosenfeld Deposition, June 2015

In The Third Judicial District County of Dona Ana, New Mexico
Betty Gonzalez, et al. Plaintiffs vs. Del Oro Dairy, Del Oro Real Estate LLC, Jerry Settles and Deward DeRuyter, Defendants
Rosenfeld Deposition: July 2015

In The Iowa District Court For Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No 4980
Rosenfeld Deposition: May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case Number CACE07030358 (26)
Rosenfeld Deposition: December 2014

In the United States District Court Western District of Oklahoma
Tommy McCarty, et al., Plaintiffs, v. Oklahoma City Landfill, LLC d/b/a Southeast Oklahoma City Landfill, et al. Defendants.
Case No. 5:12-cv-01152-C
Rosenfeld Deposition: July 2014

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In the County Court of Dallas County Texas
Lisa Parr et al, *Plaintiff*, vs. Aruba et al, *Defendant*.
Case Number cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial: April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., *Plaintiffs*, vs. Republic Services, Inc., et al., *Defendants*
Case Number: 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition: October 2012

In the United States District Court of Southern District of Texas Galveston Division
Kyle Cannon, Eugene Donovan, Genaro Ramirez, Carol Sassler, and Harvey Walton, each Individually and on behalf of those similarly situated, *Plaintiffs*, vs. BP Products North America, Inc., *Defendant*.
Case 3:10-cv-00622
Rosenfeld Deposition: February 2012
Rosenfeld Trial: April 2013

In the Circuit Court of Baltimore County Maryland
Philip E. Cvach, II et al., *Plaintiffs* vs. Two Farms, Inc. d/b/a Royal Farms, Defendants
Case Number: 03-C-12-012487 OT
Rosenfeld Deposition: September 2013

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**EXHIBIT C**

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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**Matthew F. Hagemann, P.G., C.Hg., QSD, QSP**

**Geologic and Hydrogeologic Characterization**
**Industrial Stormwater Compliance**
**Investigation and Remediation Strategies**
**Litigation Support and Testifying Expert**
**CEQA Review**

**Education:**

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

**Professional Certifications:**

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

**Professional Experience:**

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2014;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 – 2003);

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- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

**Senior Regulatory and Litigation Support Analyst:**

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 100 environmental impact reports since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, Valley Fever, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Manager of a project to provide technical assistance to a community adjacent to a former Naval shipyard under a grant from the U.S. EPA.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.



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- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.

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- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

**Executive Director:**

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

**Hydrogeology:**

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.



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- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

**Policy:**

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

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**Geology:**

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

**Teaching:**

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt taught physical geology (lecture and lab and introductory geology at Golden West College in Huntington Beach, California from 2010 to 2014.

**Invited Testimony, Reports, Papers and Presentations:**

**Hagemann, M.F.**, 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

**Hagemann, M.F.**, 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

**Hagemann, M.F.**, 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

**Hagemann, M.F.**, 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

**Hagemann, M.F.**, 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

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Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

**Hagemann, M.F.**, 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

**Hagemann, M.F.**, 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

**Hagemann, M.F.**, 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

**Hagemann, M.F.**, 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

**Hagemann, M.F.**, 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

**Hagemann, M.F.**, 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

**Hagemann, M.F.**, 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.



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**Hagemann, M.F.**, 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

**Hagemann, M.F.**, 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

**Hagemann, M.F.**, and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F.** 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

**Hagemann, M.F.**, 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

**Hagemann, M.F.**, 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

**Hagemann, M.F.**, and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

**Hagemann, M.F.**, Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

**Hagemann, M. F.**, Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

**Hagemann, M.F.**, 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

**Hagemann, M.F.** and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

**Hagemann, M.F.**, 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

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**Hagemann, M.F.**, 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

**Other Experience:**

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.

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**EXHIBIT D**

FTA

FEDERAL TRANSIT ADMINISTRATION

# Transit Noise and Vibration Impact Assessment Manual

SEPTEMBER 2018

FTA Report No. 0123
Federal Transit Administration

PREPARED BY
John A. Volpe National Transportation Systems Center



U.S. Department of Transportation
Federal Transit Administration

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*Courtesy of Edwin Adilson Rodriguez, Federal Transit Administration*

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# Transit Noise and Vibration Impact Assessment Manual

SEPTEMBER 2018
FTA Report No. 0123

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U.S. Department of Transportation
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Washington, DC 20590

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## Metric Conversion Table

| SYMBOL | WHEN YOU KNOW | MULTIPLY BY | TO FIND | SYMBOL |
|---|---|---|---|---|
| | | **LENGTH** | | |
| **in** | inches | 25.4 | millimeters | mm |
| **ft** | feet | 0.305 | meters | m |
| **yd** | yards | 0.914 | meters | m |
| **mi** | miles | 1.61 | kilometers | km |
| | | **VOLUME** | | |
| **fl oz** | fluid ounces | 29.57 | milliliters | mL |
| **gal** | gallons | 3.785 | liters | L |
| **$ft^3$** | cubic feet | 0.028 | cubic meters | $m^3$ |
| **$yd^3$** | cubic yards | 0.765 | cubic meters | $m^3$ |
| | | NOTE: volumes greater than 1000 L shall be shown in $m^3$ | | |
| | | **MASS** | | |
| **oz** | ounces | 28.35 | grams | g |
| **lb** | pounds | 0.454 | kilograms | kg |
| **T** | short tons (2000 lb) | 0.907 | megagrams (or "metric ton") | Mg (or "t") |
| | | **TEMPERATURE (exact degrees)** | | |
| **°F** | Fahrenheit | 5 (F-32)/9 or (F-32)/1.8 | Celsius | °C |

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**13. SUPPLEMENTARY NOTES**

**14. ABSTRACT**
This report is the third edition of a guidance manual originally issued in 1995. It includes clarifications to existing policy and updates to outdated references where applicable. Topics presented in this manual include procedures for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. Additional topics include descriptions of noise and vibration mitigation measures, construction noise and vibration, and how to present these analyses in the Federal Transit Administration's environmental documents. This guidance is for technical specialists who conduct the analyses, as well as project sponsor staff, Federal agency reviewers, and members of the general public who may be affected by the projects.

**15. SUBJECT TERMS**
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## Abstract

This report is the third edition of a guidance manual originally issued in 1995. It includes clarifications to existing policy and updates to outdated references where applicable. Topics presented in this manual include procedures for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. Additional topics include descriptions of noise and vibration mitigation measures, construction noise and vibration, and how to present these analyses in the Federal Transit Administration's environmental documents. This guidance is for technical specialists who conduct the analyses, as well as project sponsor staff, Federal agency reviewers, and members of the general public who may be affected by the projects.

## Acknowledgments

The original 1995 version of this manual was developed by the firm Harris Miller Miller & Hanson Inc. (HMMH) and peer-reviewed by a group of specialists in the fields of acoustics and environmental planning and analysis. HMMH updated the original manual in 2006.

The updates for this current version were provided by the John A. Volpe National Transportation Systems Center, Cross Spectrum Acoustics, and FTA, and it was peer-reviewed by a panel of experts.

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SECTION 1

# Introduction

## 1.1 Purpose

The Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of the National Environmental Policy Act of 1969 (NEPA)[1,2] require that a federally-funded project be assessed for its impact on the human and natural environment prior to implementation. The Federal Transit Administration (FTA), in conjunction with the Federal Highway Administration (FHWA), has issued detailed regulations implementing NEPA for transit and highway projects. The regulations are codified in part 771 of title 23, Code of Federal Regulations, and are titled "Environmental Impact and Related Procedures." (23 CFR part 771).[3]

The Federal Transit Administration (FTA) provides financial assistance for a range of public transportation projects from new rail rapid transit (RRT) systems to bus maintenance facilities and vehicle purchases. As required by NEPA and its implementing regulations, each project must undergo environmental review.

Noise and vibration are sometimes among the major concerns regarding the effects of a transit project on the surrounding community and are key elements of the environmental impact assessment process for public transportation projects. A transit system is often placed near population centers by necessity and may cause noise and vibration at nearby residences and other sensitive types of land use.

This manual provides technical guidance for conducting noise and vibration analyses for transit projects, as well as direction regarding preparation of the information for FTA's environmental documents. Some situations may not be explicitly covered in this manual; the exercise of professional judgment may be required to extend the basic methods in these cases and frequent consultation with FTA staff is important to ensure the methods used meet the requirements for environmental reviews. See Appendix G for information on using non-standard modeling procedures.

In general, the noise and vibration impact assessment process for projects includes the following steps:

1. Determine appropriate impact criteria (Section 4.1).
2. Conduct screening and determine appropriate level of noise analysis, analyze project noise impacts, and evaluate mitigation options if appropriate (Sections 4.2–4.5).
3. Determine appropriate level of vibration analysis, analyze project vibration impacts, and evaluate mitigation options if appropriate (Sections 6.1–6.5).
4. Analyze construction noise and vibration impacts (Section 7).
5. Document findings (Section 8).

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## 1.2 Organization of the Manual

This guidance manual is organized by the following recommended analysis workflow. A glossary of terms used throughout this manual is available in Appendix A. Detailed information on the fundamentals of noise, noise impact criteria, clustering receivers, determining existing noise, computing source levels from measurements, and using non-standard methodology is available in the appendices.

**Section 2: Project Class of Action and Planning** – This section describes the first step in the analysis process that is applicable to both noise and vibration analyses.

**Section 3: Transit Noise** – This section provides the reader with background information specific to transit noise.

**Section 4: Noise Impact Analysis** – This section provides a general outline of the entire noise impact analysis process: guidelines on determining noise impact criteria, methods for choosing the appropriate level of noise analysis ("Screening," "General," or "Detailed"), steps for evaluating noise impacts with the Noise Screening Procedure (a simplified method of evaluating the potential for noise impact from transit projects), steps for evaluating noise impact with the General Noise Assessment procedure (a simplified assessment method to estimate noise impact and compare alternatives for transit projects), and steps for evaluating noise impact with the Detailed Noise Analysis procedure (a comprehensive assessment method to produce the most accurate estimates of noise impact intended for certain major public transportation projects).

**Section 5: Transit Vibration** – This section contains background information specific to transit vibration.

**Section 6: Vibration Impact Analysis –** This section provides a general outline of the entire vibration impact analysis process: guidelines on determining vibration impact criteria, methods for choosing the appropriate level of vibration analysis ("Screening," "General," or "Detailed"), steps for evaluating vibration impact with the vibration screening procedure (a simplified method of evaluating the potential for vibration impact from transit projects), steps for evaluating vibration impact with the general vibration assessment procedure (a simplified assessment method to estimate vibration impact and compare alternatives for transit projects), and steps for evaluating vibration impact with the detailed vibration analysis procedure (a comprehensive assessment method to produce the most accurate estimates of vibration impact intended for certain major public transportation projects).

**Section 7: Noise and Vibration During Construction** – This section presents the process of assessing noise and vibration impact during construction, including determination of level of assessment, source levels, impact criteria, and mitigation.

**Section 8: Documentation of Noise and Vibration Assessment** – This section includes guidance for documenting the noise and vibration assessment in technical reports and environmental documents.



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SECTION 2

# Project Class of Action and Planning

The level of environmental analysis and review depends on the significance of any potential associated environmental impacts, which in turn depends in part on the scope and complexity of the proposed project. The goals of a transit noise and vibration impact assessment are to:

1. Determine existing noise and vibration levels.
2. Assess project noise and vibration for potential impact.
3. Evaluate the effect of mitigation options on impacts.

The class of action determination will inform the required level of analysis. The FTA Regional office[1] determines the class of action based on project information provided by the project sponsor. The following types of information can assist the FTA Regional office in an initial class of action determination for a project:

- Project description
- Project-specific graphics, including:
  - Project location/sizes
  - Known land use and environmental features
- Additional information, as appropriate:
  - Summary of prior planning
  - Draft purpose and need statement

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Project classes of action are described in Section 2.1. Project planning and development guidelines are presented in Section 2.2.

## 2.1 Project Class of Action

FTA's environmental regulations classify projects by level of environmental analysis. The class of action will determine the appropriate level of analysis and documentation for a project. Details of each class are described in the following sections. For more information, review FTA's environmental impact and related procedures at 23 CFR part 771.

**Environmental Impact Statements**

Environmental impact statements (EISs) apply to projects that are expected to cause significant environmental effects in the NEPA context. Typical examples include new or extensions of fixed-guideway projects, such as heavy rail, light rail, commuter rail, and automated guideway transit (AGT) systems that are not located within existing transportation right-of-way (ROW). It is likely that for major infrastructure projects requiring an EIS, the most detailed treatment of noise and vibration impacts will often be required.

**Categorical Exclusions**

Categorical exclusions (CEs) cover actions that are excluded from requiring an EIS or environmental assessment (EA) because FTA has determined that they do

[1] http://www.fta.dot.gov/12926.html.

not routinely cause significant environmental impacts. FTA's CEs are located at 23 CFR §§ 771.118(c) and (d), commonly referred to as the c-list and d-list, respectively. Examples of projects that would normally be CEs include vehicle purchases, maintenance of equipment, vehicles, or facilities, and ROW acquisition.
In general, CEs for transit capital construction projects often require at least a screening of noise impacts.

**Environmental Assessments**
When a proposed project is presented to FTA and it is uncertain whether the project requires an EIS or qualifies for a CE, FTA will normally direct the project sponsor to prepare an environmental assessment (EA) to assist in making the determination. An EA may be prepared for any type of project if uncertainty exists about the magnitude or extent of the impacts. Generally, an EA is selected over a CE if FTA determines that several types of potential impacts require further investigation, for example, air quality, noise, wetlands, historic sites, and/or traffic, but FTA's environmental regulation does not list typical projects that require EAs.
Experience shows that most of the EAs prepared for transit projects require at least a general assessment of noise impacts.

## 2.2 Project Planning and Development

Capital transit projects are ordinarily developed initially from a comprehensive transportation planning process conducted in metropolitan areas (see 23 CFR § 450.300).[4] The metropolitan planning process often includes some early consideration of social, economic, and environmental effects of proposed major infrastructure improvements. At this stage, environmental effects are usually considered on a broad scale—for example, overall development patterns, impacts on green space, and regional air quality. Noise and vibration assessments are not typically performed at this stage because the proposed infrastructure improvements lack the necessary detail.

Once the need for a capital transit project in a corridor is established in the metropolitan transportation plan, the transit mode and general alignment best suited for the corridor are identified. The Screening and General noise assessment procedures and the vibration screening procedure described in this manual may be used to compare noise and vibration effects among different transit modes and alignments at an early stage of the project planning. The analysis that results is documented through the environmental review process.

NEPA establishes a broad policy regarding mitigation as a means of accomplishing its environmental objectives. Other Federal laws, such as Section 4(f) (49 U.S.C. 303) and Section 404 (33 U.S.C. 1344), have explicit mitigation requirements for certain resources. The decision to include noise or vibration mitigation for a project is made by FTA and the project sponsor after public review of the environmental document, as appropriate. If mitigation measures are deemed necessary to protect the environment or to satisfy statutory requirements, they will be incorporated as an integral part of the project and subsequent grant documents will reference these measures as contractual obligations on the part of the project sponsor. Through that process, FTA



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ensures that the project sponsor complies with all design and mitigation commitments contained in the environmental record.

Once the project enters construction, noise or vibration may need to be reassessed in some circumstances. Some large construction projects in densely populated residential areas may require noise monitoring to ensure agreed-upon noise limits are not exceeded. Vibration testing may be needed in the final stages of construction to determine whether vibration control measures have the predicted effect.

Considering that transit projects must be located amid or very close to concentrations of people, noise and vibration impacts can be a concern throughout the environmental review process, design, and construction phases. This manual offers the flexibility to address noise and vibration at different stages in the development of a project and in different levels of detail.

## 2.3 Mitigation Policy Considerations

Because noise is frequently among the greatest environmental concerns of planned transit projects, FTA and the project sponsor should make reasonable efforts to reduce predicted noise to levels considered acceptable for affected noise-sensitive land uses. The need for noise mitigation is determined based on the magnitude of impact and consideration of factors specifically related to the proposed project and affected land uses.

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The goal of providing noise mitigation is to gain substantial noise reduction, not simply to reduce the predicted levels to just below the "severe" impact threshold. For FTA to determine whether the mitigation is reasonable, the evaluation of specific mitigation measures should include the noise reduction potential, the cost, the effect on transit operations and maintenance, and any other relevant factors, such as any new environmental impacts that may be caused by the implementation of a noise reduction measure. A thorough evaluation enables FTA to make the findings required by NEPA and other statutes, such as Section 4(f) or Section 106 requirements and their implementing regulations.

Severe impacts have the greatest adverse impact on the community, and mitigation should be strongly considered. Areas with "moderate" impacts also have potential for effects on the community and therefore should also include consideration and possible adoption of mitigation measures when considered reasonable.

Since reasonableness is not strictly defined, FTA recommends that project sponsors work with the affected public and FTA staff during the environmental review process to decide appropriate mitigation strategies. A project sponsor may also consider developing and formally adopting a mitigation policy to aid in the determination of appropriate and applicable mitigation measures for current and proposed projects and anticipated impacts. Having such a policy in place can aid in the project planning up front and help to expedite mitigation decisions.

The following considerations can assist in determining circumstances that trigger the need for mitigation and include examples of how they can be applied in a noise mitigation policy:

- **Number of Noise-Sensitive Sites Affected**
  A row or cluster of residences adjacent to a rail transit line establishes a greater need for mitigation than one or several isolated residences in a mixed-use area. Single residences may not be able to meet a cost-effectiveness criterion for mitigation.

  ***Example Mitigation Policy Consideration:*** Set a minimum number of noise-sensitive sites as a threshold, combined with a reference to a cost-effectiveness criterion.

- **Increase over Existing Noise Levels**
  Since the noise impact criteria are delineated as bands or ranges, project noise can vary 5 to 7 decibels (dB) within the band of moderate impact at any specific ambient noise level. If the project and ambient noise plot falls just below the severe range, the need for mitigation is strongest for a moderate impact. Similarly, if the plot falls within the moderate range just above the no impact threshold, the impacts are expected to be less, so the justification for mitigation would not be as strong.

  ***Example Mitigation Policy Consideration:*** Set a strong need for mitigation when a moderate impact is 2 dB (for example) over the no impact threshold.

- **Noise Sensitivity of the Property**
  Section 4.1 includes a comprehensive list of noise-sensitive land uses, yet there can be differences in noise sensitivity depending on individual circumstances. For example, parks and recreational areas vary in their sensitivity depending on the type of use they experience (active vs. passive recreation) and the settings in which they are located.

  ***Example Mitigation Policy Consideration:*** Cite the use of the property as a determination of sensitivity for parks and recreational areas.

- **Effectiveness of the Mitigation Measure(s)**
  Determine the magnitude of the noise reduction that can be achieved, and consider whether there are conditions that limit effectiveness, such as noise barrier effectiveness for a multi-story apartment building.

  ***Example Mitigation Policy Consideration:*** Set a minimum reduction in noise level to be considered effective. A 5-dB reduction is typically considered an effective reduction from mitigation.

- **Feasibility of the Mitigation Measure(s)**
  Determine if the mitigation measure is feasible from an engineering, operations or safety perspective. In some cases, it may not be possible to construct mitigation (noise barriers) due to physical or structural limitations



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or because of safety concerns, especially related to sight lines for pedestrians and vehicles.

***Example Mitigation Policy Consideration:*** State that the engineering design of the mitigation must be feasible, that it must be implementable in light of operations, and that mitigation must not compromise safety.

- **Fairness and Equity of the Mitigation Measure(s)**
  Ensure that mitigation measures are applied in a fair and equitable manner. In many cases, small differences in distances or operations can result in small differences in projected noise levels. For example, all the residences in a row could have a projected moderate impact except for one residence at the end of the row that falls just under the moderate criteria due to being set slightly further back from the alignment. In a case like this, mitigation should be applied for the entire row of residences if possible.

  ***Example Mitigation Policy Consideration:*** State that mitigation should be applied equitably.

- **Existing Transportation Noise**
  Neighborhoods with ambient noise levels already heavily influenced by transportation noise, especially the same type of noise source as the project, should be considered. Often adding a new similar noise source will not add to the ambient noise levels or only slightly increase it to within acceptable levels. Whereas, impacts would be more likely, if the new noise was added to a neighborhood with minimal transportation noise. However, it is important to note that per (Section 4.1, Step 3) the higher the existing noise, the lower the allowable noise increase from new sources. A new cumulative noise environment may be very objectionable because people will not be compartmentalizing the existing noise versus the new noise and reacting only to the new noise. In this circumstance, impacts predicted in the moderate range could be treated as if they were severe.

  ***Example Mitigation Policy Consideration:*** Set a policy that moderate impacts under these circumstances be treated as severe and cite the potential for reducing noise from existing transportation noise, as well as from project noise.

- **Community Views**
  This manual provides the methodology to make an objective assessment of the need for noise mitigation. However, the views of the community should be considered where there are potential noise impacts predicted through this manual. The NEPA compliance process provides the framework for hearing the community's concerns about a proposed project and then making a good-faith effort to address those concerns. Many projects can be expected to have projected noise levels within the moderate impact range and, where possible, decisions regarding mitigation should be made after considering input from the affected public, relevant government agencies, and community organizations. There have been cases where the solution to the noise problem, a noise barrier, was not preferable to community members because of perceived adverse visual effects.



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***Example Mitigation Policy Consideration:*** State that community input in determining the need for mitigation will be included whenever possible.

- **Implementation Cost**
  Cost is an important consideration in reaching decisions about noise mitigation measures. One guideline for gauging the reasonableness of the cost of mitigation is the state DOT's procedures on the subject. Many states have established their own cost threshold per benefited residence for determining whether installation of noise barriers for noise reduction is a reasonable expenditure. Several airport authorities have placed limits on the costs they will incur for sound insulation per residence for homes, and FTA assesses cost in a similar manner by benefited residence. Higher costs may be justified depending on the specific set of circumstances of a project.

  ***Example Mitigation Policy Consideration:*** State the adopted cost threshold per benefited receiver for typical circumstances.

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SECTION 3

# Transit Noise

This section presents the basic concepts of transit noise as background for computation methods and transit noise assessment procedures presented in Section 4. An overview of fundamental noise topics, including amplitude, frequency, time pattern, and decibel addition, is presented in Appendix B.

The Source-Path-Receiver framework for noise illustrated in Figure 3-1 is central to all environmental noise studies. Each transit source generates noise that depends upon the type of source and its operating characteristics. Along the propagation path, between all sources and receivers, noise levels can be reduced (attenuated) by distance depending on ground type, intervening obstacles, and other factors. Finally, noise combines from multiple sources at each receiver and potentially interferes with activities at that location.

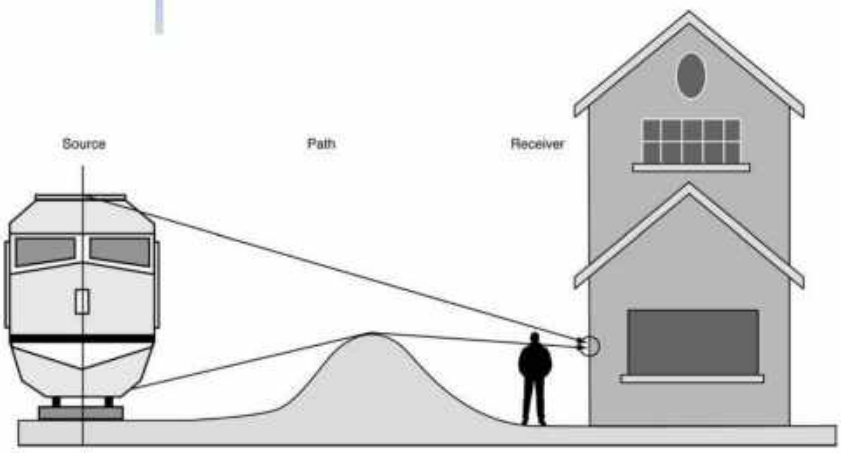


**Figure 3-1 Source-Path-Receiver Framework**

This section contains the following:

- Section 3.1 presents the noise metrics used in this manual.
- Section 3.2 provides an overview of transit noise sources, including a listing of major sources and a discussion of noise-generation mechanisms.
- Section 3.3 provides an overview of noise paths, including a discussion of the various attenuating mechanisms on the path between source and receiver.
- Section 3.4 provides an overview of receiver response to transit noise, including a discussion of the technical background for transit noise criteria and the distinction between absolute and relative noise impact.



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## 3.1 Noise Metrics

This manual uses the noise metrics outlined in Table 3-1 for transit noise measurements, computations, and assessment. The terminology is consistent with common usage in the United States. All of these noise metrics are expressed in units of A-weighted decibels (dBA). A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This is the basic noise unit for transit noise analyses.

**Table 3-1 Noise Metrics**

| Metric | Abbreviation | Definition |
|---|---|---|
| A-weighted Sound Level | dBA | A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This is expressed as A-weighted decibels (dBA), the basic noise unit for transit noise analyses. |
| Sound Exposure Level | SEL | SEL is the cumulative noise exposure from a single noise event, normalized to one second. SEL contains the same overall sound energy as the actual varying sound energy during the event. It is the primary metric for the measurement of transit vehicle noise emissions, and is an intermediate metric in the measurement and calculation of both $L_{eq(t)}$ and $L_{dn}$. |
| Equivalent Sound Level | $L_{eq(t)}$ | The equivalent sound level $L_{eq(t)}$ describes a receiver's cumulative noise exposure from all events normalized to a specified period of time "t". $L_{eq(t)}$ represents a hypothetical, constant sound level and contains the same overall sound energy as the actual varying sound energy during the time period "t". For transit noise impact assessments, the equivalent sound level metric is A-weighted and all events are normalized over a one-hour time period, $L_{eq(1 hr)}$. For transit noise assessments, this metric is appropriate for non-residential land uses and is computed for the loudest hour of project related activity during hours of noise sensitivity. |
| Day-Night Sound Level | $L_{dn}$ | $L_{dn}$ describes a receiver's cumulative noise exposure from all events over 24 hours. Events between 10 p.m. and 7 a.m. are increased by 10 dB to account for humans' greater nighttime sensitivity to noise. $L_{dn}$ is used to assess transit noise for residential land uses. |
| Maximum Sound Level | $L_{max}$ | The maximum level describes the maximum noise level reached during a single noise event. For transit noise impact assessments, it is appropriate to consider the A-weighted maximum level ($L_{max}$) to understand the full context of the scenario. It is not appropriate to use this metric for transit noise impact assessments. This metric is commonly used in vehicle noise specifications and commonly measured for individual vehicles. |

The noise metrics, including their application to transit noise and vibration impact assessment, are described in more detail in Appendix B.1.4. Mathematical definitions and graphic illustrations are presented to facilitate understanding and the interrelationships among metrics.

## 3.2 Sources of Transit Vehicle Noise

This section discusses major characteristics of the sources of transit noise. Transit noise can be generated by transit vehicles in motion, stationary transit



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vehicles, and fixed-transit facilities. Procedures for computing nearby noise levels for major sources as a function of operating parameters such as vehicle speed are given in Sections 4.4 and 4.5.

**Transit Vehicles in Motion**

Transit vehicles most noticeably create noise when in motion. Noise from transit vehicles in motion can come from multiple sources, including the propulsion unit (i.e., the engine and engine components), the interaction of the wheels and/or tires and the running surface, and warning bells and horns.

Vehicle propulsion units generate:

- Whine from electric control systems and traction motors that propel rapid transit cars
- Diesel-engine exhaust noise from both diesel-electric locomotives and transit buses
- Air-turbulence noise generated by cooling fans
- Gear noise

Noise is also generated by the interaction of wheels and/or tires with their running surfaces. Tire noise from rubber-tired vehicles is generated at normal operating speeds. The interaction of steel wheels and rails generates:

- Rolling noise due to continuous rolling contact
- Impact noise when a wheel encounters a discontinuity in the running surface such as a rail joint, turnout or crossover (where the train or rail vehicle switches off one track and onto another)
- Impact noise from the wheel and running surface if the wheel is not completely round (wheel flat) or if the running surface is not completely flat
- Squeal generated by friction between wheels and rail on tight curves

Transit vehicles are equipped with horns and bells for use in emergency situations and as a general audible warning to track workers and trespassers within the ROW, pedestrians, and motor vehicles at highway grade crossings. Horns and bells on the moving transit vehicle combined with stationary bells at-grade crossings can generate high noise levels for nearby residents and are often sources of complaints.

For many noise sources, such as transit vehicles, the sound level is dependent on the speed of the noise source. In other cases, such as for stationary sources or horns mounted on vehicles, the sound level is not dependent on speed. Figure 3-2 illustrates sound level dependence on speed for a diesel-powered commuter rail train and an electric-powered transit train assuming all other parameters, such as weight, are equal. Plotted vertically in this figure is a notional indication of the maximum sound level during a passby. Speed dependence is strong for electric-powered transit trains because wheel/rail noise is the dominant noise source and noise from this type of source increases strongly with speed. Diesel-powered commuter rail train noise is dominated by the locomotive exhaust noise at slower speeds. As speed increases, wheel-rail



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noise becomes the dominant noise source and diesel- and electric-powered trains generate similar noise levels. Similarly, speed dependence is also strong for automobiles, city buses (two-axle), and non-accelerating highway buses (three-axle), because tire/pavement noise is the dominant noise source for these vehicles. Accelerating highway bus noise is dominated by exhaust noise.

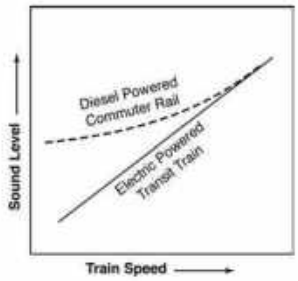


**Figure 3-2 Sound Level Dependence on Speed**

Sound levels close to the source are also dependent on vehicle acceleration, vehicle length, running surface type, and running surface condition. For high-speed rail vehicles (vehicles with an operating speed of 90–250 mph are typically beyond the scope of this manual), air turbulence can also be a source of noise. In addition, for an elevated structure, the guideway can radiate noise as it vibrates in response to the dynamic loading of the moving vehicle.

**Stationary Transit Vehicles**

Noise can be generated by transit vehicles even when they are stationary. For example, auxiliary equipment such as cooling fans on motors, radiator fans, plus hydraulic, pneumatic, and air-conditioning pumps, often continue to run when vehicles are stationary. Transit buses are also often left idling in stations or storage yards.

**Fixed-transit Facilities**

Noise can also be generated by sources at fixed-transit facilities. Such sources include ventilation fans in transit stations, subway tunnels, and electric power substations, as well as equipment in chiller plants, and many activities within maintenance facilities and shops.

**Common Noise Sources**

Table 3-2 summarizes common sources of transit noise by vehicle and facility type.

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**Table 3-2 Sources of Transit Noise**

| Vehicle or Facility* | Dominant Components | Comments |
|---|---|---|
| RRT or Light Rail Transit (LRT) on exclusive ROW | Wheel/rail interaction and guideway amplification | Depends on condition of wheels and rails |
| | Propulsion system | When accelerating and at higher speeds |
| | Brakes | When stopping |
| | Auxiliary equipment | When stopped |
| | Wheel squeal | On tight curves |
| | *In general* | Noise increases with speed and train length |
| LRT in Mixed Traffic | Wheel squeal | On tight curves |
| | Auxiliary equipment | When stopped |
| | Horns and crossing bells | At-grade crossings and stations |
| | *In general* | Traveling at lower speeds in mixed traffic produces less noise than when traveling at higher speeds in exclusive ROW |
| Commuter Rail | Diesel exhaust | On diesel-hauled trains |
| | Cooling fans | On both diesel and electric-powered trains |
| | Wheel/rail interaction | Depends on condition of wheels and rails |
| | Horns and crossing gate bells | At-grade crossings and stations |
| | *In general* | Noise is usually dominated by locomotives and horns/bells at-grade crossings |
| Low and Intermediate Capacity Transit | Propulsion systems, including speed controllers | At low speeds |
| | Ventilation systems | At low speeds |
| | Tire/guideway interaction | For rubber-tired vehicles, including monorails |
| | Wheel/rail interaction | Depends on condition of wheels and rails |
| | *In general* | Wide range of vehicles: monorail, rubber-tired, steel-wheeled, linear induction. Noise characteristics depend upon type |
| Diesel Buses | Cooling fans | While idling |
| | Engine casing | While idling |
| | Diesel exhaust | At low speeds and while accelerating |
| | Tire/roadway interaction | At moderate and high speeds |
| | *In general* | Includes city buses (generally two-axle) and commuter buses (generally three-axle) |
| Electric Buses and Trackless Trolleys | Tire/roadway interaction | At moderate speeds |
| | Electric traction motors | At moderate speeds |
| | *In general* | Much quieter than diesel buses |
| Bus Storage Yards | Buses starting up | Usually most disruptive in the early morning |
| | Buses accelerating | Usually near entrances/exits and/or locations that require buses to accelerate (tight turns) |
| | Buses idling | Warm-up areas |
| | *In general* | Site specific: often peak periods with considerable noise |
| Rail Transit Storage Yards | Wheel squeal | On tight curves |
| | Wheel impacts | On joints and switches |
| | Wheel rolling noise | On tangent track |
| | Auxiliary equipment | Throughout day and night; includes air-break release noise |
| | Coupling/uncoupling | On storage tracks |
| | Signal horns | Throughout yard site |
| | *In general* | Site specific: often early morning and peak periods with considerable noise |



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| | | |
|---|---|---|
| Maintenance Facilities | Signal horns | Throughout facility |
| | Intercoms | Throughout facility |
| | Impact tools | Shop buildings |
| | Car/bus washers/driers | Wash facility |
| | Vehicle activity | Throughout facility |
| | *In general* | Site specific: considerable activity throughout day and night, some outside. |
| Stations | Automobiles | Patron arrival/departure, especially in early morning |
| | Buses idling | Bus loading zone |
| | Intercoms | Platform area |
| | Locomotive idling | At commuter rail terminal stations |
| | Auxiliary systems | At terminal stations and layover facilities |
| | Horns | At stations, if applicable |
| | *In general* | Site specific, with peak activity periods |
| Subways | Fans | Noise through vent shafts/structures |
| | Buses/trains in tunnels | Noise through vent shafts/structures |
| | *In general* | Noise is not a problem, except in the immediate vicinity of vent shafts/structures. |

† Refer to Appendix A for additional information.

## 3.3 Paths of Transit Noise from Source to Receiver

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Cont.

This section contains a qualitative overview of noise-path characteristics from source to receiver, including attenuation along these paths. Equations for specific noise-level attenuations along source-receiver paths are included in Sections 4.4 and 4.5.

Sound paths from source to receiver are predominantly through the air. Along these paths, sound reduces with distance due to divergence, absorption/diffusion, and shielding. These mechanisms of sound attenuation are discussed below.

**Divergence**

Sound levels naturally attenuate with distance, as shown in Figure 3-3. The plot shows attenuation at the receiver relative to the sound level 50 ft from the source. This type of attenuation is called divergence and is dependent upon source configuration (line or point source) or other source-emission characteristics. Localized sources (point sources) grouped closely together attenuate greatly with distance at a rate of approximately 6 dB per doubling of distance. Examples of point sources include highway grade-crossing signals along rail corridors, intercoms in maintenance yards and other closely grouped sources of noise. Vehicles passing along a track or roadway forming a line are called line sources. Line sources attenuate less than point sources with distance. Rate of attenuation for line sources varies depending on the noise metric. $L_{eq(1hr)}$ and $L_{dn}$ noise levels attenuate at a rate of 3 dB per doubling of distance and $L_{max}$ noise levels attenuate at a rate of 3 to 6 dBs per doubling of distance.

Figure 3-3 illustrates approximate attenuation with distance between the source and receiver for point and line sources. The line source curve for the $L_{max}$ noise

metric separates into three curves because it is dependent on the length of the line source. Equations for the curves in Figure 3-3 are included in Section 4.5.

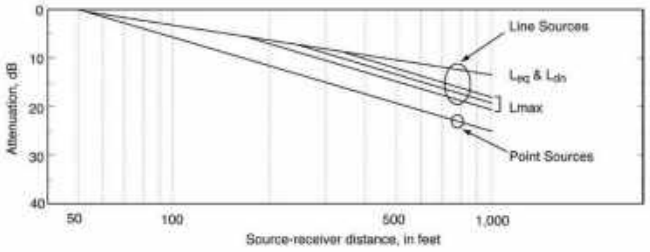


**Figure 3-3 Attenuation Due to Distance (Divergence)**

## Absorption/Diffusion

In addition to distance, sound levels can be attenuated depending on the type of ground between the source and receiver. A portion of the sound energy is absorbed by the ground and only the remaining energy travels to the source. How much energy the ground absorbs is dependent on the ground type (characterized as acoustically "hard" or "soft") and geometry. Example absorptive ground types include freshly-plowed or vegetation-covered ground. Figure 3-4 illustrates approximate attenuation due to ground type by source to receiver path distance and height. Ground attenuation can be as large as 5 dB over a path distance of several hundred ft. At very large distances, wind and temperature gradients could modify the expected ground attenuation. However, these variable atmospheric effects are not included in this manual because they generally occur beyond the range of typical transit-noise impact. Equations for the curves in this figure are included in Section 4.5.

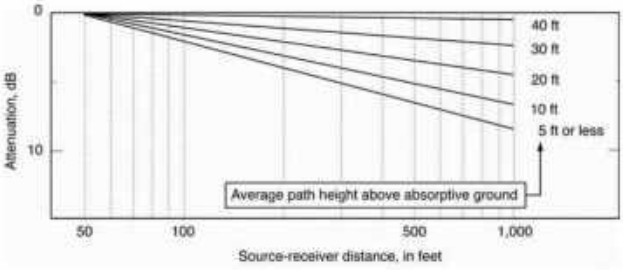


**Figure 3-4 Attenuation due to Soft Ground**

## Shielding

Sound paths are sometimes interrupted by terrain, human-constructed noise barriers, rows of buildings, or other objects. Noise barriers are one of the most effective means of mitigating noise (Section 4.5, Step 7). A noise barrier reduces sound levels at a receiver by breaking the direct line-of-sight between source and receiver with a solid wall (in contrast to vegetation which hides the source from view but does not reduce sound levels substantially over short distances). Sound energy reaches the receiver only by bending (diffracting) over the top of



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the barrier, as shown in Figure 3-5. This diffraction over the barrier reduces the sound level that reaches the receiver. One important consideration in using noise barriers to mitigate noise impacts is safety. Noise barriers, if not designed and sited carefully, can reduce visibility of trains for pedestrians and motorists, leading to less safe conditions. It is important to consult with safety experts when choosing and siting a noise barrier.

Noise barriers for transportation systems are typically used to attenuate noise at the receiver, potentially reducing received sound levels by 5 to 15 dB, depending upon barrier height, length, and distance from both source and receiver. Barriers on structures close to the transportation noise source may provide less attenuation than barriers located farther from the source due to reverberation (multiple reflections) between the barrier and the body of the vehicle or noise source. This reverberation can be offset by increased barrier height and/or acoustical absorption on the source side of the barrier. Further discussion and equations on acoustical absorption and barrier attenuation is provided in Section 4.5.

Source-to-receiver sound paths may not always travel through the air, but rather through the ground or through structural components of the receiver's building. Discussion of such ground-borne and structure-borne propagation is included in Section 5.

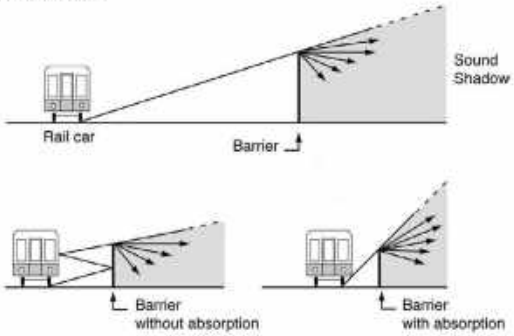


**Figure 3-5 Noise Barrier Geometry**

## 3.4 Receiver Response to Transit Noise

This section contains an overview of human receiver response to noise. It serves as background information for the noise impact criteria in Section 4.1.

Noise can interrupt ongoing activities causing community annoyance, especially in residential areas. In general, most residents become highly annoyed when noise interferes considerably with activities such as sleeping, talking, noise-sensitive work, and audio entertainment. In addition, some land uses, such as outdoor concert pavilions, are inherently incompatible with high noise levels.



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Annoyance from noise has been investigated and approximate dose-response relationships have been quantified by the U.S. Environmental Protection Agency (EPA).[5] The selection of noise metrics in this manual is largely based upon this EPA work. Beginning in the 1970s, the EPA undertook a number of research and synthesis studies relating to community noise of all types. Results of these studies have been widely published, discussed, and refereed by many professionals in acoustics. Basic conclusions of these studies have been adopted by the Federal Interagency Committee on Noise (FICON),[10] the U.S. Department of Housing and Urban Development (HUD), the American National Standards Institute, and even internationally[6][7][8][9]. Conclusions from this seminal EPA work remain scientifically relevant today.

Figure 3-6 contains a synthesis of actual case studies of community reaction to newly introduced sources of noise in a residential urban neighborhood.[10] Plotted horizontally in the figure is the increase in noise from new sources above existing noise levels expressed as Day-Night Sound Levels, $L_{dn}$, discussed in Appendix B.1.4.5. Plotted vertically is the community reaction to this newly introduced noise. As shown in the figure, community reaction varies from no reaction to vigorous action for newly introduced noises averaging from 10 dB below existing to 25 dB above existing. Note the assumptions included in the graphic are associated with the specific data points from the study. These assumptions are generally appropriate to give context to most transit projects, but community reaction may differ for conditions specific to each project.

In many community attitudinal surveys, transportation noise has been ranked among the greatest causes of community dissatisfaction. A synthesis of many such surveys on annoyance is shown in Figure 3-7.[11][12] Noise exposure levels are plotted against the percentage of people who are highly annoyed by the particular level of neighborhood noise. As shown in the figure, the percentage of high annoyance is approximately 0 percent at 45 dB, 10 percent around 60 dB, and increases quite rapidly to approximately 70 percent around 85 dB. The scatter about the synthesis line is due to community variation and wording differences in the surveys. An update of the original research containing additional railroad, transit and street traffic noise surveys generally follows the shape of the original response curve shown in Figure 3-7.[12][13]

As indicated by Figure 3-6 and Figure 3-7, introduction of certain levels of transit noise into a community may have two undesirable effects. First, it may substantially increase noise levels above existing noise levels in a community. This effect is called a relative noise impact. Evaluation of this effect compares new noise levels to the existing levels. Criteria for a relative noise impact evaluation are based upon noise increases above existing levels. Second, newly introduced transit noise may interfere with community activities independent of existing noise levels. For example, it may be too loud to converse or sleep. This effect is called absolute noise impact and is expressed as a fixed level threshold that is not to be exceeded. The fixed level threshold is determined independently of existing noise levels. Relative and absolute noise impacts are discussed in terms of transit noise criteria in Section 4.1, Step 3.

[a] The Federal Interagency Committee on Aviation Noise (FICAN) is the current version of this group.



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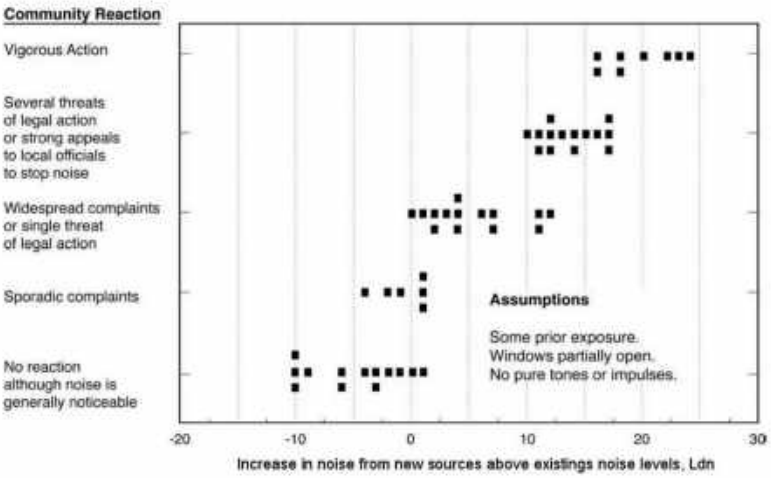


**Figure 3-6 Community Reaction to New Noise, Relative to Existing Noise in a Residential Urban Environment**

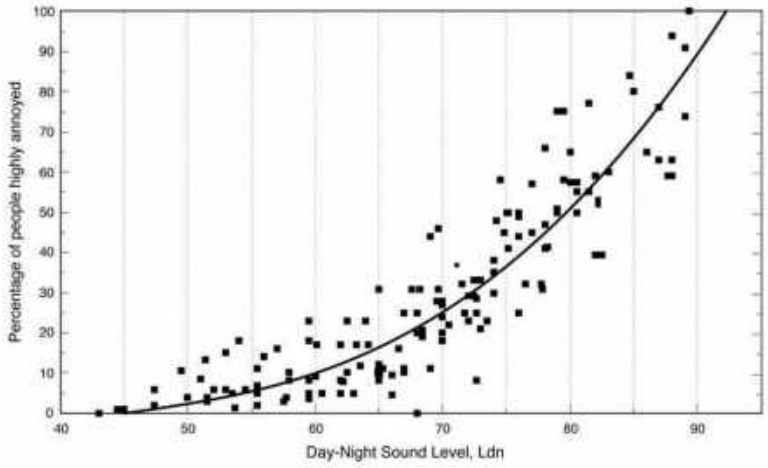


**Figure 3-7 Community Annoyance Due to Noise**

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SECTION 4

# Noise Impact Analysis

The FTA noise impact analysis process is a multi-step process used to evaluate the project for potential noise impacts for FTA NEPA approvals. If impact is determined, measures necessary to mitigate adverse impacts must be considered for incorporation into the project.[4] It is recommended that project sponsors develop and formally adopt a policy for determining the need for mitigation for situations that are loosely covered by the impact criteria. Considerations for mitigation policies are included in Section 2.3. The FTA noise impact analysis steps are summarized as follows and are described in the subsequent subsections:

**4.1:** Determine noise impact criteria.
- **Step 1:** Identify the type of project/dominant noise source (transit or multimodal).
- **Step 2:** Choose land use category for FTA criteria.

**4.2:** Determine the highest appropriate level of noise analysis for the current stage of project planning or development.

**4.3:** Evaluate for the potential of impact according to the Noise Screening Procedure.
- **Step 1:** Identify project type.
- **Step 2:** Determine the screening distance.
- **Step 3:** Identify the study area.
- **Step 4:** Locate noise-sensitive land uses.

**4.4:** Evaluate impact according to the General Noise Assessment and evaluate preliminary mitigation options if impact is found.
- **Step 1:** Identify noise-sensitive receivers.
- **Step 2:** Determine the project noise source reference levels.
- **Step 3:** Estimate project noise exposure by distance.
- **Step 4:** Combine noise exposure from all sources.
- **Step 5:** Measure existing noise exposure.
- **Step 6:** Inventory noise impacts.
- **Step 7:** Determine noise mitigation needs.

**4.5:** Evaluate for impact according to the Detailed Noise Analysis and evaluate mitigation options if impact is found.
- **Step 1:** Identify noise-sensitive receivers.
- **Step 2:** Determine noise source levels for detailed analysis.
- **Step 3:** Calculate project noise exposure by distance.
- **Step 4:** Combine noise exposure from all sources.
- **Step 5:** Determine existing noise exposure.
- **Step 6:** Assess noise impact.
- **Step 7:** Determine noise mitigation measures.

In addition to analyzing for potential noise impacts, analyze the project for potential vibration impacts according to the process presented in Section 6. After both the noise and vibration analyses have been completed, assess



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construction noise and vibration according to Section 7 and document findings according to Section 8.

## 4.1 Determine Noise Impact Criteria

This section describes the procedure for determining the appropriate criteria for assessing project noise impact based on the type of project and project noise source. Project noise is the new noise or change in noise introduced by the project. Noise impact criteria may vary for different segments of the project. Project segments can be portions of a project with similar characteristics.

The procedure to determine the appropriate impact criteria is described in this section and shown more simply as a flow chart in Figure 4-1. If there is uncertainty in how to determine the appropriate criteria, contact the FTA Regional office.

The selected criteria are used in the analysis procedures discussed in Sections 4.3, 4.4, and 4.5 to identify potential impacts and the level of impact.

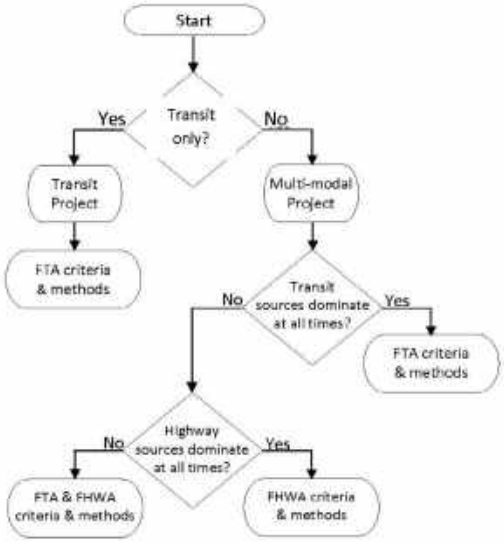


**Figure 4-1 Noise Impact Criteria Flow Chart by Project Segment**



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## Step 1: Identify Project Type

*Identify the type of project as transit, multimodal (transit and highway), or other multimodal according to the dominant noise source.*

**Option A: Transit Project (Transit Noise Only) –** The transit project category includes all transit projects where the project noise is exclusively due to new transit sources, no changes are made to the highway or to existing highway noise barriers, and the existing noise levels generated by roadway sources will not change because of the project. For these transit projects, FTA is the lead agency conducting the environmental review in cooperation with the transit agency.

Typical examples of transit projects include:

- RRT, LRT, commuter rail, and AGT
- Rail projects built within an existing highway or railroad corridor that do not alter the existing noise levels generated by roadway sources
- Bus facility projects with operations on local streets and highways used to access the facility, where the project does not include roadway construction or modification that changes roadway capacity substantially
- Fixed facilities including storage and maintenance yards, passenger stations and terminals, parking facilities, and substations
- Portions of transit projects not adjacent to highway corridors

*FTA impact criteria are appropriate for transit projects, proceed to Step 2.*

**Option B: Multimodal Project (Transit and Highway Noise) –** In this manual, "multimodal" refers to projects that include changes to both transit and highway components, resulting in project noise comprised of both highway and transit noise sources.

Typical examples of multimodal projects include:

- New highway construction providing general-purpose lanes as well as dedicated bus and high occupancy vehicle (HOV) lanes
- Rail transit projects that involve changes to the highway travel lanes or existing highway noise barriers

Evaluate multimodal projects for impact according to the project noise source by project segment. FHWA's noise assessment methods are used to inform FTA's NEPA evaluation only for segments where highway noise levels change due to the transit project. These projects are not necessarily subject to FHWA's procedures at 23 CFR part 772 *(see call out box below)*. For segments of the project outside the highway corridor, use FTA's criteria and methods. Use Table 4-1 to determine multimodal project noise.

Once the project noise source(s) is identified, determine the appropriate assessment method according to Table 4-2.



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Note that a separate noise analysis may be required for FHWA approval of a multimodal project pursuant to 23 CFR part 772. For these projects, it is important to work with FHWA early in the environmental review process to determine how a noise assessment will be completed where FHWA approval is needed for the project.

The determination of whether a project is subject to FHWA procedures at 23 CFR part 772 depends upon the specific circumstances of a project. A proposed transit project that would share an existing highway ROW is not necessarily a FHWA-defined multimodal project. A transit project that meets all three of the following criteria is not considered a multimodal project subject to 23 CFR part 772:

- FTA is the lead agency in the NEPA process and FHWA's limited participation is as a cooperating agency.
- The main transportation purpose of the project, as stated in the purpose and need statement of the environmental document, is transit-related and not highway-related.
- No Federal-aid highway funds are being used to fund the project.

**Table 4-1 Multimodal Project Noise Factors**

| Factor | Description |
|---|---|
| Volume of Traffic | Major freeways and interstate highways often carry large volumes of traffic throughout the day and night such that the highway noise dominates at all times. Transit noise in this case may be unimportant by comparison, but must still be evaluated using FTA's noise criteria for a potential impact. |
| Traffic Patterns | Some highways and arterials serve primarily as commuter routes such that nighttime traffic diminishes considerably, while transit systems continue to operate well into the late hours. Here the dominant noise source at times of maximum sensitivity may be transit. |
| Type of Traffic | Some highways and arterials may serve commuters during the daytime hours, but provide access to business centers by trucks at night. In this case, the roadway noise would likely continue to dominate. |
| Alignment Configuration | Elevation of the transit mode in the median or beside a busy highway may result in transit noise contributing more noise to nearby neighborhoods than a highway that may be partially shielded by rows of buildings adjacent to the ROW. In this case, both transit and highway noise may be considered dominant. |

**Table 4-2 Multimodal Project Assessment Methods**

| Dominant Noise Source | Assessment Method |
|---|---|
| Transit, at All Times | Use FTA criteria and methods. *Proceed to Step 2.* |
| Highway, at All Times | Use FHWA criteria and methods to inform FTA's NEPA evaluation. *Contact FHWA directly for assistance using FHWA noise analysis methods and FHWA noise impact criteria.* |
| Transit and Highway at Different Times | Use both the FHWA and FTA methods to determine if one, both, or neither method determines impact due to the project noise for these segments. Note that the project noise includes both highway and transit sources associated with the project. Both methods are used because the FTA methods consider nighttime sensitivity while the FHWA methods consider the peak traffic hour. *Proceed to Step 2 for FTA criteria. Contact FHWA directly for assistance using FHWA noise analysis methods and FHWA noise impact criteria.* |



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**Option C: Other Multimodal Projects –** For projects with components from other modes, contact the FTA Regional office. Additional information on high-speed rail vibration and noise can be found in the Federal Railroad Administration (FRA) "High-Speed Ground Transportation Noise and Vibration Impact Assessment" guidance manual.[14]

## Step 2: Choose Land Use Category for FTA Criteria

*Determine the appropriate noise-sensitive land use category for the project segment using Table 4-3 and the descriptions below then, proceed to Step 3. FTA criteria are presented by land use.*

**Table 4-3 Land Use Categories and Metrics for Transit Noise Impact Criteria**

| Land Use Category | Land Use Type | Noise Metric, dBA | Description of Land Use Category |
|---|---|---|---|
| 1 | High Sensitivity | Outdoor $L_{eq(1hr)}$* | Land where quiet is an essential element of its intended purpose. Example land uses include preserved land for serenity and quiet, outdoor amphitheaters and concert pavilions, and national historic landmarks with considerable outdoor use. Recording studios and concert halls are also included in this category. |
| 2 | Residential | Outdoor $L_{dn}$ | This category is applicable all residential land use and buildings where people normally sleep, such as hotels and hospitals. |
| 3 | Institutional | Outdoor $L_{eq(1hr)}$* | This category is applicable to institutional land uses with primarily daytime and evening use. Example land uses include schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities are also included in this category. |

* $L_{eq(1hr)}$ for the loudest hour of project-related activity during hours of noise sensitivity.

Noise-sensitive land use categories are described in in order of sensitivity. Most commercial or industrial uses are not considered noise-sensitive because activities within these buildings are generally compatible with higher noise levels. Business can be considered noise-sensitive if low noise levels are an important part of operations, such as sound and motion picture recording studios.

For residential land use (category 2), apply the noise criteria at the nearest façade of the occupied portion of the building, e.g., not at a garage or porch. The residential criteria should be applied at locations with nighttime sensitivity. For major noise-sensitive outdoor use at non-residential locations, apply the noise criteria at the point of noise-sensitive use nearest the noise source.

Land use categories are evaluated using noise metrics that reflect the noise-sensitive time of day:

- **Categories 1 and 3** – The noise metric, $L_{eq(1hr)}$ is used for all category 1 and 3 land uses where nighttime sensitivity is not a factor. Category 3 land uses are considered less noise-sensitive than category 1 land uses. For transit analyses, $L_{eq(1hr)}$ is computed for the noisiest hour of transit-



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related activity during which human activities occur at the noise-sensitive location. See Appendix B.1.4.4 for more information on this metric.

- **Category 2** – The noise metric $L_{dn}$ is a used for all category 2 land uses where nighttime sensitivity is a factor. This noise metric includes a 10-dB penalty for nighttime noise. See Appendix B.1.4.5 for more information on this metric.

**Land Use Categories: Special Cases**

Historic sites, parks, indoor-only land use, and undeveloped land require special consideration. In addition to NEPA, noise impacts may need to be considered under other environmental laws such as Section 106[15] or Section 4(f).[16] Indoor-only use and undeveloped land should be evaluated on a case-by-case basis to determine noise sensitivity based on how each facility is used or the reason it is protected under the applicable requirement.

**Historic Sites** – Section 106 requires Federal agencies to evaluate potential effects from projects on historic properties. Per the regulations at 36 CFR part 800,[17] historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for the National Register of Historic Places (NRHP). An adverse effect determination under Section 106 is made when a project may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Under FTA environmental reviews, some structures may be evaluated as noise-sensitive resources per this noise manual and evaluated as historic properties under Section 106. However, because this manual and Section 106 regulations have different criteria for effect, identifying a severe noise impact for a structure under this manual does not necessarily mean there would be an adverse effect under Section 106. It is important to thoroughly document the characteristics of historic properties that qualify for inclusion in the NRHP for evaluation of effect under Section 106.

If a property, for example, is listed on the NRHP under criterion C because the structure possesses high artistic values, but lacks integrity of setting, feeling, or association, it is unlikely that a change in the noise environment would affect the features that qualify the property for listing or eligibility for inclusion in the NRHP.

In the assessment of effects on historic properties, consideration should be given to not just the proposed transit project, but any associated mitigation measures with the transit project. For example, if a transit project would involve noise walls or berms as mitigation, the effect of those structures on the visual setting may need to be considered in a Section 106 analysis.

**Parks** – Most parks used primarily for active recreation such as sports complexes and bike or running paths are not considered noise-sensitive.



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However, some parks (even some in dense urban areas) are primarily used for passive recreation such as reading, conversation, or meditation. These places, which may be valued as havens from the noise and rapid pace of everyday city life, are treated as noise-sensitive, and are included in land use category 3. Consult the state or local agency with jurisdiction over the park on questions about how the park is used, and visit the park to observe its use, if possible.

**Indoor-Only Use** – The land use categories described in this section correspond with noise impact criteria that provide protection for both outdoor and indoor land uses. For locations where noise impact will be evaluated but there is no outdoor land use such as apartment buildings, hotels or upper levels of multi-story buildings, indoor criteria can be used. In these cases, the criterion for indoor noise levels from project sources is a $L_{dn}$ of 45 dBA.[18] This criterion is consistent with the Federal Aviation Administration (FAA). See Section 4.5 for more information on how indoor criteria apply to noise mitigation consideration.

**Undeveloped Land –** Undeveloped land may also need to be considered for noise impact assessment and mitigation if plans are under way to develop the land for noise-sensitive use. The policy for considering such land for assessment and mitigation should be determined on a project-specific basis by the project sponsor in consultation with the FTA Regional office.

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Cont.

### Step 3: Determine Appropriate FTA Criteria Presentation

FTA criteria for noise impact were developed specifically for transit noise sources operating on fixed-guideways or at fixed facilities in urban areas. These criteria are based on well-documented research on human response to community noise and represent a reasonable balance between community benefit and project costs. These criteria do not reflect specific community attitudinal factors. See Appendix C for additional background information on the development of FTA noise criteria.

The criteria specify a comparison of future project noise with existing noise. Note that projections of future noise exposure without the project (no-build scenario) are not included in this analysis. The criteria also consider land use which is an important factor that reflects noise sensitivity based on activity and time period of concern. The criteria are defined with the expectation that communities already exposed to high levels of noise can only tolerate a small increase. In contrast, if the existing noise levels are low, it is reasonable to allow a greater change in the community noise.

The levels of impact are described in Table 4-4. The criteria at which the levels of impact occur are presented in two ways depending on the relationship of project and existing noise sources.

*If the project noise source is a new source of transit noise in the community, such as a new project in an area currently without transit, use the criteria as presented in Option A. If the project noise adds to or changes existing transit noise in the community, use the criteria as presented in Option B.*

**Table 4-4 Levels of Impact**

| Level of Impact | Description |
|---|---|
| No Impact | Project-generated noise is not likely to cause community annoyance. Noise projections in this range are considered acceptable by FTA and mitigation is not required. |
| Moderate Impact | Project-generated noise in this range is considered to cause impact at the threshold of measurable annoyance. Moderate impacts serve as an alert to project planners for potential adverse impacts and complaints from the community. Mitigation should be considered at this level of impact based on project specifics and details concerning the affected properties. |
| Severe Impact | Project-generated noise in this range is likely to cause a high level of community annoyance. The project sponsor should first evaluate alternative locations/alignments to determine whether it is feasible to avoid severe impacts altogether. In densely populated urban areas, evaluation of alternative locations may reveal a trade-off of affected groups, particularly for surface rail alignments. Projects that are characterized as point sources rather than line sources often present greater opportunity for selecting alternative sites. This guidance manual and FTA's environmental impact regulations both encourage project sites which are compatible with surrounding development when possible. If it is not practical to avoid severe impacts by changing the location of the project, mitigation measures must be considered. |

**Option A: Project Noise Impact Criteria Presentation –** The impact criteria presentation for evaluating existing noise independently to project noise is presented in this option.

The noise levels at which impacts occur are presented in Figure 4-2 and Table 4-5. Equations for the impact criteria are presented in Appendix C. If impact is determined, measures necessary to mitigate impacts are to be considered for incorporation into the project.[3]

Figure 4-2 presents the existing noise exposure on the horizontal axis and project noise on the vertical axis. Category 1 and 2 land uses have the same criteria for project noise and are on the primary vertical axis. Category 3 land use criteria are presented on the secondary vertical axis. Note that project noise for category 1 and 3 land uses is expressed as $L_{eq(1hr)}$, whereas project noise for category 2 land use is expressed as $L_{dn}$. Also, note that project noise criteria are 5 dB higher for category 3 land uses in Figure 4-2 since these types of land use are less noise-sensitive than those in categories 1 and 2.

Note that for projects in locations with existing noise levels below 55 dBA, the project noise exposure is allowed some increase over the existing noise exposure before it is considered to cause impact. For category 1 and 2 land uses, the maximum project noise level to be considered to cause no impact is 65 dBA ($L_{eq(1hr)}$ or $L_{dn}$) regardless of the existing noise. Note that no impact at 65 dBA aligns with other Federal agencies in that a $L_{dn}$ of 65 dBA is a standard limit for an acceptable living environment among some Federal agencies.[19] [20] Project noise levels above the top curve are considered to cause severe impact. The upper limit of the severe impact range is 75 dBA for category 1 and 2 land uses. The upper limit of 75 dBA is associated with an unacceptable living environment. Project noise between the two curves is considered to have moderate impact on the community.



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Cont.

The criteria are also tabulated in Table 4-5. Figure 4-2 and the equations that correspond with this figure in Appendix C are the precise definition of the criteria. The values in Table 4-5 can be used for illustrative purposes and should only be used if all numbers are rounded up to the nearest decibel.

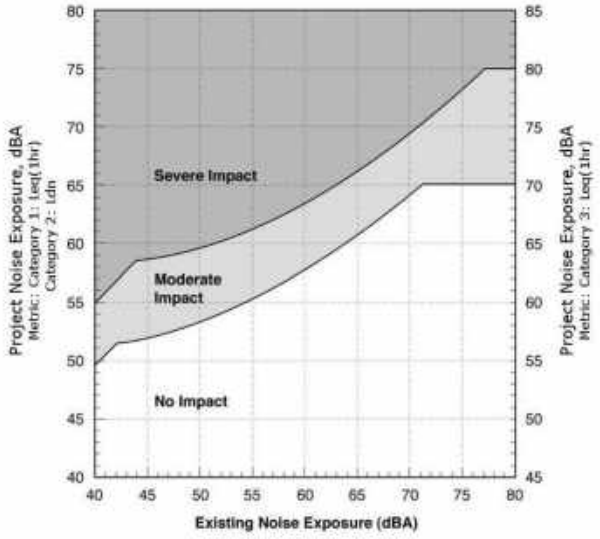


**Figure 4-2 Noise Impact Criteria for Transit Projects**

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**Table 4-5 Noise Levels Defining Impact for Transit Projects**

| Existing Noise Exposure, dBA | Project Noise Impact Exposure, dBA | | | | | |
|---|---|---|---|---|---|---|
| | Category 1 ($L_{eq(1hr)}$) or 2 ($L_{dn}$) Sites | | | Category 3 Sites ($L_{eq(1hr)}$) | | |
| $L_{eq(1hr)}$ or $L_{dn}$ | No Impact | Moderate Impact | Severe Impact | No Impact | Moderate Impact | Severe Impact |
| <43 | < Ambient+10 | Ambient +10 to 15 | > Ambient+15 | < Ambient+15 | Ambient +15 to 20 | > Ambient+20 |
| 43 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 44 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 45 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 46 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 47 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 48 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 49 | <54 | 54-59 | >59 | <59 | 59-64 | >64 |
| 50 | <54 | 54-59 | >59 | <59 | 59-64 | >64 |
| 51 | <54 | 54-60 | >60 | <59 | 59-65 | >65 |
| 52 | <55 | 55-60 | >60 | <60 | 60-65 | >65 |
| 53 | <55 | 55-60 | >60 | <60 | 60-65 | >65 |
| 54 | <55 | 55-61 | >61 | <60 | 60-66 | >66 |
| 55 | <56 | 56-61 | >61 | <61 | 61-66 | >66 |
| 56 | <56 | 56-62 | >62 | <61 | 61-67 | >67 |
| 57 | <57 | 57-62 | >62 | <62 | 62-67 | >67 |
| 58 | <57 | 57-62 | >62 | <62 | 62-67 | >67 |
| 59 | <58 | 58-63 | >63 | <63 | 63-68 | >68 |
| 60 | <58 | 58-63 | >63 | <63 | 63-68 | >68 |
| 61 | <59 | 59-64 | >64 | <64 | 64-69 | >69 |
| 62 | <59 | 59-64 | >64 | <64 | 64-69 | >69 |
| 63 | <60 | 60-65 | >65 | <65 | 65-70 | >70 |
| 64 | <61 | 61-65 | >65 | <66 | 66-70 | >70 |
| 65 | <61 | 61-66 | >66 | <66 | 66-71 | >71 |
| 66 | <62 | 62-67 | >67 | <67 | 67-72 | >72 |
| 67 | <63 | 63-67 | >67 | <68 | 68-72 | >72 |
| 68 | <63 | 63-68 | >68 | <68 | 68-73 | >73 |
| 69 | <64 | 64-69 | >69 | <69 | 69-74 | >74 |
| 70 | <65 | 65-69 | >69 | <70 | 70-74 | >74 |
| 71 | <66 | 66-70 | >70 | <71 | 71-75 | >75 |
| 72 | <66 | 66-71 | >71 | <71 | 71-76 | >76 |
| 73 | <66 | 66-71 | >71 | <71 | 71-76 | >76 |
| 74 | <66 | 66-72 | >72 | <71 | 71-77 | >77 |
| 75 | <66 | 66-73 | >73 | <71 | 71-78 | >78 |
| 76 | <66 | 66-74 | >74 | <71 | 71-79 | >79 |
| 77 | <66 | 66-74 | >74 | <71 | 71-79 | >79 |
| >77 | <66 | 66-75 | >75 | <71 | 71-80 | >80 |

**Option B: Cumulative Noise Impact Criteria Presentation**

*The impact criteria presentation for evaluating existing noise to project noise cumulatively is presented in this option.*

In certain cases, the cumulative form of the noise criteria shown in Figure 4-3 can be used. These cases involve projects where changes are proposed to an existing transit system, as opposed to a new project in an area previously without transit. Such changes might include operations of a new type of vehicle, modifications of track alignments within existing transit corridors, or changes in facilities that dominate existing noise levels. In these cases, the existing noise



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sources change because of the project, and so it is not possible to define project noise separately from existing noise. An example would be a commuter rail corridor where the existing noise along the alignment is dominated by diesel locomotive-hauled trains, and where the project involves electrification with the resulting replacement of some of the diesel-powered locomotives with electric trains operating at increased frequency of service and higher speeds on the same tracks. In this case, the existing noise can be determined and a new future noise can be calculated, but it is not possible to describe what constitutes the "project noise." For example, if the existing noise dominated by trains was measured to be an $L_{dn}$ of 63 dBA at a particular location, and the new combination of diesel and electric trains is projected to be an $L_{dn}$ of 65 dBA, the change in the noise exposure due to the project would be 2 dB. Referring to Figure 4-3, a 2-dB increase with an existing noise exposure of 63 dBA would be rated as a moderate impact. Normally the project noise is added to the existing noise to come up with a new cumulative noise, but in this case, the existing noise was dominated by a source that changed due to the project, so it would be incorrect to add the project noise to the existing noise. Consequently, the existing noise determined by measurement is compared with a new calculated future noise, but a description of what constitutes the actual project is complex.

Another example would be a rail corridor where a track is added and grade crossings are closed, potentially resulting in a change in train location and horn operation. Here the "project noise" results from moving some trains closer to some receivers, away from others, and elimination of horns. In this case, the change in noise level is more readily determined than the noise from the actual project elements. In all cases, Figures 4-3 and 4-4 for changes in a transit system results in the same assessment of impact as Figure 4-2 for development of transit facilities in a new area.

The noise impact criteria in Figure 4-3 and Figure 4-4 are presented as an increase in cumulative noise level between the existing and project conditions. The horizontal axis represents the existing noise exposure and the vertical axis is the increase in cumulative noise level due to the transit project. Note that noise exposure is expressed as $L_{eq(1hr)}$ for category 1 and 3 land uses and $L_{dn}$ for category 2 land use. Since $L_{eq(1hr)}$ and $L_{dn}$ are measures of total acoustic energy, any new noise sources in a community will cause an increase, even if the new source level is the same or less than the existing noise level (refer to decibel addition in Appendix B). As shown in Figure 4-3, the criterion for moderate impact is a noise exposure increase of 10 dB for an existing noise exposure level of 42 dBA or less, but only a 1-dB increase when the existing noise exposure is 70 dBA.

As the existing level of ambient noise increases, the allowable level of transit noise increases, but the total amount that community noise exposure is allowed to increase is reduced. This accounts for the unexpected result that a project exposure which is less than the existing noise exposure can still cause impact. This is clearer from the examples listed in Table 4-6 which indicate the level of transit noise allowed for different existing levels of exposure. Any increase greater than shown in the table will cause moderate impact.

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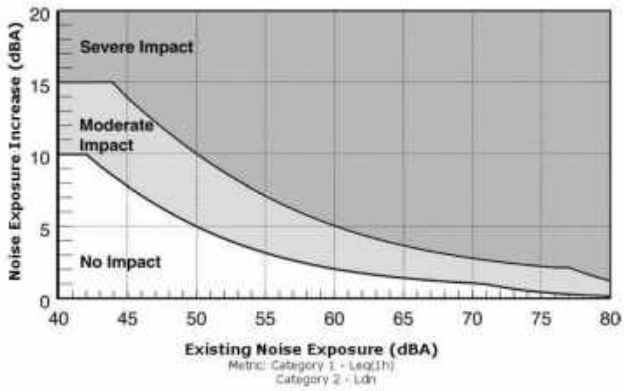


**Figure 4-3 Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 1 & 2)**

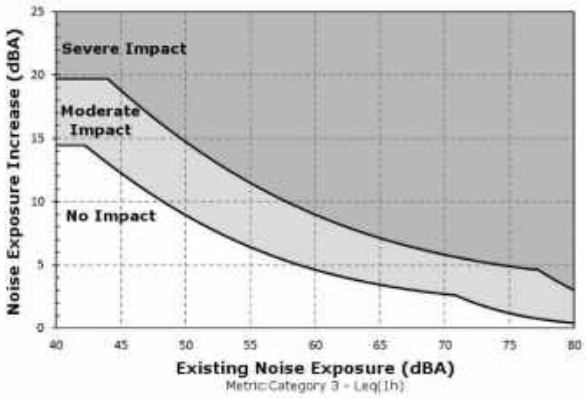


**Figure 4-4 Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 3)**

This table shows that as the existing noise exposure increases from 45 dBA to 75 dBA, the allowed project noise exposure increases from 51 dBA to 65 dBA. However, the allowed increase in the cumulative noise level decreases from 7 dB to 0 dB (rounded to the nearest whole decibel). The justification for this is that people already exposed to high levels of noise should be expected to tolerate only a small increase in the amount of noise in their community. In contrast, if the existing noise levels are quite low, it is reasonable to allow a greater change in the community noise for the equivalent difference in annoyance.



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Note that Table 4-6 was developed for illustrative purposes and the official criteria are included in Figure 4-3 and Figure 4-4 and the associated equations.

**Table 4-6 Noise Impact Criteria: Effect on Cumulative Noise Exposure**

| $L_{dn}$ or $L_{eq(1hr)}$ in dBA (rounded to nearest whole decibel) | | | |
|---|---|---|---|
| **Existing Noise Exposure** | **Allowable Project Noise Exposure Before Moderate Impact** | **Allowable Combined Total Noise Exposure** | **Allowable Noise Exposure Increase Before Moderate Impact** |
| 45 | 51 | 52 | 7 |
| 50 | 53 | 55 | 5 |
| 55 | 55 | 58 | 3 |
| 60 | 57 | 62 | 2 |
| 65 | 60 | 66 | 1 |
| 70 | 64 | 71 | 1 |
| 75 | 65 | 75 | 0 |

## 4.2 Determine Noise Analysis Level

There are three levels of analysis to evaluate noise on a transit project based on the type and scale of the project, stage of project development, and environmental setting. These levels, described below, are the Noise Screening Procedure, the General Noise Assessment and the Detailed Noise Analysis.

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The Noise Screening Procedure, conducted first, defines the study area of any subsequent noise impact assessment. Where there is potential for noise impact, the General Noise Assessment and Detailed Noise Analysis procedures are used to determine the extent and severity of impact. In some cases, a General Noise Assessment may be all that is needed. However, if the proposed project is near noise-sensitive land uses, and it appears at the outset that the impact would be substantial, it is prudent to conduct a Detailed Noise Analysis.

*Conduct the noise screening procedure and then determine the appropriate noise analysis option.*

**Noise Screening Procedure** – The Noise Screening Procedure is a simplified method of identifying study area receivers or locations where a project may have the potential for noise impacts from transit projects. This procedure accounts for impact criteria, the type of project, and noise-sensitive land uses. If no noise-sensitive land uses or receivers are present in the analysis area, then no further noise assessment is needed. If noise-sensitive receivers are identified, then proceed to conduct a General Assessment and/or a Detailed Assessment.

The Noise Screening Procedure steps are provided in Section 4.3.

**General Noise Assessment** – The General Noise Assessment is used to examine potentially impacted areas identified in the screening step by examining the location and estimated severity of noise impacts. This procedure considers noise source and land use information likely to be available at an early stage in the project development process. Estimates are made of project noise levels and of existing noise conditions to model the location of a noise impact contour

that defines the outer limit of an impact corridor or area. This modeling method uses transit-specific noise and adjustment data (in tabular and graphical form) for the noise computations.

For many smaller projects, this assessment may be sufficient to define impacts and determine whether noise mitigation is necessary. The procedure can be used in conjunction with established highway noise prediction procedures to compare highway, transit, and multimodal alternatives. If an assessment is needed to inform the decision on transit mode and general alignment in a corridor, the General Noise Assessment procedures should be used, and not the Detailed Noise Analysis, which requires more detailed information.

The General Noise Assessment procedure is provided in Section 4.4. FTA has also developed an Excel spreadsheet to more simply conduct the General Noise Assessment. It is on FTA's website at http://www.fta.dot.gov/12347_2233.html.

**Detailed Noise Analysis** – The Detailed Noise Analysis procedure is a comprehensive assessment method that produces the most accurate estimates of noise impacts for a proposed project. It is important to recognize that use of the Detailed Noise Analysis methods will not provide more accurate results than the General Noise Assessment unless more detailed and case-specific input data are used.

The project must be defined to the extent that location, alignment, transit mode, hourly operational schedules during day and night, speed profiles, plan and profiles of guideways, locations of access roads, and landform topography (including terrain and building features) are determined. A detailed Noise Analysis is often accomplished at the development of the final environmental impact statement (FEIS), record of decision (ROD), or combined FEIS/ROD in the NEPA process, when the preferred alternative is undergoing refinements to mitigate its adverse impacts. However, these project details may not be available until the final design phase, requiring that the detail noise analysis be conducted after the NEPA process is complete. However, it is recommended that the detailed analysis be conducted earlier for controversial projects or projects with highly noise-sensitive sites close to tracks.

A Detailed Noise Analysis may be warranted as part of the development of an environmental assessment (EA) if there are potentially severe impacts due to the proximity of noise-sensitive land uses.

In some cases, decisions on appropriate noise mitigation measures can be made based on the results of the General Noise Assessment. But if costly measures may be needed, it is generally recommended that a Detailed Noise Analysis be conducted to verify the need and design of the noise mitigation. The Detailed Noise Analysis is always appropriate under two sets of circumstances:

- For a major transit project with likely noise impacts after the preferred alternative has been selected.
- For any other transit project where potentially severe impacts are identified at an early stage.



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Cont.

Noise impacts may occur for relatively minor transit projects when the project is near noise-sensitive sites, particularly residences. In this case, completing a Detailed Noise Analysis is recommended. Some examples include:

- A terminal or station sited adjacent to a residential neighborhood
- A maintenance facility located near a school
- A storage yard adjacent to residences
- An electric substation located adjacent to a hospital

The Detailed Noise Analysis procedure is provided in Section 4.5.

## 4.3 Evaluate Impact: Noise Screening Procedure

*Identify the potential for impact using the Noise Screening Procedure described below.*

### Step 1: Identify Project Type

*Identify the project type using Table 4-7 and confirm the assumptions in Table 4-8 are appropriate for the project.*

The noise screening procedure is intended to be conservative to broadly capture the potential for impact with minimal effort. To make the procedure conservative, the project system must be assumed to be operating under relatively high-capacity conditions, which would produce more noise than normal operating conditions. In addition, the assumptions in Table 4-8 were made using the lowest threshold of impact (50 dBA) from the criteria curves in Figure 4-2. Clarification can be obtained from FTA on special cases that are not represented in this section.

If the assumptions in Table 4-8 are not appropriate for the project, make adjustments to the screening distances in Table 4-8 according to the methodology in Section 4.4 or the FTA spreadsheet model.

### Step 2: Determine the Screening Distance

*Determine the appropriate screening distance considering the type of project and shielding from intervening buildings.*

**2a.** Determine the appropriate screening distance column in Table 4-7.

**Option A: Buildings in the Sound Paths –** Use the screening distances in the "Intervening Buildings" column.

**Option B: Buildings Not in the Sound Paths –** Use the distances in the "Unobstructed" column.

**2b.** Adjust these distances according to the methodology in Section 4.4, or the FTA spreadsheet model, if the assumptions in Table 4-8 are not appropriate for the project. The appropriate screening distance is where the project noise reaches 50 dBA for the appropriate metric. If the assumptions in Table 4-8 are not appropriate for a commuter rail grade crossing project where horns and



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Cont.

warning bells are used, use the FRA horn noise model available from the FRA website to develop the screening distance distance (49 CFR § 222).[23]

### Step 3: Identify Study Area

*Apply the screening distances as follows to identify the study area. The study area is intended to be sufficiently large to encompass all potentially impacted locations.*

**Option A: Fixed Guideway Transit Sources –** Apply the screening distance from the guideway centerline.

**Option B: Highway/Transit Sources (e.g., Bus) –** Apply the screening distance from the nearest ROW line on both sides of a highway or access road.

**Option C: Small Stationary Facilities –** Apply the screening distance from the center of the noise-generating activity.

**Option D: Stationary Facility Spread Over a Large Area –** Apply the screening distance from the outer boundary of the proposed project site.

### Step 4: Locate Noise-Sensitive Land Uses

*Locate all noise-sensitive land uses within the study area using Table 4-3.*

See Section 4.1 for more information on noise-sensitive land uses. Include all categories of noise-sensitive land uses in this step.

***If no noise-sensitive land uses are identified, no further noise analysis is needed. If one or more of the noise-sensitive land uses are in the study area, proceed to Section 4.4 and complete a General Noise Assessment.***

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**Table 4-7 Screening Distance for Noise Assessments**

| Project Systems | | Screening Distance, ft* | |
|---|---|---|---|
| | | Unobstructed | Intervening Buildings |
| ***Fixed-Guideway Systems*** | | | |
| Commuter Rail Mainline | | 750 | 375 |
| Commuter Rail Station | With Horn Blowing | 1,600 | 1,200 |
| | Without Horn Blowing | 250 | 200 |
| Commuter Rail Road Crossing with Horns and Bells | | 1,600 | 1,200 |
| RRT | | 700 | 350 |
| RRT Station | | 200 | 100 |
| LRT | | 350 | 175 |
| Streetcar | | 200 | 100 |
| Access Roads to Stations | | 100 | 50 |
| Low and Intermediate Capacity Transit | Steel Wheel | 125 | 50 |
| | Rubber Tire | 90 | 40 |
| | Monorail | 175 | 70 |
| Yards and Shops | | 1000 | 650 |
| Parking Facilities | | 125 | 75 |
| Access Roads to Parking | | 100 | 50 |
| Ancillary Facilities: Ventilation Shafts | | 200 | 100 |
| Ancillary Facilities: Power Substations | | 250 | 125 |
| ***Bus Systems*** | | | |
| Busway | | 500 | 250 |
| Bus Rapid Transit (BRT) on exclusive roadway | | 200 | 100 |
| Bus Facilities | Access Roads | 100 | 50 |
| | Transit Mall | 225 | 150 |
| | Transit Center | 225 | 150 |
| | Storage & Maintenance | 350 | 225 |
| | Park & Ride Lots w/Buses | 225 | 150 |
| ***Ferry Boat Terminals*** | | 300 | 150 |

*Measured from centerline of guideway for fixed-guideway sources, from the ROW on both sides of the roadway for highway/transit sources, from the center of noise-generating activity for stationary sources, or from the outer boundary of the proposed project site for fixed facilities spread out over a large area.

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**Table 4-8 Assumptions for Screening Distances for Noise Assessments**

| Type of Project | | Operations | Speeds* | Metric** |
|---|---|---|---|---|
| ***Fixed-Guideway Systems*** | | | | |
| Commuter Rail Mainline | | 66 day /12 night; 1 loco, 6 cars | 55 mph | $L_{dn}$ |
| Commuter Rail Station | With Horn Blowing | 22 day / 4 night | N/A | $L_{dn}$ |
| | Without Horn Blowing | 22 day / 4 night | N/A | $L_{dn}$ |
| Commuter Rail-Highway Crossing with Horns and Bells | | 22 day / 4 night | 55 mph | $L_{dn}$ |
| RRT | | 220 day / 24 night; 6-car trains | 50 mph | $L_{dn}$ |
| RRT Station | | 220 day / 24 night | 20 mph | $L_{dn}$ |
| LRT | | 150 day / 18 night; 2 artic veh. | 35 mph | $L_{dn}$ |
| Streetcar | | 150 day / 18 night | 25 mph | $L_{dn}$ |
| Access Roads to Stations | | 1000 cars, 12 buses | 35 mph | $L_{eq(1hr)}$ |
| Low and Intermediate Capacity Transit | Steel Wheel | 220 day / 24 night | 30 mph | $L_{dn}$ |
| | Rubber Tire | 220 day / 24 night | 30 mph | $L_{dn}$ |
| | Monorail | 220 day / 24 night | 30 mph | $L_{dn}$ |
| Yards and Shops | | 20 train movements | N/A | $L_{eq(1hr)}$ |
| Parking Facilities | | 1000 cars | N/A | $L_{eq(1hr)}$ |
| Access Roads to Parking | | 1000 cars | 35 mph | $L_{eq(1hr)}$ |
| Ancillary Facilities: Ventilation Shafts | | Rapid Transit in Subway | 50 mph | $L_{dn}$ |
| Ancillary Facilities: Power Substations | | Sealed shed, air conditioned | N / A | $L_{dn}$ |
| ***Bus Systems*** | | | | |
| Busway | | 30 buses, 120 automobiles | 50 mph | $L_{eq(1hr)}$ |
| BRT on exclusive roadway | | 30 buses | 35 mph | $L_{eq(1hr)}$ |
| Bus Facilities | Access Roads | 1000 cars | 35 mph | $L_{eq(1hr)}$ |
| | Transit Mall | 20 buses | N/A | $L_{eq(1hr)}$ |
| | Transit Center | 20 buses | N/A | $L_{eq(1hr)}$ |
| | Storage & Maintenance | 30 buses | N/A | $L_{eq(1hr)}$ |
| | Park & Ride Lots w/Buses | 1000 cars, 12 buses | N/A | $L_{eq(1hr)}$ |
| ***Ferry Boat Terminals*** | | 8 boats with horns used in normal docking cycle | N/A | $L_{eq(1hr)}$ |

*N/A = not applicable
**$L_{eq(1hr)}$ = the loudest hour of project related activity during hours of noise sensitivity.

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## 4.4 Evaluate Impact: General Noise Assessment

The General Noise Assessment should be completed after the Noise Screening Procedure (Section 4.3), through which noise-sensitive receivers have been identified. This can be completed either by using the General Noise Assessment Procedure described below or using the FTA General Noise Assessment Spreadsheet found on the following FTA website: http://www.fta.dot.gov/12347_2233.html.

Assumptions are used throughout the General Noise Assessment. If the listed assumptions are not appropriate for the project and good engineering judgement cannot be used by following the General Noise Assessment procedure, proceed to a Detailed Noise Analysis or consult with the FTA Regional office.

Major steps in the General Noise Assessment procedure and recommended workflow are shown in Figure 4-5 and listed below. Four examples of General Noise Assessments are given at the end of this section. Many of these concepts are explained in greater detail in the context of a Detailed Noise Analysis in Section 4.5.

**Step 1: Identify Noise-Sensitive Receivers –** Identify noise-sensitive receivers (Section 4.3) and their proximity to the project and major noise sources.

**Step 2: Determine Project Noise Source Reference Levels –** Determine the project noise sources and reference levels. Then, estimate the project noise exposure at the reference distance of 50 ft considering operational characteristics with preliminary estimations of the effect of mitigation.

**Step 3: Estimate Project Noise Exposure by Distance –** Estimate project noise exposure at distances beyond 50 ft considering propagation characteristics using a simplified procedure.

**Step 4: Combine Noise Exposure from All Sources –** Combine all sources associated with the project to predict the total project noise at the receivers.

**Step 5: Measure Existing Noise Exposure –** Measure the existing noise or estimate the existing noise exposure using a simplified procedure.

**Step 6: Inventory Impacts**

**Option A:** Tabulate the change in noise (existing vs. estimated project noise) at each noise-sensitive receiver or cluster, identifying all moderate and severe impacts.

**Option B:** Take inventory of noise-sensitive receivers that fall within the moderate and severe noise contours.



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**Step 7: Determine Noise Mitigation Needs –** Evaluate the need for mitigation and repeat the General Noise Assessment with proposed mitigation.

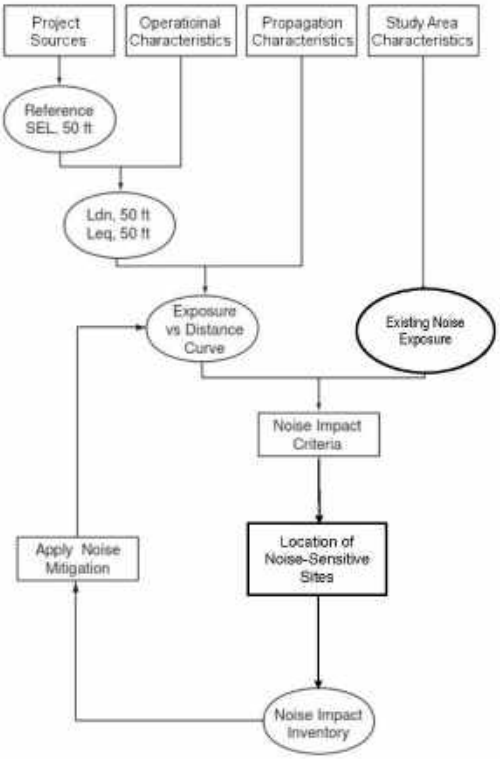


**Figure 4-5 Procedure for General Noise Assessment**

## Step 1: Identify Noise-Sensitive Receivers

*Determine the proximity of noise-sensitive land uses identified in Section 4.3 to the project and to the nearest major roadways and railroad lines.*

**1a.** When necessary, use windshield surveys or detailed land use maps to confirm the location of noise-sensitive land uses.

**1b.** For land uses more than 1,000 ft from major roadways or railroad mainlines, obtain an estimate of the population density in the immediate area, expressed in people per square mile. Distances to roadways or railroads, or population density, will be used later to estimate the existing



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noise level. Coordinate with the Metropolitan Planning Organization (MPO) for population densities at an appropriate level of detail.

### Step 2: Determine Project Noise Source Reference Levels

*Determine the general source reference level for each project noise source.*

Classify all project noise sources as fixed-guideway transit, highway/transit, or stationary facility and determine the source reference levels. Note that a major fixed-guideway system will have stationary facilities associated with it and that a stationary facility may have highway/transit elements associated with it.

**Option A: Fixed-guideway Transit Sources –** For this manual, fixed-guideway transit sources include commuter rail, RRT, LRT, streetcar, AGT, monorail, and magnetically levitated vehicles (maglev). For commuter railroads and LRT systems, the crossing of streets and highways at-grade is likely, and in that case, warning devices should be included in the assessment. At an early project stage, the information available for a General Noise Assessment includes:

- Candidate transit mode
- Guideway options
- Time of operation
- Operational headways
- Design speed
- Alternative alignments

This information is not sufficient to predict noise levels at all locations along the ROW. Therefore, use conservative estimates (e.g., maximum (expected) design speeds and operations at design capacities) to estimate worst-case noise levels.

First choose the appropriate fixed-guideway transit source reference level and then predict the noise exposure at 50 ft in terms of $L_{eq(1hr)}$ and $L_{dn}$.

**A.i.** Choose the reference source noise levels 50 ft from the track for one vehicle in terms of Sound Exposure Level (SEL) using Table 4-9. See Appendix B for a detailed explanation of SEL. Note that the SEL reference speed is 50 mph, unless otherwise noted.

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**Table 4-9 Reference SEL's 50 ft from Track and at 50 mph, One Vehicle**

| Source | Type | Reference Conditions | Reference SEL ($SEL_{ref}$), dBA |
|---|---|---|---|
| Commuter Rail, At-Grade | *Locomotives* | Diesel-electric, 3000 hp, throttle 5 | 92 |
| | | Electric | 90 |
| | *Diesel Multiple Unit (DMU)* | Diesel-powered, 1200 hp | 85 |
| | *Horns* | Within ¼ mile of grade crossing | 110 |
| | *Cars* | Ballast, welded rail | 82 |
| Rail Transit and Streetcars at 50 mph | | At-grade, ballast, welded rail | 82 |
| Rail Transit and Streetcars at 25 mph | | At-grade, ballast, welded rail | 76 |
| Transit whistles / warning devices | | Within 1/8 mile of grade crossing | 93 |
| AGT | *Steel Wheel* | Aerial, concrete, welded rail | 80 |
| | *Rubber Tire* | Aerial, concrete guideway | 78 |
| Monorail | | Aerial straddle beam | 82 |
| Maglev | | Aerial, open guideway | 72 |

**A.ii.** Collect the following data:

- Number of train passbys during the day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) for category 2 land uses
- Maximum number of train passbys during hours that category 1 or category 3 land uses are normally in use (typically the peak hour train volume)
- Number of vehicles per train for each time period for category 2 land uses (if this number varies during the day or night, take the average)
- Maximum number of vehicles per train during hours that category 1 or category 3 land uses are normally in use (typically the peak hour train volume)
- Train speed in mph (maximum expected)
- Guideway configuration
- Location of highway and street grade crossings, if any
- If this process is repeated to estimate the effect of proposed noise mitigation, include the noise barrier location

**A.iii.** Calculate the noise exposure at 50 ft in terms of $L_{eq(1hr)}$:

- Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-10.
- Compute $L_{eq(1hr),Combo}$ using Eq. 4-6. It may be necessary to compute the combined totals with and without warning horns. Some neighborhoods along the corridor may be exposed to horn noise, but some may not.

**A.iv.** Calculate the noise exposure at 50 ft in terms of $L_{dn}$:

- If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-10.
- It may be necessary to calculate $L_{dn}$ with and without warning horns, as in the previous step.

Note that the equations in Table 4-10 include terms to account for a difference in speed from the 50 mph reference speed and a numerical adjustment to account for the one-hour time period for this metric. For



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more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

Table 4-10 presents an estimate of the noise reduction potentially provided by wayside noise barriers that can be used when assessing mitigation options in a General Noise Assessment. If impact is determined during the General Noise Assessment, repeat the procedure and include proposed mitigation according to Section 4.4, Step 7. See Section 4.5, Step 7 for a complete description of the benefits resulting from various noise mitigation measures that can be evaluated with a Detailed Noise Analysis.

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**Table 4-10 Computation of Noise Exposure at 50 ft for Fixed-Guideway General Noise Assessment**

| | | |
|---|---|---|
| **Locomotives*** $L_{eq\,(hr)}$ at 50 ft | $L_{eq\,Loco(1hr)} = SEL_{ref} + 10\,log(N_{Loco}) + Klog(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-1** |
| **Locomotive Warning Horns**** $L_{eq\,(hr)}$ at 50 ft | $L_{eq\,LHorns(1hr)} = SEL_{ref} + 10\,log(V) - 35.6$ | **Eq. 4-2** |
| **Rail Vehicles**† $L_{eq\,(hr)}$ at 50 ft | $L_{eq\,RCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-3** |
| **Streetcars (25 mph or slower)** $L_{eq\,(hr)}$ at 50 ft | $L_{eq\,SCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 2\log(\frac{S}{25}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-4** |
| **Transit Warning Horns** $L_{eq\,(hr)}$ at 50 ft | $L_{eq\,THorns(1hr)} = SEL_{ref} - 10\,log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-5** |
| **Combined Locomotive and transit**†† $L_{eq\,(hr)}$ at 50 ft | $L_{eq\,Combo(1hr)} = 10\log(10^{(L_{eq\,Loco(1hr)}/10)} + 10^{(L_{eq\,RCars(1hr)}/10)} + 10^{(L_{eq\,SCars(1hr)}/10)} + 10^{(L_{eq\,LHorns(1hr)}/10)} + 10^{(L_{eq\,THorns(1hr)}/10)})$ | **Eq. 4-6** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$, $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-7** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$, $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-8** |
| **Day/Night** $L_{dn}$ at 50 ft | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-9** |

$N_{Loco}$ = average number of locomotives per train

K = constant
- -10 for passenger diesel
- 0 for DMUs
- +10 for electric

S = train speed, mph

$V$ = average hourly volume of train traffic, trains per hour

$N_{Cars}$ = average number of cars per train

$Adj_{track}$ = constant
- +5 for jointed track or for a crossover within 300 ft
- +4 for aerial structure with slab track (except AGT and monorail)
- +3 for embedded track on grade
- -5 if a noise barrier blocks the line of sight

$V_d$ = average hourly daytime volume of train traffic, trains per hour

$= \frac{number\ of\ trains, 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of train traffic, trains per hour

$= \frac{number\ of\ trains, 10\ p.m.\ to\ 7a.m.}{9}$

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)

$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)

$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

* Assumes a diesel locomotive power rating at approximately 3000 hp.
** Based on FRA's horn noise model (http://www.fra.dot.gov/eLib/Details/L04091).
† Includes all commuter rail cars, transit cars, streetcars above 25 mph, AGT and monorail.
†† Only include appropriate terms.

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**Option B: Highway/Transit Sources –** The highway/transit type sources include most transit modes that do not require a fixed-guideway. Examples are high-occupancy vehicles, such as buses, commuter vanpools and carpools. Use the instructions below to estimate source noise levels for projects that involve these types of vehicles and are using FTA's environmental review procedures. At an early project stage, the information available for a General Noise Assessment includes:

- Vehicle type
- Transitway design options
- Time of operation
- Typical headways
- Design speed
- Alternative alignments

This information is not sufficient to predict noise levels at all locations along the ROW; therefore, use of conservative estimates (e.g., maximum (expected) design speeds and operations at design capacities) to estimate worst-case noise impact levels is recommended. The procedure is consistent with FHWA's highway noise prediction method. The reference SEL levels in Table 4-11 correspond to FHWA's source emission levels and speed coefficients for buses and automobiles.[22]

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**B.i.** Using Table 4-11, choose the appropriate reference source noise levels 50 ft from the roadway in terms of SEL. Note that the SEL reference speed is 50 mph, unless otherwise noted.

**Table 4-11 Source Reference Levels at 50 ft from Roadway, 50 mph**

| Source* | Reference SEL, dBA |
|---|---|
| Automobiles and Vans | 74 |
| Buses (diesel-powered) | 82 |
| Buses (electric) | 80 |
| Buses (hybrid) | 83** |

* Assumes normal roadway surface conditions.
** For hybrid buses, determine Reference SEL on a case-by-case basis because they vary, and data are scarce.

**B.ii.** Collect the following data:

- Number of vehicle passbys during the day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) for each vehicle type in Table 4-11, if a category 2 land use is present
- Number of vehicle passbys during hours that category 1 or category 3 land uses are normally in use, each vehicle type in Table 4-11
- Speed (maximum expected)
- Transitway configuration (with or without noise barrier)

**B.iii.** Calculate the noise exposure at 50 ft in terms of $L_{eq(1hr)}$. Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-12.

**B.iv.** Calculate the noise exposure at 50 ft in terms of $L_{dn}$. If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-12.

Note that the equations in Table 4-12 include terms to account for a speed other than the 50 mph reference speed and a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

Table 4-12 presents an estimate of noise reduction potentially provided by wayside noise barriers. This is considered illustrative given that barriers are the most common noise mitigation measure. See Section 4.5, Step 7 for a complete description of the benefits resulting from noise mitigation. If impact is determined during the General Noise Assessment without mitigation, repeat the procedure and include proposed mitigation.

**Table 4-12 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Highway/Transit General Noise Assessment**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(V) + C_S log(\frac{S}{50}) - 35.6$ | **Eq. 4-10** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{Aeq(1hr)}$ where V = $V_d$ | **Eq. 4-11** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{Aeq(1hr)}$ where V = $V_n$ | **Eq. 4-12** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-13** |
| **Barrier Adjustment** | = -5 for noise barriers | |
| $V$ | = hourly volume of vehicles, vehicles per hour | |
| $C_s$ | = Speed constant<br>15 for diesel buses<br>28 for electric buses<br>21 for hybrid buses[23]<br>30 for automobile and van pools | |
| S | = average vehicle speed, mph | |
| $V_d$ | = average hourly daytime volume of vehicles, vehicles per hour<br>$= \frac{total\ number\ of\ vehicles, 7\ a.m.\ to\ 10\ p.m.}{15}$ | |
| $V_n$ | = average hourly nighttime volume of vehicles, vehicles per hour<br>$= \frac{total\ number\ of\ vehicles, 10\ p.m.\ to\ 7\ a.m.}{9}$ | |

**Option C: Stationary Sources** – Stationary sources include fixed transit system facilities. New transit facilities undergo a site review for best location that considers the noise sensitivity of surrounding land uses. Although many facilities such as bus maintenance garages are usually located in industrial and commercial areas, some facilities such as bus terminals, ferry terminals, train stations, and park-and-ride lots may be placed near residential neighborhoods where noise impact may occur. Access roads to some of these facilities may also



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pass through noise-sensitive areas. Noise from access roads is treated according to the procedures described in the Highway/Transit Sources category. In a General Noise Assessment, only the prominent features of each fixed facility are considered in the noise analysis.

**C.i.** For small facilities, using Table 4-13, determine the reference source noise levels 50 ft from the center of the site in terms of SEL. The source reference levels given in the table are based on measurements for the peak hour of operation of a typical stationary source of the noted type and size.

A large facility, such as a rail yard, is spread out over considerable area with various noise sources with different noise levels depending on the layout of the facility. Specifying a single reference SEL for the facility at 50 ft from the center of the site could be misleading if all of these different noise sources are not represented. Therefore, the reference distance should be the equivalent distance of 50 ft, which is determined by estimating the noise levels from the center of the site at a distance far enough to capture all noise sources and projecting back to 50 ft from the center of the site. This approach allows for a conservative estimate of noise for all surrounding areas and the equivalent noise can be considered as concentrated at the center of the site. If the location of noise sources is known, then the distance should be taken from the point of the noisiest activity on the site (e.g., the dock in the case of ferry boat operations) instead of the center of the site.

**Table 4-13 Source Reference Levels at 50 ft from Center of Site, Stationary Sources**

| Source | Reference SEL, dBA | Reference Conditions |
|---|---|---|
| ***Rail System*** | | |
| Yards and shops | 118 | 20 train movements in peak activity hour |
| Layover tracks (commuter rail) | 109 | 1 train with diesel locomotive idling for 1 hour |
| Crossing signals | 109 | 3600 second duration |
| ***Bus System*** | | |
| Storage yard | 111 | 100 buses accessing facility in peak activity hour |
| Operating facility | 114 | 100 buses accessing facility, 30 buses serviced and cleaned in peak activity hour |
| Transit center | 101 | 20 buses in peak activity hour |
| ***Ferry Terminal*** | | |
| Ferry boat (no fog horn sounded) | 97 | 4 ferry boat landings in 1 hour |
| Ferry boat (fog horn sounded) | 100 | |
| ***Parking Garage*** | 92 | 1000-car capacity in peak activity hour |
| ***Park & Ride Lot*** | 101 | 12 buses, 1000 cars in peak activity hour |

**C.ii.** Collect the following data:

- Number of layover tracks and hours of use
- Number of buses, if different from assumed reference conditions (if this number varies during the day or night, take the average)
- Number of ferry boat landings, if different from assumed reference conditions (if this number varies during the day or night, take the average)
- Actual capacity of parking garage or lot



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**C.iii.** Calculate $L_{eq(1hr)}$ at 50 ft. Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-14.

**C.iv.** Calculate $L_{dn}$ at 50 ft. If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-14.

The equations in Table 4-14 include a numerical adjustment to account for the one-hour time period for this metric. See Appendix B.1.4.4 for more information on the numerical adjustment.

Table 4-14 presents an estimate of noise reduction potentially provided by noise barriers at the property line. Only approximate locations and lengths for barrier or other noise mitigation measures are developed during a General Noise Assessment to provide a preliminary indication of the costs and benefits of mitigation. A Detailed Noise Analysis of the preferred alternative is usually warranted following the General Noise Assessment (if it predicts any impacts) to verify impacts and design the mitigation.

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**Table 4-14 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Stationary Source General Noise Assessment***

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + C_N - 35.6$ | **Eq. 4-14** |
| **Daytime** $L_d$ at 50 ft | $L_d = 10\log((\frac{1}{15}) \sum_{7am-10pm} 10^{(L_{Aeq(1hr)}/10)})$ | **Eq. 4-15** |
| **Nighttime** $L_n$ at 50 ft | $L_n = 10\log((\frac{1}{9}) \sum_{10pm-7am} 10^{(L_{Aeq(1hr)}/10)})$ | **Eq. 4-16** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-17** |
| **Barrier Adjustment** | = -5 for noise barrier at property line | |
| **Volume Adjustment** | $= C_N$ | |
| | $= 10\log(\frac{N_T}{20})$ Rail yards and shops | |
| | $= 10\log(N_T)$ Layover tracks | |
| | $= 10\log(\frac{N_B}{100})$ Bus storage yard | |
| | $= 10\log(\frac{N_B}{200} + \frac{N_S}{60})$ Bus operating facility | |
| | $= 10\log(\frac{N_B}{20})$ Bus transit center | |
| | $= 10\log(\frac{N_V}{4})$ Ferry terminal | |
| | $= 10\log(\frac{N_A}{1000})$ Parking garage | |
| | $= 10\log(\frac{N_A}{2000} + \frac{N_B}{24})$ Park & ride lot | |
| | $= 10\log(\frac{E}{3600})$ Crossing signals | |
| | $N_T$ = average number of trains per hour during the day (7AM to 10PM) or night (10PM to 7AM)<br>$N_B$ = average number of buses per hour during the day or night<br>$N_V$ = average number of ferry boat landings per hour during the day or night<br>$N_S$ = average number of buses serviced and cleaned per hour during the day or night<br>$N_A$ = average number of automobiles per hour during the day or night<br>E = average hourly duration of events, sec during the day or night | |

* If any of these numbers is zero, omit that term.



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## Step 3: Estimate Project Noise Exposure by Distance

*Estimate the project noise exposure for locations beyond the reference distance, such as for noise-sensitive land uses.*

In the previous step, noise exposure at the reference distance of 50 ft was calculated for the various noise sources. This step describes how to estimate the project noise exposure beyond (or, if needed, closer than) the reference distance, such as at noise-sensitive land uses locations. This procedure estimates the source's noise exposure as a function of distance. Adjustments are provided to account for shielding attenuation from rows of buildings.

**3a.** Select the appropriate distance correction curve (Fixed-Guideway & Highway or Stationary) from Figure 4-6. The Fixed-Guideway & Highway curve refers to line sources while the Stationary curve is refers to point sources. The distance correction factor ($C_{distance}$) is 0 dB at 50 ft.

**3b.** Choose a distance other than 50 ft, such as the distance to a receiver. Determine the correction factor using Figure 4-6 or calculate using the equations in Table 4-15.[18] For distances beyond 1,000 ft, the equations in Table 4-15 can be used; however, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. More detailed calculation methods may be required to account for those effects beyond 1,000 ft.

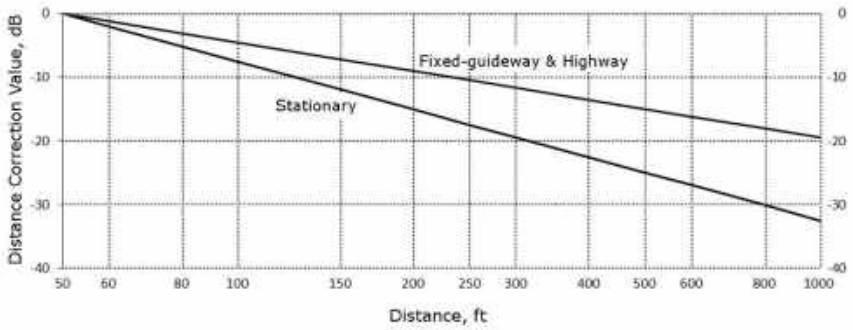


**Figure 4-6 Curves for Estimating Exposure vs. Distance in General Noise Assessment**

[18] Note that the curves and equations assume acoustically soft ground beyond a distance of 50 ft. See Table 4-27 for more detailed calculation of ground attenuation.



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**Table 4-15 Distance Correction Factor Equations for General Noise Assessment**

| Source | Equation | |
|---|---|---|
| Stationary Sources | $C_{distance} = -25\log(\frac{D}{50})$ | Eq. 4-18 |
| Fixed-guideway and Highway | $C_{distance} = -15\log(\frac{D}{50})$ | Eq. 4-19 |
| $D$ = distance, ft | | |

**3c.** Apply the distance correction ($C_{distance}$) to the project noise exposure at 50 ft (Section 4.4, Step 2) using the following equation:

$$L_{distance} = L_{50} + C_{distance} \quad \text{Eq. 4-20}$$

where:

$L_{distance}$ = $L_{dn}$ or $L_{eq(1hr)}$ at the new distance in feet
$L_{50}$ = $L_{dn}$ or $L_{eq(1hr)}$ at 50 ft

**3d.** Repeat Step 3c for each source-receiver distance from the project. A noise exposure vs. distance curve can be created, if desired, by calculating the noise exposure for all distances of interest and plotting a curve. This curve can be used to assist in determining the noise impact contour for the first row of unobstructed buildings. This plot can be used to display noise from both unmitigated and mitigated conditions to assess the potential benefits from mitigation measures.

For second row receivers and beyond, it is necessary to account for shielding attenuation from rows of intervening buildings. Without accounting for shielding, impacts may be substantially overestimated. Use the following general rules to account for the effect of shielding from intervening rows of buildings:

- Assign 4.5 dB of shielding attenuation for the first row of intervening buildings only.
- Assign 1.5 dB of shielding attenuation for each subsequent row, up to a maximum total attenuation of 10 dB.

## Step 4: Combine Noise Exposure from All Sources

*Combine all sources to predict the total project noise at the receivers using the equations in Table 4-16, once propagation adjustments have been made for the noise exposure from each source separately (fixed-guideway, highway/transit, and stationary).*

**Table 4-16 Computing Total Noise Exposure**

| | | |
|---|---|---|
| Total $L_{eq(h)}$ from all sources for the hour of interest: | $L_{eq\,total(1hr)} = 10\log(\sum_{all\ sources} 10^{L_{eq}/10})$ | Eq. 4-21 |
| Total $L_{dn}$ from all sources | $L_{dn,total} = 10\log(\sum_{all\ sources} 10^{L_{dn}/10})$ | Eq. 4-22 |



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## Step 5: Estimate Existing Noise Exposure

*Measure the existing noise or estimate the existing noise exposure using a simplified procedure.*

Existing noise in the project vicinity must be quantified and compared to the project noise to determine the potential noise impact. It is generally recommended to measure existing noise, especially at locations known to be noise-sensitive, but if measurement results are not available then they must be estimated. In the Detailed Noise Analysis, the existing noise exposure is usually based on noise measurements at representative locations in the community.

It is not necessary or recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for "clusters" of sites based on measurements or estimates at representative locations in the community. Because of the sensitivity of the noise criteria to the existing noise exposure, careful characterization of pre-project ambient noise is important. Guidelines for selecting representative receiver locations and determining ambient noise are provided in Appendix D and Appendix E, respectively.

**Changes to Existing Transit**
For projects that propose changes to an existing transit system, such as a rehabilitation project, the project noise can include changes to the existing noise because of the project, and so it is not possible to define project noise separately. For these projects, refer to Section 4.1, Step 3 – Option B, on using the cumulative noise criteria.

This section describes how to estimate the existing noise in the project study area from general data available early in project planning. The procedure uses Table 4-17, where a neighborhood's existing noise exposure is based on proximity to nearby major roadways or railroads, or on population density. For areas near major airports, published aircraft noise contours can also be used to estimate the existing noise exposure. The process is as follows:

**5a.** Obtain scaled mapping and aerial photographs showing the project location and alternatives. A scale of 1 inch = 200 or 400 ft is convenient for the accuracy needed in the noise assessment. The size of the base map should be sufficient to show distances of at least 1000 ft from the center of the alignment or property center, depending on whether the project is a line source (fixed guideway/ roadway) or a stationary facility. These data are commonly available from local transit agencies and a number of publicly available online tools.

**5b.** Estimate the existing noise exposure by estimating the noise from major roads and railroad lines or by population density. First, evaluate the site's proximity to major roads and railroad lines including those that are included in the project. If these noise sources are far enough away that ambient noise is dominated by local streets and community activities, estimate the existing noise based on population density. To choose the appropriate existing noise exposure, compare noise levels from each of the three categories—Roadways, Railroads, and Population Density—and select the lowest level. In case of a



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lightly used railroad (one train per day or less) select the Population Density category. Existing noise levels are presented in Table 4-17. Refer to Section 4.1, Step 3 – Option B, on using the cumulative noise criteria for projects that propose changes to an existing transit system, such as a rehabilitation project.

**Option A: Roadways –** Major roadways are separated into two categories for a general noise assessment. Roadways that cannot be described by these two categories are not considered major roadways and would use the Population Density method described below. The roadway categories are as follows:

- Interstate highway—roadways with 4 or more lanes that allow trucks
- Other roadway—parkways without trucks and city streets with the equivalent of 75 or more heavy trucks per hour or 300 or more medium trucks per hour

The estimated roadway noise levels in Table 4-17 are based on data for light to moderate traffic on typical highways and parkways using FHWA highway noise prediction procedures. Where a range of distances is given, the noise exposure estimates are given at the larger distance (note that the traffic noise at the smaller distance is underestimated). For highway noise, distances are measured from the centerline of the near lane for roadways with two lanes, while for roadways with more than two lanes the distance is measured from the geometric mean of the roadway. This distance is computed as follows:

$$D_{GM} = \sqrt{(D_N)(D_F)} \qquad \textbf{Eq. 4-23}$$

where:

$D_{GM}$ = distance to the geometric mean in feet
$D_N$ = distance to the nearest lane centerline in feet
$D_F$ = distance to the farthest lane centerline in feet

**Option B: Railroad Lines –** For railroads, the estimated noise levels are based on an average train traffic volume of 5–10 trains per day at 30–40 mph for main line railroad corridors and the noise levels are provided in terms of $L_{dn}$ only. Distances are referenced to the track centerline, or in the case of multiple tracks, to the centerline of the rail corridor. Because of the intermittent nature of train operations, train noise will affect the $L_{eq(1hr)}$ only during certain hours of the day, and these hours may vary from day to day. Therefore, to avoid underestimating noise impact when using $L_{eq(1hr)}$, it is recommended that sites near rail lines are estimated based on nearby roadways or population density unless very specific train information is available.

**Option C: Population Density –** In areas away from major roadways, noise from local streets or in neighborhoods is estimated using a relationship determined during a research program by EPA.[24] EPA determined that ambient noise can be related to population density in locations away from transportation corridors, such as airports, major roads and railroad tracks, according to the following relation:

$$L_{dn} = 22 + 10\log(p) \qquad \textbf{Eq. 4-24}$$



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Cont.

where:

$L_{dn}$ = in dBA
$p$ = population density in people per square mile

In areas near major airports, published noise contours can be used to estimate the existing noise exposure. The $L_{dn}$ from such contours should be applied if greater than the estimates of existing noise from other sources at a given location.

**Table 4-17 Estimating Existing Noise Exposure for General Noise Assessment**

| Dominant Existing Noise Source | Distance from Major Noise Source, ft* | Population Density, people per sq. mi. | *Noise Exposure Estimates* | | | |
|---|---|---|---|---|---|---|
| | | | $L_{eq}$ Day | $L_{eq}$ Evening | $L_{eq}$ Night | $L_{dn}$ |
| Interstate Highway** | 10–50 | | 75 | 70 | 65 | 75 |
| | 50–100 | | 70 | 65 | 60 | 70 |
| | 100–200 | | 65 | 60 | 55 | 65 |
| | 200–400 | | 60 | 55 | 50 | 60 |
| | 400–800 | | 55 | 50 | 45 | 55 |
| | 800 and up | | 50 | 45 | 40 | 50 |
| Other Roadway† | 10–50 | | 70 | 65 | 60 | 70 |
| | 50–100 | | 65 | 60 | 55 | 65 |
| | 100–200 | | 60 | 55 | 50 | 60 |
| | 200–400 | | 55 | 50 | 45 | 55 |
| | 400 and up | | 50 | 45 | 40 | 50 |
| Railway†† | 10–30 | | -- | -- | -- | 75 |
| | 30–60 | | -- | -- | -- | 70 |
| | 60–120 | | -- | -- | -- | 65 |
| | 120–240 | | -- | -- | -- | 60 |
| | 240–500 | | -- | -- | -- | 55 |
| | 500–800 | | -- | -- | -- | 50 |
| | 800 and up | | -- | -- | -- | 45 |
| Population | | 1–100 | 35 | 30 | 25 | 35 |
| | | 100–300 | 40 | 35 | 30 | 40 |
| | | 300–1000 | 45 | 40 | 35 | 45 |
| | | 1000–3000 | 50 | 45 | 40 | 50 |
| | | 3000–10000 | 55 | 50 | 45 | 55 |
| | | 10000–30000 | 60 | 55 | 50 | 60 |
| | | 30000 and up | 65 | 60 | 55 | 65 |

*Distances do not include shielding from intervening rows of buildings. Generally, for estimating shielding attenuation in populated areas, assume 1 row of buildings every 100 ft, 4.5 dB for the first row, and 1.5 dB for every subsequent row up to a maximum of 10 dB attenuation.
** Roadways with 4 or more lanes that permit trucks, with traffic at 60 mph.
† Parkways with traffic at 55 mph, but without trucks, and city streets with the equivalent of 75 or more heavy trucks per hour and 300 or more medium trucks per hour at 30 mph.
†† Main line railroad corridors typically carrying 5-10 trains per day at speeds of 30-40 mph.

## Step 6: Inventory Noise Impacts

*Inventory the potential noise impacts either by comparing the project and existing noise at each noise-sensitive land use or by developing noise impact contours.*

Use land use information and assumptions for shielding attenuation from rows of buildings. In some cases, it may be necessary to supplement the land use information or determine the number of dwelling units within a multi-family building with a visual survey. If the objective is to compare major alignment options, it may not be necessary to identify every different type of noise-



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Cont.

sensitive land use. The inventory may include a subset of land uses, including residential and public institutional uses.

Option A is the preferred method as it quantifies the noise impact at each noise-sensitive land use indicating the severity of the impact. Option B may be useful for comparing and narrowing down major alignment options with numerous noise-sensitive land uses.

**Option A: Compare existing noise to project noise at each noise-sensitive land use.**

**A1.** Tabulate each individual noise-sensitive land use building and site within the identified screening distance (Section 4.3).

**A2.** Determine for each noise-sensitive land use the existing noise (Section 4.4, Step 5), the project noise (Section 4.4, Step 3) and the resulting change in noise.

**A3.** Designate each noise-sensitive land use with either a no, moderate, or severe noise impact based on the criteria in Section 4.1.

**A4.** Identify all moderate and severe impacts on a project map.

**Option B: Develop noise impact contours.**

**B1.** Determine the noise level thresholds at which the project noise would cause moderate and severe impacts using the estimated existing noise exposure from Section 4.4, Step 5 and the noise impact criteria in Figure 4-2.

**B2.** Determine the distances from the project boundary to the two impact levels using the noise exposure vs. distance curves or equations in Section 4.4, Step 3.

**B3.** Plot points on a project land use map that correspond to the distances determined in Section 4.4, Step 3. Continue this process for all areas surrounding the project. Connect the plotted points to represent the noise impact contours.

**B4.** Tabulate all noise-sensitive land use buildings and sites that lie between the impact contours and the project boundary. For residential buildings, an estimate of the number of dwelling units is satisfactory.

**B5.** Prepare summary tables showing the number of buildings (and estimated dwelling units, if available) within both impact categories.

Specific decibel level noise contours, for example, 65 dBA, can also be plotted if desired. The distances can be determined using the procedure in Section 4.4, Step 3 by substituting the desired decibel level for the impact threshold.

Locations of points will change with respect to the project boundary as the existing ambient exposure changes, the project source levels change, and as shielding effects change. It is recommended to plot points close together to



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Cont.

draw a smooth curve. For a General Noise Assessment, the contours may be drawn through buildings and terrain features as if they were not present. This practice is acceptable considering the level of detail associated with a project in its early stages of development. Example 4-1 and Example 4-4 describe the development of noise contours with illustrations.

### Step 7: Determine Noise Mitigation Needs

*Apply estimates of the noise reduction from proposed mitigation measures (Section 4.4, Step 2), where the assessment shows either severe or moderate impact, and repeat the tabulation of noise impacts.*

Note that noise barriers are the only form of mitigation available in a General Noise Assessment. The other mitigation measures are available for a Detailed Noise Analysis. The approximate noise barrier lengths and locations developed in a General Noise Assessment provide a preliminary basis for evaluating the costs and benefits of impact mitigation. This evaluation will provide a conservative estimate of the effect of the mitigation on the identified impacts.

In general, it is recommended to complete a Detailed Noise Analysis for final mitigation measures. However, if impact is identified through a General Noise Assessment and can be mitigated to a level of no impact using the noise reduction estimates included in the General Noise Assessment, a Detailed Noise Analysis may not be needed. Mitigation assumed in the assessment used for the NEPA evaluation must be included in the project as a commitment. Consult with the FTA Regional office to determine if a Detailed Noise Analysis is required for final mitigation measures.

The following examples illustrate how to complete general noise assessments for varying project types including commuter rail, highway/transit, BRT system, and a transit center.

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Cont.

### Example 4-1 General Noise Assessment – Commuter Rail

**General Noise Assessment for a Commuter Rail System in an Existing Abandoned Railroad Right-of-Way**

The following example illustrates the General Noise Assessment procedure for a new fixed-guideway project. The hypothetical project is a commuter rail system to be built within the abandoned ROW of a railroad. The example covers a segment of the corridor that passes through a densely developed area with population density of 25,000 people per square mile in mixed single- and multi-family residential land uses as shown in Figure 4-7. The example is presented in two parts: first, a segment where the rail line is grade-separated and a horn is not sounded; and second, an at-grade street-rail crossing where the horn is sounded.

**Assumptions**

- **Project Corridor**
  Existing population density is 25,000 people per square mile.
- **Commuter Rail System**
  Commuter train with one locomotive and a three-car consist on a double-track at-grade system with welded rail. Trains operate with 20-minute headways during peak hours and 1-hour headways during off-peak. Speeds are approximately 40 mph along the corridor.

**Operating Schedule**

| | Period | Headway (minutes) Inbound | Headway (minutes) Outbound | Trains per hour Inbound | Trains per hour Outbound | Trains per hour Total | Period Total |
|---|---|---|---|---|---|---|---|
| Daytime | 7 a.m. – 8 a.m. | 20 | 20 | 3 | 3 | 6 | 6 |
| | 8 a.m. – 4 p.m. | 60 | 60 | 1 | 1 | 2 | 16 |
| | 4 p.m. – 6 p.m. | 20 | 20 | 3 | 3 | 6 | 12 |
| | 6 p.m. – 10 p.m. | 60 | 60 | 1 | 1 | 2 | 8 |
| Nighttime | 10 p.m. – 11 p.m. | 60 | 60 | 1 | 1 | 2 | 2 |
| | 11 p.m. – 5 a.m. | -- | -- | -- | -- | -- | -- |
| | 5 a.m. – 6 a.m. | 60 | 60 | 1 | 1 | 2 | 2 |
| | 6 a.m. – 7 a.m. | 20 | 20 | 1 | 1 | 2 | 2 |

***Part 1: Grade-Separated Street Crossing***

**Determine Project Source Reference Levels at 50 ft**

Classify the noise source: Fixed-Guideway Transit
Determine noise source reference level from Table 4-9:
Locomotive: 92 dBA
Cars: 82 dBA

**Estimate Project Noise Exposure at 50 ft**

Determine average hourly daytime and nighttime volumes of train traffic.

Daytime (7 a.m. – 10 p.m.)

$$V_d = \frac{42\ trains}{15\ hours} = 2.8\ trains/hour$$

Nighttime (10 p.m. – 7 a.m.)

$$V_n = \frac{6\ trains}{9\ hours} = 0.7\ trains/hour$$

Use Eq. 4-1 and Eq. 4-3 to calculate the daytime $L_{eq(1hr)}$ at 50 ft for the locomotives and rail cars.

$$\begin{aligned} L_{d,Locos} &= SEL_{ref} + 10log(N_{Locos}) + Klog(\frac{S}{50}) + 10log(V_d) - 35.6 \\ &= 92 + 10log(1) - 10log(\frac{40}{50}) + 10log(2.8) - 35.6 \\ &= 61.8\ dBA \text{ at 50 ft} \end{aligned}$$

$$\begin{aligned} L_{d,RCars} &= SEL_{ref} + 10log(N_{Cars}) + 20log(\frac{S}{50}) + 10log(V_d) - 35.6 \\ &= 82 + 10log(3) + 20log(\frac{40}{50}) + 10log(2.8) - 35.6 \\ &= 53.7\ dBA \text{ at 50 ft} \end{aligned}$$

Calculate the total daytime $L_d$ for the locomotive and rail cars using Eq. 4-7.

$$\begin{aligned} L_{d,Combo} &= 10log(10^{L_{d,Loco}/10} + 10^{L_{d,RCars}/10}) \\ &= 10log(10^{61.8/10} + 10^{53.7/10}) \\ &= 62.4\ dBA \text{ at 50 ft} \end{aligned}$$



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Cont.

Calculate the nighttime $L_{eq(1hr)}$ at 50 ft for the locomotives and rail cars.

$$L_{n,Locos} = SEL_{ref} + 10\log(N_{Locos}) + K\log(\frac{S}{50}) + 10\log(V_n) - 35.6$$
$$= 92 + 10\log(1) - 10\log(\frac{40}{50}) + 10\log(0.7) - 35.6$$
$$= 55.8\ dBA \text{ at 50 ft}$$

$$L_{n,RCars} = SEL_{ref} + 10\log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\log(V_n) - 35.6$$
$$= 82 + 10\log(3) + 20\log(\frac{40}{50}) + 10\log(0.7) - 35.6$$
$$= 47.7\ dBA \text{ at 50 ft}$$

Calculate the total nighttime $L_n$ for the locomotive and rail cars using Eq. 4-8.

$$L_{n,Combo} = 10log(10^{L_{n,Locos}/10} + 10^{L_{n,RCars}/10})$$
$$= 10log(10^{55.8/10} + 10^{47.7/10})$$
$$= 56.4\ dBA \text{ at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-9.

$$L_{dn,Combo} = 10log\ (15 \times 10^{(L_{d,Combo}/10)} + 9 \times 10^{((L_{n,Combo}+10)/10)}) - 13.8$$

**Estimate Existing Noise Exposure**

Estimate existing noise at noise-sensitive sites. Since the existing alignment is on an abandoned railroad, the dominant existing noise source can be described by a generalized noise level to characterize a large area. Use Table 4-17 and population density of 25,000 people per square mile to determine the existing noise level. Unobstructed residences range from 100 to 200 ft from the rail line.

According to Table 4-17: $L_{dn}$ = 60 dBA

**Determine Noise Level and Distance for the Onset Of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 60 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{dn}$.

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 60 dBA | 58 dBA | 64 Dba |

Determine the distance from the project noise sources to the noise impact contours using the fixed-guideway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise level at 50 ft is approximately 64 dBA.

Moderate impact (58 dBA)

$$58 - 64 = -6\ dB$$

According to Figure 4-6, the distance correction is approximately -6 dB at 120 ft.

Severe Impact (64 dBA)

$$64 - 64 = 0\ dB$$



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According to Figure 4-6, the distance correction is less than 0 dB at approximately 51 ft.

| Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 64 dBA | 120 ft | 51 ft |

**Develop Noise Impact Contours**

Draw contours for each affected land use, based on the above table and its distance from the rail line (Figure 4-7). Note that the impact distances listed are in terms of distance to the centerline of the Commuter Rail corridor.

**Inventory of Noise Impact**

There are six residential buildings within the contours defining moderate impact (shaded in Figure 4-7).

**Noise Mitigation**

The procedure is repeated assuming a noise barrier to be placed at the railroad ROW line. The barrier serves to reduce project noise from the commuter rail by at least 5 dB. Note that the barrier does not affect the project criteria to be used in determining impact, and the same existing noise levels (as the case without a barrier) are used to determine these thresholds.

In this example, the noise barrier decreases the distance to moderate impact from 120 to 60 ft and eliminates all residential noise impact for this segment of the project area.

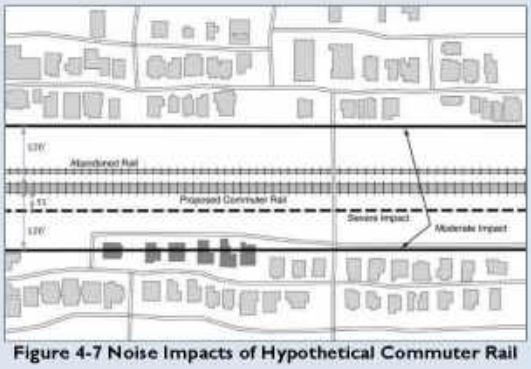


**Figure 4-7 Noise Impacts of Hypothetical Commuter Rail**

***Part 2: At-Grade Crossing with Horn Blowing***

Now consider the case of an active street crossing of the commuter railroad tracks. The General Noise Assessment method includes source reference levels for horns on moving trains and warning bells (crossing signals) at the street crossing. According to Table 4-9, the horn noise applies to track segments within ¼ mile of the grade crossing.

**Estimate Project Noise Exposure at 50 ft**

Using the train volumes from Part 1 and the information in Table 4-9 and Table 4-10, determine the day and nighttime $L_{eq(1hr)}$ from sounding the horns at 50 ft.

$$\begin{aligned} L_{d,Horns} &= SEL_{ref} + 10\log(V_d) - 35.6 \\ &= 110 + 10\log(2.8) - 35.6 \\ &= 78.9\ dBA \end{aligned}$$

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Cont.

$$L_{n,LHorns} = SEL_{ref} + 10\log(V_n) - 35.6$$
$$= 110 + 10\log(0.7) - 35.6$$
$$= 72.9\ dBA$$

Calculate the $L_{dn}$ at 50 ft from train horns using Eq. 4-9 :

$$L_{dn,LHorns} = 10\log(15 \times 10^{(L_{d,LHorns}/10)} + 9 \times 10^{((L_{n,LHorns}+10)/10)}) - 13.8$$
$$= 81\ dBA$$

At-grade street crossings will have warning bells, typically sounding for 20 seconds for every train passby. The total daytime and nighttime durations are as follows:

$E_d$ = average daytime hourly duration
=20 seconds X 2.8 trains/hour = 56 seconds/hour

$E_n$ = average nighttime hourly duration
=20 seconds X 0.7 trains/hour = 14 seconds/hour

From Table 4-14:

$$L_{d,WBell} = SEL_{ref} + 10\log(\frac{E_d}{3600}) - 35.6$$
$$= 109 + 10\log(\frac{56}{3600}) - 35.6$$
$$= 55.3\ dBA$$

$$L_{n,WBell} = SEL_{ref} + 10\log(\frac{E_n}{3600}) - 35.6$$
$$= 109 + 10\log(\frac{14}{3600}) - 35.6$$
$$= 49.3\ dBA$$

Calculate $L_{dn}$ at 50 ft. from the warning bells using Eq. 4-17:

$$L_{dn,WBell} = 10\log(15 \times 10^{(L_{d,WBell}/10)} + 9 \times 10^{((L_{n,WBell}+10)/10)}) - 13.8$$
$$= 57.3\ dBA$$

Compared to horn blowing, the crossing signal warning bell noise is negligible, but still must be included in the evaluation.

**Estimate Existing Noise Exposure**

From Part 1, the existing noise level is 60 dBA.

**Determine Noise Level and Distance for the Onset Of Impact**

As in Part 1, the existing noise level (60 dBA) is used to determine the onset of moderate and severe impacts:

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 60 dBA | 58 dBA | 64 dBA |



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Cont.

Determine the distance from the project noise sources to the impact contours using the fixed-guideway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise at 50 ft is approximately 81 dBA. However, there are at least two intervening rows of buildings, which will provide 6 dB (4.5 dB for the first row and 1.5 dB for the second row) of shielding.

Moderate impact (58 dBA)

$$58 - (81 - 6) = -17\ dB$$

According to Figure 4-6, the distance correction is approximately -17 dB at 715 ft.

Severe Impact (64 dBA)

$$64 - (81 - 6) = -11\ dB$$

According to Figure 4-6, the distance correction is approximately -11 dB at 265 ft.

| Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 81 dBA | 715 ft | 265 ft |

**Draw Noise Impact Contours**

Contours can be drawn as in Part 1 for ¼ mile on either side of the grade crossing.

## Example 4-2 General Noise Assessment – Highway/Transit

**General Noise Assessment Example of Highway/Transit Corridor Projects**

This example illustrates a highway/transit project where the highway noise dominates and the FHWA assessment methods should be used to inform the FTA process according to the impact criteria in Section 4.1.

**Case 1: Highway Dominates**

A new LRT system is planned for the median of a major highway that carries heavy traffic both day and night. The noise levels at the first row of houses along the highway were measured during peak hour, mid-day and nighttime with hourly $L_{eq(1hr)}$ readings of 65 dBA, 63 dBA, and 60 dBA, respectively. The LRT tracks will be 125 ft from the first row of houses. The LRT operations during peak hour will be 4-car trains at 45 mph, with 5-minute headways in both directions. Nighttime service decreases to 2-car trains and 20 minute headways.

FTA is providing a share of the funding for the LRT project, but the State DOT and the FHWA are co-lead agencies because the median requires considerable preparation for the tracks, including replacing bridge piers of street crossings and moving some highway lanes.

**Assumptions**

$SEL_{ref}$ = 82 dBA
$Nd$ = 4 cars per train
$Nn$ = 2 cars per train
$S$ = 45 mph
$V_d$ = 24 trains per hour
$V_n$ = 6 trains per hour

**Estimate Project Noise Exposure at 50 ft**

Use Table 4-9 and Table 4-10 to determine the peak hour $L_{eq(1hr)}$ for the rail vehicles.

Use Eq. 4-3 to calculate the LRT peak-hour noise level.

$$L_{d,RCars}(h) = SEL_{ref} + 10\,log(N_{cars}) + 20\log(\tfrac{S}{50}) + 10\,log(V) - 35.6$$
$$= 82 + 10\,log(4) + 20\log(\tfrac{45}{50}) + 10\,log(24) - 35.6$$
$$= 65 \text{ dBA at 50 ft}$$



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Cont.

Use Eq. 4-3 to calculate the LRT late evening hourly noise level.

$$L_{n,RCars}(h) = SEL_{ref} + 10\,log(N_{cars}) + 20\log(\tfrac{S}{50}) + 10\,log(V) - 35.6$$
$$= 82 + 10\,log(2) + 20\log(\tfrac{45}{50}) + 10\,log(6) - 35.6$$
$$= 56 \text{ dBA at 50 ft}$$

**Estimate Project Noise Exposure at 125 ft**

Since the LRT tracks will be 125 ft from the first row of houses, use Figure 4-6 to determine the level at 125 ft.

At 125 ft, the distance correction is 5 dB.
Peak hour:

$$65 - 5 = 60\ dBA\ at\ 125\ ft$$

Night hourly:

$$56 - 5 = 51\ dBA\ at\ 125\ ft$$

In this case, the highway dominates the noise environment in the area both day and night, by 5 dB during peak hour and 9 dB at night. According to Section 4.1 and Table 4-2, use the FHWA assessment methods.

## Example 4-3 General Noise Assessment – BRT System

**General Noise Assessment for a BRT System in an Existing Railroad Right-of-Way**

This example for a simple BRT project illustrates using the FTA procedures for a new BRT corridor planned in an existing abandoned railroad ROW.

**Assumptions**

| | |
|---|---|
| $SEL_{ref}$ | = 82 for buses |
| $S$ | = 25 mph |
| $V_d$ | = (344 buses) / (15 hours) = 22.9 buses per hour |
| $V_n$ | = (116 buses) / (9 hours) = 12.9 buses per hour |

**Estimate Project Noise Exposure**

Use the information and equations in Table 4-12 to calculate the daytime and nighttime $L_{eq(hr)}$ at 50 ft.

$C_S$ = 15 for buses

$$L_{d,Bus} = SEL_{ref} + 10\,log(V_d) + C_S\log(\tfrac{S}{50}) - 35.6$$
$$= 82 + 10\,log(22.9) + 15log(\tfrac{25}{50}) - 35.6$$
$$= 55 \text{ dBA at 50 ft}$$

$$L_{n,Bus} = SEL_{ref} + 10\,log(V_n) + C_S\log(\tfrac{S}{50}) - 35.6$$
$$= 82 + 10\,log(12.9) + 15log(\tfrac{25}{50}) - 35.6$$
$$= 53 \text{ dBA at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-13.

$$L_{dn,Bus} = 10\log(15 \times 10^{(L_{d,Bus}/10)} + 9 \times 10^{((L_{n,Bus}+10)/10)}) - 13.8$$
$$= 60 \text{ dBA at 50 ft}$$

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Cont.

**Estimate Existing Noise Exposure**

The surrounding area is residential with 2,500 people per square mile starting approximately 100 ft away from the proposed alignment. Determine the existing noise using Table 4-17.

$L_{eq}$ = 50 dBA

**Determine Noise Level and distance for the Onset of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 50 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{eq}$.

| Existing Noise $L_{eq}$ | Onset of Moderate Impact $L_{eq}$ | Onset of Severe Impact $L_{eq}$ |
|---|---|---|
| 50 dBA | 54 dBA | 59 dBA |

Determine the distance to the noise impact contours using the fixed-guideway & highway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise level at 50 ft is approximately 60 dBA.

Moderate impact (54 dBA)

$$54 - 60 = -6\,dB$$

According to Figure 4-6, the distance correction is approximately -6 dB at 125 ft.

Severe Impact (59 dBA)

$$59 - 60 = -1\,dB$$

According to Figure 4-6, the distance correction is less than -1 dB at approximately 60 ft.

| Project Level $L_{eq}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 60 dBA | 125 ft | 60 ft |

**Inventory of Noise Impact**

Since there are residential land uses approximately 100 ft away from the proposed alignment and the onset of moderate impact is at 125 ft, there are possible moderate impacts to the residences.

**Noise Mitigation**

A barrier is proposed for mitigation between the BRT system and the residences. The analysis is repeated and results in a predicted new project level of 55 dBA and the following impact distances:

| Mitigated Project Level $L_{eq}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 55 dBA | 60 ft | N/A |

With a noise barrier in place between the BRT system and the residences, it is predicted that the onset of moderate impact would occur approximately 60 ft away from the BRT system. Since the residential area begins approximately 100 ft away from the BRT system, which is beyond the distance of moderate impact (60 ft), a noise barrier would provide the appropriate noise mitigation for the predicted moderate impact. The onset of severe impact is listed as N/A because with a noise barrier, the severe impact criterion is not exceeded by the project.



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Cont.

## Example 4-4 General Noise Assessment – Transit Center

### General Noise Assessment for a Transit Center

The following example illustrates the procedure for performing a General Noise Assessment for a stationary source. The example represents a typical FTA-assisted project in an urban area, the siting of a busy transit center in a mixed commercial and residential area, as shown in Figure 4-8.

Assume that the Noise Screening Procedure has already been done for this project and the nearest residence has been identified approximately 140 ft from the center of the proposed transit center. Recall that if any residential or other noise-sensitive land use is identified within 150 ft of a transit center during the Noise Screening Procedure, additional analysis is required.

**Assumptions**

- **Main Street Traffic**
  Peak hour traffic of 1200 autos, 20 heavy trucks, 300 medium trucks.
- **Population Density**
  12 houses per block, single family homes, 3 people per family.
  - Block area 78,750 square ft.
  - Population density = 9,750 people/square mile.
- **Bus Traffic**

| Period | Hours | Buses per Hour |
|---|---|---|
| Peak, Morning | 7 a.m.–9 a.m. | 30 |
| Peak, Afternoon | 4 p.m.–6 p.m. | 30 |
| Mid-day | 9 a.m.–4 p.m. | 15 |
| Evening | 6 p.m.–10 p.m. | 12 |
| Early Morning (Night) | 6 a.m.–7 a.m. | 15 |
| Late Night | 10 p.m.–1 a.m. | 4 |

**Estimate Project Noise Exposure at 50 ft**

Determine the hourly volume of buses during day and night.

Daytime (7 a.m. – 10 p.m.)

$$V_d = \frac{273\ buses}{15\ hours} = 18.2\ buses/hour$$

Nighttime (10 p.m. – 7 a.m.)

$$V_n = \frac{27\ buses}{9\ hours} = 3\ buses/hour$$

Calculate the daytime and nighttime $L_{eq(hr)}$ at 50 ft for the bus transit center using the reference levels in Table 4-13 and the equations in Table 4-14.

$$L_{d,BTCenter} = SEL_{ref} + C_N - 35.6$$
$$= 101 + 10\log\left(\frac{18.2}{20}\right) - 35.6$$
$$= 65\ dBA \text{ at } 50 \text{ ft}$$

$$L_{n,BTCenter} = SEL_{ref} + C_N - 35.6$$

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Cont.

$$= 101 + 10\log(\frac{3}{20}) - 35.6$$
$$= 57\ dB\text{A at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-17.

$$L_{dn,BTCenter} = 10\log(15 \times 10^{(L_{d,BTCenter}/10)} + 9 \times 10^{((L_{n,BTCenter}+10)/10)}) - 13.8$$
$$= 66\ dBA \text{ at 50 ft}$$

**Estimate Existing Noise Exposure**

Estimate existing noise at noise-sensitive sites from the dominant noise source, and either major roadways or local streets (population density).

**Roadway Noise Estimate –** The traffic on Main Street qualifies this street for the Other Roadway category in Table 4-17. According to the map, the nearest residence is 275 ft from the edge of Main Street. The table shows existing $L_{dn}$ = 55 dBA at this distance for representative busy city street traffic.
**Population Density Noise Estimate –** Noise from local streets is estimated from the population density of 9,750 people/square mile. Table 4-17 confirms that the $L_{dn}$ is approximately 55 dBA.

In this example, the existing noise level by both the roadway and population density estimates are the same, but that is not always the case. If the levels are different, use the lower noise level. The existing noise level associated with the residential neighborhood in this example is $L_{dn}$ = 55 dBA.

**Determine Noise Level and Distance for the Onset of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 55 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{dn}$.

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 55 dBA | 56 dBA | 62 dBA |

Determine the distances from the center of the property to the noise impact contours using the stationary curve in Figure 4-6. The project noise level at 50 ft is 66 dBA.

Moderate impact (56 dBA)

$$56 - 66 = -10\ dB$$

According to Figure 4-6, the distance correction is approximately -10 dB at 125 ft.

Severe impact (62 dBA)

$$62 - 66 = -4\ dB$$

According to Figure 4-6, the distance correction is -4 dB at approximately 70 ft.

| Project Noise $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 66 dBA | 125 ft | 70 ft |

**Draw Noise Impact Contours**

Draw lines at 70 ft and 125 ft from the center of the property of the proposed transit center. These lines represent the noise impact contours. (Note that in Figure 4-8 the severe impact contour is not drawn for clarity. The contour is just within the dashed line representing the moderate impact contour after mitigation).

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Cont.

**Inventory of Noise Impact**

Within, or touching, the contour defining moderate impact are three residential buildings (shaded in Figure 4-8). No residences are within the severe impact contour.

**Noise Mitigation**

The process is repeated with a hypothetical noise barrier at the property line on the residential side of the transit center. This would consist of a wall approximately 15 ft high partially enclosing the transit center, sufficient to screen the residences but not the commercial block facing Main Street. According to Table 4-14, the approximate noise barrier effect is -5 dB. Repeating the procedure above, the noise barrier will reduce the moderate impact contour to 80 ft and the severe impact contour to 45 ft (note that at 50 ft the distance correction is 0), which in this example eliminates all potential impacts on the residences.

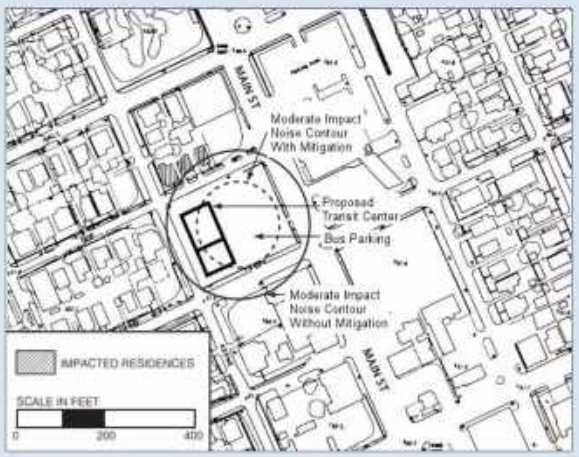


**Figure 4-8 Example of Project for General Noise Assessment: Siting of Transit Center in Mixed Commercial/Residential Area**

## 4.5 Evaluate Impact: Detailed Noise Analysis

**Evaluate for impact using the Detailed Noise Analysis procedure in this section, if appropriate.** For guidelines on when the Detailed Noise Analysis is appropriate, review Section 4.2.

The steps in the Detailed Noise Analysis (Figure 4-9) parallel the steps in the General Noise Assessment, though the Detailed Noise Analysis employs equations for computations rather than graphs or tables. Each step in the Detailed Noise Analysis is more refined in the prediction of project noise and subsequent evaluation of mitigation measures. Noise projections from the project must be determined for each receiver.

- **Step 1: Identify Noise-Sensitive Receivers**
  Identify the noise-sensitive receivers of interest in the impact analysis study, including clustering noise-sensitive areas. This identification is usually based



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on the Screening Procedure and General Noise Assessment previously conducted.

- **Step 2: Determine Project Noise Source Reference Levels**
  Determine the project noise sources and reference levels. Then, estimate the project noise exposure at the reference distance of 50 ft, considering operational characteristics. When appropriate, measurements may be used to determine noise source reference levels.

- **Step 3: Determine Propagation Characteristics**
  Estimate project noise exposure as a function of distance, accounting for shielding and propagation along the path.

- **Step 4: Combine Noise Exposure from All Sources**
  Combine all sources to predict the total project noise at receivers.

- **Step 5: Determine Existing Noise Exposure**
  Determine the existing noise exposure. Measurements are used to determine the existing noise exposure. When measurements are unavailable, a simplified procedure to estimate existing noise exposure may be used with a clear justification to and approval by the FTA Regional office.

- **Step 6: Assess Noise Impact**
  Assess the noise impact at each receiver of interest using separate procedures for transit only and multimodal transportation projects.

- **Step 7: Determine Noise Mitigation Measures**
  Evaluate the need for mitigation and repeat the Detailed Noise Analysis with proposed mitigation.

When situations arise that are not explicitly covered in the Detailed Noise Analysis, professional judgment, in consultation with the FTA Regional office, may be used to extend these methods to cover these unique cases, when appropriate. Appendix G provides information on developing and using non-standard modeling procedures.

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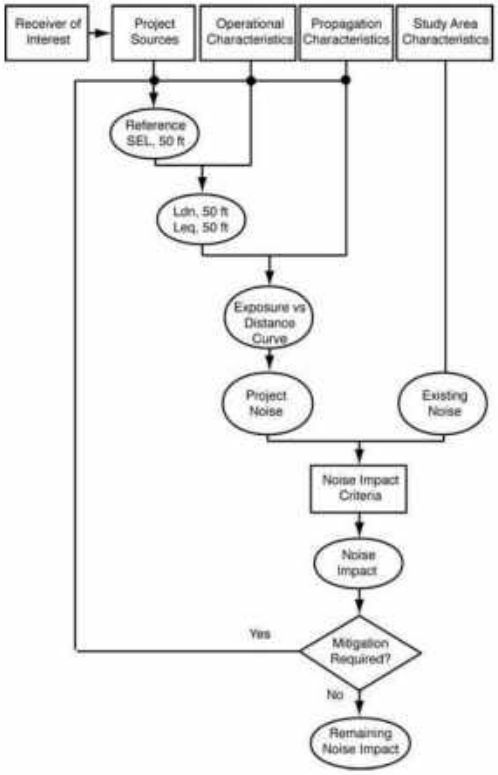


**Figure 4-9 Procedure for Detailed Noise Analysis**

## Step 1: Identify Noise-Sensitive Receivers

*Select the noise-sensitive receivers of interest, the number of which will depend upon the land use in the vicinity of the proposed project and the extent of the study area defined by the Noise Screening Procedure in Section 4.3 and the results of the General Noise Assessment in Section 4.4.*

The steps in identifying the noise-sensitive receivers of interest, both the number of receivers needed and their locations, shown in Figure 4-10, include:

**1a.** Identify all noise-sensitive land uses.
**1b.** Select individual receivers of interest.
**1c.** Cluster residential neighborhoods and other large noise-sensitive areas.

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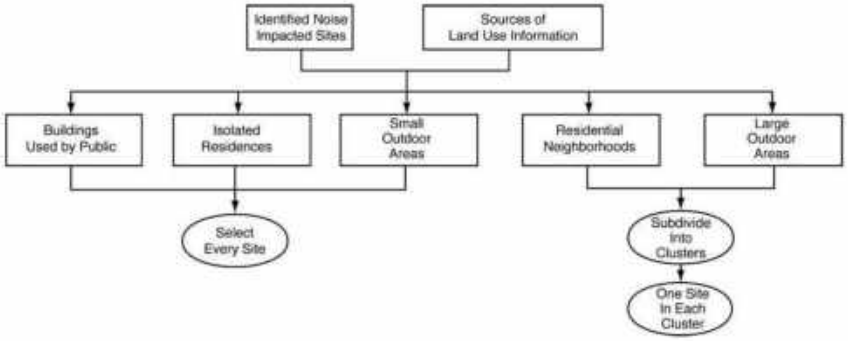


**Figure 4-10 Guide to Selecting Noise-Sensitive Receivers of Interest**

**1a.** Identify all noise-sensitive land uses where impact is identified by the General Noise Assessment in Section 4.4. If a General Noise Assessment has not been done, include all noise-sensitive sites according to the Noise Screening Procedure in Section 4.3. In areas where ambient noise is low, include land uses that are farther from the proposed project than for areas with higher ambient levels.

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Recommended materials and methods that can assist in locating noise-sensitive land uses near the proposed project include:

- **Land use maps** prepared by regional or local planning agencies or by the project staff. Area-wide maps often do not have sufficient detail to be of much use. But they can provide broad guidance and may suggest residential pockets hidden within otherwise commercial zones. Of more use are project-specific maps that provide building-by-building detail on the land near the proposed project.
- **Road and town maps** can supplement other maps, are generally more up-to-date, and may be of larger scale.
- **Aerial photographs,** when current, especially those of 400-ft scale or better, are valuable in locating all potential noise-sensitive land uses close to the proposed project. In addition, they can be useful in determining the distances between receivers and the project.
- **Windshield survey,** in which the corridor is driven and land uses are annotated on base maps, may be used for definitive identification of noise-sensitive sites. The windshield survey, supplemented by footwork where needed, is especially useful in identifying newly-constructed sites and in confirming land uses very close to the proposed project. In addition, maps and aerial photos typically reveal only horizontal distances, not vertical distances. Houses on a hill overlooking the project may need a barrier of unacceptable height for its attenuation to be effective, and the greater vertical distance between source and receiver may eliminate the impact entirely. The windshield survey would reveal where vertical contour maps

or other means may be needed so that vertical distances can be determined.

- **Geographic Information Systems (GIS)** provides electronic mapping needed for identifying noise-sensitive land uses. GIS data may include land parcels, building structures, aerial photography, and project-specific information. These data may be obtained during the project study or from local or regional agencies that store and maintain GIS data. Using electronic GIS data has advantages over paper mapping with respect to automating the process of identifying noise-sensitive land uses and accurately being able to determine their distances to the project alignment

Table 4-18 contains three types of *land uses of interest* and provides guidelines as to when receivers should be analyzed individually and when they can be clustered.

**Table 4-18 Land Uses of Interest**

| Land Uses | Specific Use | Selecting Receivers |
|---|---|---|
| Residences | Isolated single family residences<br><br>Neighborhoods (single and multi-family residences, apartment buildings, duplexes, etc.) | Select each isolated residence as a receiver of interest.<br>For residential areas, cluster by proximity to project sources, proximity to ambient-noise sources, and location along project line. Choose one receiver of interest (closest to the project noise source and at an intermediate distance from the predominant sources of existing noise) in each cluster (i.e., Balance the distance between the receiver and the new noise source and the receiver and the existing noise source). Multiple clusters in one location may be needed to fully characterize the area. |
| Indoor noise-sensitive sites | Places of worship<br>Schools Hospitals/nursing homes Libraries<br>Public meeting halls<br>Concert halls/auditoriums/theaters<br>Recording/broadcast studios<br>Museums and certain historic buildings<br>Hotels and motels<br>Other public buildings with noise- sensitive indoor use | Select noise-sensitive buildings as separate receivers of interest. |
| Outdoor noise-sensitive areas | Certain parks<br>Historic sites used for interpretation<br>Amphitheaters<br>Passive recreation areas<br>Cemeteries<br>Other outdoor noise-sensitive areas | For relatively small noise-sensitive areas, select noise-sensitive sites as separate receivers of interest.<br>For relatively large areas (e.g. a cemetery, etc.), cluster by proximity to project noise sources, proximity to ambient-noise sources, and location along project line. Choose one receiver of interest (closest to the project noise source and at an intermediate distance from the predominant sources of existing noise) in each cluster. |



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Cont.

**1b.** Select the following types of noise-sensitive receivers within the noise study area, per Table 4-18, to be evaluated as individual receivers:

- Every major noise-sensitive public building
- Every isolated residence
- Every relatively small outdoor noise-sensitive area

Use judgment to avoid analyzing noise where such analysis is obviously not needed. Areas that are considered particularly noise-sensitive by the community, but do not meet the criteria in Table 4-3, should be considered on a case-by-case basis as discussed in Section 4.1.

**1c.** Residential neighborhoods and relatively large outdoor noise-sensitive areas can often be clustered, simplifying the analysis that is required without compromising the accuracy of the analysis. Subdivide all such neighborhoods/areas into clusters of approximately uniform noise, each containing a collection of noise-sensitive sites. Strive to obtain uniformity of both project noise and ambient noise using the following guidelines:

- In general, project noise reduces (drops off) with distance from the project. For this reason, project noise uniformity requires nearly equal distances between the project noise source and all sites within the cluster. Clusters are typically shaped as long narrow strips parallel to the transit corridor and/or circling project point sources such as maintenance facilities. It is suggested to cluster sites where the project noise varies over a range of 5 dB or less.

- Note that noise drops off approximately 3 dB per doubling of distance for line sources and approximately 6 dB per doubling of distance for point sources over open terrain. This reduction in noise will occur over a shorter distance in areas containing obstacles blocking the path of sound propagation, such as rows of buildings.

- Ambient noise usually drops off from non-project sources in the same manner as noise from project sources. For this reason, clustering for uniform ambient noise will usually result in long narrow strips parallel to major roadways or circling major point sources of ambient noise, such as manufacturing facilities. It is suggested to cluster sites where the ambient noise varies over a range of 5 dB or less. Ambient noise levels may be difficult to judge without measurements. In areas without predominant sources of noise, like highways, ambient noise can be considered to vary with population density, which is often uniform along the corridor. In situations where ambient noise tends to be uniform, the clusters can encompass relatively large areas.

After defining clusters, select one representative receiver in each cluster. It is recommended to choose the receiver closest to the project noise source and at an intermediate distance from the predominant sources of existing noise. See Appendix D for additional guidance and examples on clustering receivers, as well as an example.



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Cont.

Assess each identified cluster representative and individual noise-sensitive receiver of interest using the Detailed Noise Analysis as presented in the following steps.

### Step 2: Determine Project Noise Source Reference Levels

*Identify the major project noise sources near the noise-sensitive receivers of interest, group them by source type, and determine reference levels to compute project noise at 50 ft, as shown in Figure 4-11.*

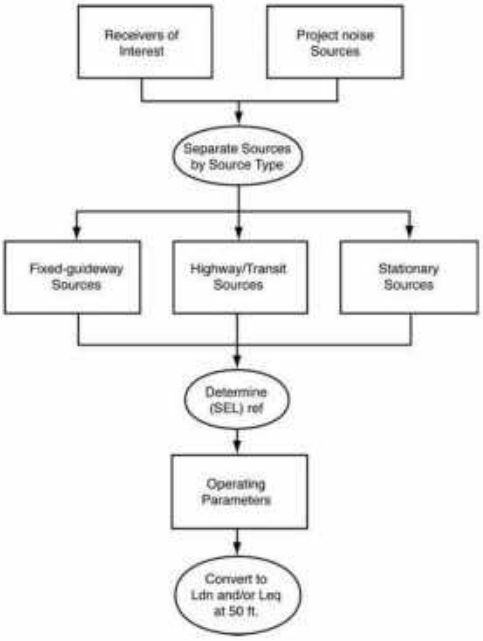


**Figure 4-11 Flow Diagram for Determining Project Noise at 50 ft**

**2a.** Identify the major project noise sources near receivers of interest according to Table 4-19. The right-hand column of the table indicates if each source is considered as a major contributor to the overall noise impact. Note that some noise sources can create high noise levels but are not indicated as major contributors. Although such sources are loud, they rarely stay in a neighborhood for more than a day or two; therefore, the overall noise exposure is relatively minor. Computations are required for all major noise sources in this table.



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Cont.

**Table 4-19 Sources of Transit Noise**

| Project Type | Source Type | Actual Source | Major? |
|---|---|---|---|
| Commuter Rail<br>Light Rail Streetcars<br>RRT | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Horns and whistles | Yes |
| | | Crossing signals | Yes |
| | | Crossovers/switches | Yes |
| | | Squeal on tight curves | Yes |
| | | Track-maintenance equipment | No |
| | Stationary | Substations | Yes |
| | | Chiller plants | No |
| Busways<br>Bus Transit Malls | Highway/Transit | Bus passbys | Yes |
| | | Buses parking | No |
| | Stationary | Buses idling | Yes |
| AGT | Fixed-Guideway | Vehicle passbys | Yes |
| Monorail | Miscellaneous | Line equipment | No |
| Terminals<br>Stations<br>Transit Centers | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Crossovers/switches | Yes |
| | | Squeal on tight curves | Yes |
| | Highway/Transit | Bus passbys | Yes |
| | | Buses parking | No |
| | | Automobile passbys | No |
| | Stationary | Locomotives idling | Yes |
| | | Buses idling | Yes |
| | | Ferry boats landing, idling, and departing at dock | Yes |
| | | HVAC equipment | No |
| | | Cooling towers | No |
| | | P/A systems | No |
| Park-and-Ride Lots | Highway/Transit | Bus passbys | Yes |
| | | Buses idling | Yes |
| | | Automobile passbys | No |
| | Stationary | P/A systems | No |
| Traffic Diversion Projects | Highway/Transit | Highway vehicle passbys | Yes |
| Storage Facilities<br>Maintenance Facilities | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Locomotives idling | Yes |
| | | Squeal on tight curves | Yes |
| | | Horns, warning signals, coupling/ uncoupling, auxiliary equipment, crossovers/ switches, brake squeal, and air release | Yes |
| | Highway/Transit | Bus passbys | Yes |
| | Stationary | Buses idling | Yes |
| | | Yard/shop activities | No |
| | | Car washes | No |
| | | HVAC Equipment | No |
| | | P/A Systems | No |

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Cont.

**2b.** Separate the major noise sources by source type: fixed-guideway transit, highway/transit or stationary facility. Note that a major fixed-guideway system will usually have stationary facilities associated with it, and that a stationary facility may have highway/transit elements associated with it. Then use the instructions in the following source type options below to:

**2c.** Determine the source reference levels for the all project noise sources. Each source reference level pertains to reference operating conditions for stationary sources or one vehicle passby under reference operating conditions.

These reference levels should incorporate source-noise mitigation only if such mitigation will be considered for incorporation into the system specifications. The source levels used in this manual are typical of systems designed according to current engineering practice, but they do not include special noise control features that could be incorporated in the specifications at extra cost. If special features that result in noise reductions are included in any of the predictions, the Federal environmental documents must include a commitment by the project sponsor to adopt such treatments before the project is approved for construction. For example, if the specifications include vehicle noise limits that may not be exceeded, these limits should be used to determine the reference level, and this level should be used in the analysis rather than the standard, tabulated reference level.

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**2d.** Convert the source reference level to noise exposure in terms of $L_{eq(1hr)}$ or $L_{dn}$ under project operating conditions using the appropriate equations depending upon the type of source. The noise exposure is determined at the reference distance of 50 ft.

**Option A. Fixed-guideway Sources –** Compute project noise at 50 ft for fixed-guideway sources as identified in the second column of Table 4-19.

**A.i. Reference SEL Levels**
Determine the reference SEL at 50 ft for each major fixed-guideway noise source, either by measurement according to Appendix F or by referencing Table 4-20. The table provides guidance on which method is preferred for each source type. The "NO" designation implies that the source levels given in the table are appropriate to use in the analysis, and the "YES" designation implies that measurements are preferred over the data given in the table. In general, measurements are preferred for source types that vary considerably from project to project, including any emerging technology sources. The data in the table are adequate for source types that do not vary considerably from project to project.

For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of these measurements to the reference conditions of Table 4-20. For projects where source-noise specifications have been defined (e.g., noise limits are usually included in the specifications for purchase of new transit vehicles), these specifications may be used instead of measurements after conversion to reference conditions using the equations in Appendix F. This is only appropriate when there is a firm commitment to adopt the noise specifications in the vehicle

procurement documents during the engineering phase and to adhere to the specifications throughout the procurement, delivery, and testing of the vehicles.

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

**Table 4-20 Source Reference SELs at 50 ft: Fixed-Guideway Sources at 50 mph**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements? * |
|---|---|---|---|
| Rail cars | 82 | 80 | No |
| Streetcars** | 76 | 74 | No |
| Locomotives – diesel | 92 | 88 | No |
| Locomotives – electric | 90 | 86 | No |
| Diesel multiple unit (DMU) | 85 | 81 | Yes |
| Agt – steel wheel | 80 | 78 | Yes |
| Agt – rubber tire | 78 | 75 | Yes |
| Monorail | 82 | 80 | Yes |
| Maglev | 72 | 70 | Yes |
| Transit car horns (emergency) | 93 | 90 | No |
| Transit car whistles | 81 | 78 | No |
| Locomotive horns | | | |
| At-grade crossing | 113 | 110 | No |
| From crossing to 1/8 mile | † | 110 | |
| From 1/8 mile to 1/4 mile | 110 | 110 | |

* "No" implies that the source levels given in the table are appropriate to use in the analysis and "Yes" implies that measurements are preferred over the data given in the table.
** The reference speed for streetcars is 25 mph. For streetcar speeds above 25 mph, use the "Rail Cars" reference level and 50 mph for the reference speed.
† Use the following equation for locomotive horns from crossing to 1/8 mile:

$$SEL_{Ref} = 113 - 3 \times \left(\frac{D_P}{660}\right)$$

where:
$D_P$ = distance from grade crossing parallel to tracks

**A.ii. Estimate Noise Exposure at 50 ft** – Use the reference SELs in Table 4-20, operating conditions, and the equations in Table 4-21 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Trains with different numbers of cars or operating conditions produce different noise exposure levels and should be converted from SEL to $L_{dn}$ separately. Use the following guidelines to determine if sources should be converted separately. These differences in operating conditions will produce an approximate 2-decibel change in noise exposure:
   - 40 percent change in number of locomotives or cars per train.
   - 40 percent change in number of trains per hour.
   - 40 percent change in number of trains per day, or per night (for computation of $L_{dn}$).
   - 15 percent change in train speed.
   - Change of one notch in diesel locomotive throttle setting (e.g., from notch 5 to notch 6).

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2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project-related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for locomotives, rail cars, and warning horns.
   - Number of rail cars in the train (if this number varies during the day, take the average for the daytime and nighttime periods separately for category 2 land uses, and use the maximum number during the period of interest for category 1 or 3 land uses).
   - Number of locomotives in the train, if any.
   - Train speed, in miles per hour (maximum expected).
   - Average throttle setting of the train's locomotive(s) for diesel-powered locomotives and DMU's only.[*] If this input is not available, assume a throttle setting of 8 for locations where the vehicle would accelerate and 5 for all other locations.[25]
   - For residential receivers of interest:
     - Average hourly train volume during daytime hours (the total number of train passbys between 7 a.m. and 10 p.m., divided by 15 hours);
     - Average hourly train volume during nighttime hours (the total number of train passbys between 10 p.m. and 7 a.m., divided by 9 hours);
   - For non-residential receivers of interest, number of events that occur during each hour of interest in trains per hour; and
   - Track type (continuously welded or jointed) and profile (at-grade or elevated).

4. **Calculate $L_{eq(1hr)}$ at 50 ft**
   - Calculate $L_{eq(1hr)}$ using the appropriate equations in Table 4-21 for each hour of interest.
   - Compute the combined $L_{eq(1hr)}$. It may be necessary to compute the combined totals with and without the warning horns; some neighborhoods along the corridor may be exposed to the horn noise and some may not.

5. **Calculate $L_{dn}$ at 50 ft**
   - If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined day $L_{eq(1hr)}$ and the combined night $L_{eq(1hr)}$.
   - It may be necessary to calculate $L_{dn}$ with and without the warning horns, as above.

[*] Omit this term if not applicable from the equation in Table 4-21 for other vehicle types.



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Cont.

Note that the equations in Table 4-21 include terms to account for a difference in speed from the reference speed of 50 mph and a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

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Cont.

**Table 4-21 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Fixed-Guideway Sources**

| | | |
|---|---|---|
| **Locomotives*** $L_{eq(1hr)}$ at 50 ft | $L_{eq,Loco(1hr)} = SEL_{ref} + 10\,log(N_{Loco}) + C_T + K log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-25** |
| **Locomotive Warning Horns**** $L_{eq(1hr)}$ at 50 ft | $L_{eq,LHorns(1hr)} = SEL_{ref} + 10\,log(V) - 35.6$ | **Eq. 4-26** |
| **Rail Vehicles†** $L_{eq(1hr)}$ at 50 ft | $L_{eq,RCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-27** |
| **Streetcar (25 mph or slower)** $L_{eq(1hr)}$ at 50 ft | $L_{eq,SCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 2\log(\frac{S}{25}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-28** |
| **Transit Warning Horns**** $L_{eq(1hr)}$ at 50 ft | $L_{eq,THorns(1hr)} = SEL_{ref} - 10\,log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-29** |
| **Combined Locomotive and transit††** $L_{eq(1hr)}$ at 50 ft | $L_{eq,Combo(1hr)} = 10\log(10^{(L_{eq,Loco(1hr)}/10)} + 10^{(L_{eq,RCars(1hr)}/10)} + 10^{(L_{eq,SCars(1hr)}/10)} + 10^{(L_{eq,LHorns(1hr)}/10)} + 10^{(L_{eq,THorns(1hr)}/10)})$ | **Eq. 4-30** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$, $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-31** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$, and $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-32** |
| **Day/Night** $L_{dn}$ at 50 ft | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-33** |

$N_{Loco}$ = average number of locomotives per train

$C_T$ = $0\ for\ T < 6$; $2(T-5)\ for\ T \geq 6$
where
T = average throttle setting for diesel-powered locomotives and DMUs only

K = -10 for passenger diesel
0 for DMUs‡
+10 for electric

$N_{Cars}$ = average number of cars per train

$V$ = average hourly volume of train traffic, trains per hour

S = train speed, mph

$Adj_{track}$ = constant
+5 for jointed track or for a crossover within 300 ft
+4 for aerial structure with slab track (except AGT and monorail)
+3 for embedded track on grade

$V_d$ = average hourly daytime volume of train traffic, trains per hour
$= \frac{number\ of\ trains,\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of train traffic, trains per hour
$= \frac{number\ of\ trains,\ 10\ p.m.\ to\ 7a.m.}{9}$

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)
$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)
$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

* Assumes a diesel locomotive power rating at approximately 3000 hp ** Based on FRA's horn noise model (www.fra.dot.gov/Elib/Document/2681)
† Includes all commuter rail cars, transit cars, streetcars above 25 mph, AGT and monorail. †† Only include appropriate terms.
‡ Because of the wide range of vehicle types that qualify as a DMU, measurements are preferred for the reference level and speed coefficient. If no measurements are conducted, use the reference level in Table 4-20 and a speed coefficient of 0.

01-28 Cont.

## Example 4-5 Detailed Noise Analysis – Fixed Guideway Noise Sources

### Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Fixed-Guideway Source

A commuter train with 1 diesel locomotive and 6 cars will pass close to a residential area at a grade crossing. The track is jointed.

**Assumptions**

$SEL_{ref}$ = 92 for diesel locomotives
= 82 for rail cars
= 113 for locomotive warning horns at-grade crossing
$N_{Cars}$ = 6
$N_{Loco}$ = 1
$S$ = 43 mph
$T$ = 8
$V_d$ = $40\ trains/15\ hours = 2.667\ trains\ per\ hour$
$V_n$ = $2\ trains/9\ hours = 0.222\ trains\ per\ hour$

Use the equations in Table 4-21 to determine the daytime $L_{eq(1hr)}$ for each source and the combined daytime $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Locs(1hr)} = SEL_{ref} + 10\log(N_{Loco}) + C_T + K\log(\frac{S}{50}) + 10\log(V_d) - 35.6$$
$$= 92 + 10\log(1) + 6 + (-10)\log(\frac{43}{50}) + 10\log(2.667) - 35.6$$
$$= 67.3\ dBA \text{ at 50 ft}$$

$$L_{d.RCars(1hr)} = SEL_{ref} + 10\log(N_{Cars}) + 20\log\left(\frac{S}{50}\right) + 10\log(V_d) - 35.6 + Adj_{track}$$
$$= 82 + 10\log(6) + 20\log\left(\frac{43}{50}\right) + 10\log(2.667) - 35.6 + 5$$
$$= 62.1\ dBA \text{ at 50 ft}$$

$$L_{d.LHorn(1hr)} = SEL_{ref} + 10\log(V_d) - 35.6$$
$$= 113 + 10\log(2.667) - 35.6$$
$$= 81.7\ dBA \text{ at 50 ft}$$

$L_{d.Combo(1hr)}$ With horn:
$$= 10\log\left[10^{(L_{d.Locos(1hr)}/10)} + 10^{(L_{d.RCars(1hr)}/10)} + 10^{(L_{d.LHorn(1hr)}/10)}\right]$$
$$= 81.9\ dBA \text{ in neighborhoods where the horn is sounded}$$

Without horn:
$$= 10\log\left[10^{(L_{d.Locos(1hr)}/10)} + 10^{(L_{d.RCars(1hr)}/10)}\right]$$
$$= 68.4\ dBA \text{ in neighborhoods where the horn is not sounded}$$

Use the same equations as above to determine the nighttime $L_{eq(1hr)}$ at 50 ft. Use $V_n$ instead of $V_d$.

$L_{n.Locos(1hr)}$ = 56.5 for locomotives
$L_{n.RCars(1hr)}$ = 51.3 for cars
$L_{n.LHorn(1hr)}$ = 70.9 for horns
$L_{n.Combo(1hr)}$ = 71.1 in neighborhoods where the horn is sounded
= 57.6 in neighborhoods where the horn is not sounded

Calculate the $L_{dn}$ with and without horns.

$$L_{dn.Combo} = 10\log\left[15 \times 10^{(L_{d.Combo}/10)} + 9 \times 10^{((L_{n.Combo}+10)/10)}\right] - 13.8$$

01-28 Cont.

With horn: = 81.6 at 50 ft in neighborhoods where horns are sounded
Without horn: = 68.1 at 50 ft in neighborhoods where horns are not sounded

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

**Option B. Highway/Transit Sources** – Compute project noise at 50 ft for highway/transit noise sources as identified in the second column of Table 4-19. Use the instructions below to estimate source noise levels for projects following FTA's procedures that involve highway vehicles.

This method is based on the original FHWA highway noise prediction model, with updated noise emission levels.[26] The vehicle equations are applicable to speeds typical of freely-flowing traffic on city streets and access roads.

**B.i. Reference SEL Levels** – Determine the reference SEL at 50 ft for each major highway/transit source, either by measurement according to Appendix F or by using Table 4-22.[v] The table provides guidance on which method is preferred for each source type. "NO" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table. For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of measurement data to the reference conditions in Table 4-20.

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

**Table 4-22 Source Reference SELs at 50 ft: Highway/Transit Sources at 50 mph**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements?* |
|---|---|---|---|
| Automobiles | 74 | 70 | No |
| Buses (diesel) | 82 | 79 | No |
| Buses (electric trolleybus) | 80 | 77 | No |
| Buses (hybrid)** | 83 | 80 | Yes |

* "No" implies that the source levels given in the table are appropriate to use in the analysis and "Yes" implies that measurements are preferred over the data given in the table.
** Hybrid bus with full-time diesel engine and electric drive motors.

[v] Idling buses are considered stationary sources.



O1-28 Cont.

**B.ii. Noise Exposure at 50 ft** – Use the reference SELs in Table 4-22, operating conditions, and the equations in Table 4-23 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Noise emission from most transit buses is not dependent upon whether the buses are accelerating or cruising. However, accelerating suburban buses are substantially louder than cruising suburban buses. For this reason, suburban buses require separate calculation along roadway stretches where they are accelerating. Separate calculation is also needed for all highway/transit vehicles at different speeds, since speed affects noise emissions. Use the following guidelines to determine if sources should be calculated separately. These differences in operating conditions will produce an approximate 2-decibel change in noise exposure:
   - 40 percent change in number of vehicles per hour;
   - 40 percent change in number of vehicles per day, or per night (for computation of $L_{dn}$); or
   - 15 percent change in vehicle speed.

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for the vehicle types of concern
   - Average running speed in miles per hour
   - For residential receivers of interest:
     - Average hourly vehicle volume during daytime hours (total number of vehicle passbys between 7 a.m. and 10 p.m., divided by 15).
     - Average hourly vehicle volume during nighttime hours (total number of vehicle passbys between 10 p.m. and 7 a.m., divided by 9).
   - For non-residential receivers of interest, number of events that occur during each hour of interest, in vehicles per hour

4. **Calculate $L_{eq(1hr)}$ at 50 ft – Calculate $L_{eq(1hr)}$ using the appropriate** equations in Table 4-23 for each hour of interest.

5. **Calculate $L_{dn}$ at 50 ft –** If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the day $L_{eq(1hr)}$ and night $L_{eq(1hr)}$.

Note that the equations in Table 4-23 include terms to account for a difference in speed from the reference speed of 50 mph and a numerical adjustment to



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Cont.

account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

**Table 4-23 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Highway/Transit Sources**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(V) + C_{emissions} - 10\log(\frac{S}{50}) - 35.6$ | **Eq. 4-34** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$ | **Eq. 4-35** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$ | **Eq. 4-36** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-37** |
| **Adjustments** | = -3 for automobiles, open-graded asphalt<br>= +3 for automobiles, grooved pavement | |

$V$ = average hourly volume of vehicles, vehicles per hour

$C_{emissions}$ = $25\log(\frac{S}{50})$ for buses
$31\log(\frac{S}{50})$ for hybrid buses [23]
1.6 for accelerating 3-axle commuter buses
$40\log(\frac{S}{50})$ for automobiles

$S$ = average vehicle speed, mph (distance divided by time, excluding stop time at red lights)

$V_d$ = average hourly daytime volume of vehicles of this type, vehicles per hour
$= \frac{total\ vehicle\ volume, 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of vehicles, vehicles per hour
$= \frac{total\ vehicle\ volume, 10\ p.m.\ to\ 7\ a.m.}{9}$

## Example 4-6 Detailed Noise Analysis – Highway Transit Noise Sources

**Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Highway/Transit Source**

A bus route with city buses will pass close to a school that is in session from 8 a.m. to 4 p.m. on weekdays. Within this time period, the hour of greatest activity for this bus route is 8 a.m. to 9 a.m.

**Assumptions**

$SEL_{ref}$ = 82 dBA
$S$ = 40 mph
$V$ = 30 buses per hour

Use the equations in Table 4-23 to determine the hourly $L_{eq(1hr)}$ at 50 ft.

$$L_{d,Bus} = SEL_{ref} + 10\,log(V) + C_{emissions} - 10\log(\frac{S}{50}) - 35.6$$
$$= 82 + 10\,log(30) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 59.7\ dBA \text{ at 50 ft}$$



O1-28
Cont.

This same bus also passes close to a residential area with the following operating conditions:

$V_d$ = 200 *buses*/15 *hours* = 13.33 *buses per hour*
$V_n$ = 20 *buses*/9 *hours* = 2.22 *buses per hour*

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Bus} = 82 + 10\,log(13.33) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 56.2\,dBA \text{ at 50 ft}$$

$$L_{n.Bus} = 82 + 10\,log(2.22) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 48.4\,dBA \text{ at 50 ft}$$

Calculate $L_{dn}$ at 50 ft.

$$L_{dn.Bus} = 10log(15 \times 10^{(L_{d.Bus}/10)} + 9 \times 10^{((L_{n.Bus}+10)/10)}) - 13.8$$
$$= 57.2\,dBA \text{ at 50 ft}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

**Option C. Stationary Sources** – Compute project noise at 50 ft for stationary sources as identified in the second column of Table 4-19.

**C.i. Determine Reference SEL Levels** – Determine the reference SEL at 50 ft for each major stationary source, either by measurement according to Appendix F or by using Table 4-24. The table provides guidance on which method is preferred for each source type. "NO" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table. In general, measurements are preferred for source types that vary considerably from project to project. For example, curve squeal is highly variable depending on weather conditions, curve radius, and train speed. The data in the table are adequate for source types that do not vary considerably from project to project (crossing signals, for example). For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of these measurements to the reference conditions of Table 4-24.

Layover facilities and transit centers can be the sources of low-frequency noise from idling diesel engines. Sounds with considerable low-frequency components can cause greater annoyance than would be expected based on their A-weighted levels. Low-frequency sounds often cause windows and walls to vibrate resulting in secondary effects in buildings such as rattling of dishes in cupboards and wall-mounted pictures. The reference levels in Table 4-24 are adjusted to take increased annoyance into account. For a Detailed Noise Analysis at locations where such idling takes place for an extended period, use the method described in ANSI Standard S12.9-Part 4, Annex D.[27]

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

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Cont.

**Table 4-24 Source Reference SELs at 50 ft: Stationary Sources**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements?* |
|---|---|---|---|
| Auxiliary Equipment | 101 | 65 | Yes |
| Locomotive Idling | 109 | 73 | No |
| Rail Transit Idling | 106 | 70 | No |
| Buses Idling | 111 | 75 | No |
| Ferry Boat Landing**, Idling, and Departing | 91 | 78 | No |
| Ferry Boat Fog Horn | 90 | 84 | No |
| Track Curve Squeal | 136 | 100 | Yes |
| Car Washes | 111 | 75 | Yes |
| Crossing Signals | 109 | 73 | No |
| Substations | 99 | 63 | No |

*"No" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table.

**Ferry boat landings are included in the stationary source category because the noise from the landing remains in one area even though the boats move in and out.

**C.ii. Estimate Noise Exposure at 50 ft** – Use the reference SELs in Table 4-24, operating conditions, and the equations in Table 4-25 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Identify actual source durations and numbers of events. Sources with different operating conditions should be converted from SEL to $L_{dn}$ separately. Use the following guidelines to determine if sources should be converted separately. These differences in operating conditions will produce an approximate 2-dB change in noise exposure:
   - 40 percent change in event duration (e.g., from 30 to 42 minutes), or
   - 40 percent change in number of events per hour (e.g., from 10 to 14 events per hour).

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for each relevant source
   - Average duration of one event, in seconds
   - For residential receivers of interest:
     - Average number of events per hour that occur during the daytime (the total number of events between 7 a.m. and 10 p.m., divided by 15).

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- Average number of events per hour that occur during the nighttime (the total number of events between 10 p.m. and 7 a.m., divided by 9).
- For non-residential receivers of interest, number of events that occur during each hour of interest in events per hour

4. **Calculate $L_{eq(1hr)}$ at 50 ft** – Calculate $L_{eq(1hr)}$ using the appropriate equations in Table 4-25 for each hour of interest.

5. **Calculate $L_{dn}$ at 50 ft** – If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the day $L_{eq(1hr)}$ and night $L_{eq(1hr)}$.

Note that the equations in Table 4-25 include a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

**Table 4-25 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Stationary Sources**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(N) + 10\log(\frac{E}{3600}) - 35.6$ | **Eq. 4-38** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where N = $N_d$ | **Eq. 4-39** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where N = $N_n$ | **Eq. 4-40** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-41** |

$N$ = number of events of this type that occur during one-hour

E[a] = duration of one event, sec

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)

$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)

$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

[a]Omit the term containing E for ferry boat, and fog horn noise sources.

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## Example 4-7 Detailed Noise Analysis – Stationary Noise Sources

**Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Stationary Sources**

A signal crossing lies close to a school that is in session from 8 a.m. to 4 p.m. on weekdays. Within this time period, the hour of greatest activity for the signal crossing is 8 a.m. to 9 a.m.

**Assumptions**

$SEL_{ref}$ = 109 dBA
$E$ = 25 seconds (counting both cycles of the signal)
$N$ = 22

Use the equations in Table 4-25 to determine the hourly $L_{eq(1hr)}$ at 50 ft.

$$L_{d,Cross} = SEL_{ref} + 10log(N) + 10log\left(\frac{E}{3600}\right) - 35.6$$
$$= 109 + 10log(22) + 10log(\frac{25}{3600}) - 35.6$$
$$= 65.2\,dBA \text{ at 50 ft}$$

This same signal crossing lies close to a residential area with the following operating conditions:

$N_d$ = 200 /15 $hours$ = 13.3 $events\ per\ hour$
$N_n$ =12 /9 $hours$ = 1.33 $events\ per\ hour$

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$$L_{d,Cross} = 109 + 10log(13.3) + 10log(\frac{25}{3600}) - 35.6$$
$$= 63.1\,dBA \text{ at 50 ft}$$
$$L_{n,Cross} = 109 + 10log(1.33) + 10log(\frac{25}{3600}) - 35.6$$
$$= 53.1\,dBA \text{ at 50 ft}$$

Calculate $L_{dn}$ at 50 ft.

$$L_{dn} = 10log(15 \times 10^{(L_{d,Cross}/10)} + 9 \times 10^{((L_{n,Cross}+10)/10)}) - 13.8$$
$$= 63.1\,dBA \text{ at 50 ft}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

### Step 3: Determine Propagation Characteristics

*Determine the combined propagation characteristics between each source and receiver of interest.*

**3a.** Calculate project noise exposure as a function of distance. *Calculate the project noise exposure at distances other than 50 ft, such as at receiver locations, as a function of distance accounting for shielding and ground effects along the path.* See Example 4-8 below.



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Cont.

1. Determine the topography of the ground within the transit corridor using the figures in Table 4-26 as a guide. It is not necessary to represent the transit corridor with an extreme number of changes in topography. Often, several typical sections will suffice throughout the transit corridor.

2. Use the equations in Table 4-26 to determine ground factor (G) based on the effective path height (Heff) for each identified terrain feature. Standard source heights are included at the bottom of the table. Assume receiver heights of 5 ft for both outdoor receivers and first-floor receivers. Note that larger ground factors correspond to larger amounts of ground attenuation with increasing distance from the source. For acoustically "hard" (e.g., non-absorptive) ground conditions, G should be taken to be zero.

3. Determine the distance correction factor using the ground factor and another distance, such as the distance to a receiver, and the equations in Table 4-27.

4. Apply the distance correction ($C_{distance}$) to the project noise exposure at 50 ft (Section 4.5, Step 2) using the following equation:

$$L_{distance} = L_{50ft} + C_{distance} \quad \text{Eq. 4-42}$$

where:

$L_{distance}$ = $L_{dn}$ or $L_{Aeq(1hr)}$ at the new distance, ft

$L_{50ft}$ = $L_{dn}$ or $L_{Aeq(1hr)}$ at 50 ft

5. Plot noise exposure as a function of distance if desired.

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Cont.

**Table 4-26 Ground Factor G, for Ground Attenuation**

**Ground Factor**

**Soft Ground:**

$$G = \begin{cases} 0.66, & H_{eff} \le 5 \\ 0.75\left(1 - \frac{H_{eff}}{42}\right), & 5 < H_{eff} < 42 \\ 0, & H_{eff} \ge 42 \end{cases}$$ **Eq. 4-43**

$H_{eff}$ = sum of average path heights on either side of the barrier, see below.

**Hard Ground:** $G = 0$

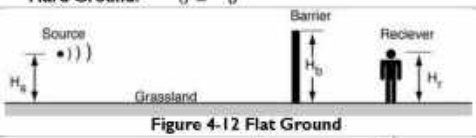


**Figure 4-12 Flat Ground**

$$H_{eff} = \frac{H_s + 2H_b + H_r}{2}$$ **Eq. 4-44**

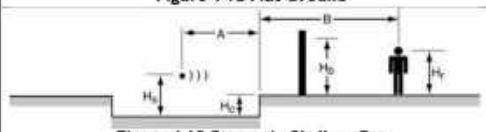


**Figure 4-13 Source in Shallow Cut**

$$H_{eff} = \frac{H_s + 2H_b + H_c + H_r}{2} \quad for\ B \le \frac{A}{2}$$

Use Eq. 4-44 $\quad for\ B > \frac{A}{2}$

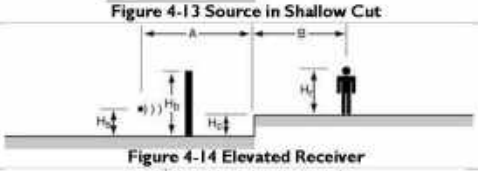


**Figure 4-14 Elevated Receiver**

$$H_{eff} = \frac{H_s + H_c + H_r}{2} \quad for\ H_b \le H_c$$

$$H_{eff} = \frac{H_s + 2H_b - H_c + H_r}{2} \quad for\ H_b > H_c$$

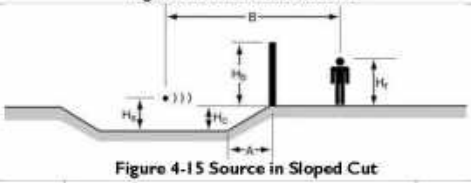


**Figure 4-15 Source in Sloped Cut**

Use Eq. 4-44 $\quad for\ A \le \frac{B}{2}$

$$H_{eff} = \frac{H_s + 2H_b + H_c + H_r}{2} \quad for\ A > \frac{B}{2}$$

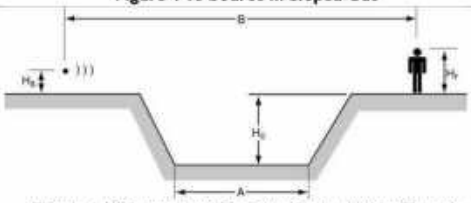


**Figure 4-16 Source and Receiver Separated by Trench**

$$H_{eff} = \frac{H_s + H_r}{2} \quad for\ A \le \frac{B}{2}$$

$$H_{eff} = \frac{H_s + 2H_c + H_r}{2} \quad for\ A > \frac{B}{2}$$

$H_r$ = 8 ft for trains with diesel-electric locomotives
= 2 ft for trains without diesel-electric locomotives
= 0 ft for automobiles
= 3 ft for 2-axle city buses
= 8 ft for 3-axle commuter buses

Note: Equations for $H_{eff}$ remain valid when $H_b = 0$

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Cont.

**Table 4-27 Distance Correction Factor Equations for Detailed Noise Analysis**

| Source | Equation* | |
|---|---|---|
| Stationary Sources | $C_{distance} = -20\log(\frac{D}{50}) - 10G\log(\frac{D}{50})$ | Eq. 4-45 |
| Fixed-guideway rail car passbys | $C_{distance} = -10\log(\frac{D}{50}) - 10G\log(\frac{D}{42})$ | Eq. 4-46 |
| Fixed-guideway locomotive and rubber-tired vehicle passbys, highway vehicle passbys and horns | $C_{distance} = -10\log(\frac{D}{50}) - 10G\log(\frac{D}{29})$ | Eq. 4-47 |
| $D$ = distance, ft<br>$G$ = ground factor, see Table 4-26 | | |

*These equations assume the distance between the source and receiver is approximately 300 ft or less. At longer distances, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. Therefore, more detailed calculation methods may be required to account for those effects.

## Example 4-8: Detailed Noise Analysis – Exposure vs. Distance Curve

**Exposure vs. Distance Curve for Fixed-Guideway Source**

Plot an exposure vs. distance curve for a diesel-electric commuter train that does not sound the horn in this area.

**Assumptions**

The terrain is flat grassland without a noise barrier.

$L_{eq\,Loco}$ (8 − 9am) = 72 dBA at 50 ft
$L_{dn\,Loco}$ = 68 dBA at 50 ft
$H_r$ = 5 ft
$H_b$ = 0 ft (for a "no noise barrier" case)
$H_s$ = 8 ft (for a diesel-electric commuter train)

Calculate $H_{eff}$ using the equations in Table 4-26.

$$H_{eff} = \frac{H_s + 2H_b + H_r}{2} = \frac{8 + 0 + 5}{2} = 6.5 \text{ ft}$$

Determine the ground factor using Eq. 4-43.

$$G = 0.75(1 - \frac{H_{eff}}{42}) = 0.63$$

Use Eq. 4-45 to determine noise vs. exposure equations for $L_{eq\,Loco}$ and $L_{dn\,Loco}$.

$$L_{eq\,Loco} = 72 - 10\log(\frac{D}{50}) - 6.3\log(\frac{D}{42})$$

$$L_{dn\,Loco} = 68 - 10\log(\frac{D}{50}) - 6.3\log(\frac{D}{42})$$

Plot the two equations (see example in Figure 4-17). From these curves, the noise levels due to this train operation can be determined for a receiver of interest at any distance without shielding.

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Cont.

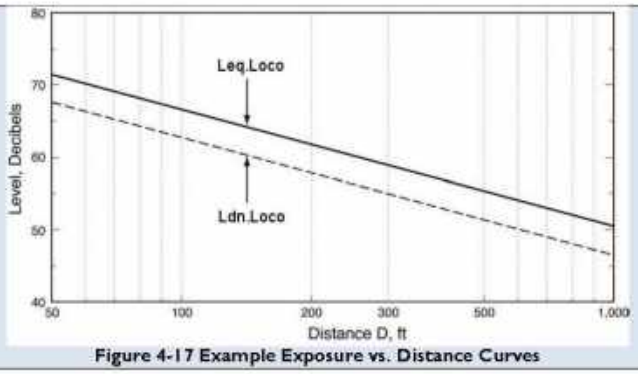


**Figure 4-17 Example Exposure vs. Distance Curves**

**3b.** Calculate the attenuation due to shielding for each distance of interest from Step 3a, using the following equation and Tables 4-26 through 4-30 and as illustrated in Example 4-9. If the conditions described in the tables are not met, the attenuation due to shielding is considered zero. Shielding can be due to intervening noise barriers, terrain features, rows of buildings, and dense tree zones.

$$A_{shielding} = \max\{IL_{barrier} \text{ or } A_{buildings} \text{ or } A_{trees}\} \qquad \text{Eq. 4-48}$$

where:

$IL_{barrier}$ = barrier insertion loss, see Table 4-28

$A_{buildings}$ = attenuation due to buildings, see Table 4-29

$A_{trees}$ = attenuation due to trees, see Table 4-30

**Table 4-28 Barrier Insertion Loss**

| **Barrier Insertion Loss** | $IL_{barrier} = \max\{0 \text{ or } (A_{barrier} - 10(G_{NB} - G_B)\log(\frac{D}{50}))\}$ **Eq. 4-49** | |
|---|---|---|
| $A_{barrier}$ | $= \min\{12 \text{ or } [5.3\log(P) + 6.7]\}$ | For non-absorptive transit barriers within 5 ft of the rail |
| | $= \min\{15 \text{ or } (5.3\log(P) + 9.7)\}$ | For absorptive transit barriers within 5 ft of the rail |
| | $= \min\{15 \text{or}(20\log(\frac{2.51\sqrt{P}}{\tanh(4.46\sqrt{P})}) + 5)\}$ | For all other barriers, and for protrusion of terrain above the line of sight |
| P | = path length difference, ft (see figure 4-18)* | |
| $D$ | = closest distance between the receiver and the source, ft | |
| $G_{NB}$ | = ground factor G computed without barrier (see Table 4-26) | |
| $G_B$ | = ground factor G computed with barrier (see Table 4-26) | |

* If the source height (exhaust outlet) for diesel-electric locomotives is not available, assume 15 ft.



O1-28
Cont.

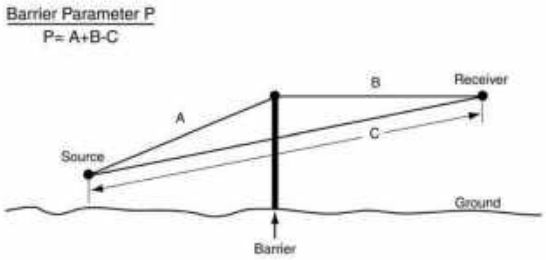


**Figure 4-18 Noise Barrier Parameter "P"**

**Table 4-29 Attenuation due to Buildings**

| Condition | Equation | |
|---|---|---|
| Gaps in the row of buildings constitute less than 35% of the length of the row | $A_{buildings} = \min\{10 \text{ or } [1.5\ (R-1)+5]\}$ | Eq. 4-50 |
| Gaps in the row of buildings constitute 35 to 65% of the length of the row | $A_{buildings} = \min\{10 \text{ or } [1.5\ (R-1)+3]\}$ | Eq. 4-51 |
| Gaps in the row of buildings constitute more than 65% of the length of the row | $A_{buildings} = 0$ | |
| $R$ = number of rows of houses that intervene between the source and receiver | | |

**Table 4-30 Attenuation due to Trees**

| Condition | Equation | |
|---|---|---|
| At least 100 ft of trees intervene between the source and receiver with no clear line-of-sight between source and receiver, and the trees extend 15 ft or more above the line-of-sight | $A_{trees} = \min\left\{10 \text{ or } \frac{W}{20}\right\} \text{ where } W \geq 100ft$<br>$= 0 \text{ where } W < 100ft$ | Eq. 4-52 |
| W = width of tree zone along the line-of-site between the source and receiver in feet | | |

## Example 4-9: Detailed Noise Analysis – Shielding

**Computation of Shielding**

The following features are between the rail corridor and a receiver of interest. Calculate the attenuation due to shielding.

1. A 15-foot high noise barrier is 40 ft from the closest track and 130 ft from the receiver
2. A dense tree zone 100 ft thick that extends 15 ft above the line-of-sight

**Assumptions**

$H_s$ = 8 ft
$H_r$ = 5 ft

Barrier dimensions

A = 40.61 ft
B = 130.38 ft
C = 170.03 ft

**Barrier**

Calculate $H_{eff}$ with and without the barrier using the equations in Table 4-26.

$$H_{eff,NoBarrier} = \frac{H_s + 2H_b + H_r}{2}$$

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Cont.

$$= \frac{8+0+5}{2}$$
$$= 6.5 \text{ ft}$$

$$H_{eff\,Barrier} = \frac{H_s + 2H_b + H_r}{2}$$
$$= \frac{8+15+5}{2}$$
$$= 21.5 \text{ ft}$$

Determine the ground factor with and without the barrier using Eq. 4-43.

$$G_{NoBarrier} = 0.75\left(1 - \frac{H_{eff}}{42}\right)$$
$$= 0.63$$

$$G_{Barrier} = 0.75\left(1 - \frac{H_{eff}}{42}\right)$$
$$= 0.37$$

Calculate the barrier insertion loss using Table 4-28 and Figure 4-18.

$$P = A + B - C$$
$$= 0.96 \text{ ft}$$

$$A_{barrier} = \min\left\{15 \text{ or } \left\{20 \log\left(\frac{2.51\sqrt{P}}{\tanh\left(4.46\sqrt{P}\right)}\right) + 5\right\}\right\}$$
$$= 12.8 \text{ dB}$$
$$= \min\{15 \text{ or } 12.8\}$$
$$= 12.8 \text{ dB}$$

$$IL_{barrier} = \max\left\{0 \text{ or } \left(A_{barrier} - 10(G_{NoBarrier} - G_{Barrier}) \log\left(\frac{D}{50}\right)\right)\right\}$$
$$= 12.8 - 10(0.63 - 0.37) \log\left(\frac{170}{50}\right)$$
$$= 11.4 \text{ dB}$$

**Trees**

Determine the attenuation due to trees using Table 4-30.

$$A_{trees} = \min\left\{10 \text{ or } \frac{W}{20}\right\}$$
$$= 5 \text{ dB}$$

**Total Shielding**

The total shielding is the maximum of the barrier and tree zone shielding, 11.4 dB.

$$A_{shielding} = \max\{IL_{barrier} \text{ or } A_{buildings} \text{ or } A_{trees}\}$$
$$= \max\{11.4 \text{ or } 0 \text{ or } 5\}$$
$$= 11.4 \text{ dB}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.



O1-28
Cont.

**3c.** Combine the two propagation characteristics.
Combine the results from Steps 3a and 3b to determine the noise at the receiver considering the propagation characteristics of distance and shielding by applying the distance correction and attenuation due to shielding to the project noise exposure level at 50 ft.

The equations in Table 4-31 combine the equations in Steps 3a and 3b.

**Table 4-31 Calculate $L_{dn}$ or $L_{eq(1hr)}$**

| Source | Equation* | |
|---|---|---|
| Stationary Sources | $L_{DistShield} = L - 20\log(\frac{D}{50}) - 10Glog(\frac{D}{50}) - A_{shielding}$ | Eq. 4-53 |
| Fixed-guideway rail car passbys | $L_{DistShield} = L - 10\log(\frac{D}{50}) - 10Glog(\frac{D}{42}) - A_{shielding}$ | Eq. 4-54 |
| Fixed-guideway locomotive and rubber-tired vehicle passbys, highway vehicle passbys and horns | $L_{DistShield} = L - 10\log(\frac{D}{50}) - 10Glog(\frac{D}{29}) - A_{shielding}$ | Eq. 4-55 |

$L$ = $L_{dn}$ or $L_{eq}$
$D$ = distance, ft
$G$ = ground factor, see Section 4.5, Step 3a
$A_{shielding}$ = attenuation due to shielding, see Section 4.5, Step 3b.

*These equations assume the distance between the source and receiver is approximately 300 ft or less. At longer distances, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. Therefore, more detailed calculation methods may be required to account for those effects.[28, 29]

## Step 4: Combine Noise Exposure from All Sources

*Combine all sources to predict the total project noise at the receivers using the equations in Table 4-32 after propagation adjustments have been made for the noise exposure from each source separately.*

**Table 4-32 Computing Total Noise Exposure**

| | | |
|---|---|---|
| Total $L_{eq(1hr)}$ from all sources for the hour of interest: | $L_{eq,total(1hr)} = 10\log(\sum_{all\ sources} 10^{L_{Aeq(1hr)}/10})$ | Eq. 4-56 |
| Total $L_{dn}$ from all sources | $L_{dn,total} = 10\log(\sum_{all\ sources} 10^{L_{dn}/10})$ | Eq. 4-57 |

### Example 4-10 Detailed Noise Analysis – Combine Sources

**Computation of Total Exposure from Combined Sources**

Combine the noise exposure from the commuter train and light rail system to estimate the total noise exposure at the receiver.

**Assumptions**
A commuter train operation produces the following levels at a receiver of interest:
$L_{eq,Commuter}$ = 72 dBA
$L_{dn,Commuter}$ = 68 dBA

A light rail system produces the following levels at the same receiver:
$L_{eq,LightRail}$ = 69 dBA



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$L_{dn,LightRail}$ = 70 dBA

No other project sources affect this receiver.

Calculate the total noise exposure at the receiver using the equations in Table 4-32.

$$L_{eq,total} = 10\log(10^{(72/10)} + 10^{(69/10)}) = 73.8 \text{ dBA}$$

$$L_{dn,total} = 10\log(10^{(68/10)} + 10^{(70/10)}) = 72.1 \text{ dBA}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

### Step 5: Determine Existing Noise Exposure

*Choose the appropriate method for characterizing noise and then determine the existing noise at each identified noise-sensitive receiver.* The existing noise is needed to determine the noise impact according to the criteria described in Section 4.1, Step 2. Recall that impact is assessed based on a comparison of the existing ambient noise exposure and the additional noise exposure that will be caused by the project. The existing noise exposure must be estimated for all receivers of interest identified in Section 4.5, Step 1.

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For a Detailed Noise Analysis, it is recommended to measure existing noise at each receiver of interest identified in Section 4.5, Step 1, for the most precise assessment of existing noise and conclusions concerning noise impact. However, measurements are expensive, often thwarted by weather, and take considerable time in the field. If taking measurements at each identified receiver is not possible, other less precise methods are available. Different methods may be used at different receivers along the project. However, it is important to recognize the correlation between the precision of measurements and the confidence in the impact assessment. Especially in a Detailed Noise Analysis, avoid using less precise methods of measuring existing noise just for the sake of convenience or expediency. The use of less precise methods must be clearly justified.

**Option A. Noise Exposure Measurements** – Full one-hour measurements are the most appropriate way to determine ambient noise exposure for non-residential receivers with the level of precision expected in a Detailed Noise Analysis. For residential receivers, full 24-hour measurements are more appropriate. These full-duration measurements are preferred over other methods of characterizing existing noise where time and study funds allow.

Follow the procedures below for these full-duration ambient noise exposure measurements:

**Ai. Non-residential land uses** – Measure a full hour $L_{eq(1hr)}$ at the receiver of interest on at least two non-successive weekdays (generally between noon on Monday and noon on Friday). Select the hour of the day when the maximum project activity is expected to occur.

**A.ii. Residential land uses** – Measure a full 24-hour $L_{dn}$ at the receiver of interest for a single weekday (generally between noon on Monday and noon on Friday).

**A.iii. Microphone position** – The location of the microphone at the receiver depends upon the proposed location of the transit noise source, so use good technical judgment in positioning the measurement microphone. If, for example, a new rail line will be in front of the house, do not locate the microphone in the backyard behind the house where the line of sight between the noise source and receiver is obstructed. Figure 4-19 illustrates recommended measurement positions for various locations of the project, with respect to the house and the existing source of ambient noise.

**A.iv. Measurement guidelines** – Undertake all measurements in accordance with good engineering practice following guidelines given in ASTM and ANSI standards.[30][31]

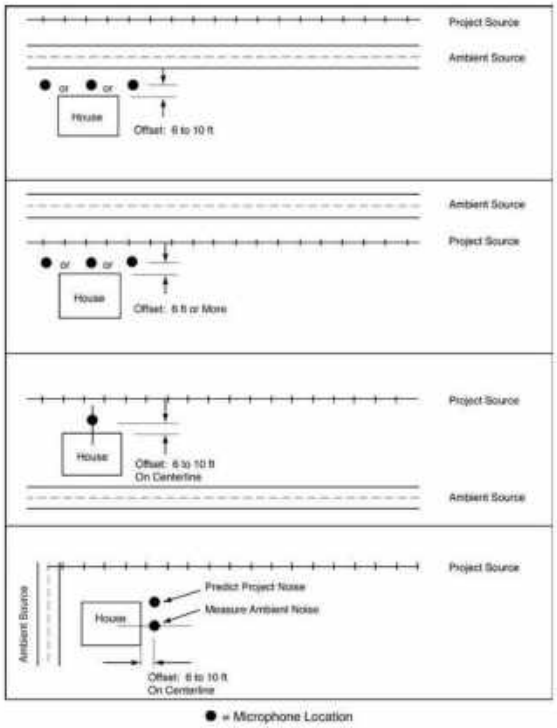


**Figure 4-19 Recommended Microphone Locations for Existing Noise Measurements**

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**Option B. Noise Exposure Computations from Partial Measurements** – Often, measurements can be made at some of the receivers of interest and used to estimate noise exposure at nearby receivers. In other situations, several $L_{eq(1hr)}$ measurements can be taken at a receiver and then the $L_{dn}$ computed from these. Both options require experience and knowledge of acoustics to select representative measurement sites. If using this method to compute an Ldn, a minimum time period of one hour should be used for each measurement period. It is unacceptable to extrapolate a one hour measurement from a shorter measurement period.

Measurements at one receiver can be used to represent the noise environment at other sites, but only when proximity to major noise sources is similar among the sites. Residential neighborhoods with otherwise similar homes may have greatly varying noise environments. For example, one area of the neighborhood may be located where the ambient noise is clearly due to highway traffic. A second area toward the interior of the neighborhood may have highway noise as a factor, but also include other noise sources from the community. A third area located deep into the residential area could have local street traffic and other community activities dominate the ambient noise. In this example, three or more measurement sites would be required to represent the varying ambient noise conditions in a single neighborhood.

Typical situations where representative measurement sites can be used to estimate noise levels at other sites occur when both share the following characteristics:

- Proximity to the same major transportation noise sources, such as highways, rail lines and aircraft flight patterns
- Proximity to the same major stationary noise sources, such as power plants, industrial facilities, rail yards and airports
- Similar type and density of housing, such as single-family homes on quarter-acre lots and multi-family housing in apartment complexes

Acoustical professionals are often adept at such computations from partial data and are encouraged to use their experience and judgment in fully utilizing the measurements in their computations. This does necessitate a conservative estimate (underestimate) of existing noise to account for reduced precision from partial data as compared to full noise measurements.

Those without a background in acoustics are encouraged to use the procedures in Appendix E to compute existing noise from partial measurements. These methods include a factor to conservatively estimate (underestimate) existing noise to account for reduced precision from partial data as compared to full noise measurements.

**Option C. Estimating Existing Noise Exposure** – The least precise way to determine noise exposure is to estimate it from a table. This method is often used for the General Noise Assessment, but it is not recommended for a Detailed Noise Analysis. It can be used, however, in the absence of better data for locations where roadways or railroads are the predominant ambient noise source. Table 4-17 presents these existing levels. The levels in Table 4-17 are



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Cont.

conservative and underestimate existing noise to account for reduced precision compared to full noise measurements. If a simplified procedure to estimate existing noise exposure is chosen it must be clearly justified and receive approval by the FTA Regional office.

While measurements are considered the most precise method, there is one situation where it may be more accurate to estimate rather than measure the existing noise exposure, which is in areas near major airports where aircraft noise is dominant. Because airport noise is highly variable based on weather conditions and corresponding runway usage, it is preferable in such cases to base the existing noise exposure on published aircraft noise contours in terms of Annual Average $L_{dn}$.

### Step 6: Assess Noise Impact

Assess noise impact at each receiver of interest identified in Section 4.5, Step 1 using the noise impact criteria in Section 4.1 and the procedures in this step. Choose the appropriate noise impact assessment procedure for a transit project or multimodal project.

**Option A. Transit Projects** – For transit projects, noise impact is assessed at each receiver of interest using the criteria for transit projects described in Section 4.1. The noise impact assessment procedure is as follows:

**A.i.** Tabulate existing ambient noise exposure (rounded to the nearest whole decibel) at all receivers identified Section 4.5, Step 1. In cases where large residential buildings are exposed to noise on one side only, the receivers on that side are included in the analysis.

**A.ii.** Tabulate project noise exposure at these receivers from Section 4.5, Step 4.

**A.iii.** Determine the level of noise impact (no impact, moderate impact, or severe impact) according to Section 4.1.

**A.iv.** Document the results in noise-assessment inventory tables. Include the following information:

- Receiver identification and location
- Land use description
- Number of noise-sensitive sites represented (number of dwelling units in residences or acres of outdoor noise-sensitive land)
- Closest distance to the project
- Existing noise exposure
- Project noise exposure
- Level of noise impact (no impact, moderate impact, or severe impact)
- A sum of the total number of receivers and numbers of dwelling units predicted to experience moderate impact or severe impact

**A.v.** Illustrate the areas of moderate impact and severe impact. Two methods of displaying impact are labeling and contouring.



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- In a Detailed Noise Analysis, the most accurate indication of impact is to label each impacted building or cluster identified in the inventory table.
- A less precise illustration of impacted areas is a plot of project noise contours on the maps or aerial photographs, along with shaded impact areas. Use the procedures in Section 4.4, Step 6 and the levels from Section 4.5, Step 2 to develop these contours.

Note that it is difficult to position noise contours in urban areas due to shielding, terrain features, and other propagation anomalies. If noise contours are used, they should be considered illustrative rather than definitive. If desired to conform to the practices of another agency, the contouring may perhaps include several contour lines of constant project noise, such as $L_{dn}$ 65, $L_{dn}$ 70, and $L_{dn}$ 75 dBA.

**A.vi.** Including information on the magnitude of the impacts is an essential part of the assessment. The magnitude of noise impact is defined by the two threshold curves delineating onset of moderate impact and severe impact.

**Option B. Multimodal Projects** – For multimodal projects, project noise comprised of both highway and transit noise sources that are assessed according to the FTA noise impact criteria (see Table 4-2), use the procedure in Option A above. For multimodal projects that require FHWA's noise assessment methods to inform FTA's evaluation (see Section 4.1, Step 1 - Option B), follow the FHWA guidance.[32] In general, the appropriate calculation method is to use the current version of FHWA's Traffic Noise Model (TNM).[22] TNM is a state-of-the-art computer program used for predicting noise impacts near highways.

TNM allows for a detailed assessment at each receiver of interest by separately calculating the noise contribution of each roadway segment. For each roadway segment, the noise from each vehicle type is computed from reference noise levels, adjusted for:

- Vehicle volume
- Vehicle speed
- Grade
- Roadway segment length
- Source-to-receiver distance

Further adjustments needed to accurately model the sound propagation from source to receiver include:

- Shielding provided by rows of buildings,
- Effects of different ground types,
- Source and receiver elevations, and
- Effect of any intervening noise barriers.

TNM sums the noise contributions of each vehicle type for a given roadway segment at the receiver. TNM then repeats this process for all roadway segments, summing their contributions to generate the predicted noise level at each receiver.



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## Step 7: Determine Noise Mitigation Measures

Evaluate alternative mitigation measures where the Detailed Noise Analysis shows either severe or moderate impact, and it is not feasible to change the alignment or location of the project to avoid impact. Project noise that is found to cause no impact does not generally require any mitigation.

Mitigation of noise impact from transit projects may involve treatments at the three fundamental components of the noise problem: at the noise source, along the source-to-receiver propagation path, or at the receiver. Generally, the transit property has authority to treat the source and some elements of the propagation path, but may have little or no authority to modify anything at the receiver. After mitigation options have been determined, repeat the project noise computations including the adopted mitigation and reassess the remaining noise impact.

Approximate costs for noise control measures are documented in a report from the Transit Cooperative Research Program (TCRP)[33] and are also presented in this section. These costs reflect the noise mitigation costs available in 1997 (unless otherwise noted), which are the most recent data available as of this publication, and should only be used as representative estimates when considering noise mitigation options. Current noise mitigation costs should be researched before decisions on noise mitigation options are finalized, and then they should be documented according to Section 8.

**7a. Evaluate Source Treatments** – The most effective noise mitigation treatments are applied at the noise source. This is the preferred approach to mitigation when possible. Common source treatments and their estimated acoustical effectiveness are included in Table 4-33 and described below. It is important to note that the values below are estimates and should be applied with good engineering judgement. It also important to note that these mitigation measures should not be applied as a reduction in the reference SEL values for a vehicle that already incorporates that measure as a feature, such as vehicle skirts. Measurements to determine the reference SEL source level are required in those instances.

**Table 4-33 Transit Noise Mitigation Measures – Source Treatments**

| Mitigation Measure | | Effectiveness |
|---|---|---|
| Stringent Vehicle & Equipment Noise Specifications | | Varied |
| Operational Restrictions† | | Varied |
| Resilient or Damped Wheels* | For rolling noise on tangent track: | 2 dB |
| | For wheel squeal on curved track: | 10-20 dB |
| Vehicle Skirts* | | 6-10 dB |
| Undercar Absorption* | | 5 dB |
| Quiet Fan Design and Fan Placement* | | Varied |
| Preventative Maintenance on Rail Systems* | | Varied |
| Resurfacing Roads** | | 10 dB |
| Guideway Support for Buses†** | | 10 dB |
| Turn Radii Greater than 1000 ft* | | Avoids Squeal |
| Rail Lubrication on Sharp Curves* | | Reduces Squeal |
| Movable-Point Frogs (reduce rail gaps at crossovers)* | | Reduces Impact Noise |
| Engine Compartment Treatments | | 6-10 dB |
| Quiet Zones* | | Reduces occurrence of horn noise |

†FTA does not normally accept operational restrictions as a noise mitigation measure – see below.
* Applies to rail projects only.
** Applies to bus projects only.



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Cont.

- **Stringent Vehicle and Equipment Noise Specifications**
  - **Vehicles** – Among the most effective noise mitigation treatments is noise control during the specification and design of the transit vehicle. Such source treatments apply to all transit modes. By developing and enforcing stringent but achievable noise specifications, the transit property takes a major step in controlling noise everywhere on the system. It is important to ensure that the noise levels quoted in the specifications are achievable with the application of best available technology during the development of the vehicle and reasonable considering the noise reduction benefits and costs.

    Effective enforcement includes penalties for non-compliance with the specifications. The noise mitigation achieved by source treatment is dependent on the quality of installation and maintenance. Vehicles failing to meet the noise specification could result in complaints from the public and require additional noise mitigation measures applied along the path or at receivers.

  - **Stationary sources** – Stringent but achievable noise specifications for stationary sources are also an effective approach for mitigating noise impacts. Typical equipment includes fixed plant equipment such as transformers and mechanical equipment, as well as grade-crossing signals. For example, it may be possible to reduce noise impact from grade-crossing signals in some areas by specifying equipment that sets the level of the warning signal lower in locations where ambient noise is lower to minimize the signal noise in the direction of noise-sensitive receivers.

- **Operational Restrictions** – Changes in operations that can mitigate noise include the lowering of speed, the reduction of nighttime (10 p.m. to 7 a.m.) operations, and reduction of warning horns and signals.

  - **Speed reduction** – Because noise from most transit vehicles is dependent on speed, a reduction of speed results in lower noise levels. The effect can be considerable. For example, the speed dependency of steel-wheel/steel-rail systems for $L_{eq(1hr)}$ and $L_{dn}$ (Table 4-21) results in a 6-dB reduction when reducing the speed to half of the original speed.

    Although there are tangible benefits from speed reductions during the most noise-sensitive time periods, FTA does not ordinarily accept speed reduction as a noise mitigation measure for two important reasons: speed reduction is unenforceable and negated if vehicle operators do not adhere to established policies, and it is contrary to the purpose of the transit investment by FTA, which is to move as many people as possible as efficiently and safely as possible.

  - **Reduction of nighttime operations** – Complete elimination of nighttime operations has a strong effect on reducing the $L_{dn}$, because nighttime noise is increased by 10 dB when calculating $L_{dn}$. But restrictions on operations are usually not feasible because of service demands. FTA generally does not pursue restrictions on operations as a



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noise reduction measure. However, if early morning idling can be curtailed to the minimum necessary, however, this can have a measurable effect on $L_{dn}$.

While there are tangible benefits from limits on operations during the most noise-sensitive time periods, FTA does not recommend limits on operations as a way to reduce noise impacts because it is contrary to the purpose of the transit investment by FTA which is to move as many people as possible as efficiently and safely as possible.

- **Reduction of warning horns and signals** – Minimizing or eliminating horns and other warning signals at gate crossings can reduce noise impact for light rail and commuter rail systems. Although these mitigation options are limited by safety considerations, they can be effective in the right circumstances. For examples, see quiet zones below and wayside horns in Step 7b.

- **Wheel Treatments (Rail)** – A major source of noise from steel-wheel and steel-rail systems is the wheel/rail interaction that can produce three distinctive sounds: roar, impact, and squeal (as discussed in Section 3.2). Roar is the rolling noise caused by small-scale roughness on the wheel tread and rail running surface. Impacts are caused by discontinuities in the running surface of the rail or by a flat spot on the wheels. Squeal occurs when a steel-wheel tread or its flange rubs across the rail, resulting in resonant vibrations in the wheel that creates a screeching sound. Various wheel designs and other mitigation measures exist to reduce the noise from each of these three mechanisms.

  - **Resilient wheels** – Resilient wheels are effective in eliminating wheel squeal on tight turns with reductions of 10 to 20 dB in the high-frequency range where squeal noise occurs. Rolling noise is also slightly reduced with resilient wheels and typically achieves a 2-dB reduction on tangent track. The costs for resilient wheels are approximately $2000 to $3000 per wheel, as compared to about $400 to $700 for standard steel wheels.[M]

  - **Damped wheels** – Damped wheels, like resilient wheels, are effective in eliminating wheel squeal on tight turns with reductions of 5 to 15 dB in the high-frequency range where squeal occurs. Rolling noise is also slightly reduced by approximately 2 dB on tangent track. This treatment involves attaching vibration absorbers to standard steel wheels. The costs for damped wheels add approximately $500 to $1000 to the normal $700 for each steel wheel.

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[M] Assumes 8 wheels per vehicle.

- **Vehicle Treatments** – Vehicle noise mitigation measures are applied to the various mechanical systems associated with propulsion, ventilation, and passenger comfort. Propulsion systems of transit vehicles include diesel engines, electric motors, and diesel-electric combinations. Noise from the propulsion system depends on the type of unit and how much noise mitigation is built into the design. Mufflers on diesel engines are generally required to meet noise specifications; however, mufflers are generally practical only on buses, not on locomotives. Control of noise from engine casings may require shielding the engine by body panels without louvers, dictating other means of cooling, and ventilation.

  Ventilation requirements for vehicle systems are related to the noise generated by a vehicle. Fan noise often remains a major noise source after other mitigation measures have been instituted because of the need to have direct access to cooling air. This applies to heat exchangers for electric traction motors, diesel engines, and air-conditioning systems. The mitigation options for these systems include:

  - **Quiet fan design and placement** – Fan noise can be reduced by installation of quiet, efficient fans. Forced-air cooling on electric traction motors can be quieter than self-cooled motors at operating speeds. Placement of fans on the vehicle can make a considerable difference in the noise radiated to the wayside or to patrons on the station platforms.

  - **Vehicle skirts and undercar absorption** – The vehicle body design can provide shielding and absorption of the noise generated by the vehicle components. Acoustical absorption under the car has been demonstrated to provide up to 5 dB of mitigation for wheel/rail noise and propulsion-system noise on rapid transit trains. Similarly, vehicle skirts over the wheels can provide more than 5 dB of mitigation. By carrying their own noise barriers, vehicles with these features can provide cost-effective noise reduction. The cost for vehicle skirts will add approximately $5000 to $10000 per vehicle. Undercar absorption will add approximately $3500 per vehicle, assuming that 50% of the underside of the floor is treated.

- **Preventative Maintenance (Rail)** – Preventative maintenance is the best strategy to minimize rail and wheel deterioration. While these are not mitigation measures in the traditional sense and should not be included as mitigation in an environmental document, they can help to keep both noise and vibration levels at a "like-new" level or reduce both noise and vibration in systems with deferred maintenance. This can be accompanied by considerable life cost benefits for the transit system.

  - **Spin-slide control systems** – Similar to anti-locking brake systems (ABS) on automobiles, spin-slide control systems reduce the incidence of wheel flats, a major contributor of impact noise. Trains with smooth wheel treads can be up to 20 dB quieter than those with wheel flats. To be effective, the anti-locking feature should be in operation during all braking phases, including emergency braking. Wheel flats are more likely



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to occur during emergency braking than during dynamic braking. The cost of slip-slide control may be incorporated in the new vehicle costs, but may be between $5,000 and $10,000 per vehicle with a maintenance cost of $200 per year.

- **Wheel truing** – Maintenance of wheels by truing eliminates wheel flats from the treads and restores the wheel profile. As discussed above, wheel flats are a major source of impact noise. As a guideline, it is recommended that wheel sets match within approximately ±0.01 inch and all wheels on the same truck should match within ±0.02 inches to minimize damage and wear to wheels and rails.[34] A wheel truing machine costs approximately $1 million, including associated maintenance materials and labor costs. The TCRP report estimates a system with 700 vehicles would incur a yearly cost of $300,000 to $400,000 for a wheel truing program.

  It is recommended to install wheel-flat detector systems to identify vehicles that are most in need of wheel truing. These systems are becoming more common on railroads and intercity passenger systems, but are relatively rare on transit systems.

- **Rail grinding** – The smoothness of the running surface is critical in the mitigation of noise from a moving vehicle. Mill scale grinding before commencement of pre-revenue service train operations is critical. Experience shows that grinding new rails after approximately 3 months of train operations and scheduling routine grinding at approximate intervals of 2 years in the problem areas would minimize noise problems related to corrugation in most cases. Grinding with small machines when the corrugation depth is still small is a reasonable approach. As a guideline, it is recommended to spot-grind at locations where corrugation occurs before corrugation grows to 0.02 inches (32).

  Periodic rail grinding can result in a net savings per year on wheel and rail wear. Most transit systems contract out rail grinding, although some of the larger systems make the investment of approximately $1 million for the equipment and do their own grinding. Contractors typically charge a fixed amount per day for the equipment on site, plus an amount per pass-mile (one pass of the grinding machine for one mile). Typical rail grinding cost would be approximately $7,000 to $10,000 per pass-mile.

- **Wheel and rail profile matching** – It is important to consider the wheel and rail profile compatibility when truing wheels and grinding rails. If the profiles do not match, the benefits of this kind of preventative maintenance will not be achieved.

  It is equally important to consider initial wheel and rail profile compatibility. Work with track designers and vehicle suppliers early in the design process to ensure wheel and rail profile compatibility. Profiles should be defined during the design phase and should be in

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place when system opens.[32] The cost of wheel and rail profile matching may be incorporated in the new vehicle and new rail costs.

Profile grinding of the rail head in combination with a wheel truing program may be the most practical approach to controlling and reducing noise and vibration where such practices are not normally conducted.

- **Maintenance program** – Clearly defined maintenance specifications should be developed during design phase of the project. The specifications should define rail and wheel profiles, include detailed guidance for pre-revenue mill scale grinding, address issues related to healthy rail-wheel interface, and include a mechanism for periodic monitoring of wheel and rail condition and verification for compliance.[32] A diligent maintenance program can often resolve or reduce rail noise issues before they occur. Vehicle reconditioning programs should also be developed particularly for components such as suspension system, brakes, wheels, and slip-slide detectors.

- **Guideway Support (Bus)** – The smoothness of the running surface is critical in the mitigation of noise from a moving vehicle.
  - **Resurfacing roads** – Roughness on the guideway can be eliminated by resurfacing roads, thereby reducing noise levels by up to 10 dB.
  - **Bridge expansion joint angles and design** – Bridge expansion joints are also a source of noise for rubber-tire vehicles. This source of noise can be reduced by placing expansion joints on an angle or by specifying the serrated type rather than joints with right-angle edges.

- **Turn Radii and Rail Lubrication** – For steel-wheel/steel-rail systems with non-steerable trucks and sharp turns, squeal can typically be eliminated by designing all turn radii to be greater than 1000 ft, or 100 times the truck wheelbase, whichever is less. If this is not possible, squeal can be mitigated by installation of lubricators (though the potential environmental impacts of lubricant application should be factored into this decision).Rail lubricators cost approximately $10,000 - $40,000 per curve.

- **Movable-point and Spring-rail Frogs** – Frogs with spring-loaded mechanisms and frogs with movable points can reduce impact noise near crossovers. According to the TCRP report, a spring frog costs approximately $12,000, twice the cost of a standard frog. A movable point frog involves elaborate signal and control circuitry resulting in higher costs of approximately $200,000.

- **Use of Locomotive Horns at-grade Crossings and Quiet Zones** – In cases where commuter rail operations share tracks or ROW with freight or intercity passenger trains that are part of the general railroad system, the safety rules of the FRA, including the Train Horn Rule, apply.[35] The Train Horn Rule requires that locomotive horns be sounded at public highway grade crossings, although some exceptions are allowed in carefully defined circumstances. Locomotive horns are often a major contributor in



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projections of adverse noise impact, in the community from proposed commuter rail projects. Since noise barriers are not feasible at highway-rail grade crossings, the establishment of quiet zones could be considered.

Quiet zones can be established in which supplemental safety measures (SSMs) are used in place of the locomotive horn to provide an equivalent level of safety at-grade crossings.[vii] By adopting an approved SSM at each public grade crossing, a quiet zone of at least a half-mile long can be established. These measures are in addition to the standard safety devices required at most public grade crossings (e.g., stop signs, reflectorized crossbucks, flashing lights with gates that do not completely block travel over the tracks). Below are four SSMs that have been predetermined by the FRA to fully compensate for the lack of a locomotive horn:

- **Temporary closure of a public highway-rail grade crossing** – This measure requires closure of the grade crossing for one period each 24 hours, and the closure must occur at the same time each day.
- **Four-quadrant gate system** – This measure involves the installation of at least one gate for each direction of traffic to fully block vehicles from entering the crossing.
- **Gates with medians or channelization devices** – This measure keeps traffic in the proper travel lanes as it approaches the crossing. This denies the driver the option of circumventing the gates by traveling in the opposing lane.
- **One-way street with gates** – This measure consists of one-way streets with gates installed, so that all approaching travel lanes are completely blocked.

In addition to the pre-approved SSMs, the FRA rule also identifies a range of other measures that may be used in establishing a quiet zone. These could include modified SSMs or non-engineering types of measures, such as increased monitoring by law enforcement for grade crossing violations or instituting public education and awareness programs that emphasize the risks associated with grade crossings and applicable requirements. These alternative safety measures (ASMs) require approval by FRA based on a demonstration that public safety would not be compromised by eliminating horn usage.

The lead agency for designating a quiet zone is the local public authority responsible for traffic control and law enforcement on the roads crossing the tracks. To satisfy the FRA regulatory requirements, the public transit agency must work closely with this agency while also coordinating with any freight or passenger railroad operator sharing the ROW. The final environmental document should discuss the main considerations in adopting the quiet zone including: the engineering feasibility, receptiveness of the local public authority, consultation with the railroad, preliminary cost estimates, and evidence of the planning and interagency coordination that has occurred to date. If a quiet zone will be relied on as a mitigation measure, the final environmental document should provide reasonable

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[vii] For more information on quiet zones, visit: https://www.fra.dot.gov/Page/P0889.

assurance that any remaining issues can and will be resolved. For more information on documentation requirements see Section 8.

The cost of establishing a quiet zone varies considerably, depending on the number of intersections that must be treated and the specific SSMs, ASMs, or combination of measures that are used. The FRA gives a cost estimate of $15,000 per crossing for installing two 100-foot-long, non-traversable medians that prevent motorists from driving around closed gates. A typical installation of a four-quadrant gate system is in the range of $175,000–$300,000 per crossing.[36] Who pays for the installation of modifications can become a major consideration in a decision to pursue a quiet zone designation, especially in cases where noise from preexisting railroad operations is controversial in the community. In many cases where a quiet zone would mitigate a severe impact caused by the proposed transit project, the costs are covered by the project sponsor and FTA in the same proportion as the overall cost-sharing for the project.

**7b. Evaluate Path Treatments** – When noise mitigation treatments cannot be applied at the noise source or additional mitigation is required after treating the source, the next preferred placement of noise mitigation is along the noise propagation path between the source and receiver. Common path treatments and their estimated acoustical effectiveness are included in Table 4-34 and described below.

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**Table 4-34 Transit Noise Mitigation Measures – Path Treatments**

| Mitigation Measure | Effectiveness |
|---|---|
| Noise barriers close to vehicles | 6-15 dB |
| Noise barriers at row line | 3-15 dB[37] |
| Alteration of horizontal & vertical alignments | Varied |
| Wayside horns | Varied |
| Acquisition of buffer zones | Varied |
| Ballast on at-grade guideway* | 3 dB |
| Ballast on aerial guideway* | 5 dB |
| Resilient track support on aerial guideway | Varied |
| Vegetation and trees | Varied, see Table 4-30 |

* Applies to rail projects only.

- **Noise Barriers** – Noise barriers are effective in mitigating noise when they break the line-of-sight between source and receiver. The mechanism of sound shielding is described in Section 3.3. The necessary height of a barrier depends on the source height and the distance from the source to the barrier, see Table 4-28 and Figure 4-18.
  - **Noise barriers close to vehicles** – Barriers located very close to a rapid transit train, for example, may only need to be approximately 3 to 4 ft above the top of rail to be effective. Standard barriers close to vehicles can provide noise reductions of 6 to 10 dB.
  - **Noise barriers at ROW line –** Barriers on the ROW line or for trains on the far track, the height must be increased to provide equivalent effectiveness to barriers located close to the vehicles. Otherwise, the effectiveness can drop to 3 dB or less, even if the barrier breaks the line-of-sight.

All barrier effectiveness can be increased by as much as 5 dB by applying sound-absorbing material to the inner surface of the barrier. The length of the barrier wall is also important to its effectiveness. The barrier must be long enough to block noise from a moving train along most of its visible path. This is necessary so that train noise from beyond the ends of the barrier will not severely compromise noise-barrier performance at noise-sensitive locations. The barrier length can be refined in the engineering phase, closely examining the predicted sound level exceedances at specific receivers, site geometries, and the contribution of barrier flanking noise, then adjusting the length as appropriate.

Noise barriers can be made of any outdoor weather-resistant solid material that meets the minimum sound transmission loss required by the project. Materials that are commonly used for noise barriers include 16-gauge steel, 1-inch thick plywood, and any reasonable thickness of concrete. Typically, a surface density of 4 pounds per square foot is required. Areas with strong winds may require more stringent structural requirements. It is critical to seal any gaps between barrier panels and between the barrier and the ground or elevated guideway deck for maximum performance.

Costs for noise barriers (based on highway installations) range from $20 to $25 per square foot of installed noise barrier at-grade with additional cost for design and inspection.[38] Installation on aerial structures could be twice the amount of installation at-grade, especially if the structure has to be strengthened to accommodate the added weight and wind load.

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As described in Section 3.3, noise barriers, if not designed and sited carefully, can reduce visibility of trains for pedestrians and motorists, which causes safety concerns. It is important to consult with safety experts in choosing and siting a noise barrier.

- **Alteration of Horizontal and Vertical Alignments** – Transit alignment in a cut as part of grade separation can accomplish the same result as installation of a noise barrier at-grade or on aerial structure. The walls of the cut serve the same function as barrier walls in breaking the line-of-sight between source and receiver.

- **Wayside Horns** – The sounding of a locomotive horn as the train approaches an at-grade intersection produces a very wide noise footprint in the community. Using wayside horns at these intersections instead of the locomotive horn can substantially reduce the noise footprint without compromising safety at the grade crossing.

  A wayside horn does not need to be as loud as a locomotive horn, and the warning sound is focused only on the area where it is needed. These are pole-mounted horns used in conjunction with flashing lights and gates at the intersection, with a separate horn oriented toward each direction of oncoming vehicle traffic. Noise levels in nearby residential and business areas can be reduced substantially with wayside horns, depending on the location with respect to the grade crossing.

A plan to use wayside horns in place of the locomotive horn at public grade crossings must be coordinated with several public and private entities, notably the local agency having responsibility for traffic control and law enforcement on the road crossings, the state agency responsible for railroad safety, any railroads that share the ROW, and FRA. Public notification must also be given. Preliminary cost information from testing programs indicates a wayside horn system at a railroad/highway grade crossing costs approximately $50,000.

- **Buffer Zones** – Because noise levels attenuate with distance, one noise mitigation option is to increase the distance between noise sources and the closest noise-sensitive receivers. This can be accomplished by locating alignments away from noise-sensitive sites. Acquisition of land or purchasing easements for noise buffer zones is an option that may be considered if appropriate for the project.

- **Ground Absorption – Ballast on Guideways** – Propagation of noise over ground is affected by whether the ground surface is absorptive or reflective. Noise from vehicles on the surface is strongly affected by the character of the ground in the immediate vicinity of the vehicle. Roads and streets for buses are hard and reflective, but the ground at the side of a road has a substantial effect on the propagation of noise to greater distance. Guideways for rail systems can be either reflective or absorptive, depending on whether they are concrete or ballast. Ballast on a guideway can reduce train noise 3 dB at-grade and up to 5 dB on an aerial structure.

- **Vegetation and Trees** – In almost all cases, vegetation and trees are ineffective at providing noise mitigation. Vegetation and Trees can provide some mitigation if at least 100 ft of trees intervene between the source and receiver, if no clear line-of-sight exists between the source and receiver, and if the trees extend 15 ft or more above the line-of-sight as described in Section 4.5, Step 3b. This is generally not a recommended form of mitigation to pursue.

**7c. Evaluate Receiver Treatments –** Consider treatments to the receivers when noise mitigation treatments cannot be applied at the source or along the propagation path, or if combinations of treatments are required. Common receiver treatments and their estimated acoustical effectiveness are included in Table 4-35 and are described in this section.

**Table 4-35 Transit Noise Mitigation Measures – Receiver Treatments**

| Mitigation Measure | Effectiveness |
|---|---|
| Acquisition of Property Rights for Construction of Noise Barriers | 5-10 dB |
| Building Noise Insulation | 5-20 dB |

- **Noise Barriers** – In certain cases, it may be possible to acquire limited property rights for the construction of noise barriers at the receiver. As discussed above, barriers need to break the line-of-sight between the noise source and the receiver to be effective and are most effective when they are



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closest to either the source or the receiver. See Section 3.3 for more information on noise barriers.

- **Building Insulation** – In cases where noise barriers are not feasible—such as multi-story buildings, buildings very close to the ROW, or grade crossings—the only practical noise mitigation measure may be to provide sound insulation for the buildings. In these cases, the need for mitigation at locations where impact has been identified will depend on the use (outdoor vs. indoor), any existing outdoor to indoor reduction in noise levels, and the feasibility of constructing effective noise barriers for second stories and above.

  Depending on the quality of the original building façade, especially windows and doors, sound insulation treatments can improve the noise reductions from transit noise by 5 to 20 dB. To be considered cost-effective, a treatment should provide a minimum reduction of 5 dB in the interior of the building and meet the $L_{dn}$ 45 dBA interior criterion. For more information, see Section 4.1.

  In many cases, especially in locations with high ambient noise levels, the existing sound insulation of a building may already meet the 45 dBA $L_{dn}$ interior noise criterion. It is recommended that sound insulation testing be conducted to determine if the existing sound insulation is sufficient or what additional measures would be required to meet the interior criterion. Effective treatments include:
  - Caulking and sealing gaps in the building façade; and
  - Installation of new doors and windows that are specially designed to meet acoustical transmission-loss requirements:
    - Exterior doors facing the noise source should be replaced with well-gasketed, solid-core wood doors and well-gasketed storm doors.
    - Acoustical windows are typically made of multiple layers of glass with air spaces between to provide noise reduction. Acoustical performance ratings are published in terms of Sound Transmission Class (STC) for these windows. It is recommended to use a minimum STC rating of 39 on any window exposed to the noise source.

  These treatments are beneficial for heat insulation as well as for sound insulation, but acoustical windows are typically non-operable and central ventilation or air conditioning is needed. Residents' preferences should be considered.

  If needed, additional building sound insulation can be provided by sealing vents and ventilation openings and relocating them to a side of the building away from the noise source. In cases where the noise sources is low-frequency noise from diesel locomotives, it may be necessary to increase the mass of the building façade for wood-frame houses by adding a layer of sheathing to the exterior walls.

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Examples of residential sound insulation for rail or highway projects are limited. However, much practical experience with sound insulation of buildings has been gained through grants for noise mitigation to local airport authorities by FAA.

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SECTION 5

# Transit Vibration

This section presents the basic concepts of transit ground-borne vibration, also referred throughout this manual as simple "vibration," and low-frequency groundborne-noise that sometimes results from vibration. The steps for the screening and assessing of potential vibration impacts of transit projects for FTA NEPA approval are described in the following sections.

The Source-Path-Receiver framework for ground-borne vibration for a rail system illustrated in Figure 5-1 is central to all environmental vibration studies. The train wheels rolling on the rails create vibration energy that is transmitted through the track support system into the transit structure. The vibration of the transit structure excites the adjacent ground, creating vibration waves that propagate through the ground and into nearby buildings creating ground-borne vibration effects that potentially interfere with activities. The vibrating building components may radiate sound, which this manual refers to as ground-borne noise. Airborne noise from transit sources is covered in Sections 2.3–4.5 of this manual. Ground-borne noise refers to the noise generated by ground-borne vibration.

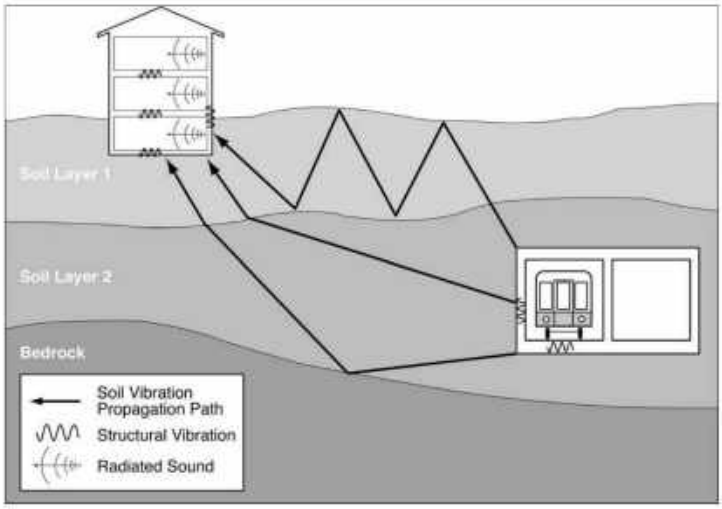


**Figure 5-1 Propagation of Ground-Borne Vibration into Buildings**

This section contains the following:

- Section 5.1 The ground-borne vibration and noise metrics used in this manual
- Section 5.2 An overview of transit vibration sources



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- Section 5.3 An overview of transit vibration paths
- Section 5.4 An overview of receiver factors of transit vibration and a discussion of the technical background for ground-borne noise criteria

## 5.1 Ground-Borne Vibration and Noise Metrics

Vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration. Because the motion is oscillatory, there is no net movement of the vibration element and the average of any of the motion metrics is zero. Displacement is the most intuitive metric. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement and acceleration is the rate of change of the speed.

Although displacement is easier to understand than velocity or acceleration, it is rarely used for describing ground-borne vibration. Most transducers used for measuring ground-borne vibration use either velocity or acceleration. Furthermore, the response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.

This manual uses the metrics outlined in Table 5-1 for transit ground-borne vibration and noise measurements, computations, and assessment. These metrics are consistent with common usage in the United States.

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**Table 5-1 Ground-borne Vibration and Noise Metrics**

| Metric | Abbreviation | Definition |
|---|---|---|
| Vibration Decibels | VdB | The vibration velocity level in decibel scale. |
| Peak Particle Velocity | PPV | The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States. |
| Root Mean Square | rms | The square root of the arithmetic average of the squared amplitude of the signal. |
| A-weighted Sound Level | dBA | A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This unit is used to characterize ground-borne noise. |

The metrics in the table above are illustrated in Figure 5-2. The components in the figure include:

- **Raw signal** – This curve shows the instantaneous vibration velocity, which fluctuates positively and negatively about the zero point.
- **Peak particle velocity (PPV)** – PPV is the maximum instantaneous positive or negative peak of the vibration signal. PPV is often used in monitoring of construction vibration (such as blasting) since it is related to the stresses that are experienced by buildings and is not used to evaluate human response.
- **Root mean square (rms) velocity** – Because the net average of a vibration signal is zero, the rms amplitude is used to describe smoothed vibration amplitude. The rms of a signal is the square root of the

average of the squared amplitude of the signal. The average is typically calculated over a one-second period. The rms amplitude is always less than the PPV[VII] and is always positive. The rms amplitude is used to convey the magnitude of the vibration signal felt by the human body, in inches/second.

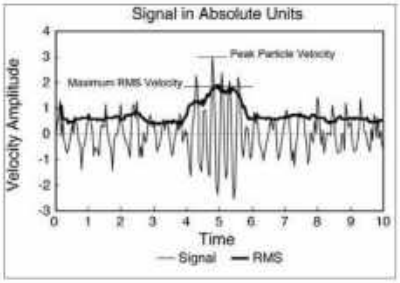


**Figure 5-2 Vibration Signal in Absolute Units**

The PPV and rms velocity are described in inches per second in the United States and meters per second internationally (with several different reference values). Although it is not universally accepted, vibration is commonly expressed in decibel notation. The decibel scale compresses the range of numbers required to describe vibration.

The graph in Figure 5-3 shows the rms curve from Figure 5-2 expressed in decibels.

Vibration velocity level in decibels is defined as:

$$L_v = 20 \log\left(\frac{v}{v_{ref}}\right) \qquad \text{Eq. 5-1}$$

where:

$L_v$ = velocity level, VdB
$v$ = rms velocity amplitude
$v_{ref}$ = $1 \times 10^{-6}$ in/sec in the USA
= $1 \times 10^{-8}$ m/sec internationally*

*Because of the variations in the reference quantities, it is important to be clear about what reference quantity is being used when specifying velocity levels. All vibration levels in this manual are referenced to $1 \times 10^{-6}$ inches/second.

[VII] The ratio of PPV to maximum rms amplitude is defined as the crest factor for the signal. The crest factor is typically greater than 1.41, although a crest factor of 8 or more is not unusual for impulsive signals. For ground-borne vibration from trains, the crest factor is usually 4 to 5.



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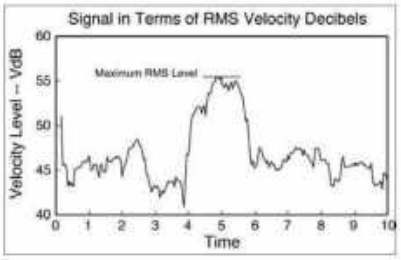


**Figure 5-3 Vibration Signal in RMS Velocity Decibels**

Ground-borne noise occurs when vibration radiates through a building interior and creates a low-frequency sound, often described as a rumble, as a train passes by. The annoyance potential of ground-borne noise is typically characterized with the A-weighted sound level. Although the A-weighted sound level is typically used to characterize community noise, characterizing low-frequency noise using A-weighting can be challenging because the non-linearity of human hearing causes sounds dominated by low-frequency components to seem louder than broadband sounds (sounds consisting of many frequency components, with no dominant frequencies) that have the same A-weighted level. The result is that ground-borne noise with a level of 40 dBA sounds louder than 40 dBA broadband noise. Because ground-borne noise sounds louder than broadband noise at the same noise level, the limits for ground-borne noise are lower (i.e., stricter) than would be the case for broadband noise.

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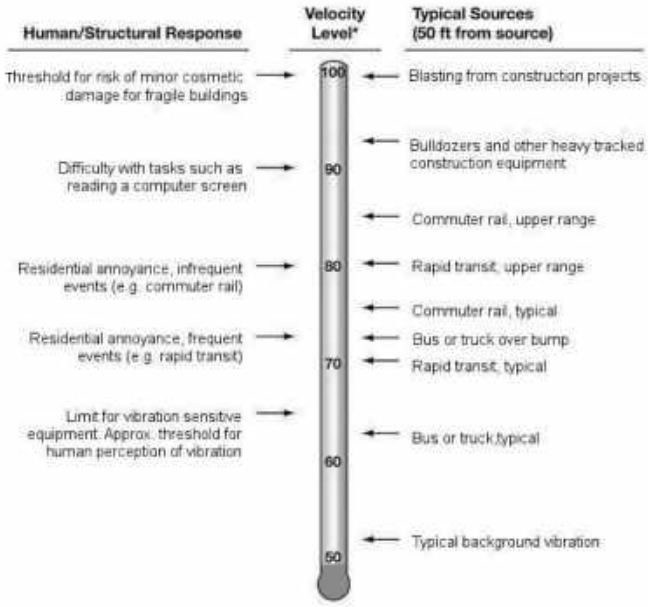
## 5.2 Sources of Transit Ground-borne Vibration and Noise

Ground-borne vibration can be a concern for nearby neighbors of a transit system route or maintenance facility. However, in contrast to airborne noise, ground-borne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. This section discusses common sources of ground-borne vibration and noise.

Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of vibration waves that propagate through the ground and create perceptible ground-borne vibration in nearby buildings include construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is fairly smooth, the vibration from rubber-tired traffic is rarely perceptible. Building damage due to vibration is also rare for typical transportation projects; but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings.

Figure 5-4 illustrates common vibration sources and the human and structural response to ground-borne vibration ranging from approximately 50 VdB (below

perceptibility) to 100 VdB (the threshold of potential damage). The background vibration velocity level in residential areas is usually 50 VdB or lower,[ix] and the threshold of perception for humans is approximately 65 VdB. A vibration level of 85 VdB in a residence can result in strong annoyance.




*RMS Vibration Velocity Level in VdB relative to $10^{-6}$ inches/second

**Figure 5-4 Typical Levels of Ground-Borne Vibration**

Rapid transit or light rail systems typically generate vibration levels of 70 VdB or more near their tracks, while buses and trucks rarely create vibration that exceeds 70 VdB unless there are bumps due to frequent potholes in the road. Heavy locomotives on diesel commuter rail systems create vibration levels approximately 5 to 10 dB higher than rail transit vehicles.

Vibration from trains is strongly dependent on factors such as how smooth the wheels and rails are, as well as the resonance frequencies of the vehicle suspension system and the track support system. These systems, like all mechanical systems, have resonances that result in increased vibration response at certain frequencies, called natural frequencies. Unusually rough road or track, steel-wheel flats, geologic conditions that promote efficient propagation of vibration, or vehicles with very stiff suspension systems could increase typical

[ix] Background vibration is typically well below the threshold of human perception and is of concern only when the vibration affects very sensitive manufacturing or research equipment. Electron microscopes and high-resolution lithography equipment are examples of equipment that is highly sensitive to vibration.



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vibration levels by approximately 10 VdB. Common factors that contribute to ground-borne vibration and noise at the source are presented in Table 5-2. These factors are discussed in more detail throughout this Section.

**Table 5-2 Factors that Influence Levels of Ground-Borne Vibration and Noise at the Source**

| Category | Factors | Influence |
|---|---|---|
| Operations and Vehicles | Speed | Higher speeds result in higher vibration levels. Doubling speed results in a vibration level increase of approximately 4 to 6 dB. |
| | Vehicle Suspension | Stiff suspension in the vertical direction can increase the effective vibration forces. On transit cars, the primary suspension has the largest effect on vibration levels. |
| | Wheel Condition and Type | Wheel flats and general wheel roughness are major sources of vibration from steel wheel/steel rail systems. Resilient wheels on rail transit systems can provide some vibration reduction over solid steel wheels, but are usually too stiff to provide substantial reduction. For more information, see Section 6.4, Step 2. |
| Guideway | Track/Roadway Surface | Rough track or rough roads are often sources of excessive vibration. Maintaining a smooth surface will reduce vibration levels. |
| | Track Support System | On rail systems, the track support system is one of the major components in determining the levels of vibration. The highest vibration levels are created by track that is rigidly attached to a concrete trackbed (e.g., track on wood half-ties embedded in the concrete). The vibration levels are much lower when special vibration control track systems such as resilient fasteners, ballast mats, and floating slabs are used. |
| | Transit Structure | Heavier transit structures typically result in the lower vibration levels. The vibration levels from a lightweight bored tunnel will usually be higher than from a poured concrete box subway. |
| | Transit System Elevation | A rail system guideway will be either underground (subway), at-grade, or elevated, with substantial differences in the vibration characteristics at each elevation.<br>▪ Underground: vibration is typically the most important environmental factor of interest.<br>▪ At-grade: airborne noise is typically the dominant factor, although vibration and noise can be a problem, particularly at interior locations well isolated from exterior noise.<br>▪ Elevated: it is rare for vibration to be an issue with elevated railways except when guideway supports are located within 50 ft of buildings. |

Brief discussions of ground-borne vibration and noise sources for different modes of transit are provided below.

**At-Grade Heavy Rail and Light Rail**

Ground-borne vibration and noise from urban heavy rail and LRT is common when there is less than 50 ft between the track and building foundations. Local geology and structural details of the building determine if the source of complaints is due to perceptible vibration or audible ground-borne noise. Complaints about ground-borne vibration from surface track are more common than ground-borne noise complaints. A substantial percentage of complaints about both ground-borne vibration and noise correlate with proximity of special track work, rough or corrugated track, or wheel flats. Light rail systems tend to generate fewer complaints than heavy rail due to lower operating speeds.

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**Commuter and Intercity Passenger Trains**
There is the potential for vibration-related issues when new commuter or intercity rail passenger service (including electric multiple units (EMUs) and diesel multiple units (DMUs)) powered by either diesel or electric locomotives is introduced in an urban or suburban area. Commuter and intercity passenger trains have similar characteristics, but commuter trains typically operate on a more frequent schedule. These passenger trains often share track with freight trains, which have different vibration characteristics as discussed below.

**Freight Trains**
Local and long-distance freight trains are similar in that they both are diesel-powered and have the same types of cars. They differ in their overall length, number and size of locomotives, and number of heavily loaded cars. However, because locomotive suspensions are similar, the maximum vibration levels of local and long-distance freights are similar. Locomotives and rail cars with wheel flats are the sources of the highest vibration levels.

If the transit project does not in any way change the freight service, tracks, etc., then vibration from the freight line would be part of the existing conditions and need to be considered in terms of cumulative impacts (see Section 6.2, Step 3 on how to consider cumulative impacts). If the project results in changes to the freight path, operations, frequency, etc. (e.g., relocating freight tracks within the ROW to make room for the transit tracks) then those potential impacts and mitigation should be evaluated as part of the proposed project. However, note that vibration mitigation is very difficult to implement on tracks where freight trains with heavy axle loads operate.

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**High-Speed Passenger Trains**
Passenger trains travelling at high speeds, 90 to 250 miles per hour, have the potential for creating high levels of ground-borne vibration. Ground-borne vibration should be anticipated as one of the major environmental impacts of any trains travelling at high speeds located in an urban or suburban area.[x] For projects that are specifically high-speed transportation refer to the FRA "High-Speed Ground Transportation Noise and Vibration Impact Assessment" guidance manual.[39]

**AGT Systems**
AGT systems include a wide range of transportation vehicles that provide local circulation in downtown areas, airports, and theme parks. Because AGT systems normally operate at low speeds, have lightweight vehicles, run on elevated structures, and rarely operate in vibration-sensitive areas, ground-borne vibration problems are very rare.

**Subway and At-grade Track**
While ground-borne vibration produced from trains operating subway and at-grade track have very different characteristics, they have comparable overall vibration velocity levels. Complaints about ground-borne vibration are often more common near subways than near at-grade track. This is not because

[x] Amtrak trains (branded Acela at the time of publication) on the Northeast Corridor between Boston and Washington, DC, which attain moderate to high speeds in some sections with improved track, fit into this category.

subways create higher vibration levels than at-grade systems, rather because subways are usually located in more densely developed areas in closer proximity to building foundations, and the airborne noise is usually a more serious problem for at-grade systems than the ground-borne vibration. Another difference between subway and at-grade track is that the ground-borne vibration from subways tends to be higher frequency than the vibration from at-grade track, which makes the ground-borne noise more noticeable.

**Streetcars**

Complaints about ground-borne vibration from street cars are uncommon given that streetcars typically operate at very low speeds (less than 25 mph).

**Buses**

Because the rubber tires and suspension systems of buses provide vibration isolation, it is unusual for buses to cause ground-borne vibration or noise problems. For most issues with bus-related vibration, such as rattling of windows, the cause is almost always airborne noise and directly related to running surface conditions such as potholes, bumps, expansion joints, or other discontinuities in the road surface (usually resolved by smoothing the discontinuities).

Buses operating inside buildings will likely cause vibration concerns for other building inhabitants. An example of this situation is a bus transfer station in the same building as commercial office space. Sudden loading of a building slab by a heavy moving vehicle or by vehicles running over lane divider bumps can cause intrusive building vibration.

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## 5.3 Paths of Transit Ground-Borne Vibration and Noise

Vibration travels from the source through the transit structure and excites the adjacent ground, creating vibration waves that propagate through soil layers and rock strata to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the building structure. The vibration of the building structure and room surfaces can radiate a low-frequency rumble called ground-borne noise (Figure 5-1).

Soil and subsurface conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils. Shallow rock may concentrate the vibration energy close to the surface, resulting in ground-borne vibration problems at large distances from the track. Factors such as soil layers and depth to water table can have substantial effects on the propagation of ground-borne vibration. These factors are summarized in Table 5-3.

**Table 5-3 Factors that Influence Levels of Ground-borne Vibration and Noise along Path**

| Geology Factors | Influence |
|---|---|
| Soil type | Vibration levels are generally higher in stiff clay-type soil than in loose sandy soil. |
| Rock layers | Vibration levels are usually high near at-grade track when the depth to bedrock is 30 ft or less. Subways founded in rock will result in lower vibration amplitudes close to the subway. Vibration levels do not attenuate as rapidly in rock as in soil. |
| Soil layering | Soil layering can have a substantial effect on the vibration levels since each stratum can have considerably different dynamic characteristics. |
| Depth to water table | The presence of the water table may have a substantial effect on vibration, but a definite relationship has not been established. |

## 5.4 Receiver Factors that Influence Ground-Borne Vibration and Noise

Ground-borne vibration is a concern almost exclusively inside buildings. Train vibration may be perceptible to people who are outdoors, but it is very rare for outdoor vibration to cause complaints.

The vibration levels inside a building are dependent on the vibration energy that reaches the building foundation, coupling of the building foundation to the soil, and propagation of the vibration through the building. In general, the heavier a building is, the lower the response will be to the incident vibration energy. Common factors that contribute to ground-borne vibration and noise at the receiver are presented in Table 5-4.

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**Table 5-4 Factors that Influence Levels of Ground-Borne Vibration and Noise at the Receiver**

| Receiver Building Factors | Influence |
|---|---|
| Foundation type | The heavier the building foundation, the greater the coupling loss as the vibration propagates from the ground into the building. |
| Building construction | Each building has different characteristics relative to structure-borne vibration, but, in general, the heavier the building, the lower the levels of vibration. The maximum vibration amplitudes of the floors and walls of a building will often occur at the resonance frequencies of the components of the building. |
| Acoustical absorption | The more acoustically absorptive materials in the receiver room, the lower the ground-borne noise level. Note that because ground-borne noise usually is a low-frequency phenomenon, it is affected by low-frequency absorption (e.g., below 250 Hz). |

## 5.5 Human Response to Transit Ground-borne Vibration and Noise

This section contains an overview of human receiver response to ground-borne vibration and noise. It serves as background information for the vibration impact criteria in Section 6.2.

The effects of ground-borne vibration can include perceptible movement of floors in buildings, rattling of windows, shaking of items on shelves or hanging on walls, and low-frequency noise (ground-borne noise). Building damage is not a

factor for typical transportation projects, but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings. Although the perceptibility threshold is approximately 65 VdB, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB (Figure 5-4). A vibration level that causes annoyance is well below the damage risk threshold for typical buildings (100 VdB).

Ground-borne vibration is almost never a problem outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of a building, the motion does not provoke the same adverse human reaction. Ground-borne noise that accompanies the building vibration is usually perceptible only inside buildings and typically is only an issue at locations with subway or tunnel operations where there is no airborne noise path or for buildings with substantial sound insulation such as a recording studio.

One of the challenges in developing suitable criteria for ground-borne vibration is that there has been relatively little research into human response to vibration and, specifically, human annoyance with building vibration. The American National Standards Institute (ANSI) developed criteria for evaluation of human exposure to vibration in buildings in 1983,[40] and the International Organization for Standardization (ISO) adopted similar criteria in 1989[41] and revised them in 2003.[42] The 2003 version of ISO 2631-2 acknowledges that "human response to vibration in buildings is very complex." It further indicates that the degree of annoyance cannot always be explained by the magnitude of the vibration alone. In some cases, complaints are associated with measured vibration that is lower than the perception threshold. Other phenomena such as ground-borne noise, rattling, visual effects such as movement of hanging objects, and time of day (e.g., late at night) all play some role in the response of individuals. To understand and evaluate human response, which is often measured by complaints, all of these related effects need to be considered.

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Figure 5-5 illustrates the relationship between the vibration velocity level measured in 22 homes and the general response of the occupants to the vibration from measurements performed for several transit systems along with subjective ratings by researchers and residents. These data are published in the "State-of-the-Art Review of Ground-borne Noise and Vibration."[43] The figure also includes a curve representing the percent of people annoyed by vibration from high-speed trains from a Japanese study for comparison.[44]

Both the occupants and the people who performed the measurements agreed that floor vibration in the Distinctly Perceptible range is unacceptable for a residence. The data indicates that residential vibration exceeding 75 VdB is unacceptable for a repetitive vibration source such as rapid transit trains that pass every 5 to 15 minutes. The results from the Japanese study confirm the conclusion that at a vibration velocity level of 75 to 80 VdB, many people will find the vibration annoying. A Transportation Research Board (TRB) study of human response to vibration from 2009 also supports this finding and indicates that incidence of complaints fall rapidly with a level decreasing below 72 VdB.[42][45]

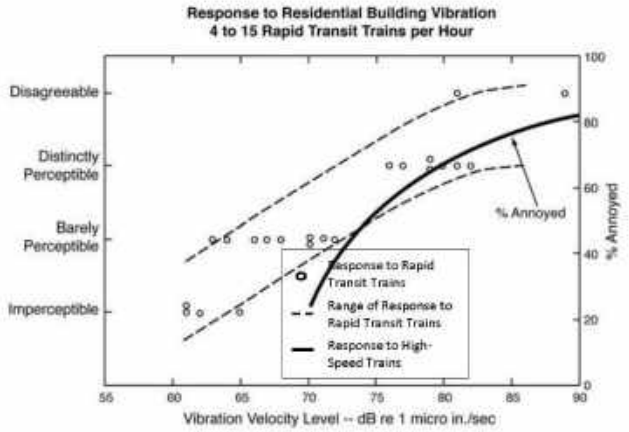


**Figure 5-5 Response to Transit-Induced Residential Vibration**

Table 5-5 presents the human response to different levels of ground-borne vibration and noise on which the criteria presented in Section 6.2 are based. The vibration level (VdB) is presented with the corresponding frequency assuming that the vibration spectrum peaks at 30 Hz or 60 Hz.[xi] The ground-borne noise levels (dBA) are estimated for the specified vibration velocity with a peak vibration spectrum of 30 Hz (Low Freq) and 60 Hz (Mid Freq). Note that the human response differs for vibration velocity level based on frequency. For example, the noise caused by vibrating structural components may cause annoyance even though the vibration cannot be felt. Alternatively, a low-frequency vibration can cause annoyance while the ground-borne noise level it generates does not.

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[xi] The A-weighted level of ground-borne noise can be estimated by applying A-weighting to the vibration velocity spectrum and by subtracting an additional 5 dB for a room with average acoustical absorption. Since the A-weighting at 31.5 Hz is -39.4 dB, if the vibration spectrum peaks at 30 Hz, the A-weighted sound level will be approximately 40 dB lower than the velocity level. If the vibration spectrum peaks at 60 Hz, the A-weighted sound level will be approximately 25 dB lower than the velocity level.

**Table 5-5 Human Response to Different Levels of Ground-Borne Vibration and Noise**

| Vibration Velocity Level | Noise Level | | Human Response |
|---|---|---|---|
| | Low Freq* | Mid Freq** | |
| 65 VdB | 25 dBA | 40 dBA | Approximate threshold of perception for many humans. Low-frequency sound: usually inaudible. Mid-frequency sound: excessive for quiet sleeping areas. |
| 75 VdB | 35 dBA | 50 dBA | Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise: tolerable for sleeping areas. Mid-frequency noise: excessive in most quiet occupied areas. |
| 85 VdB | 45 dBA | 60 dBA | Vibration tolerable only if there are an infrequent number of events per day. Low-frequency noise: excessive for sleeping areas. Mid-frequency noise: excessive even for infrequent events for some activities. |

*Approximate noise level when vibration spectrum peak is near 30 Hz.
**Approximate noise level when vibration spectrum peak is near 60 Hz.

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SECTION 6

# Vibration Impact Analysis

The FTA vibration impact analysis process is a multi-step process used to evaluate a project for potential vibration impacts. If impact is determined, measures necessary to mitigate adverse impacts are to be considered for incorporation into the project.[3]

The FTA vibration impact analysis steps are summarized as follows and are described in the following sections:

**6.1** Determine vibration analysis level.

**6.2** Determine vibration impact criteria.
- **Option A:** General Vibration Assessment Criteria
- **Option B:** Vibration Impact Criteria for a Detailed Vibration Analysis

**6.3** Evaluate Impact: Vibration Screening Procedure
- **Step 1:** Classify project vehicles.
- **Step 2:** Determine project type.
- **Step 3:** Determine screening distance.
- **Step 4:** Identify vibration-sensitive land uses.

**6.4** Evaluate Impact: General Vibration Assessment.
- **Step 1:** Select base curve for ground surface vibration level.
- **Step 2:** Apply adjustments.
- **Step 3:** Inventory vibration impact.

**6.5** Evaluate Impact: Detailed Vibration Analysis
- **Step 1:** Characterize Existing Vibration
- **Step 2:** Estimate Vibration Impact
- **Step 3:** Assess Vibration Impacts
- **Step 4:** Determine Vibration Mitigation Measures

A similar process for the noise impact analysis is presented in Section 4. After the noise and vibration analyses have been completed, assess construction noise and vibration according to Section 7 and document findings according to Section 8.

## 6.1 Determine Vibration Analysis Level

There are three levels of analysis to assess the potential ground-borne vibration and noise impacts resulting from a public transportation project. The appropriate level of analysis varies by project based on the type and scale of the project, the stage of project development, and its environmental setting. These three levels are: the Vibration Screening Procedure, the General Vibration Assessment, and the Detailed Vibration Analysis. These levels of vibration analysis mirror the levels of noise analysis discussed in Section 4.2.

The Vibration Screening Procedure, performed first, defines the study area of any subsequent vibration impact assessment. Where there is potential for



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impact, the General Vibration Assessment and Detailed Vibration Analysis procedures are used to determine the extent and severity of impact. In some cases, a General Vibration Assessment may be all that is needed. However, if the proposed project is near noise-sensitive land uses and it appears at the outset that the impact would be substantial, it is prudent to conduct a Detailed Vibration Analysis.

The methods for analyzing transit vibration are consistent with those described in recognized handbooks and international standards.[46][47]

*Conduct the vibration screening procedure and then determine the appropriate vibration analysis option:*

**Vibration Screening Procedure** – The Vibration Screening Procedure is a simplified method of identifying the potential for vibration impact from transit projects. The Vibration Screening Procedure is applicable to all types of transit projects and does not require any specific knowledge about the vibration characteristics of the system or the geology of the area. This procedure uses simplified assumptions and considers the type of project and the presence or absence of vibration-sensitive land uses within a screening distance that has been developed to identify most potential vibration impacts. If no vibration-sensitive land uses are present within the defined screening distance, then no further vibration assessment is necessary.

The Vibration Screening Procedure steps are provided in Section 6.3, Step 1.

**General Vibration Assessment** – The General Vibration Assessment is used to examine potential impacts to vibration-sensitive land use areas identified in the screening step more closely. It uses generalized information likely to be available at an early stage in the project development process and during the development of most environmental documents.

Vibration levels at receivers are determined by estimating the overall vibration velocity level and A-weighted ground-borne noise levels as a function of distance from the track and applying adjustments to account for factors such as track support systems, vehicle speed, type of building, and track and wheel conditions.

A General Vibration Assessment is sufficient for the environmental review of many projects, including projects that compare transit modal alternatives or relocate a crossover or turnout. The General Vibration Assessment may also be sufficient if it results in a commitment to mitigation that eliminates the vibration impacts, such as a change in transit mode or alignment. However, if impact is identified through the General Vibration Assessment procedures and not mitigated, a Detailed Vibration Analysis of the selected alternative must be completed. Most vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done.

The General Vibration Assessment procedure is provided in Section 6.3, Step 2.

**Detailed Vibration Analysis** – The Detailed Vibration Analysis procedure is a comprehensive assessment method that produces the most accurate estimates



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of vibration impact for a proposed project and is often accomplished during the engineering phase of a project when there are sufficient data identifying potential adverse vibration impacts from the project. However, a Detailed Vibration Analysis may be warranted earlier in the environmental review process if there are potentially severe impacts due to the proximity of vibration-sensitive land uses. This type of assessment requires professionals with experience in performing and interpreting vibration propagation tests.

A Detailed Vibration Analysis may not be necessary for all segments of a project. Generalized prediction curves from the General Vibration Assessment procedures may be sufficient for most of the alignment, and the Detailed Vibration Analysis procedure may only need to be applied to particularly sensitive receivers (Section 6.3). Note that a Detailed Vibration Analysis is typically required when designing special track-support systems such as floating slabs or ballast mats. These and other costly vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done in the engineering phase of the project.

The Detailed Vibration Analysis procedure is presented in Section 6.3, Step 3.

## 6.2 Determine Vibration Impact Criteria

Use the FTA criteria presented in this section when conducting a General Vibration Assessment or a Detailed Vibration Assessment. Like noise, the sensitivity to vibration varies by land use type, and the criteria represent these sensitivities. These criteria are based on national and international standards,[38][39][48] as well as experience on human response to building vibration. See Section 5.5 for additional background information on the development of FTA vibration criteria. The criteria for environmental impact from ground-borne vibration and noise are based on the maximum root-mean-square (rms) vibration velocity levels for repeated events of the same source.

Determine the appropriate criteria based on the level of analysis (Section 6.1). The impact criteria for the General Vibration Assessment are presented in Option A, and the impact criteria for the Detailed Vibration Analysis are presented in Option B.

### Option A: General Vibration Assessment Criteria

Determine the land use according to Step 1 and the frequency of events according to Step 2. The impact criteria for the General Vibration Analysis are presented in Step 3.

#### Step 1: Land Use Categories

*Determine the appropriate land use category for the receiver of vibration impacts of the project or project segment.* Sensitive land use categories for vibration assessment are presented in Table 6-1 in order of sensitivity. Consider indoor use of the buildings when determining land use categories for ground-borne vibration and noise, since impact is experienced indoors.



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**Table 6-1 Land Use Categories for General Vibration Assessment Impact Criteria**

| Land Use Category | Land Use Type | Description of Land Use Category |
|---|---|---|
| - | Special Buildings | This category includes special-use facilities that are very sensitive to vibration and noise that are not included in the categories below and require special consideration. However, if the building will rarely be occupied when the source of the vibration (e.g., the train) is operating, there is no need to evaluate for impact. Examples of these facilities include concert halls, TV and recording studios, and theaters. |
| 1 | High Sensitivity | This category includes buildings where vibration levels, including those below the threshold of human annoyance, would interfere with operations within the building. Examples include buildings where vibration-sensitive research and manufacturing* is conducted, hospitals with vibration-sensitive equipment, and universities conducting physical research operations. The building's degree of sensitivity to vibration is dependent on the specific equipment that will be affected by the vibration. Equipment moderately sensitive to vibration, such as high resolution lithographic equipment, optical microscopes, and electron microscopes with vibration isolation systems are included in this category.** For equipment that is more sensitive, a Detailed Vibration Analysis must be conducted. |
| 2 | Residential | This category includes all residential land use and buildings where people normally sleep, such as hotels and hospitals. Transit-generated ground-borne vibration and noise from subways or surface running trains are considered to have a similar effect on receivers.*** |
| 3 | Institutional | This category includes institutions and offices that have vibration-sensitive equipment and have the potential for activity interference such as schools, churches, doctors' offices. Commercial or industrial locations including office buildings are not included in this category unless there is vibration-sensitive activity or equipment within the building. As with noise, the use of the building determines the vibration sensitivity. |

* Manufacturing of computer chips is an example of a vibration-sensitive process.

** Standard optical microscopes can be impacted at vibration levels below the threshold of human annoyance.

*** Even in noisy urban areas, the bedrooms will often be in quiet buildings with effective noise insulation. However, ground-borne vibration and noise are experienced indoors, and building occupants have practically no means to reduce their exposure. Therefore, occupants in noisy urban areas are just as likely to be exposed to ground-borne vibration and noise as those in quiet suburban areas.

- **Ground-borne Vibration** – Locations with equipment that is highly-sensitive to vibration should be included in category 1 or assessed using the Detailed Vibration Analysis procedures (Section 6.3, Step 3) and criteria (Section 6.2, Option B) or specific criteria of the equipment manufacturer.

  Most computer installations or telephone switching equipment is not considered sensitive to vibration. Although the owners of this type of equipment often are concerned with the potential for ground-borne vibration interrupting smooth operation of their equipment, it is rare for computer or other electronic equipment to be particularly sensitive to vibration. This type of equipment is typically designed to operate in common building environments where the equipment may experience occasional disturbances and continuous background vibration caused by other equipment.

- **Ground-borne Noise** – Ground-borne noise is typically only assessed at locations with subway or tunnel operations where there is no airborne noise path, or for buildings with substantial sound insulation such as a recording studio. For typical buildings with at-grade or elevated transit operations, the interior airborne noise levels are often higher than the



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ground-borne noise levels. For interior rooms or other special cases, ground-borne noise may need to be assessed.

### Step 2: Identify Event Frequency

*Determine the appropriate frequency of events for the project or project segment.*

Community response to vibration correlates with the frequency of events and, intuitively, more frequent events of low vibration levels may evoke the same response as fewer high vibration level events. This effect is accounted for in the ground-borne vibration and noise impact criteria by characterizing projects by frequency of events. Event frequency definitions are presented in Table 6-2.

**Table 6-2 Event Frequency Definitions**

| Category | Definition | Typical Project Types |
|---|---|---|
| Frequent Events | More than 70 events per day | Most rapid transit |
| Occasional Events | 30–70 events per day | Most commuter trunk lines |
| Infrequent Events | Fewer than 30 events per day | Most commuter rail branch lines |

### Step 3: Apply Impact Criteria by Land Use and Event Frequency

Select the appropriate impact criteria for ground-borne vibration and noise based on the previously identified land use categories and frequency of events. It is also important to consider the time of vibration sensitivity. If the building is not typically occupied when the vibration source (e.g., train) is operating, it is not necessary to consider impact.

The criteria in this section are appropriate for assessing human annoyance or interference with vibration-sensitive equipment for common projects. While not typical, existing conditions, freight train operations, and building damage may require consideration.

- **Existing Conditions** – The criteria in this section do not consider existing conditions. In most cases, the existing environment does not include a substantial number of perceptible ground-borne vibration or noise events. However, existing conditions must be evaluated in some cases, such as for projects located in an existing rail corridor. For criteria considering existing conditions, see Step 3b.

- **Freight Train Operations** – The criteria are primarily based on experience with passenger train operations. Passenger train operations (rapid transit, commuter rail, and intercity passenger railroad) create vibration events that last approximately 10 seconds or less while a typical line-haul freight train event lasts approximately two minutes. This manual is oriented to transit projects. However, situations will occur when freight train operations must be evaluated, such as when freight train tracks are relocated for a transit project within a railroad ROW. Guidelines on applying these criteria to freight train operations are presented in Step 3c.



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- **Building Damage** – It is extremely rare for vibration from train operations to cause substantial or even minor cosmetic building damage. However, damage to fragile historic buildings located near the ROW may be of concern. Even in these cases, damage is unlikely except when the track is located very close to the structure. Damage thresholds that apply to these structures are discussed in Section 7.2, Step 4 on Construction Vibration Impacts.

**3a. Choose the impact criteria by land use category and event frequency.** The criteria for ground-borne vibration and noise land use categories 1-3 are presented in Table 6-3. The criteria are presented in terms of acceptable indoor ground-borne vibration and noise levels. Impact will occur if these levels are exceeded. Criteria for ground-borne vibration are expressed in terms of rms velocity levels in VdB, and criteria for ground-borne noise are expressed in terms of A-weighted sound pressure levels in dBA.

**Table 6-3 Indoor Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for General Vibration Assessment**

| Land Use Category | GBV Impact Levels (VdB re 1 micro-inch /sec) | | | GBN Impact Levels (dBA re 20 micro Pascals) | | |
|---|---|---|---|---|---|---|
| | Frequent Events | Occasional Events | Infrequent Events | Frequent Events | Occasional Events | Infrequent Events |
| **Category 1**: Buildings where vibration would interfere with interior operations. | 65 VdB* | 65 VdB* | 65 VdB* | N/A** | N/A** | N/A** |
| **Category 2**: Residences and buildings where people normally sleep. | 72 VdB | 75 VdB | 80 VdB | 35 dBA | 38 dBA | 43 dBA |
| **Category 3**: Institutional land uses with primarily daytime use. | 75 VdB | 78 VdB | 83 VdB | 40 dBA | 43 dBA | 48 dBA |

* This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed.
** Vibration-sensitive equipment is generally not sensitive to ground-borne noise; however, the manufacturer's specifications should be reviewed for acoustic and vibration sensitivity.

The criteria for ground-borne vibration and noise for special land uses are presented in Table 6-4. The criteria are presented in terms of acceptable indoor ground-borne vibration and noise levels. Impact will occur if these levels are exceeded. As for the other land uses, the criteria for ground-borne vibration are expressed in terms of rms velocity levels in VdB, and criteria for ground-borne noise are expressed in terms of sound pressure levels in dBA.

**Table 6-4 Indoor Ground-Borne Vibration and Noise Impact Criteria for Special Buildings**

| Type of Building or Room | Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch/sec) | | Ground-Borne Noise Impact Levels (dBA re 20 micro-Pascals) | |
|---|---|---|---|---|
| | Frequent Events | Occasional or Infrequent Events | Frequent Events | Occasional or Infrequent Events |
| Concert halls | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| TV studios | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| Recording studios | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| Auditoriums | 72 VdB | 80 VdB | 30 dBA | 38 dBA |
| Theaters | 72 VdB | 80 VdB | 35 dBA | 43 dBA |



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**3b. Consider the presence of existing vibration conditions.**
When the project will cause vibration more than 5 dB above the existing vibration, the existing source can be ignored, and the standard vibration criteria in Step 3a are appropriate. When the project will cause vibration less than 5 dB above the existing vibration level, use the instructions presented in this section to determine the appropriate impact criteria for the project. For information on characterizing existing vibration conditions, see Section 6.2, Step 3.

Use Table 6-5 and Figure 6-1 to determine the appropriate impact criteria. Sources of existing vibration are typically longer in duration than the events introduced into the environment due to the project. The frequency of use in the rail corridor is also a factor in characterizing the existing conditions. Both factors are considered in the process of determining appropriate impact criteria in Table 6-5 and Figure 6-1.
Examples of projects considering the existing vibration conditions in Table 6-5 and Figure 6-1 include:

- An automated people mover system planned for a corridor with an existing rapid transit service with 220 trains per day that did not have a significant increase in events from the existing 220 trains per day and that is not 3 dB above the existing vibration level would cause no additional impact.
- Where a new commuter rail line shares a heavily-used corridor with a rapid transit system, the project vibration exceeds the existing vibration level, there is not a significant increase in the number of events, and the project vibration exceeds the existing vibration level by 3 dB or more, the projected vibration levels must be evaluated using the standard impact criteria to determine impact.
- If a new transit project will use an existing railroad ROW and the location of existing railroad tracks are shifted, existing vibration can be substantial. The track relocation and reconstruction can result in lower vibration levels that would benefit the receivers and not introduce any adverse impact. However, if the track relocation causes higher vibration levels at vibration-sensitive receivers, then the projected vibration levels must be evaluated using the standard impact criteria to determine impact.

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**Table 6-5 Impact Criteria Considering Existing Conditions**

| Category | Number of Operations (At present – without project) | Criteria |
|---|---|---|
| Heavily Used | More than 12 trains per day | Use the standard vibration criteria in Section 6.2, Step 3a for the following scenarios:<br>• The existing vibration does not exceed the standard vibration criteria.<br>• The existing vibration exceeds the standard vibration criteria and there is a significant increase in events.*<br>• The existing vibration exceeds the standard vibration criteria, and the project vibration is 3 dB or more above the existing vibration.<br>The project has no impact if the existing vibration exceeds the standard vibration criteria, the number of events does not increase significantly, and the project vibration does not exceed the existing vibration by 3 dB or more. |
| Moderately Used | 5 – 12 trains per day | Use the standard vibration criteria in Section 6.2 Step 3a for the following scenarios:<br>• The existing vibration does not exceed the standard vibration criteria.<br>• The existing vibration exceeds the standard vibration criteria, and the project vibration is not 5 dB or more below the existing vibration.<br>The project has no impact if the existing vibration exceeds the standard vibration criteria and the project vibration is at least 5 dB below the existing vibration. |
| Infrequently Used | Fewer than 5 trains per day | The standard vibration criteria in Section 6.2, Step 3a apply. |

* Approximately doubling the number of events is required for a significant increase.

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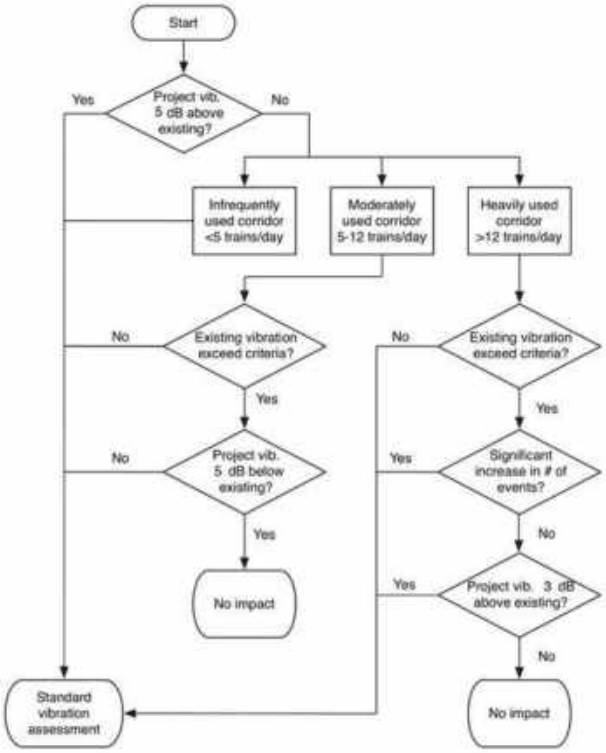


**Figure 6-1 Existing Vibration[x6] Criteria Flow Chart**

**3c. Apply criteria to freight trains if part of the project.**
Use the criteria presented in Step 3a to assess the vibration from freight trains in shared ROW scenarios because no specific impact criteria exist for freight railroads. It is important to consider that freight operations occur over substantially greater distances than passenger train operations and have different weight and axle loads.

When assessing vibration from freight train operations, consider the locomotive and rail car vibration separately. Since locomotive vibration lasts for a very short time, it can be characterized by the infrequent events category in Table 6-2. Rail car vibration from a typical line-haul freight train usually lasts for several minutes and can be characterized by the frequent events category in Table 6-2. Note

[x6] Vibration is abbreviated as "vib." in this flowchart.



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that locomotives often create vibration levels that are 3 to 8 dB higher than those created by rail cars.

Use good engineering judgment to confirm the approach is reasonable for each project. For example, some spur rail lines carry very little rail traffic (sometimes only one train per week) or have short trains, in which case it may not be necessary to evaluate for impact. If there is uncertainty in how to determine the appropriate criteria, contact the FTA Regional office.

Decisions to relocate freight tracks closer to vibration-sensitive sites should be made with the understanding that increased vibration due to freight rail may not be possible to mitigate. Freight rail vibration may not always be successfully mitigated by the same methods as rail transit systems.

### Option B: Vibration Impact Criteria for a Detailed Vibration Analysis

Determine the appropriate impact criteria for ground-borne vibration and ground-borne noise for a Detailed Vibration Analysis.

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Cont.

### Step 1: Ground-Borne Vibration

*Choose the appropriate criteria based on Figure 6-2 and Table 6-6.*

Ground-borne vibration criteria presented in this section are more detailed than in the General Vibration Assessment. The criteria are based on international standards for the effects of vibration on people related to annoyance and interference with activities in buildings[39] as well as industry standards for vibration-sensitive equipment.[46] The criteria in this section are used to assess the potential for interference or annoyance from building response and to determine performance of vibration reduction methods. Note that for highly-sensitive equipment, specific vibration criteria provided by the manufacturer supersede the criteria in this section.

The criteria are presented by category in Figure 6-2 and are defined by international and industry standards.[39][46] These criteria define limits for acceptable maximum rms vibration velocity level with a one-second averaging time at the floor of the receiving building in terms of a one-third octave band frequency spectrum. Band levels that exceed a particular criterion curve indicate impact; and therefore, mitigation options should be evaluated considering the specific frequency range in which the treatment is most effective. Interpretations of the criteria are presented in Table 6-6.

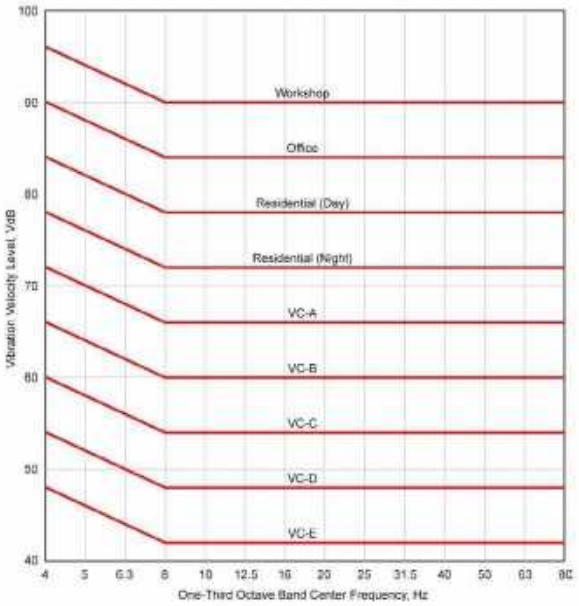


**Figure 6-2 Criteria for Detailed Vibration Analysis**

**Table 6-6 Interpretation of Vibration Criteria for Detailed Vibration Analysis**

| Criterion Curve | Max Lv,* VdB | Description of Use |
|---|---|---|
| Workshop (ISO) | 90 | Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration. |
| Office (ISO) | 84 | Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration. |
| Residential Day (ISO) | 78 | Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20X). |
| Residential Night, Operating Rooms (ISO) | 72 | Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power optical microscopes (100X) and other equipment of low sensitivity. |
| VC-A | 66 | Adequate for medium- to high-power optical microscopes (400X), microbalances, optical balances, and similar specialized equipment. |
| VC-B | 60 | Adequate for high-power optical microscopes (1000X) and inspection and lithography equipment to 3-micron line widths. |
| VC-C | 54 | Appropriate for most lithography and inspection equipment to 1-micron detail size. |
| VC-D | 48 | Suitable in most instances for the most demanding equipment, including electron microscopes operating to the limits of their capabilities. |
| VC-E | 42 | The most demanding criterion for extremely vibration-sensitive equipment. |

* As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hz.



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Cont.

In addition to the uses described in Table 6-6, the detailed vibration criteria can be applied to the three land use categories presented in Table 6-3.

- For residential land uses (category 2), use the residential night criterion curve in Table 6-6.
- For institutional uses (category 3), use the residential day criterion curve in Table 6-6.
- For category 1, the specific use of the building should be matched to the appropriate criterion curve in Table 6-6.
- For special buildings, such as those found in Table 6-4, either the criteria in Table 6-4 or specific criteria presented by the building operator should be used.

These criteria use a frequency spectrum because vibration-related problems generally occur due to resonances of the structural components of a building or vibration-sensitive equipment. Resonant response is frequency-dependent. A Detailed Vibration Analysis can provide an assessment that identifies potential problems resulting from resonances.

The detailed vibration criteria are based on generic cases when people are standing or equipment is mounted on the floor in a conventional manner. Consequently, the criteria are less stringent at very low frequencies below 8 Hz. Where special vibration isolation has been provided in the form of pneumatic isolators, the resonant frequency of the isolation system is very low. Consequently, in this special case, the curves may be extended flat at lower frequencies.

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Cont.

### Step 2: Ground-borne Noise

Ground-borne noise impacts are assessed based on criteria for human annoyance and activity interference. The Detailed Vibration Analysis procedure provides vibration spectra inside a building. To evaluate ground-borne noise, convert these vibration spectra to sound pressure level spectra in the occupied spaces using the method described in Section 6.5 and compare to the criteria as follows:

- For residential buildings, use the criteria presented in Table 6-3.
- For special buildings listed in Table 6-4, A-weighted noise may not be sufficient to assess activity interference for a Detailed Vibration Analysis. Each special building may have a unique specification for acceptable noise levels and criteria must be determined on a case-by-case basis. For example, a recording studio may have stringent requirements for allowable noise in each frequency band.

## 6.3 Evaluate Impact: Vibration Screening Procedure

*Determine the potential for impact using the Vibration Screening Procedure by identifying any vibration-sensitive land uses (Table 6-1) within the appropriate screening distance.*

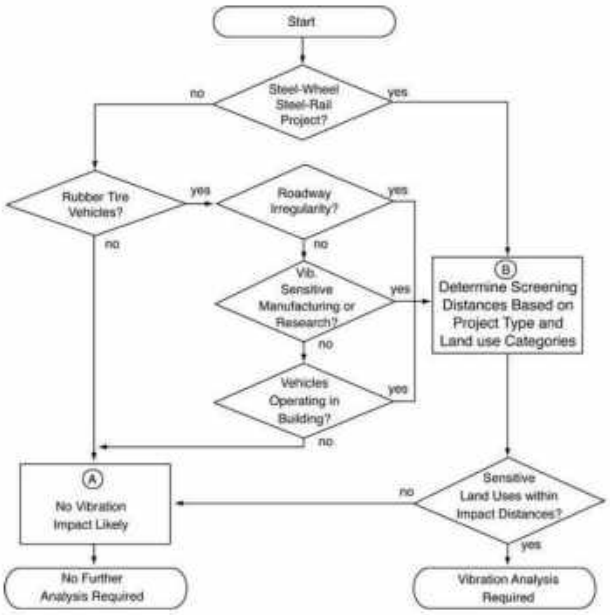


**Figure 6-3 Flow Chart of Vibration Screening Process**

## Step 1: Classify Project Vehicles

*Determine the project type and the next step based on the guidelines below.*

**Option A: No Vehicles** – Transit projects that do not involve vehicles do not have potential for vibration impact and do not require further analysis (Box A in Figure 6-3).

Many smaller FTA-funded projects, such as bus terminals, park-and-ride lots, and station rehabilitation are in this category, and do not require further analysis of ground-borne vibration impact. However, if track systems are modified (e.g., tracks moved or switches modified), *proceed to Step 2.*



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Cont.

**Option B: Steel-wheeled/Steel-rail Vehicles** – Transit projects with steel-wheeled/steel-rail vehicles have potential for vibration impact (Box B in Figure 6-3); *proceed to Step 2*. These rail systems include urban rapid transit, LRT, commuter rail, and steel-wheel intermediate capacity transit (ICT) systems.

**Option C: Rubber-tire Vehicles** – For projects that involve rubber-tire vehicles and do not meet the following conditions, vibration impact is unlikely, and no further analysis is needed. *Proceed to Step 2* for projects that involve rubber-tire vehicles and meet the following conditions (Box A in Figure 6.3):

- **Roadway irregularity** – Expansion joints, speed bumps, or other design features that result in unevenness in the road surface can result in perceptible ground-borne vibration at distances up to 75 ft away.
- **Operation close to vibration-sensitive buildings** – Buses, trucks, or other heavy vehicles operating close to a vibration-sensitive building (within approximately 100 ft from the property line) may impact vibration-sensitive activities, such as research that uses electron microscopes or manufacturing of computer chips.
- **Vehicles operating within buildings** – Special considerations are often required for shared use facilities where vehicles operate inside or directly underneath buildings such bus stations located inside an office building complex.

## Step 2: Determine Project Type

*Determine the project type according to Table 6-7.*

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Cont.

**Table 6-7 Project Types for Vibration Screening Procedure**

| Project Type Number | Project Type | Description |
|---|---|---|
| 1 | Conventional Commuter Railroad | Both locomotives and passenger vehicles create vibration. For commuter trains, the highest vibration levels are typically created by the locomotives. Electric commuter rail vehicles create levels of ground-borne vibration that are comparable to electric rapid transit vehicles. |
| 2 | RRT | Ground-borne vibration impact from rapid transit trains is one of the major environmental issues for new systems. Ground-borne vibration is usually a major concern for subway operations. It is less common for at-grade and elevated rapid transit lines to create intrusive ground-borne vibration and noise since air-borne noise typically dominates. |
| 3 | LRT and Streetcars | The ground-borne vibration characteristics of light rail systems are very similar to those of rapid transit systems. Because the speeds of light rail systems are usually lower, typical vibration levels are usually lower. Steel-wheel/steel-rail AGT is included in either this category or the ICT category depending on the level of service and train speeds. |
| 4 | Intermediate Capacity Transit | Because of the low operating speeds of most ICT systems, vibration problems are not common. However, steel-wheel ICT systems that operate close to* vibration-sensitive buildings have the potential of causing intrusive vibration. With a stiff suspension system, an ICT system could create intrusive vibration. |
| 5 | Bus and Rubber-Tire Transit Projects | This category encompasses most projects that do not include steel-wheel trains of some type. Examples include diesel buses, electric trolley buses, and rubber-tired people movers. Most projects that do not include steel-wheel trains do not cause vibration impacts.** |

*See the screening distances for category 1 land uses in Table 6-8.

** Most complaints about vibration caused by buses and trucks are related to rattling of windows or items hung on the walls. These vibrations are usually the result of airborne noise and not ground-borne vibration. In the case where ground-borne vibration is the source of the complaint, the vibration can usually be attributed to irregularities in the road.

## Step 3: Determine Screening Distance

*Determine the appropriate screening distances based on land use and project type according to Table 6-8.*

The distances are based on the criteria presented in Section 6.3, the procedures in Section 6.4 assuming normal vibration propagation, and include a 5-dB factor of safety. Even so, areas with very efficient vibration propagation can have substantially higher vibration levels.

Because of the 5-decibel safety factor, the screening distances will identify most of the potentially impacted areas, even for areas with efficient propagation. However, when there is evidence of efficient propagation, such as previous complaints about existing transit facilities or a history of problems with construction vibration, increase the distances in Table 6-8 by a factor of 1.5.

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Cont.

**Table 6-8 Screening Distances for Vibration Assessments**

| Type of Project | Critical Distance for Land Use Categories* Distance from ROW or Property Line, ft | | |
|---|---|---|---|
| | Land Use Cat. 1 | Land Use Cat. 2 | Land Use Cat. 3 |
| Conventional Commuter Railroad | 600 | 200 | 120 |
| RRT | 600 | 200 | 120 |
| LRT and Streetcars | 450 | 150 | 100 |
| ICT | 200 | 100 | 50 |
| Bus Projects (if not previously screened out) | 100 | 50 | -- |

*For the Vibration Screening Procedure, evaluate special buildings as follows: Category 1 - concert halls and TV studios, Category 2 - theaters and auditoriums

### Step 4: Identify Vibration-Sensitive Land Uses

Identify all vibration-sensitive land uses (Table 6-1) within the chosen screening distance. If no vibration-sensitive land uses are identified, no further vibration analysis is needed. If one or more of the vibration-sensitive land uses are in the screening distance, complete a General Vibration Assessment (Section 6.4) or a Detailed Vibration Analysis (Section 6.5).

## 6.4 Evaluate Impact: General Vibration Assessment

*Evaluate for impact using the General Vibration Assessment procedure if the Vibration Screening Procedure (Section 6.3) identified vibration-sensitive receivers within the screening distance of the transit vibration source.*

For guidelines on when the General Vibration Assessment is appropriate, review Section 6.1.

The basic approach for the General Vibration Assessment is to define a curve or set of curves that predicts the overall ground-borne vibration as a function of distance from the source, then apply adjustments to these curves to account for factors such as vehicle speed, geologic conditions, building type, and receiver location within the building. When the vehicle type is not covered by the curves included in this section, it will be necessary to define an appropriate curve either by extrapolating from existing information or performing measurements at an existing facility.

### Step 1: Select Base Curve for Ground Surface Vibration Level

*Select a standard vibration curve to represent general vibration characteristics for the source.*

The curves presented in Figure 6-4 are based on measurements of ground-borne vibration at representative North American transit systems and can be used to represent vibration characteristics for standard transportation systems in the General Vibration Assessment.



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These curves assume typical ground-borne vibration levels, equipment in good condition, and speeds of 50 mph for the rail systems and 30 mph for buses. Adjustments to account for differences in speed and geologic conditions are included in Step 2.

Select a base curve from Figure 6-4 according to the guidelines in Table 6-9. Equations for the curves in Figure 6-4 are included in Table 6-10. Additional considerations for selecting a base curve for systems not included in Table 6-9 are presented below by transit mode.

**Table 6-9 Ground Surface Vibration Level Base Curve Descriptions**

| Curve | Description |
|---|---|
| Locomotive-Powered Passenger or Freight Curve | Appropriate for vehicles powered by diesel or electric locomotives including intercity passenger trains and commuter rail trains. |
| Rapid Transit or Light Rail Vehicles Curve | Appropriate for both heavy and light-rail vehicles on at-grade and subway track. |
| Rubber-Tired Vehicles Curve | Appropriate for rubber-tire vehicles. These types of vehicles rarely create ground-borne vibration problems unless there is a discontinuity or bump in the road that causes the vibration. This curve represents the vibration level for a typical bus operating on smooth roadway. |

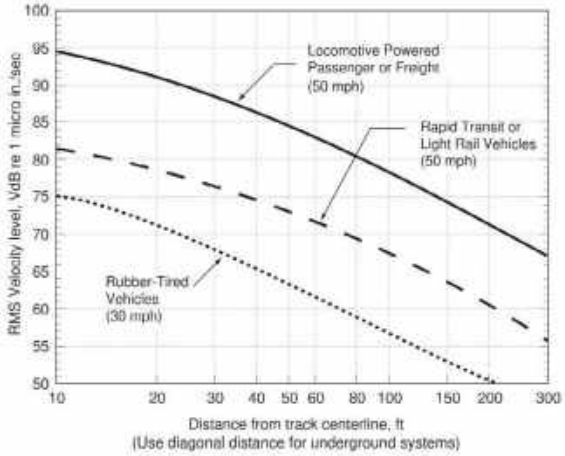


**Figure 6-4 Generalized Ground Surface Vibration Curves**

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Cont.

**Table 6-10 Generalized Ground Surface Vibration Equations**

| Curve | Equation | |
|---|---|---|
| Locomotive Powered Passenger or Freight Curve | $L_v = 92.28 + 14.81\log(D) - 14.17\log(D)^2 + 1.65\log(D)^3$ | Eq. 6-1 |
| Rapid Transit or Light Rail Vehicles Curve | $L_v = 85.88 - 1.06\log(D) - 2.32\log(D)^2 - 0.87\log(D)^3$ | Eq. 6-2 |
| Rubber-Tired Vehicles Curve | $L_v = 66.08 + 34.28\log(D) - 30.25\log(D)^2 + 5.40\log(D)^3$ | Eq. 6-3 |
| $L_v$ = velocity level, VdB<br>$D$ = distance, ft | | |

Considerations for selecting a base curve for different transit modes include:

- **Intercity passenger trains** – Although intercity passenger trains can be an important source of environmental vibration, it is rare that they are considered for FTA-funded projects unless a new transit mode uses an existing rail alignment. When a new transit line uses an existing rail alignment, changes in the intercity passenger traffic can result in either positive or negative impacts. Use the locomotive-powered passenger or freight curve for intercity passenger trains unless there are specific data available on the ground-borne vibration created by the new train operations.
- **Locomotive-powered commuter rail** – Use the locomotive-powered passenger or freight curve for all commuter rail system powered by either diesel or electric locomotives.
- **Electric multiple unit (EMU)** – Use the rapid transit or light rail vehicles curve for self-powered electric commuter rail trains.
- **Diesel multiple unit (DMU)** – Self-powered DMUs create vibration levels somewhere between rapid transit vehicles and locomotive-powered passenger trains. A vibration curve for DMUs can be estimated by lowering the locomotive-powered passenger or freight curve by 5 dB.
- **Subway heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for subway heavy rail and subway light rail. Although vibrations from subway and at-grade tracks have very different characteristics, the overall vibration velocity levels are comparable. When applied to subways, the rapid transit or light rail vehicles curve assumes a relatively lightweight bored concrete tunnel in soil. The vibration levels will be lower for heavier subway structures such as cut-and-cover box structures and stations.
- **At-grade heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for at-grade heavy rail or light rail. Heavy rail and LRT vehicles have similar suspension systems and axle loads and create similar levels of ground-borne vibration.

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- **Elevated guideways or aerial structures** – Vibration from operations on an elevated structure is typically not an issue unless the guideway is supported by a building or located very close to buildings. Apply the appropriate adjustment for the aerial structures (Section 6.4, Step 2).

- **Streetcars** – Use the rapid transit or light rail vehicles curve for street cars.

- **ICT** – Use the rapid transit or light rail vehicles curve for ICT systems with steel wheels and the rubber-tired vehicles curve for ICT systems with rubber tires.

- **Other vehicle types** – For less common modes such as magnetically-levitated vehicles (maglev), monorail, or AGT, use good engineering judgment to choose a standard curve to best fit the mode or if a new curve needs to be developed, as a function of distance from the track. Examples include:
  - Vibration from a rubber-tire monorail operating on aerial guideway can be approximated using the rubber-tired vehicles curve with the appropriate adjustment for the aerial structure (Section 6.4, Step 2).
  - Most of the data available on the noise and vibration characteristics of maglev vehicles comes from high-speed systems intended for inter-city service. Even though there is no direct contact between the vehicle and the guideway, the dynamic loads on the guideway can generate ground-borne vibration. Measurements on a German high-speed maglev resulted in ground-borne vibrations at 75 mph which is comparable to the base curve for rubber-tired vehicles at 30 mph.[49]

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### Step 2: Apply Adjustments

*Apply project-specific adjustments to the standard vibration curve.*

Once the base curve has been selected, use the adjustments in the following instructions to develop project-specific vibration projections at each receiver. All adjustments are given as single numbers to add to, or subtract from, the base level.

Adjustments are separated by source, path, and receiver and include speed, wheel and rail type and condition, type of track support system, type of building foundation, and number of floors above the basement level. Calculate the appropriate adjustments to the base level. An example of the General Vibration Assessment is provided at the end of this Section.

It should be recognized that many of these adjustments are strongly dependent on the frequency spectrum of the vibration source and the frequency dependence of the vibration propagation. The adjustments in this section are suitable for generalized evaluation of the vibration impact and vibration

mitigation measures because they are based on typical vibration spectra. However, these adjustments are not adequate for detailed evaluations of impact of vibration-sensitive buildings or for detailed specification of mitigation measures.

**2a.** Apply source adjustments to the base curve using Table 6-11 and the descriptions below to account for the project-specific source characteristics.

**Table 6-11 Source Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Source Factor | Adjustment to Propagation Curve | | | Comment |
|---|---|---|---|---|
| | | Reference Speed | | |
| | Vehicle Speed | 50 mph | 30 mph | |
| Speed | 60 mph | +1.6 dB | +6.0 dB | Vibration level is approximately proportional to 20log(speed/speed$_{ref}$), see Eq. 6-4. |
| | 50 mph | 0.0 dB | +4.4 dB | |
| | 40 mph | -1.9 dB | +2.5 dB | |
| | 30 mph | -4.4 dB | 0.0 dB | |
| | 20 mph | -8.0 dB | -3.5 dB | |
| **Vehicle Parameters (not additive, apply greatest value only)** | | | | |
| Vehicle with stiff primary suspension | +8 dB | | | Transit vehicles with stiff primary suspensions have been shown to create high vibration levels. Include this adjustment when the primary suspension has a vertical resonance frequency greater than 15 Hz. |
| Resilient Wheels | 0 dB | | | Resilient wheels do not generally affect ground-borne vibration except at frequencies greater than about 80 Hz. |
| Worn Wheels or Wheels with Flats | +10 dB | | | Wheel flats or wheels that are unevenly worn can cause high vibration levels. |
| **Track Conditions (not additive, apply greatest value only)** | | | | |
| Worn or Corrugated Track | +10 dB | | | Corrugated track is a common problem. Mill scale* on new rail can cause higher vibration levels until the rail has been in use for some time. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment. |
| Special Trackwork within 200 ft | +10 dB (within 100 ft)<br>+5 dB (between 100 and 200 ft) | | | Wheel impacts at special trackwork will greatly increase vibration levels. The increase will be less at greater distances from the track. Do not include an adjustment for special trackwork more than 200 ft away. |
| Jointed Track | +5 dB | | | Jointed track can cause higher vibration levels than welded track. |
| Uneven Road Surfaces | +5 dB | | | Rough roads or expansion joints are sources of increased vibration for rubber-tire transit. |
| **Track Treatments (not additive, apply greatest value only)** | | | | |
| Floating Slab Trackbed | -15 dB | | | The reduction achieved with a floating slab trackbed is strongly dependent on the frequency characteristics of the vibration. |
| Ballast Mats | -10 dB | | | Actual reduction is strongly dependent on frequency of vibration. |
| High-Resilience Fasteners | -5 dB | | | Slab track with track fasteners that are very compliant in the vertical direction can reduce vibration at frequencies greater than 40 Hz. |

*Mill scale on a new rail is a slightly corrugated condition caused by certain steel mill techniques.



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In addition to the comments in Table 6-11, use the following guidelines to select the appropriate adjustment factors. Some adjustments in the same category are not cumulative (additive) and only the greatest applicable adjustment should be applied. The adjustments that are not additive are noted in Table 6-11 and in the descriptions below. Note that some adjustments are not additive across multiple categories and are noted in the comments of Table 6-11. For example, the adjustment for a vehicle with stiff primary suspension is 8 dB, and the adjustment for wheel flats is 10 dB. If the vehicle has a stiff primary suspension and has wheel flats, the projected vibration levels should be increased by 10 dB, not 18 dB.

In addition, some vibration control measures are targeted for specific frequency ranges. The shape of the actual vibration spectra should be considered so that an appropriate vibration control measure may be selected.

- **Speed** – The levels of ground-borne vibration and noise vary, approximately, as 20 times the logarithm of speed. This means that doubling train speed will increase the vibration levels approximately 6 dB, and halving train speed will reduce the levels by 6 dB. The adjustments in Table 6-11 have been tabulated for reference vehicle speeds of 30 mph for rubber-tired vehicles and 50 mph for steel-wheel vehicles. Use the following relationship to calculate the adjustments for other speeds.

  $$Adj_{speed}\ (dB) = 20\log(\frac{speed}{speed_{ref}})$$ **Eq. 6-4**

  Variation with speed has been observed to be as low as $15\log(\frac{speed}{speed_{ref}})$, but unless specific speed data for vibration for a vehicle has been obtained, use Eq. 6-4.

- **Vehicle Parameters** – The most important factors for the vehicles are the suspension system, wheel condition, and wheel type. Most new heavy rail and light rail vehicles have relatively soft primary suspensions. However, a stiff primary suspension (vertical resonance frequency greater than 15 Hz) can result in higher levels of ground-borne vibration than soft primary suspensions. Vehicles, for which the primary suspension consists of rubber or neoprene around the axle bearing, usually have a very stiff primary suspension with a vertical resonance frequency greater than 40 Hz or more.

  Deteriorated wheel condition is another factor that increases vibration levels. It can be assumed that a new system has vehicles with wheels in good condition. When older vehicles are used on new track, it is important to consider the condition of the wheels, and it may be appropriate to include an adjustment for the wheel condition.

  Resilient wheels will reduce vibration levels at frequencies greater than the effective resonance frequency of the wheel. When this resonance



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frequency is relatively high, greater than 80 Hz, resilient wheels may only have a marginal effect on ground-borne vibration.

The adjustments in this category are not additive; apply the greatest applicable value only.

- **Track Conditions** – This category includes the type of rail (welded, jointed, or special trackwork), the track support system, and the condition of the rail. The base curves assume welded rail in good condition. Jointed rail causes higher vibration levels than welded rail and the increase depends on the condition of the joints.

  Wheel impacts at special trackwork, such as frogs at crossovers, create much higher vibration forces than typical track conditions. Because of the higher vibration levels at special trackwork, crossovers are the principal areas of vibration impact on new systems. Methods of mitigating the vibration impact include modifying the track support system, installing low-impact frogs, or relocating the crossover. Special track support systems such as ballast mats, high-resilience track fasteners, resiliently supported ties, and floating slabs have all been shown to be effective in reducing vibration levels.

  The condition of the running surface of the rails can strongly affect vibration levels. Factors such as corrugations, general wear, or mill scale on new track can cause vibration levels 5 to 15 dB higher than normal. Mill scale will typically wear away after some time in service, but the track must be ground to remove corrugations or to reduce the roughness from wear.

  Roadway surfaces in the rubber-tired vehicle base curve are assumed to be smooth. Rough washboard surfaces, bumps, or uneven expansion joints are the types of running surface defects that cause increased vibration levels over the smooth road condition.

  The adjustments in this category are not additive; apply the greatest applicable value only. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment.

**2b.** Apply path adjustments to the base curve using Table 6-12 and the descriptions below to account for the project-specific path characteristics.

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**Table 6-12 Path Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Path Factor | Adjustment to Propagation Curve | | Comment |
|---|---|---|---|
| Resiliently Supported Ties (Low-Vibration Track, LVT) | -10 dB | | Resiliently supported tie systems have been found to provide very effective control of low-frequency vibration. |
| **Track Structure (not additive, apply greatest value only)** | | | |
| Type of Transit Structure | Relative to at-grade tie & ballast: | | In general, the heavier the structure, the lower the vibration levels. Putting the track in cut may reduce the vibration levels slightly. Rock-based subways generate higher-frequency vibration. |
| | Elevated structure | -10 dB | |
| | Open cut | 0 dB | |
| | Relative to bored subway tunnel in soil: | | |
| | Station | -5 dB | |
| | Cut and cover | -3 dB | |
| | Rock-based | -15 dB | |
| **Ground-borne Propagation Effects** | | | |
| Geologic conditions that promote efficient vibration propagation | Efficient propagation in soil | +10 dB | Refer to the text for guidance on identifying areas where efficient propagation is possible. |
| | Propagation in rock layer: Dist. | Adjust. | The positive adjustment accounts for the lower attenuation of vibration in rock compared to soil. It is generally more difficult to excite vibrations in rock than in soil at the source. |
| | 50 ft | +2 dB | |
| | 100 ft | +4 dB | |
| | 150 ft | +6 dB | |
| | 200 ft | +9 dB | |
| Coupling to building foundation | Wood-Frame Houses | -5 dB | In general, the heavier the building construction, the greater the coupling loss. |
| | 1-2 Story Masonry | -7 dB | |
| | 3-4 Story Masonry | -10 dB | |
| | Large Masonry on Piles | -10 dB | |
| | Large Masonry on Spread Footings | -13 dB | |
| | Foundation in Rock | 0 dB | |

In addition to the comments in Table 6-12, use the following guidelines to select the appropriate adjustment factors.

- **Track Structure** – The weight and size of a transit structure affects the vibration radiated by that structure. In general, vibration levels are lower for heavier transit structures. Therefore, the vibration levels from a cut-and-cover concrete double-box subway can be assumed to be lower than the vibration from a lightweight concrete-lined bored tunnel.

  The vibration from elevated structures is lower than from at-grade track because of the mass and damping of the structure and the extra distance that the vibration must travel before it reaches the receiver. Elevated structures in AGT applications are sometimes designed to bear on building elements. This is a special case and may require detailed design considerations.

  The adjustments in this category are not additive; apply the greatest applicable value only.



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- **Ground-Borne Propagation Effects – Geologic Conditions** – Although it is known that geologic conditions have a considerable effect on the vibration levels, it is rarely possible to develop more than a general understanding of the vibration propagation characteristics for a General Vibration Assessment. One of the challenges with identifying the cause of efficient propagation is the difficulty in determining whether higher than normal vibration levels are due to geologic conditions or due to special source conditions (e.g., rail corrugations or wheel flats).

  Some geologic conditions are repeatedly associated with efficient propagation. Shallow bedrock, less than 30 ft below the surface, is likely to have efficient propagation. Soil type and stiffness are also important factors in determining propagation characteristics. In particular, stiff, clayey soils, consolidated sand, gravel, and glacial till can be associated with efficient vibration propagation. Investigation of soil boring records can be used to estimate depth to bedrock and the presence of problem soil conditions.

  A conservative approach would be to use the 10-dB adjustment for efficient propagation for areas where efficient propagation is likely. However, this adjustment can greatly overstate the potential for vibration impact where efficient propagation is not present and should be applied using good judgment. Review available geological data and any complaint history from existing transit lines and major construction sites near the transit corridor to identify areas where efficient propagation is possible. If there is reason to suspect efficient propagation conditions, conduct a Detailed Vibration Analysis during the engineering phase and include vibration propagation tests at the areas with potential for efficient propagation.

- **Track Structure and Geologic Conditions – Examples**
  - **Subway**

    For a subway, determine if the subway will be founded in bedrock. Bedrock is considered to be hard rock. It is usually appropriate to consider soft siltstone and sandstone to be more like soil than hard rock. Whether a subway is founded in soil or rock can make a 15-dB difference in the vibration levels.

    When a subway structure is founded in rock, include the following Track Structure and Ground-borne Propagation Effects adjustments from Table 6-12:
    - Type of Transit Structure adjustment: Rock-based – 15 dB
    - Geologic Conditions adjustment: Propagation in rock layer for the appropriate distance.

    This adjustment increases with distance because vibration attenuates more slowly in rock than in the soil used as a basis for the reference curve.

- **At-grade** – When considering at-grade vibration sources, determine if the vibration propagation characteristics are typical or efficient. Efficient



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Cont.

vibration propagation results in vibration levels approximately 10 dB higher than typical levels. This more than doubles the potential impact zone for ground-borne vibration.

- **Ground-Borne Propagation Effects – Coupling to Building Foundation** – Since annoyance from ground-borne vibration and noise is an indoor phenomenon, the effects of the building structure on the vibration must be considered. Wood-frame buildings, such as typical residential structures, are more easily excited by ground vibration than heavier buildings. In contrast, large masonry buildings with spread footings have a low response to ground vibration.

  When a building foundation is directly on the rock layer, there is no coupling loss due to the weight and stiffness of the building. Use the standard coupling factors based on building type if there is at least a 10-foot layer of soil between the building foundation and the rock layer.

**2c.** Apply receiver adjustments to the base curve using Table 6-13 and the descriptions below to account for the project-specific receiver characteristics. The data in Table 6-13 is applicable when the building structural features are known.

For more generic cases that do not have detailed information on individual buildings, use a conservative approach and apply the following adjustments to predict indoor vibration based on the outdoor vibration, instead of using the adjustments in Table 6-13:[43][50]

- Light-weight, wood-frame construction 1st floor: +3 dB
- Light-weight, wood-frame construction 2nd and 3rd floors: +6 dB
- Large buildings: 0 dB
- Small masonry buildings: +3 dB

**Table 6-13 Receiver Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Receiver Factor | Adjustment to Propagation Curve | | Comment |
|---|---|---|---|
| Floor-to-floor attenuation | 1 to 5 floors above grade | -2 dB/floor | This factor accounts for dispersion and attenuation of the vibration energy as it propagates through a building starting with the first suspended floor.* |
| | 5 to 10 floors above grade | -1 dB/floor | |
| Amplification due to resonances of floors, walls, and ceilings | +6 dB | | The actual amplification will vary greatly depending on the type of construction. The amplification is lower near the wall/floor and wall/ceiling intersections. |

* Floor-to-floor attenuation adjustments for the first floor assume a basement.



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Cont.

In addition to the comments in Table 6-13, use the following guidelines to select the appropriate adjustment factors. Note that receiver adjustments are additive.

- Vibration generally reduces in level as it propagates through a building. As indicated in Table 6-13, a 1- to 2-decibel attenuation per floor is typically appropriate.
- Resonances of the building structure, particularly the floors, will cause some amplification of the vibration. Consequently, for a wood-frame structure, the building-related adjustments nearly cancel out. Example: All adjustments for the first floor assuming a basement are: -5 dB for the coupling loss; -2 dB for the propagation from the basement to the first floor; and +6 dB for the floor amplification. The total adjustment in this case is -1 dB.

**2d.** Apply adjustments to the final adjusted curve using Table 6-14 and the descriptions below to convert ground-borne vibration levels to ground-borne noise levels.

**Table 6-14 Conversion to Ground-borne Noise**

| Conversion to Ground-borne Noise | | | |
|---|---|---|---|
| Noise Level in dBA | Peak frequency of ground vibration: | | Use these adjustments to estimate the A-weighted sound level given the average vibration velocity level of the room surfaces. See text for guidelines for selecting low-, mid-, or high-frequency characteristics. Use the high-frequency adjustment for subway tunnels in rock or if the dominant frequencies of the vibration spectrum are known to be 60 Hz or greater. |
| | Low frequency (<30 Hz) | -50 dB | |
| | Mid Frequency (peak 30 to 60 Hz) | -35 dB | |
| | High frequency (>60 Hz) | -20 dB | |

Estimate the levels of radiated noise using the average vibration amplitude of the room surfaces (floors, walls, and ceiling), and the total acoustical absorption in the room.

The un-weighted sound pressure level is approximately 5 dB[37][43] less than the vibration velocity level when the velocity level is referenced to $1 \times 10^{-6}$ inches/sec; but for a better estimate, it is necessary to consider general frequency ranges. Since ground-borne noise is A-weighted, the adjustments vary by frequency range, as described below. See Appendix B.1.4.1 for more information on A-weighting.

To select the appropriate adjustment, classify the frequency characteristics according to the guidelines below.

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- **Low Frequency (<30 Hz)** – Low-frequency vibration characteristics can be assumed for the following conditions:
  - Subways surrounded by cohesionless sandy soil
  - Vibration isolation track support systems
  - Most surface track
- **Mid Frequency (peak 30 to 60 Hz)** – The mid-frequency vibration characteristic can be assumed for the following conditions:
  - Subways, unless other information indicates that one of the other assumptions is appropriate,
  - Surface track when the soil is very stiff with high clay content
- **High Frequency (>60 Hz)** – High-frequency characteristics can be assumed for the following conditions:
  - Subways with the transit structure founded in rock
  - Subways, when there is very stiff, clayey soil

### Step 3: Inventory of Vibration Impact

*Take inventory of vibration-sensitive land uses with impact and determine if a Detailed Vibration Analysis is required.*

Compare the projected vibration levels, including all appropriate adjustments in Section 6.4, Step 2, to the criteria to determine if impact from ground-borne vibration or noise is likely. Note that for any transit mode, variation in vibration levels under apparently similar conditions is not uncommon. In the General Vibration Assessment, it is preferable to make a conservative assessment of the impact and include buildings that may ultimately not be subject to impact.

The standard curves in Section 6.4, Step 1, represent the upper range of vibration levels from well-maintained systems. Although actual levels fluctuate widely, it is rare that ground-borne vibration will exceed these curves by more than 1 or 2 dB unless there are extenuating circumstances such as wheel- or running-surface defects. However, because actual levels of ground-borne vibration will sometimes differ substantially from the projections, use the following guidelines to interpret vibration impact:

- **Projected vibration is below the impact threshold** – Vibration impact is unlikely, and the environmental document should state this.
- **Projected ground-borne vibration is 0 to 5 dB greater than the impact threshold** – There is a strong chance that actual ground-borne vibration levels will be below the impact threshold. The environmental document should report impact at these locations as exceeding the applicable threshold, present possible mitigation measures and costs, and commit to conducting more detailed studies to refine the vibration impact analysis during the engineering phase. During the Detailed Vibration Analysis, determine appropriate mitigation, if necessary. A site-specific Detailed Vibration Analysis may show that vibration impacts will not occur and control measures are not needed.

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- **Projected ground-borne vibration is 5 dB or greater than the impact threshold** – Vibration impact is probable and Detailed Vibration Analysis must be conducted during the engineering phase to determine appropriate vibration control measures. The environmental document should report impact at these locations as exceeding the applicable threshold, present possible mitigation measures and costs, and commit to conducting more detailed studies to refine the vibration impact analysis during the engineering phase. During the Detailed Vibration Analysis, determine appropriate mitigation, if necessary. A site-specific, Detailed Vibration Analysis may show that very costly vibration mitigation must be incorporated into the project to eliminate the impacts.

FTA recommends the reporting of a vibration level as a single value and not as a range, as ranges tend to confuse the interpretation of impact.

Express the results of the General Vibration Assessment in terms of an inventory with the following components:

- Include all vibration-sensitive land uses as identified in the Vibration Screening Procedure.
- Organize the inventory according to the categories described in Table 6-8.
- Include information on potentially feasible mitigation measures to reduce vibration to acceptable levels based on the generalized reduction estimates provided in this section. To be considered feasible, the measure or combination of measures must provide at least a 5-dB reduction of the vibration levels and be reasonable in terms of cost.

These potential mitigation measures are considered preliminary. Final vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done; see Section 6.5 for more information. Vibration control is frequency-dependent; therefore, specific recommendations of vibration control measures can only be made after evaluating the frequency characteristics of the vibration.

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### Example 6-1 General Vibration Assessment – LRT

**General Vibration Assessment for an LRT project**

The hypothetical project is a LRT system that operates at 40 mph on at-grade, ballast and tie track with welded rail. The first floor of houses is at 125 ft from the LRT tracks and there is efficient propagation through the soil. The houses are constructed with wood frames. The houses will be exposed to 260 train passbys per day. Calculate the ground-borne vibration and assess for impact.

**Select Base Curve for Ground Surface Vibration**

Determine the appropriate base curve and the RMS velocity level ($L_v$).

According to Table 6-9, the Rapid Transit or Light Rail Vehicles curve is appropriate.

$L_v = 65\ VdB$ at 125 ft for this curve at 50 mph

**Apply Adjustments**

Apply the appropriate source adjustments using Table 6-11.

$$Source\ Speed\ Adjustment = 20 \log\left(\frac{40}{50}\right) = -1.9\ dB$$
$$L_v = 65 - 1.9 = 63.1\ VdB$$

Apply the appropriate path adjustments using Table 6-12.

$$Efficient\ propagation = +10\ dB$$
$$Coupling\ to\ building\ foundation\ (wood\ frame) = -5\ dB$$
$$L_v = 63.1 + 10 - 5 = 68.1\ VdB$$

Apply the appropriate receiver adjustments using Table 6-13.

$$Amplification\ due\ to\ resonance\ of\ floor = +6\ dB$$
$$First\ floor\ attenuation = -2\ dB$$
$$L_v = 68.1 + 6 - 2 = 72.1\ VdB$$

**Assess for Impact**
Because there are more than 70 events per day, this project is in the Frequent Events category (Table 6-2). For category 2 land uses (residences) with frequent events, the impact criteria is 72 VdB (Table 6-3). Therefore, according to the General Vibration Assessment, there is potential for impact and a Detailed Vibration Analysis should be completed.

## 6.5 Evaluate Impact: Detailed Vibration Analysis

*Evaluate for impact using the Detailed Vibration Analysis procedure, if appropriate (Section 6.1).*

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The goal of the Detailed Vibration Analysis is to use all available tools to develop accurate projections of potential ground-borne vibration impact and when necessary, to design mitigation measures. A Detailed Vibration Analysis requires developing estimates of the frequency components of the vibration signal, usually in terms of 1/3-octave-band spectra. The analytical techniques for solving vibration problems are complex, and the technology continually advances. Therefore, the approach presented in this section focuses on the key steps for these analyses. The key elements of the Detailed Vibration Analysis procedure and recommended steps are described below.

The methods in this section generally assume a steel-wheel/rail system. The procedures could be adapted to bus systems. However, this is rarely necessary because vibration impact is very infrequent with rubber-tired transit.

In general, when situations arise that are not explicitly covered in the Detailed Vibration Analysis, professional judgment may be used to extend these methods to cover these unique cases, when appropriate. Appendix G provides information on developing and using non-standard modeling procedures.

### Step 1: Characterize Existing Vibration Conditions

*Conduct measurements to survey and document the existing vibration conditions.*

In contrast to noise impact analysis, the existing ambient vibration is not required to assess vibration impact in most cases; but, it is important to

document general background vibration in the project corridor. Because the existing environmental vibration is usually below human perception, a limited vibration survey is sufficient even for a Detailed Vibration Analysis.

It is particularly valuable to survey vibration conditions at sensitive locations for the following reasons:

- To obtain valuable information on the true sensitivity of the activity to external vibration and obtain a reference condition under which vibration is not problematic.
- To document that existing vibration levels are above or below the normal threshold of human perception for the existing condition.
- To document levels of vibration created by existing rail lines. If vibration from an existing rail line is higher than the proposed train, there may not be impact even if the standard impact criteria are exceeded.
- To use existing vibration sources to characterize propagation. Existing vibration sources such as freight trains, industrial processes, quarrying operations, or normal traffic can be used to characterize vibration propagation. Carefully designed and performed measurements may eliminate the need for more complex propagation tests. See Appendix G for information on using non-standard modeling procedures.
- To identify the potential for efficient vibration propagation. If a measurement site has existing vibration approaching the range of human perception (e.g., the maximum vibration velocity levels are greater than about 65 VdB), then this site should be carefully evaluated for the possibility of efficient vibration propagation.

Conduct measurements to characterize existing vibration conditions. The goal of most ambient vibration measurements is to characterize the rms vertical vibration velocity level at the ground surface. In almost all cases, it is sufficient to measure only vertical vibration and ignore the transverse components of the vibration. Although transverse components[51] can transmit vibration energy into a building, the vertical component typically dominates.

**1a. Choose Measurement Locations** – Conduct outdoor and/or indoor measurements to characterize existing vibration conditions, as appropriate, for the project. Although ground-borne vibration is almost exclusively a problem inside buildings, it is generally recommended to perform measurements outdoors because equipment inside the building may cause more vibration than exterior sources. Additionally, the building structure and the resonances of the building can have strong effects on the vibration that are difficult to predict. It can also be important to measure and document those indoor sources of vibration. These indoor sources may cause vibration greater than that due to external sources like street traffic or aircraft overflights. When measuring (indoor) floor vibration, take measurements near the center of a floor span where the vibration amplitudes are the highest.



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**1b. Measurement Considerations**

- **Site selection** – Selecting sites for an ambient vibration survey requires good judgment. Sites selected to characterize a transit corridor should be distributed along the entire project where potential for impacts have been identified and should be representative of the types of vibration environments found in the corridor. This would commonly include:
  - Measurements in quiet, residential areas removed from major traffic arterials to characterize low-ambient vibration areas;
  - Measurements along major traffic arterials and highways or freeways to characterize high-ambient vibration areas;
  - Measurements in any area with vibration-sensitive activities; and
  - Measurements at any major existing source of vibration such as railroad lines.

- **Transducer placement** – Place the transducers near the building setback line. For ambient measurements along railroad lines, it is recommended to include:
  - Multiple sites at several distances from the rail line at each site, and
  - 4 to 10 train passbys for each test.

  Because of the irregular schedule for freight trains and the low number of operations each day, it is often impractical to perform tests at more than two or three sites along the rail line or to measure more than two or three passbys at each site.

  Rail type and condition strongly affect the vibration levels. Consequently, it is important to inspect the track to locate any switches, bad rail joints, corrugations, or other factors that could be responsible for higher than normal vibration levels. Locations with these kinds of irregularities should be represented in addition to locations with rail in better condition.

- **Transducer mounting methods** – The way a transducer is mounted can affect the measured levels of ground-borne vibration.
  - Straightforward methods of mounting transducers on the ground surface or on pavement are adequate for vertical vibration measurements for the frequencies of concern for ground-borne vibration (less than about 200 Hz).
  - Quick-drying epoxy, clay, or beeswax can be used to mount transducers to smooth paved surfaces or metal stakes driven into the ground.
  - Rough concrete or rock surfaces require special mountings. One approach is to use a liberal base of epoxy to attach small aluminum blocks to the surface, and then mount the transducers on the aluminum blocks.
  - When in doubt, review the specific transducer documentation and discuss additional mounting guidance with the transducer manufacturer.



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**1c. Existing Vibration Characterization** – The appropriate methods of characterizing ambient vibration are dependent on the type of information required for the analysis. Consider the following when characterizing the existing vibration:

- **Ambient vibration** – Ambient vibration is usually characterized with a continuous 10- to 30-minute measurement of vibration. The rms velocity level of the vibration velocity level over the measurement period provides an indication of the average vibration energy. The rms velocity level over the measurement period is typically equivalent to a long averaging time rms level.

- **Specific events** – Characterize specific events such as train passbys by the rms level over the time that the train passes by. If the locomotives produce vibration levels more than 5 dB higher than the passenger or freight cars, obtain a separate rms level for the locomotives. The locomotives can usually be characterized by the $L_{max}$ during the train passby. The rms averaging time or time constant should be 1 second when determining $L_{max}$. In some cases, it may be adequate to characterize the train passby using $L_{max}$, which is simpler to obtain than the rms averaged over the entire train passby.

- **Spectral analysis** – Perform a spectral analysis of vibration propagation data. For example, if vibration transmission of the ground is suspected of having particular frequency characteristics, use 1/3-octave band charts to describe vibration behavior. Narrowband spectra also can be valuable, particularly for identifying discrete frequency components and designing specific mitigation measures.

  Note that it is preferred to characterize existing vibration in terms of the rms velocity level instead of the peak PPV, which is commonly used to monitor construction vibration. As discussed in Section 5.1, rms velocity is considered more appropriate than PPV for describing human response to building vibration.

## Step 2: Estimate Vibration Impact

*Estimate ground-borne vibration and noise at sites where significant impact is probable and assess for impact.*

Predicting ground-borne vibration associated with a transportation project continues to be a developing field. Because ground-borne vibration is a complex phenomenon that is difficult to model and predict accurately, most projection procedures that have been used for transit projects rely on empirical data.

The procedure described in this section is based on site-specific tests of vibration propagation. This procedure was developed under a FTA-funded research contract[52] and is recommended for detailed evaluations of ground-borne vibration. Other approaches to a prediction procedure, such as finite element methods, can be used. See Appendix G for information on using non-standard modeling procedures.



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**Overview of Prediction Procedure** – This procedure was developed to allow the use of data collected in one location to accurately predict vibration levels in another site where the geologic conditions may be completely different. The procedure is based on transfer mobility. Transfer mobility is the complex velocity response produced by a point force as a function of frequency. It represents the relationship between a vibration source that excites the ground and the resulting vibration of the ground surface. It is a function of both frequency and distance from the source. The analyses in this manual focus on transfer mobility magnitude, which is the magnitude for the velocity relative to the force without reference to phase. The transfer mobility level is the level in decibels relative to 1E-6 in/lb-s.

The transfer mobility measured at an existing transit system is used to normalize ground-borne vibration data and remove the effects of geology. The normalized vibration is referred to as the force density. Force density is the force per root distance along the track in $lb/ft^{1/2}$. The force density can be combined with transfer mobility measurements at vibration-sensitive sites along a new project to develop projections of future ground-borne vibration.

The transfer mobility between two points completely defines the composite vibration propagation characteristics between the two points. In most practical cases, receivers are close enough to the train tracks that the vibration cannot be considered as originating from a single point. Therefore, the vibration source must be modeled as a line-source. Consequently, the point transfer mobility must be modified to account for a line-source. The subsequent line-source transfer mobility is given in units of decibels relative to 1e-6 in/s/lb/sqrt(ft).

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Cont.

The prediction procedure considers ground-borne vibration to be divided into several basic components described below and shown in Figure 6-5.

- **Excitation Force (Force Density)** – The vibration energy is created by oscillatory and impulsive forces. Steel wheels rolling on smooth steel rails create random oscillatory forces. When a wheel encounters a discontinuity such as a rail joint, an impulsive force is created. The force excites the transit structure, such as the subway tunnel or the ballast for at-grade track.

  In the prediction method, the combination of the actual force generated at the wheel/rail interface and the vibration of the transit structure are usually combined into an equivalent force density level. The force density level is the level in decibels of the force density relative to 1 $lb/ft^{1/2}$ and describes the force that excites the soil/rock surrounding the transit structure.

- **Vibration Propagation (Transfer Mobility)** – The vibration of the transit structure causes vibration waves in the soil that propagate away from the transit structure. The vibration energy can propagate through the soil or rock in a variety of wave forms. All ground vibration includes shear and compression waves. Rayleigh waves [49] are also created and propagate along the ground surface. These Rayleigh waves can be a

major carrier of vibration energy. The mathematical modeling of vibration is complicated when there are soil strata with different elastic properties, which is common. As indicated in Figure 6-5, the propagation through the soil/rock is modeled using the transfer mobility, which is usually determined experimentally.

The combination of the force density level and the transfer mobility is used to predict the ground- surface vibration. This is the major difference from the General Vibration Assessment, which generalizes estimates of the ground-borne vibration.

- **Building Vibration** – When the ground vibration excites a building foundation, it sets the building into vibratory motion and vibration waves propagate throughout the building structure. The interaction between the ground and the foundation causes some reduction in vibration levels. The amount of reduction is dependent on the mass and stiffness of the foundation. The more massive the foundation, the lower the response to ground vibration. As the vibration waves propagate through the building, they can create vibration that can be felt and cause windows and household items to rattle.

- **Audible Noise** – In addition to vibration that can be felt, the vibration of room surfaces radiates low-frequency sound that may be audible. The sound level is affected by the amount of acoustical absorption in the receiver room.

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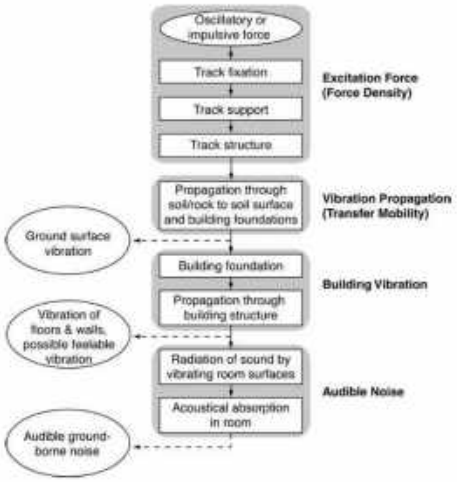


**Figure 6-5 Ground-Borne Vibration and Noise Model**

A fundamental assumption of the prediction approach outlined in this section is that the force density, transfer mobility, and the building coupling to the ground are all independent factors. The following equations are the basis for the

prediction procedure, where all of the quantities are one-third octave band spectral levels in decibels with consistent reference values:

$$L_v = FDL + LSTM + C_{build} \quad \textbf{Eq. 6-5}$$

$$L_A = L_v + K_{rad} + K_{A-wt} \quad \textbf{Eq. 6-6}$$

where:

$L_v$ = rms vibration velocity level in VdB
$FDL$ = force density level in dB for a line vibration source such as a train
$LSTM$ = line-source transfer mobility level in dB from the tracks to the sensitive site
$C_{build}$ = adjustments to account for ground-building foundation interaction and attenuation of vibration amplitudes as vibration propagates through buildings
$L_A$ = A-weighted sound level
$K_{rad}$ = adjustment to account for conversion from vibration to sound pressure level including accounting for the amount of acoustical absorption inside the room. A value of -5 dB can be used for $K_{rad}$ for typical residential rooms when the decibel reference value for $L_v$ is 1 micro in/sec [17;18]
$K_{A-wt}$ = A-weighting adjustment at the 1/3-octave band center frequency

All of the quantities given above are functions of frequency, and the standard approach is to develop projections on a 1/3-octave band basis using the average values for each 1/3-octave band. The end results of the analysis are the 1/3-octave band spectra of the ground-borne vibration and the ground-borne noise.

The spectra are then compared to the vibration criteria for the Detailed Vibration Analysis. The A-weighted ground-borne noise level can be calculated from the vibration spectrum and compared to the criteria. This more detailed approach differs from the General Vibration Assessment, where the overall vibration velocity level and A-weighted sound level are predicted without any consideration of the particular frequency characteristics of the propagation path.

The key steps in obtaining quantities for Eq. 6-5 and Eq. 6-6 are presented in the following steps and include:

**Step 2a.** Estimate force density
**Step 2b.** Measure the point-source transfer mobility
**Step 2c.** Estimate line-source transfer mobility
**Step 2d.** Project ground-borne vibration and ground-borne noise

**2a. Estimate Force Density** – The estimate of force density can be based on previous measurements or a special test program can be designed to measure the force density at an existing facility.

If no suitable measurements are available, conduct testing at a transit facility with equipment similar to the planned vehicles. Adjustments for factors such as train speed, track support system, and vehicle suspension may be needed to match the force density to the conditions at a specific site. Review the report



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"State-of- the-Art Review: Prediction and Control of Ground-Borne Noise and Vibration from Rail Transit Trains" [41] for examples of appropriate adjustments.

Force density is not a quantity that can be measured directly; it must be inferred from measurements of transfer mobility and train vibration at the same site. To derive force density, the best results are achieved by deriving line-source transfer mobility from a line of impacts. The standard approach is to average the force density from measurements at three or more positions at one site. If feasible, it is recommended to take measurements at more than one site and at multiple speeds.

If no suitable measurements are available, see Steps 2b and 2c for guidelines on obtaining line-source transfer mobility.

The force density for each 1/3-octave band is as follows:

$$FDL = L_v - LSTM \qquad \text{Eq. 6-7}$$

where:

$FDL$ = force density level in dB
$L_v$ = measured train ground-borne vibration level in VdB
$LSTM$ = line-source transfer mobility level in dB

Figure 6-6 shows example trackbed force densities in decibels relative to 1 lb/(ft)$^{1/2}$. These force densities were developed from measurements of vibration from heavy and LRT vehicles and represent an incoherent line of vibration force equal to the length of transit trains. This figure provides a comparison of the vibration forces from heavy commuter trains and LRT vehicles with different types of primary suspensions, illustrating the range of vibration forces commonly experienced in a transit system. A force density of a vehicle includes the characteristics of its track support system at the measurement site. Adjustments must be applied to the force density to account for differences between the facility where the force density was measured and the new system being analyzed.

Figure 6-7 shows typical force densities for rail transit vehicles at 40 mph on ballast and tie tracks, which are approximately within the tolerances shown in Figure 6-6. The force densities should be applied very carefully for other track types and speeds. The embedded tracks, although considerably stiffer than ballast and tie tracks, are expected to show similar force density levels.[53] The curves in Figure 6-7 should also be applied with caution for newer generations of light rail vehicles as well as vehicles that utilize direct fixation tracks. The preferred approach for vibration predictions would be to perform force density measurements at a system with vehicles and operations that are similar to those of the future project.

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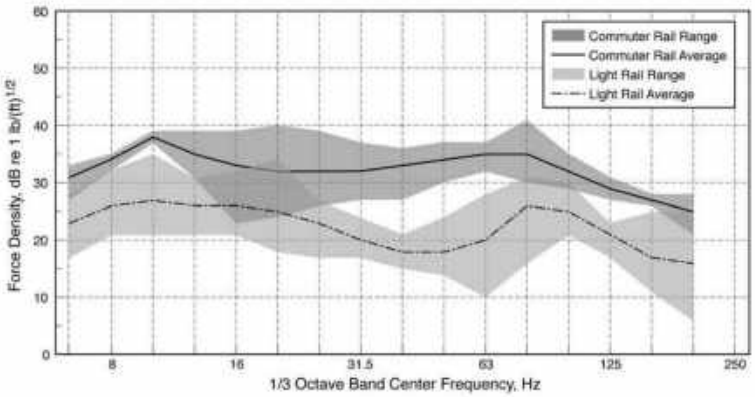


**Figure 6-6 Typical Force Densities for Rail Transit Vehicles, 40 mph**

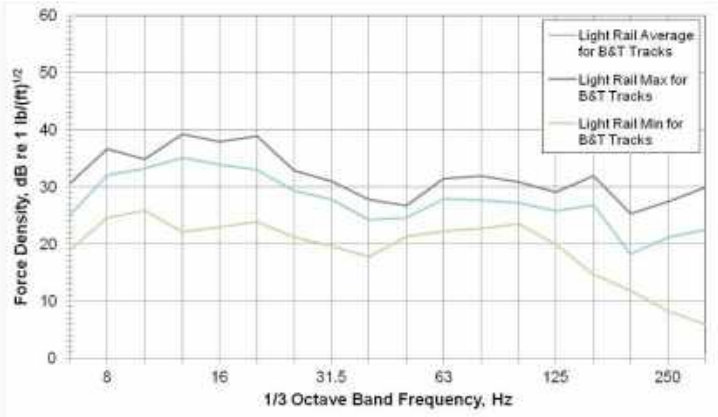


**Figure 6-7 Typical Force Densities for LRT Vehicles, 40 mph**

**2b. Measure Point-Source Transfer Mobility** – Using the appropriate instrumentation, measure point-source transfer mobility for sources with short lengths, such as buses or single car vehicles or columns supporting elevated structures. For longer vehicles, see Section 2c for a discussion of measuring line-source transfer mobilities.

The test procedure to measure point-source transfer mobility consists of impacting the ground by dropping a heavy weight and measuring the force into the ground and the response at several distances from the impact. Other excitation sources may include swept sine, sine-dwell, random vibration, and maximum length sequence. The goal of the test is to create vibration pulses that



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travel from the source to the receiver using the same path that will be taken by the transit system vibration.

Figure 6-8 illustrates the field procedure for measuring both at-grade and subway testing of transfer mobility. A weight is dropped from a height of 3 to 4 ft onto a force transducer. The responses of the force and vibration transducers are recorded on a multichannel recorder for later analysis in the laboratory. An alternative approach is to set up the analysis equipment in the field and capture the signals directly. This complicates the field testing, but eliminates the laboratory analysis of recorded data.

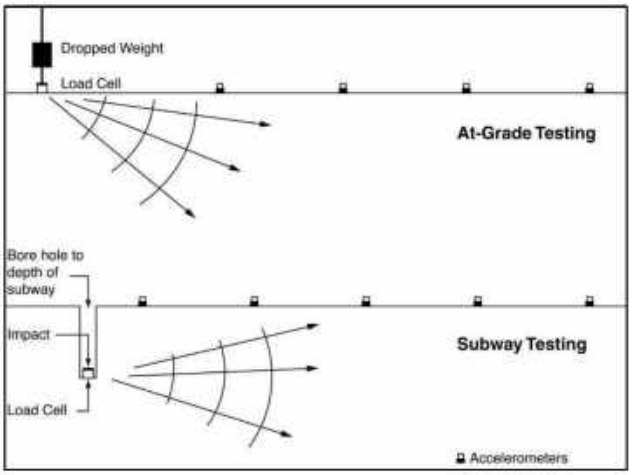


**Figure 6-8 Test Configuration for Measuring Transfer Mobility**

When the procedure is applied to subways, the force must be located at the approximate depth of the subway. This is done by drilling a bore hole and locating the force transducer at the bottom of the hole. The tests are usually performed while the bore holes are drilled to allow for the use of the soil-sampling equipment on the drill rig for the transfer mobility testing. The force transducer is attached to the bottom of the drill string and lowered to the bottom of the hole. A standard soil sampling hammer is used to excite the ground; typically, a 140-pound weight is dropped 18 inches onto a collar that is attached to the drill string. The force transducer must be capable of operating under water if the water table is near the surface or a slurry drilling process is used.

Standard signal-processing techniques are used to determine the transfer function (frequency response function) between the exciting force and the resultant ground-borne vibration. Numerical regression methods are used to combine a number of two-point transfer functions into a smooth point-source transfer mobility level that represents the average vibration propagation characteristics of a site as a function of both distance from the source and



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frequency. The transfer mobility level is usually expressed in terms of a group of 1/3-octave band transfer mobility levels. Figure 6-9 is an example of point-source transfer mobility levels from a series of tests at the Transportation Technology Center in Pueblo, Colorado.[50][54][55][56][57]

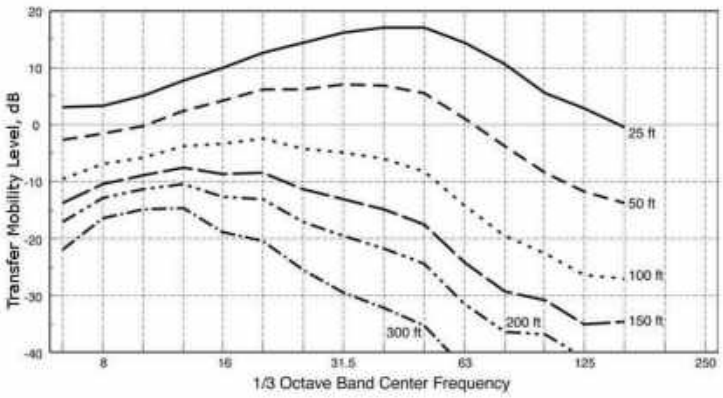


**Figure 6-9 Example of Point-Source Transfer Mobility**

## Instrumentation

Performing a transfer mobility test requires specialized equipment, which is generally available from commercial sources. Typical instrumentation for field-testing and laboratory analysis of transfer mobility is shown in Figure 6-10.

A load cell can be used as the force transducer. The force transducer should be capable of impact loads of 5,000 to 50,000 pounds depending on the hammer used for the impact. For borehole testing, the load cell must be hermetically sealed and capable of being used at the bottom of a 30- to 100-foot-deep hole partially filled with water.

Either accelerometers or geophones can be used as the vibration transducers. Geophones should be carefully mounted so that they are vertical. The requirement is that the transducers with the associated amplifiers be capable of accurately measuring levels of 0.0001 in/sec at 40 Hz and have a flat frequency response from 6 Hz to 400 Hz. Data should be acquired with a digital acquisition system with a flat frequency response over the range of 6 to 400 Hz.

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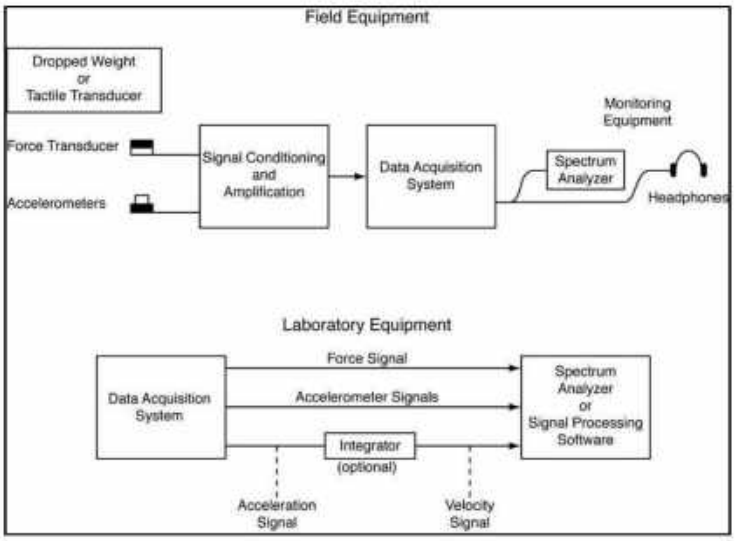


**Figure 6-10 Equipment Required for Field Testing and Laboratory Analysis**

A narrowband spectrum analyzer or signal-processing software can be used to calculate the transfer function and coherence between the force and vibration data. The analyzer must be capable of capturing impulses from at least two channels to calculate the frequency spectrum of the transfer function between the force and vibration channels. All transfer functions should include the average of at least 20 impulses. Time averaging of the impulses will provide substantial signal enhancement, which is usually required to accurately characterize the transfer function. Signal enhancement is particularly important when the vibration transducer is more than 100 ft from the impact.

Alternative methods of determining transfer mobility may be used, provided that these techniques have been demonstrated to provide the same results as the conventional weight-drop method over the frequency range of 6 Hz to 400 Hz. See Appendix G for information on developing and using non-standard procedures. These methods may include using other impulse-response measurement systems involving the use of shakers or electro-mechanical actuators, stimuli such as sweeps or maximum length sequences (MLS), and various signal processing techniques. A forthcoming ANSI Standard will describe in detail the procedures, methodologies, and reporting requirements for performing ground-borne vibration propagation measurements.

The transfer function can be calculated with either a spectrum analyzer or signal-processing software. Note that transfer functions should include the average of at least 20 impulses. Specialized multi-channel spectrum analyzers have built-in capabilities for computing transfer functions and are computationally efficient. However, signal-processing software can offer more



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flexibility in analyzing data signals and allows the use of different digital signal processing methods. Typical measurement programs involve acquisition of data in the field and later processing of the information in a laboratory. However, recent advances in instrumentation and signal-processing software allow data to be collected and analyzed while in the field.

**2c. Estimate Line-Source Transfer Mobility** – Estimate line-source transfer mobility for long sources such as multi-car trains. Line-source transfer mobilities are used to normalize measured vibration velocity levels from train passbys and to obtain force density. Two different approaches can be used to develop estimates of line-source transfer mobility. The first consists of using lines of transducers and the second consists of a line of impact positions.

**Option A: Lines of Transducers** – Develop line-source transfer mobility curves from tests using one or more lines of transducers as shown in Figure 6-11 and described below.

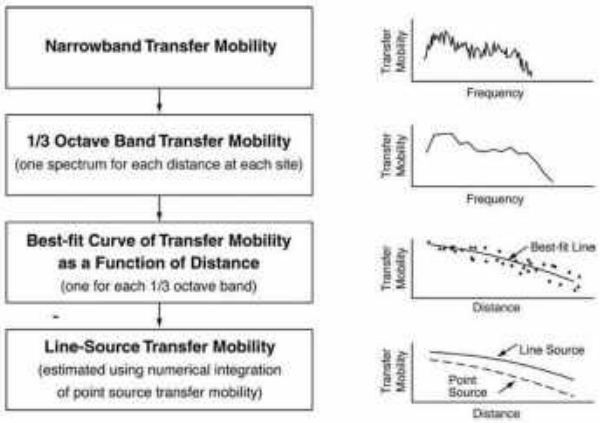


**Figure 6-11 Analysis of Transfer Mobility**

**Ai.** Obtain the narrowband transfer function between source and receiver at each measurement position. There should be a minimum of four distances in any test line. Because of the possibility of local variations in propagation characteristics, two or more lines should be used to characterize a site if possible. A total of 10 to 20 transducer positions are often used to characterize a site.

**Aii.** Calculate the equivalent 1/3-octave band transfer functions, generally between 6 and 400 Hz. This reduces each spectrum to 15 numbers. As shown in Figure 6-11, the 1/3-octave band spectrum is much smoother than the narrowband spectrum.

**Aiii.** Calculate a best-fit curve of transfer mobility as a function of distance for each 1/3-octave band. When analyzing a specific site, the best-fit curve will be



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Cont.

based on 10 to 20 points. Up to several hundred points could be used to determine average best-fit curves for a number of sites.

**Aiv.** Apply the best-fit curve to the vibration sources. The 1/3-octave band best-fit curves can be directly applied to point vibration sources. Buses can usually be considered point-sources, as can columns supporting elevated structures. However, for a line vibration source such as a train, numerical integration must be used to calculate the equivalent line-source transfer mobility. The numerical integration procedures are detailed in the TRB publication: "A Prediction Procedure for Rail Transportation Ground-Borne Noise and Vibration."[50]

**Option B: Line of Impulses** – This second procedure for estimating line-source transfer mobility is best for detailed assessment of specific vibration paths or specific buildings and is a more direct approach.

**Bi.** Measure multiple point-source transfer mobilities according to the procedures in Step 2b above. The vibration transducers are placed at specific points of interest and a line of impacts is used. For example, a 150-foot train might be represented by a line of 11 impact positions along the track centerline at 15-foot intervals (Figure 6-12).

**Bii.** Sum the point-source results using Simpson's rule[xii] for numerical integration to calculate the line-source transfer mobility.

Figure 6-13 shows an example of line-source transfer mobilities that were derived from the point-source transfer mobilities shown in Figure 6-9.

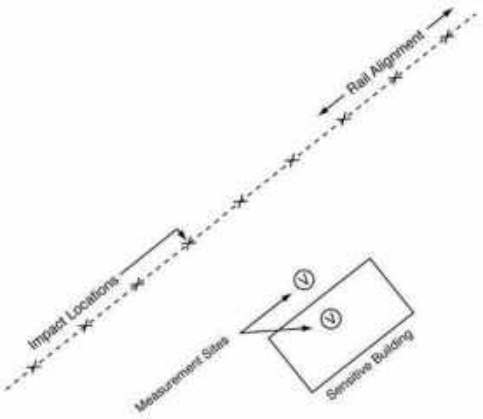


**Figure 6-12 Schematic of Transfer Mobility Measurements Using a Line of Impacts**

[xii] Simpson's rule is a method for approximating integrals.



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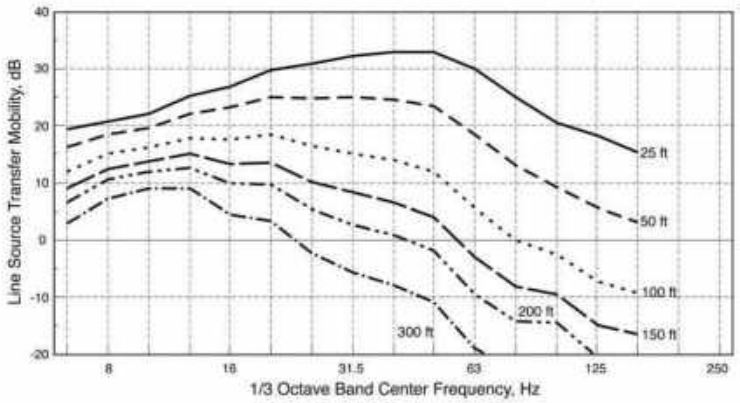


**Figure 6-13 Example of Line-source Transfer Mobility**

**2d. Project Ground-Borne Vibration and Noise** – Combine force density and line-source transfer mobility to project ground-borne vibration. Then, apply adjustment factors to estimate the building response to the ground-borne vibration and to estimate the A-weighted sound level inside buildings.

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Cont.

The propagation of vibration from the building foundation to the receiver room is very complex and dependent on the specific design of the building. Detailed evaluation of the vibration propagation would require extensive use of numerical procedures such as the finite element method. Such a detailed evaluation is generally not practical for individual buildings considered in this manual. If the detailed features of the individual buildings are available, the recommended procedure is to estimate the propagation of vibration through a building and the radiation of sound by vibrating building surfaces using simple empirical or theoretical models. The recommended procedures are outlined in the Handbook of Urban Rail Noise and Vibration Control.[44] The approach consists of adding the following adjustments to the 1/3-octave band spectrum of the projected ground-borne vibration:

- **Building response or coupling loss** – This adjustment represents the change in the incident ground-borne vibration due to the presence of the building foundation. The adjustments described in the handbook [44] are shown in Figure 6-14. Note that the correction is zero when estimating basement floor vibration or vibration of at-grade slabs. Measured values may be used in place of these generic adjustments.

- **Transmission through the building** – The vibration amplitude typically decreases as the vibration energy propagates from the foundation through the remainder of the building. The general assumption is that vibration attenuates by 1 to 2 dB for each floor.

- **Floor resonances** – Vibration amplitudes will be amplified because of resonances of the floor/ceiling systems. For a typical wood-frame

residential structure, the fundamental resonance is usually in the 15 to 20 Hz range. Reinforced-concrete slab floors in modern buildings will have fundamental resonance frequencies in the 20 to 30 Hz range. An amplification resulting in a gain of approximately 6 dB should be used in the frequency range of the fundamental resonance.

- **Floor vibration and ground-borne noise** – The projected floor vibration is used to estimate the levels of ground-borne noise. The primary factors affecting noise level are the average vibration level of the room surfaces and the amount of acoustical absorption within the room. The radiation adjustment is -5 dB for typical rooms, [37] [50] which gives:

$$L_A \approx L_V + K_{A-wt} - 5 \qquad \text{Eq. 6-8}$$

where:

$L_A$ = A-weighted sound level in a 1/3-octave band
$L_v$ = rms vibration velocity level in that band
$K_{A-wt}$ = A-weighting adjustment at the 1/3-octave band center frequency

The A-weighted levels in the 1/3-octave bands are combined to produce the overall A-weighted sound level.

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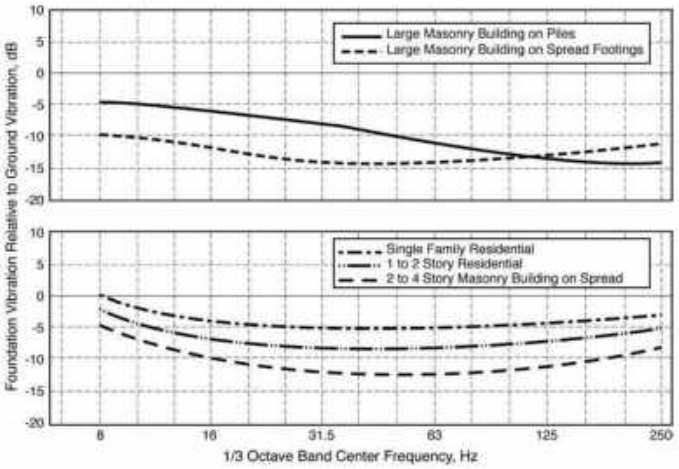


**Figure 6-14 Foundation Response for Various Types of Buildings**

Where detailed information on the structural features of individual buildings are unavailable and there are no site-specific data on outdoor to indoor propagation characteristics, the preferred approach is to apply a combined factor for the foundation response and the gain from floor resonances. Empirical data based on the TCRP D-12 Project from 34 measurement sites across 5 cities in North

America and other studies suggest that the average change in vibration from outdoor to indoor was 0 dB across all 1/3-octave bands with a standard deviation of approximately 5 to 6 dB in the 31.5 to 63 Hz frequency.[43][48] Therefore, the recommended approach for predicting indoor vibration based on outdoor data is to use an adjustment of +3 to +6 dB for light-weight, wood-frame construction and use an adjustment of 0 dB for heavier buildings.

However, for buildings with high-vibration sensitivity or where there is concern regarding interference with vibration-sensitive equipment, it is advisable to measure the outdoor-indoor response of the building, using the process described in Section 2b or 2c, to determine the actual response of the foundation and building to vibration.

### Step 3: Assess Vibration Impact

*Take inventory of vibration-sensitive land uses with impact.*

Assess vibration impact at each receiver of interest using the impact criteria in Section 6.3. Note that ground-borne vibration and noise levels that exceeded criteria in the General Vibration Assessment may not cause impact according to the more detailed procedures of the Detailed Vibration Analysis; in which case, mitigation is not required. But if projected levels still exceed the criteria, evaluate vibration mitigation measures using the spectra provided by the Detailed Vibration Analysis.

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### Step 4: Determine Vibration Mitigation Measures

*Select practical vibration control measures that will be effective at the dominant vibration frequencies and compatible with the given transit structure and track support system.*

The purpose of vibration mitigation is to minimize the adverse effects that the project ground-borne vibration and ground-borne noise will have on sensitive land uses. Because ground-borne vibration is not as common a problem as environmental noise, the mitigation approaches have not been as well defined. In some cases it may be necessary to develop innovative approaches to control the impact. See Appendix G for information on using non-standard methods.

Standard vibration control measures for rail transit systems are discussed in this step. Note that vibration control measures for rail transit systems are not always effective for freight trains.[xiv] Bus systems rarely cause vibration impact, but if impact occurs, roadway roughness or unevenness caused by bumps, pot holes, expansion joints, or driveway transitions are usually the causes. Smoothing the roadway surface is typically the recommended course of action.[xv]

[xiv] The heavy axle loads associated with freight rail are outside the range of applicable design parameters for vibration reduction on lighter rail transit systems. Plans to relocate existing railroad tracks closer to vibration-sensitive sites in order to accommodate a new rail transit line in the ROW must be carefully considered because it may not be possible to mitigate the increased vibration impact from freight trains.

[xv] In cases where a rubber-tired system runs inside a building, such as an airport people mover, vibration control may involve additional measures. Loading and unloading of guideway support beams may generate dynamic forces that transmit into the building structure. Special guideway support systems may be required, similar to the discussion below regarding floating slabs.

Vibration reduction measures incur additional costs to a system. Some of the same treatments for noise mitigation can be considered for vibration mitigation. Costs for noise control measures are documented in a report from the Transit Cooperative Research Program (TCRP).[31] Where applicable to vibration reduction, costs for noise abatement methods from that report are given in the following sections. These costs reflect the noise mitigation costs as of 1997 (unless otherwise noted), and should only be used as representative estimates when considering noise mitigation options. Current noise mitigation costs should be researched before decisions on noise mitigation options are finalized, and then they should be documented according to Section 8.

Mitigation of vibration impacts may involve treatments at the source, along the source-to-receiver propagation path, or at the receiver.

**1a. Evaluate Source Treatments** – The most effective vibration mitigation treatments are applied at the vibration source. This is the preferred approach to mitigation when possible. Possible source treatments include:

- **Preventative Maintenance** – Effective maintenance programs are essential for controlling ground-borne vibration. Key vibration points are discussed below; see Section 4.5, Step 7 for more detailed information on the benefits of effective maintenance programs on controlling transit noise and vibration. While these are not mitigation measures in the traditional sense, and should not be included as mitigation in an environmental document, they can help to keep both noise and vibration levels at a "like-new" level or reduce both in systems with deferred maintenance.
  - **Rail grinding** is a particularly important practice for vibration mitigation for rail that develops corrugations. The TCRP report notes that periodic rail grinding results in a net savings per year on wheel and rail wear. Most transit systems contract out rail grinding, although some of the larger systems make the investment and do their own grinding. As mentioned in Section 4.5, Step 7, the typical rail grinding cost would be $1000 to $7000 per grinding pass mile, with an additional investment of approximately $1 million for the equipment for a larger transit system to do its own grinding.
  - **Dramatic vibration reduction** results can be achieved by removing wheel flats through **wheel truing**. As mentioned in Section 4.5, Step 7, a wheel truing machine costs approximately $1 million, including associated maintenance, materials, and labor costs. The TCRP report figures a system with 700 vehicles would incur a yearly cost of $300,000 to $400,000 for a wheel truing program.
  - **Profile grinding of the rail head** in combination with a wheel truing program may be the most practical approach to controlling and reducing vibration and noise where such practices are not normally conducted. Profiles should be defined during the design phase and should be in place when system opens.[32] The cost of

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wheel and rail profile matching may be incorporated in the new vehicle and new rail costs.

Rough wheels or rails can increase vibration levels by as much as 20 dB in extreme cases, negating the effects of even the most effective vibration control measures. Yet, it is rare that vibration control measures (such as those discussed below) will provide more than 15 to 20 dB attenuation. When there are ground-borne vibration impacts with existing transit equipment, the best vibration control measure often is to implement new or improved maintenance procedures. Grinding rough or corrugated rail and wheel truing to eliminate wheel flats and restore the wheel contour may provide considerable vibration reduction. Regular maintenance may replace the need to modify the existing track system, such as through adding floating slabs.

- **Planning and Design of Special Trackwork** – A large percentage of the vibration impact from a new transit facility is often caused by wheel impacts at special trackwork for turnouts and crossovers. When feasible, the most effective vibration control measure is to relocate the special trackwork to a less vibration-sensitive area. This may require adjusting the location by several hundred feet provided it will not have an adverse impact on the operation plan for the system. Careful review of crossover and turnout locations during the project development phase is an important step to minimizing potential for vibration impact.

  Another approach is to use special devices (frogs) at turnouts and crossovers that incorporate mechanisms to close the gaps between running rails. Frogs with spring-loaded mechanisms and frogs with movable points can substantially reduce vibration levels near crossovers. According to the TCRP report, a spring frog costs about $12,000, twice the cost of a standard frog. A movable point frog involves elaborate signal and control circuitry resulting in higher costs at approximately $200,000.

- **Vehicle Specifications** – The ideal rail vehicle with respect to minimizing ground-borne vibration should have the following characteristics:
  - Low, unsprung weight
  - Soft primary suspension
  - A minimum of metal-to-metal contact between moving parts of the truck
  - Smooth wheels that are perfectly round

  A limit for the vertical resonance frequency of the primary suspension should be included in the specifications for any new vehicle. A vertical resonance frequency of 12 Hz or less is sufficient to control the levels of ground-borne vibration, although some have recommended the vertical resonance frequency be less than 8 Hz.

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- **Special Track Support Systems** – When the vibration assessment indicates that vibration levels will be excessive, the track support system is typically modified to reduce the vibration levels.

  Floating slabs, resiliently supported ties, high-resilience fasteners, and ballast mats can be used to reduce the levels of ground-borne vibration. To be effective, all of these measures must be optimized for the frequency spectrum of the vibration. Most of these relatively standard procedures have been successfully used on several subway projects.

  Applications on at-grade and elevated track are less common. This is because vibration impact is less common for at-grade and elevated track. Note that the cost of these types of vibration control measures is a higher percentage of the overall construction costs for at-grade and elevated track, and exposure to the elements can require substantial design modifications.

  Each major vibration control measure for track support is discussed below. Costs for these treatments are not covered by the TCRP report, but are given as estimates based on transit agency experience.

  - **Resilient fasteners** – Resilient fasteners are used to fasten the rail to concrete track slabs. Standard resilient fasteners are very stiff in the vertical direction, usually in the range of 200,000 lb/in, and do provide some vibration reduction compared to the rigid fastening systems used on older systems (e.g., wood half-ties embedded in concrete).

    Special fasteners with vertical stiffness in the range of 30,000 lb/in may reduce vibration by as much as 5 to 10 dB at frequencies above 30 to 40 Hz. These premium fasteners vary in cost and can be priced competitively when purchased in large quantities.

  - **Ballast mats** – A ballast mat consists of a rubber or other type of elastomer pad that is placed under the ballast. In general, the mat must be placed on a concrete pad to be effective. They will not be as effective if placed directly on the soil or the sub-ballast. Consequently, most ballast mat applications are in subway or elevated structures.

    Ballast mats can provide 8 to 12 dB attenuation at frequencies above 25 to 30 Hz.[58] Ballast mats are often a good retrofit measure for existing tie-and-ballast track where there is vibration impact. Installed ballast mats cost approximately $180 per track-foot.

  - **Undertie pads** – Undertie pads (resiliently supported concrete ties) consist of a rubber pad mounted on the bottom of a concrete tie directly on the ballast. The pads provide vibration isolation at frequencies above 25 Hz and are easy to



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install or retrofit. Installed undertie pads cost approximately $260 per track-foot.

- **Resiliently supported ties** – The resiliently supported tie system consists of concrete ties supported by rubber pads resting on top of a slab track or subway invert. The rails are fastened directly to the concrete ties using standard rail clips. Resiliently supported ties provide vibration reduction in between 15 to 40 Hz, which is particularly appropriate for transit systems with vibration impact in the 20 to 30 Hz range. A resiliently supported tie system costs approximately $400 per track-foot.

- **Floating slabs** – Floating slabs can be very effective at controlling ground-borne vibration and noise and consist of a concrete slab supported on resilient elements such as rubber or a similar elastomer. Floating slabs are effective at frequencies greater than their single-degree-of-freedom vertical resonance frequency.

  Floating slabs are among the most expensive vibration control treatments. A typical double-tie floating slab system costs approximately 4 times the cost of ballast and tie per track foot. Examples of floating slabs include:
  - Floating slabs used in Washington, DC; Atlanta, GA; and Boston, MA, were all designed to have a vertical resonance in the 14 to 17 Hz range.
  - A special system referred to as the double-tie system was first used in Toronto. It consists of 5-foot-long slabs with four or more rubber pads under each slab. This system was designed with a resonance frequency in the 12 to 16 Hz rang3.
  - Another special floating slab was used in San Francisco's Bay Area Rapid Transit (BART) system. It uses a discontinuous precast concrete double-tie system with a resonance frequency in the 5 to 10 Hz frequency range.

- **Tire-derived aggregate (TDA)** – TDA (shredded tires) consists of a layer of tire shreds wrapped in geotech fabric placed underneath the ballast on hard packed ground. This is a new, low-cost option that can provide reduction in vibration levels at frequencies above 25 Hz. This mitigation measure has proven to be effective for the Denver Regional Transportation District (RTD) light rail system as well as the Santa Clara Valley Transportation Authority (VTA) light rail system,[59] but the effective life of TDA has not been determined. Installed TDA costs approximately $260 per track-foot.

- **Other treatments** – Changing any feature of the track support system can change the levels of ground-borne vibration. Approaches



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such as using heavier rail, thicker ballast, or heavier ties can be expected to reduce the vibration levels. There also is some indication that vibration levels are lower with wood ties compared to concrete ties. But there is little confirmation that any of these approaches will make a substantial change in the vibration levels.

- **Operational Changes** – The most effective operational change is to reduce the vehicle speed. Reducing the train speed by a factor of two will reduce vibration levels approximately 6 dB. Other operational changes include:
  - Use of equipment that generates the lowest vibration levels during the nighttime hours when people are most sensitive to vibration and noise.
  - Adjusting nighttime schedules to minimize movements in the most sensitive hours.

While there are tangible mitigation benefits from speed reductions and limits on operations during the most sensitive time periods, FTA does not generally accept speed reduction as a vibration mitigation measure for two important reasons: (1) speed reduction is unenforceable and negated if vehicle operators do not adhere to established policies, and (2) it is contrary to the purpose of the transit investment by FTA, which is to move as many people as possible as efficiently and safely as possible. FTA does not recommend limits on operations as a way to reduce vibration impacts.

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**1b. Evaluate Path Treatments** – When vibration mitigation treatments cannot be applied at the vibration source or additional mitigation is required after treating the source, the next preferred placement of vibration mitigation is along the vibration propagation path between the source and receiver. Possible path treatments include:

- **Trenches** – Use of trenches to control ground-borne vibration is analogous to controlling airborne noise with noise barriers. This approach has not received much attention in the United States, but trenches could be a practical method for controlling transit vibration from at-grade track. A rule-of-thumb given by Richert and Hall[60] is that if the trench is located close to the source, the trench bottom must be at least 0.6 times the Rayleigh wavelength below the vibration source. For most soils, Rayleigh waves travel at around 600 ft/sec, which means that the wavelength at 30 Hz is 20 ft, requiring that a trench be approximately 15 ft deep to be effective at 30 Hz.

  A trench can be effective as a vibration barrier if it is either open or solid. The Toronto Transit Commission tested a trench filled with Styrofoam to keep it open and reported successful performance over a period of at least one year. Solid barriers can be constructed with sheet piling or concrete poured into a trench.

- **Buffer Zones** – Expanding the rail ROW can be the most economical method of reducing the vibration impact by simply increasing the distance between the source and receiver. A similar approach is to

negotiate a vibration easement from the affected property owners (e.g., a row of single-family homes adjacent to a proposed commuter rail line). There may be legal limitations, however, on the ability of funding agencies to acquire land strictly for the purpose of mitigating vibration (or noise) impact.

**1c. Evaluate Receiver Treatments** – When vibration mitigation treatments cannot be applied at the source or along the propagation path, or if combinations of treatments are required, treatments to the receivers can be considered as described below.

- **Building Modifications** – In some circumstances, it is practical to modify the affected building to reduce the vibration level. Vibration isolation of buildings consists of supporting the building foundation on elastomer pads, similar to bridge bearing pads. Vibration isolation of buildings is seldom an option for existing buildings and is typically only possible for new construction. Vibration impacts on sensitive laboratory instruments, such as electron microscopes, may be controlled with vibration isolation tables.

  This approach is particularly important for shared-use facilities such as an office space above a transit station or terminal. When vibration-sensitive equipment such as electron microscopes will be affected by transit vibration, specific modifications to the building structure may be the most cost-effective method of controlling the impact aside from modification of equipment mounting systems. For example, the floor upon which the vibration-sensitive equipment is located could be stiffened and isolated from the remainder of the building to reduce the vibration. Alternatively, the equipment mounting systems could be modified or the equipment could be relocated to a different building at far less cost.

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SECTION 7

# Noise and Vibration during Construction

Construction noise and vibration often generates complaints from the community, even when construction is for a limited timeframe. Public concerns about construction noise and vibration increase considerably with lengthy periods of heavy construction on major projects as well as prevalence of nighttime construction (often scheduled to avoid disrupting workday road and rail traffic). Noise and vibration complaints typically arise from interference with people's activities, especially when the adjacent community has no clear understanding of the extent or duration of the construction. Misunderstandings can arise when the community thinks a contractor is being insensitive, and the contractor believes it is performing the work in compliance with local ordinances. This situation underscores the need for early identification and assessment of potential problem areas.

This section outlines the procedures for assessing noise and vibration impacts during construction. The type of assessment (qualitative or quantitative) and the level of analysis are determined based on the scale of the project and surrounding land uses. In cases where a full quantitative assessment is not warranted, a qualitative assessment of the construction noise and vibration environment can lead to greater understanding and tolerance in the community. For major projects with extended periods of construction at specific locations, a quantitative assessment can aid contractors in making bids by allowing changes in construction approach and including mitigation costs before the construction plans are finalized.

Generally, local noise ordinances are not very useful for evaluating construction noise impact. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land uses. While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.

Procedures for assessing construction noise are presented in Section 7.1. Procedures for assessing construction vibration are presented in Section 7.2.

## 7.1 Construction Noise Assessment

Noise impacts from construction may vary greatly depending on the duration and complexity of the project. The key elements of the Construction Noise Assessment procedure and recommended workflow are as follows.



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**Step 1:** Determine Level of Construction Noise Assessment

**Step 2:** Use a Qualitative Construction Noise Assessment to Estimate Construction Noise

**Step 3:** Use a Quantitative Construction Noise Assessment to Estimate Construction Noise

**Step 4:** Assess Construction Noise Impact

**Step 5:** Determine Construction Noise Mitigation Measures

If there is uncertainty in how to determine the appropriate level of assessment, contact the FTA Regional office.

## Step 1: Determine Level of Construction Noise Assessment

*Determine the appropriate level of assessment based on the scale and type of the project and depending on the stage of environmental review.*

Consider the following factors:

- Scale of the project
- Proximity of noise-sensitive sites to the construction zones
- Number of noise-sensitive receivers in the project area
- Duration of construction activities near noise-sensitive receivers
- Schedule, including the construction days, hours, and time periods
- Method (e.g., cut-and-cover vs. bored tunneling)
- Concern about construction noise expressed in comments by the general public (e.g., through scoping or public meetings)

**1a. Determine if an assessment is required** – Construction Noise Assessments are not required for many small projects including:

- Installation of safety features like grade-crossing signals;
- Track improvements within the ROW; or
- Erecting small buildings and facilities which are similar in scale to the surrounding development.

For small projects like these, include descriptions in the environmental document of the length of construction, the loudest equipment to be used, the expected truck access routes, the avoidance of nighttime activity, and any other relevant planned construction method.

**1b. Determine whether a qualitative or quantitative assessment is required**

- **Qualitative Construction Noise Assessment** – Qualitative Construction Noise Assessments may be required for projects with less than a month of construction time in a noise-sensitive area. See Step 2 for more information on Qualitative Construction Noise Assessments.



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- **Quantitative Construction Noise Assessments** – Quantitative Construction Noise Assessments may be required for projects with a month or more of construction in noise-sensitive areas or if particularly noisy equipment will be involved. See Step 3 for more information on Quantitative Construction Noise Assessments.

### Step 2: Use a Qualitative Construction Noise Assessment to Estimate Construction Noise

*Use a qualitative construction noise assessment to estimate construction noise for appropriate projects per Section 7.1, Step 1b.*

Provide qualitative descriptions in the environmental document of the following elements:

- Duration of construction (both overall and at specific locations)
- Equipment expected to be used (e.g., noisiest equipment)
- Schedule with limits on times of operation (e.g., daytime use only)
- Monitoring of noise
- Forum for communicating with the public
- Commitments to limit noise levels to certain levels, including any local ordinances that apply
- Consideration of application of noise control treatments used successfully in other projects

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Effective community outreach and relations are important for these projects. Disseminate information to the public early regarding the kinds of construction equipment, expected noise levels, and durations to forewarn potentially affected neighbors about the temporary inconvenience. Including a general description of the variation of noise levels during a typical construction day may also be helpful.

Note that the construction criteria in Step 4 do not apply to qualitative assessments.

### Step 3: Use a Quantitative Construction Noise Assessment to Estimate Construction Noise

*Use a quantitative construction noise assessment to estimate construction noise for appropriate projects per Section 7.1, Step 1b.*

For Quantitative Construction Noise Assessments, follow the recommended procedure in this step and include a description of the planned construction methods and any basic measures that have been identified to reduce the potential impact, such as prohibiting the noisiest construction activities during the nighttime, in the environmental document. It may be prudent, however, to defer final decisions on noise control measures until the project and construction plans are defined in greater detail during the engineering phase.

- **Noise Source Levels from Typical Construction Equipment and Operations** – The noise levels generated by construction

equipment vary greatly on factors such as the type of equipment, the equipment model, the operation being performed, and the condition of the equipment. Typically, the dominant source of noise from most construction equipment is the engine, often a diesel engine, which usually does not have sufficient muffling. In other cases, such as impact pile-driving or pavement-breaking, noise generated by the process dominates. Construction equipment can be considered to operate in the following two modes for Construction Noise Assessments:

- **Stationary** – Stationary equipment operates in one location for one or more days at a time, with either a fixed power operation (pumps, generators, compressors) or a variable noise operation (pile drivers, pavement breakers).
- **Mobile** – Mobile equipment moves around the construction site with power applied in cyclic fashion (bulldozers, loaders), or to and from the site (trucks). Movement around the site is considered in the construction noise prediction procedure.

Variation in power imposes additional complexity in characterizing the noise source level from mobile equipment. Describe the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the $L_{eq(t)}$ of the operation.

Typical noise levels from representative equipment are included in Table 7-1. The levels are based on an EPA Report,[61] measured data from railroad construction equipment taken during the 1976 Northeast Corridor Improvement Project, the FHWA Roadway Construction Noise Model, and other measured data.

For equipment that is not represented in Table 7-1, measure the noise levels according to the standard procedures for measuring the exterior noise levels for the certification of mobile and stationary construction equipment by the Society of Automotive Engineers.[62][63]

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**Table 7-1 Construction Equipment Noise Emission Levels**

| Equipment | Typical Noise Level 50 ft from Source, dBA |
|---|---|
| Air Compressor | 80 |
| Backhoe | 80 |
| Ballast Equalizer | 82 |
| Ballast Tamper | 83 |
| Compactor | 82 |
| Concrete Mixer | 85 |
| Concrete Pump | 82 |
| Concrete Vibrator | 76 |
| Crane, Derrick | 88 |
| Crane, Mobile | 83 |
| Dozer | 85 |
| Generator | 82 |
| Grader | 85 |
| Impact Wrench | 85 |
| Jack Hammer | 88 |
| Loader | 80 |
| Paver | 85 |
| Pile-driver (Impact) | 101 |
| Pile-driver (Sonic) | 95 |
| Pneumatic Tool | 85 |
| Pump | 77 |
| Rail Saw | 90 |
| Rock Drill | 95 |
| Roller | 85 |
| Saw | 76 |
| Scarifier | 83 |
| Scraper | 85 |
| Shovel | 82 |
| Spike Driver | 77 |
| Tie Cutter | 84 |
| Tie Handler | 80 |
| Tie Inserter | 85 |
| Truck | 84 |

**3a.** Use the metric $L_{eq(i)}$ to assess construction noise. This unit is appropriate because $L_{eq(i)}$ can be used to describe:

- Noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period
- Noise level during an entire phase
- Average noise over all phases of the construction

**3b.** Use Eq. 7-1 to predict construction noise impact for major transit projects, considering the noise generated by the equipment and noise propagation due to distance. Calculate $L_{eq.equip}$ for all equipment individually, then use decibel addition to sum the $L_{Aeq.equip}$ for all equipment operating during the same time period. See Appendix B.1.1 for information on decibel addition.



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Cont.

$$L_{eq,equip} = L_{emission} + 10\log(Adj_{Usage}) - 20\log(\frac{D}{50}) - 10G\log(\frac{D}{50}) \quad \textbf{Eq. 7-1}$$

where:

$L_{eq,equip}$ = $L_{eq(t)}$ at a receiver from the operation of a single piece of equipment over a specified time period, dBA
$L_{emission}$ = noise emission level of the particular piece of equipment at the reference distance of 50 ft, dBA
$Adj_{Usage}$ = usage factor to account for the fraction of time that the equipment is in use over the specified time period
$D$ = distance from the receiver to the piece of equipment, ft
$G$ = a constant that accounts for topography and ground effects

Determine the quantities for Eq. 7-1 based on the level of assessment as described below.

- A general assessment of construction noise is warranted for projects in an early assessment stage when the equipment roster and schedule are undefined and only a rough estimate of construction noise levels is practical.
- A detailed analysis of construction noise is warranted when many noise-sensitive sites are adjacent to a construction project or where contractors are faced with stringent local ordinances or heightened public concerns expressed in early outreach efforts.

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Cont.

Complete the appropriate assessment for each phase of construction. Major construction projects are accomplished in several different phases. Each phase has a specific equipment mix, depending on the work to be accomplished during that phase. As a result of the equipment mix, each phase has its own noise characteristics; some phases have higher continuous noise levels than others, and some have higher impact noise levels than others.

**Option A: General Assessment** – Determine the quantities for Eq. 7-1 based on the following assumptions for a General Assessment of each phase of construction.

- **Noise emission level ($L_{emission}$)** – Determine the emission level at 50 ft according to noise from typical construction equipment described above and Table 7-1.
- **Usage factor ($Adj_{Usage}$)** – Assume a usage factor of 1. This assumes a time period of one-hour with full power operation. Most construction equipment operates continuously for periods of one-hour or more during the construction period.

  Therefore, $10\log(Adj_{usage}) = 0$ and can be omitted from the equation.
- **Distance (D)** – Assume that all equipment operates at the center of the project, or centerline for guideway or highway construction project.

- **Ground effect (G)** – G = 0 assuming free-field conditions and ignoring ground effects. If ground effects are of specific importance to the assessment, consider using the Detailed Analysis procedure.

Only determine the $L_{eq.equip}$ for the two noisiest pieces of equipment expected to be used in each phase of construction. Then, sum the levels for each phase of construction using decibel addition.

**Option B: Detailed Analysis –** Determine the quantities for Eq. 7-1 based on the following assumptions for a Detailed Analysis of each phase of construction. Alternatively, for detailed, long-term, and complex construction projects or projects near a particularly sensitive site, the FHWA's Windows-based screening tool, "Roadway Construction Noise Model (RCNM)," can be used for the prediction of construction noise.[64]

- **Noise emission level ($L_{emission}$)** – Measure or certify the noise emission level for each piece of equipment.

- **Usage factor ($Adj_{Usage}$)** – Long-term construction project noise impact is based on a 30-day average $L_{dn}$, the times of day of construction activity (nighttime noise is penalized by 10 dB in residential areas), and the percentage of time the equipment is used during a period of time that will affect $Adj_{Usage}$.

  For example, an 8-hour $L_{eq(t)}$ is determined by making $Adj_{Usage}$ the percentage of time each individual piece of equipment operates under full power in that period. Similarly, the 30-day average $L_{dn}$ is determined from the $Adj_{Usage}$ expressed by the percentage of time the equipment is used during the daytime hours (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.), separately, over a 30-day period. To account for increased sensitivity to nighttime noise, the nighttime noise levels are adjusted by 10 dB in the $L_{dn}$ computation (see Appendix B.1.4.5).

- **Distance (D)** – Determine the location of each piece of equipment during operation and the distance to each receiver.

- **Ground effect (G)** – Use Table 4-26 in Section 4.5, Step 3 to calculate G to account for the site topography, natural and man-made barriers, and ground effects.

  Compute the 8-hour $L_{eq(t)}$ ( $L_{eq.equip(8hr)}$) and the 30-day average $L_{dn}$ ($L_{dn.equip(30day)}$) for all equipment expected to be used in each phase of construction separately. Then, sum the levels for each phase of construction using Eq. 4-56 and Eq. 4-57 in Table 4-32.

### Step 4: Assess Construction Noise Impact

*Compare the predicted noise levels from the Quantitative Construction Noise Assessment with impact criteria to assess impact from construction noise for each phase of construction.*



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Cont.

No standardized criteria have been developed for assessing construction noise impact. Consequently, criteria must be developed on a project-specific basis unless local ordinances apply. As stated earlier in this section, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.

The construction impact guidelines are presented based on the level of quantitative assessment.

**Option A: General Assessment** – Compare the combined $L_{eq.equip(1hr)}$ for the two noisiest pieces of equipment for each phase of construction determined in Section 7.1, Step 3 to the criteria below. Then, identify locations where the level exceeds the criteria.

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**Table 7-2 General Assessment Construction Noise Criteria**

| Land Use | $L_{eq.equip(1hr)}$, dBA Day | Night |
|---|---|---|
| Residential | 90 | 80 |
| Commercial | 100 | 100 |
| Industrial | 100 | 100 |

**Option B: Detailed Analysis** – Compare the combined $L_{eq.equip(1hr)}$ and the combined $L_{dn.equip(30day)}$ for all equipment for each phase of construction determined in Section 7.1, Step 3 to the criteria below. Then, identify locations where the level exceeds the criteria.

**Table 7-3 Detailed Analysis Construction Noise Criteria**

| Land Use | $L_{eq.equip(8hr)}$, dBA Day | Night | $L_{dn.equip(30day)}$, dBA 30-day Average |
|---|---|---|---|
| Residential | 80 | 70 | 75 |
| Commercial | 85 | 85 | 80* |
| Industrial | 90 | 90 | 85* |

*Use a 24-hour $L_{eq(24hr)}$ instead of $L_{dn.equip(30day)}$.

## Step 5: Determine Construction Noise Mitigation Measures

*Evaluate the need for mitigation and select appropriate mitigation measures.*

Where potential impacts have been identified according to Section 7.1, Step 4, evaluate appropriate control measures. Include descriptions of how each affected location will be treated with one or more mitigation measures in the environmental document.

**5a.** Determine the appropriate approach for construction noise control. Categories of approaches include:

- **Design considerations and project layout**
  - Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.
  - Re-route truck traffic away from residential streets. Select streets with the fewest homes if no alternatives are available.
  - Site equipment on the construction lot as far away from noise-sensitive sites as possible.
  - Construct walled enclosures around especially noisy activities or clusters of noisy equipment. For example, shields can be used around pavement breakers, and loaded vinyl curtains can be draped under elevated structures.
- **Sequence of operations**
  - Combine noisy operations to occur in the same time period. The total noise level produced will not be substantially greater than the level produced if the operations were performed separately.
  - Avoid nighttime activities. Sensitivity to noise increases during the nighttime hours in residential neighborhoods.
- **Alternative construction methods**
  - Avoid impact pile-driving where possible in noise-sensitive areas. Drilled piles or the use of a sonic/vibratory pile driver or push pile driver are quieter alternatives where the geological conditions permit their use.
  - Use specially-quieted equipment, such as quieted and enclosed air compressors and properly-working mufflers on all engines.
  - Select quieter demolition methods. For example, sawing bridge decks into sections that can be loaded onto trucks results in lower cumulative noise levels than impact demolition by pavement breakers.

Include descriptions of how each impacted location will be treated with one or more mitigation measures in the environmental impact assessment when possible.

**5b.** Describe and commit to a mitigation plan that will be developed later when the information is available to make final decisions (not often available during the project development phase) on all specific mitigation measures. This may be the case for large, complex projects. The objective of the plan should be to minimize construction noise using all reasonable (e.g., cost vs. benefit) and feasible (e.g., possible to construct) means available.



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Components of a mitigation plan may include some or all of the following provisions, which should also be specified in construction contracts:

- **Equipment noise emission limits** – Equipment noise limits are absolute noise limits applied to generic classes of equipment at a reference distance (typically 50 ft). The limits should be set no higher than what is reasonably achievable for well-maintained equipment with effective mufflers. Lower limits that require source noise control may be appropriate for certain equipment when needed to minimize community noise impact, if reasonable and feasible. Provisions could also be included to require equipment noise certification testing prior to use on-site.

- **Lot-line construction noise limits** – Lot-line construction noise limits are noise limits that apply at the lot-line of specific noise-sensitive properties. The limits are typically specified in terms of both noise exposure (usually $L_{eq(h)}$ over a 20-30-minute period) and maximum noise level. They should be based on local noise ordinances if applicable, as well as pre-construction baseline noise levels (usually 3 to 5 dB above the baseline).

- **Operational and/or equipment restrictions** – It may be necessary to prohibit or restrict certain construction equipment and activities near residential areas during nighttime hours. This is particularly true for activities that generate tonal, impulsive, or repetitive sounds, such as back-up alarms, hoe ram demolition, and pile-driving.

- **Noise abatement requirements** – In some cases, specifications may be provided for particular noise control treatments based on the results of the design analysis and/or prior commitments made to the public by civic authorities. An example would be the requirement for a temporary noise barrier to shield a particular community area from noisy construction activities.

- **Noise monitoring plan requirements** – Plans can be developed for pre-project noise monitoring to establish baseline noise levels at sensitive locations, as well as for periodic equipment and lot-line noise monitoring during the construction period. The plan should outline the measurement and reporting methods that will be used to demonstrate compliance with the project noise limits.

- **Noise control plan requirements** – For major construction projects, preparation and submission of noise control plans on a periodic basis (e.g., every six months) are generally required. These plans should predict the construction noise at noise-sensitive receiver locations based on the proposed construction equipment and methods. If the analysis predicts that the specified noise limits will be exceeded, the plan should specify the mitigation measures that will be applied and should demonstrate the expected noise reductions these measures will achieve. The objective of this proactive approach is to minimize the

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likelihood of community noise complaints by ensuring that any necessary mitigation measures are included in the construction plans.

- **Compliance enforcement program** – If construction noise is an issue in the community, it is important that a program be implemented to monitor contractor compliance with the noise control specifications and mitigation plan. It is recommended that this function be performed by a construction management team on behalf of the public agency.
- **Public information and complaint response procedures** – To maintain positive community relations, it is recommended to keep the public informed about the construction plans and efforts to minimize noise, and procedures should be established for prompt response and corrective action to noise complaints during construction.

Most of these provisions are appropriate for large-scale projects, where construction activity will continue for many months, if not years. The linked references contain more information on construction noise for major transportation projects.[60][65]

## 7.2 Construction Vibration Assessment

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings founded on the soil near the construction site respond to these vibrations with varying results, ranging from no perceptible effects at the lowest levels, low rumbling sounds and perceptible vibrations at moderate levels, and slight damage at the highest levels.

While ground vibrations from construction activities do not often reach the levels that can damage structures, fragile buildings must receive special consideration. The construction vibration criteria include consideration of the building condition.

The key elements of the Construction Vibration Assessment procedures and recommended workflow are as follows:

**Step 1:** Determine level of construction vibration assessment

**Step 2:** Use a qualitative construction vibration assessment

**Step 3:** Use a quantitative construction vibration assessment

**Step 4:** Assess construction vibration impact

**Step 5:** Determine construction vibration mitigation measures



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Cont.

## Step 1: Determine Level of Construction Vibration Assessment

*Determine the appropriate level of assessment based on the scale and type of the project and the stage of environmental review.*

**1a. Determine if an assessment is required.**
Construction Vibration Assessments are not required for many small projects including:

- Installation of safety features like grade-crossing signals
- Track improvements within the ROW
- Erecting small buildings and facilities, which are similar in scale to the surrounding development

**1b. Determine whether a qualitative or quantitative assessment is required.**

- **Qualitative Construction Vibration Assessment** – A qualitative construction vibration assessment is appropriate for projects where prolonged annoyance or damage from construction vibration is not expected. For example, equipment that generates little or no ground vibration—such as air compressors, light trucks, and hydraulic loaders—only require qualitative descriptions. See Section 7.2, Step 2 for more information on qualitative construction vibration assessments.

- **Quantitative Construction Vibration Assessment** – A quantitative construction vibration analysis is appropriate for projects where construction vibration may result in building damage or prolonged annoyance. For example, activities such as blasting, pile-driving, vibratory compaction, demolition, and drilling or excavation near sensitive structures require a quantitative analysis. See Section 7.2, Step 3 for more information on quantitative construction vibration assessments.

If there is uncertainty in how to determine the appropriate level of assessment, contact the FTA Regional office.

## Step 2: Use a Qualitative Construction Vibration Assessment

*Use a qualitative construction vibration assessment to estimate vibration for appropriate projects per Section 7.2, Step 1b.*

Provide qualitative descriptions in the environmental document of the following elements:

- Duration of construction (both overall and at specific locations)
- Equipment expected to be used
- Description of how ground-borne vibration will be maintained at an acceptable level



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Cont.

Note that the criteria in Section 7.2, Step 4 do not apply to qualitative assessments.

### Step 3: Use a Quantitative Construction Vibration Assessment

*Use a quantitative construction vibration assessment to estimate vibration for appropriate projects per Section 7.2, Step 1b.*

For quantitative construction vibration assessments, follow the recommended procedure in this step. Vibration source levels from typical construction equipment and operations are provided below, and procedures on how to estimate construction vibration for damage and annoyance are provided in Steps 3a and 3b, respectively.

- **Vibration Source Levels from Construction Equipment** – Table 7-4 presents average source levels in terms of velocity for various types of construction equipment measured under a wide variety of construction activities. The approximate rms vibration velocity levels were calculated from the PPV limits using a crest factor of 4, representing a PPV-rms difference of 12 dB. Note that although the table gives one level for each piece of equipment, there is considerable variation in reported ground vibration levels from construction activities. The data in Table 7-4 provide a reasonable estimate for a wide range of soil conditions.[66][67][68][69]

**Table 7-4 Vibration Source Levels for Construction Equipment**

| Equipment | | PPV at 25 ft, in/sec | Approximate Lv* at 25 ft |
|---|---|---|---|
| Pile Driver (impact) | upper range | 1.518 | 112 |
| | typical | 0.644 | 104 |
| Pile Driver (sonic) | upper range | 0.734 | 105 |
| | typical | 0.17 | 93 |
| Clam shovel drop (slurry wall) | | 0.202 | 94 |
| Hydromill (slurry wall) | in soil | 0.008 | 66 |
| | in rock | 0.017 | 75 |
| Vibratory Roller | | 0.21 | 94 |
| Hoe Ram | | 0.089 | 87 |
| Large bulldozer | | 0.089 | 87 |
| Caisson drilling | | 0.089 | 87 |
| Loaded trucks | | 0.076 | 86 |
| Jackhammer | | 0.035 | 79 |
| Small bulldozer | | 0.003 | 58 |

*RMS velocity in decibels, VdB re 1 micro-in/sec

#### 3a. Damage Assessment

Assess for building damage for each piece of equipment individually. Construction vibration is generally assessed in terms of peak particle velocity (PPV), as described in Section 5.1.

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- Determine the vibration source level ($PPV_{ref}$) for each piece of equipment at a reference distance of 25 ft as described above and in Table 7-4.
- Use Eq. 7-2 to apply the propagation adjustment to the source reference level to account for the distance from the equipment to the receiver. Note that the equation is based on point sources with normal propagation conditions.

$$PPV_{equip} = PPV_{ref} \times (\frac{25}{D})^{1.5} \qquad \text{Eq. 7-2}$$

where:

$PPV_{equip}$ = the peak particle velocity of the equipment adjusted for distance, in/sec
$PPV_{ref}$ = the source reference vibration level at 25 ft, in/sec
$D$ = distance from the equipment to the receiver, ft

**3b. Annoyance Assessment**

Assess for annoyance for each piece of equipment individually. Ground-borne vibration related to human annoyance is related to rms velocity levels, expressed in VdB as described in Section 5.1.

Estimate the vibration level ($L_v$) using Eq. 7-3.

$$L_{v.distance} = L_{vref} - 30log(\frac{D}{25}) \qquad \text{Eq. 7-3}$$

where:

$L_{v.distance}$ = the rms velocity level adjusted for distance, VdB
$L_{vref}$ = the source reference vibration level at 25 ft, VdB
$D$ = distance from the equipment to the receiver, ft

## Step 4: Assess Construction Vibration Impact

*Compare the predicted vibration levels from the Quantitative Construction Vibration Assessment with impact criteria to assess impact from construction vibration.*

Assess potential damage effects from construction vibration for each piece of equipment individually. Note that equipment operating at the same time could increase vibration levels substantially, but predicting any increase could be difficult. The criteria presented in this section should be used during the environmental impact assessment phase to identify problem locations that must be addressed during the engineering phase.

Compare the PPV and approximate $L_v$ for each piece of equipment determined in Section 7.2, Step 3 to the vibration damage criteria in Table 7-5, which is presented by building/structural category, to assess impact.[70][71] The approximate rms vibration velocity levels were calculated from the PPV limits using a crest factor of 4.

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**Table 7-5 Construction Vibration Damage Criteria**

| Building/ Structural Category | PPV, in/sec | Approximate $L_v$* |
|---|---|---|
| I. Reinforced-concrete, steel or timber (no plaster) | 0.5 | 102 |
| II. Engineered concrete and masonry (no plaster) | 0.3 | 98 |
| III. Non-engineered timber and masonry buildings | 0.2 | 94 |
| IV. Buildings extremely susceptible to vibration damage | 0.12 | 90 |

*RMS velocity in decibels, VdB re 1 micro-in/sec

Compare the $L_v$ determined in Section 7.2, Step 3 to the criteria for the General Vibration Assessment in Section 6.2 to assess annoyance or interference with vibration-sensitive activities due to construction vibration.

## Step 5: Determine Construction Vibration Mitigation Measures

*Evaluate the need for mitigation and select appropriate mitigation measures where potential human impacts or building damage from construction vibration have been identified according to Section 7.2, Step 4.*

**5a.** Determine the appropriate approach for construction vibration mitigation considering equipment location and processes.

- **Design considerations and project layout**
  - Route heavily-loaded trucks away from residential streets. Select streets with the fewest homes if no alternatives are available.
  - Operate earth-moving equipment on the construction lot as far away from vibration-sensitive sites as possible.

- **Sequence of operations**
  - Phase demolition, earth-moving, and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration level produced could be substantially less when each vibration source operates separately.
  - Avoid nighttime activities. Sensitivity to vibration increases during the nighttime hours in residential neighborhoods.

- **Alternative construction methods**
  - Carefully consider the use of impact pile-driving versus drilled piles or the use of a sonic/vibratory pile driver or push pile driver where those processes might create lower vibration levels if geological conditions permit their use.
    - Pile-driving is one of the greatest sources of vibration associated with equipment used during construction of a project. The source levels in Table 7-4 indicate that sonic pile drivers may provide substantial reduction of vibration levels compared to impact pile drivers. But, there are some additional vibration effects of sonic pile drivers that may limit their use in sensitive locations.
    - A sonic pile driver operates by continuously shaking the pile at a fixed frequency, literally vibrating it into the ground. Continuous operation at a fixed frequency may, however, be more



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noticeable to nearby residents, even at lower vibration levels. Furthermore, the steady-state excitation of the ground may induce a growth in the resonant response of building components. Resonant response may be unacceptable in cases of fragile buildings or vibration-sensitive manufacturing processes. Impact pile drivers, however, produce a high vibration level for a short time (0.2 seconds) with sufficient time between impacts to allow any resonant response to decay.

- Select demolition methods involving little to no impact, where possible. For example, sawing bridge decks into sections that can be loaded onto trucks results in lower vibration levels than impact demolition by pavement breakers. Milling generates lower vibration levels than excavation using clam shell or chisel drops.
- Avoid vibratory rollers and packers near sensitive areas.

**5b.** Describe and commit to a mitigation plan that will be developed and implemented during the engineering and construction phase when the information available during the project development phase will not be sufficient to define specific construction vibration mitigation measures. The objective of the plan should be to minimize construction vibration damage using all reasonable and feasible means available. The plan should include the following components:

- A procedure for establishing threshold and limiting vibration values for potentially affected structures, based on an assessment of each structure's ability to withstand the loads and displacements due to construction vibrations
- A commitment to develop a vibration monitoring plan during the engineering phase and to implement a compliance monitoring program during construction

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SECTION 8

# Documentation of Noise and Vibration Assessment

The level of required documentation is determined according to the project class of action. Section 2.1 covers the appropriate class of action (EIS, EA, or CE) for different projects. If there is uncertainty in the appropriate level of documentation, contact the FTA Regional office.

The noise and vibration analysis must be articulated to the public in a clear, comprehensive manner for all levels of documentation. The technical data and information necessary to withstand scrutiny in the environmental review process must be documented in a way that remains intelligible to the public. Justification for all assumptions used in the analysis, such as selection of representative measurement sites and all baseline conditions, must be presented for review.

A separate technical report or memorandum is often prepared as a supplement to the environmental document. A technical report is appropriate in cases when including the data from the assessment would create an unreasonably long environmental document. The details of the analysis are important for establishing the basis for the assessment. Therefore, all details in the technical report should be contained in a well-organized format for easy access to the information.

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For large-scale projects, the environmental document should contain a summary of the essential analysis information to provide subject matter context and the analysis findings. For these projects, separate technical reports are usually prepared as supplements to the EIS or EA and referred to in the environmental document. For smaller projects, or projects with minimal noise or vibration impact, all of the technical information may be presented in the environmental document itself or in a technical memorandum. Other projects might have no potential for noise or vibration impacts. For those projects, that environmental documentation should explain that no noise or vibration impacts are expected.

This section provides guidance on presenting the necessary noise and vibration information in the environmental document (Section 8.1) and the associated technical report (Section 8.2).

## 8.1 Environmental Document

In the environmental document, provide a summary of the comprehensive noise and vibration information from the technical report and emphasize the salient points of the analysis in a format and style that the public can understand. Smaller projects may have all of the technical information contained within the environmental document, so take special care in summarizing the technical details to convey the information adequately.

## Step 1: Choose the Information to Include

*Choose the appropriate noise and vibration analysis information to include based on the level of environmental review and the associated documentation.*

**1a. Provide full disclosure of noise and vibration impacts** in the environmental document, including identification of locations where impacts cannot be mitigated below the severe impact level. In general, an EIS describes significant impacts and plans to mitigate the impacts. For EAs, completion of the environmental review with a finding of no significant impact (FONSI) may depend on mitigation being considered for incorporation in the proposed project. The way mitigation is presented in the environmental document depends on the type of impact (noise or vibration) and the stage of project development and environmental review. Projects that meet the criteria of a CE may also require the completion of a noise and/or vibration analysis, and the results of such an analysis should be documented in a noise memo or the CE documentation.

**1b. Document noise impacts** – Typically, airborne noise impacts can be accurately predicted during the environmental review. For projects that focus on a single alternative, noise impacts can be accurately identified in the draft environmental document. If mitigation is anticipated, then mitigation options should be explored in the EA or draft EIS; firm decisions on mitigation can be deferred to the final document. But for all projects, decisions on noise mitigation should be made before the final document is approved.

**1c. Document vibration impacts** – Predicting vibration impacts accurately is more complex because ground-borne vibration may be strongly influenced by subsurface conditions. The geotechnical studies that reveal these conditions are normally undertaken during the engineering phase, after the environmental review process is complete. Therefore, the final environmental document will usually not be able to state with certainty whether mitigation is needed for ground-borne vibration and noise.

If the engineering phase is conducted at the same time as the final environmental document, report the results of the Detailed Vibration Analysis in the final environmental document. If the engineering phase is conducted after the final environmental document, report the results of the General Vibration Assessment in the final environmental document. If impact is determined, include a commitment in the final document to conduct a Detailed Vibration Analysis during the engineering phase to complete the impact assessment. Also, include a discussion on various control measures that could be used and the likelihood that the criteria could be met through the use of one or more of the measures. It may be possible to state a commitment in the final environmental document to adhere to the impact criteria for the Detailed Vibration Analysis, while deferring the selection of specific vibration control measures until the completion of detailed studies in the engineering phase. When work is conducted after FTA signs its final decision document (i.e., ROD, combined FEIS/ROD, or FONSI), additional documentation, such as a reevaluation of the previous decision, may be necessary. FTA recommends contacting the FTA Regional office directly in these situations.



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**1d. Describe mitigation measures in the decision document** – After the decision document is approved, incorporate the mitigation measures by reference in the actual grant agreements signed by FTA and the project sponsor. The mitigation measures then become contractual conditions that must be adhered to by the project sponsor.

It is typically appropriate to include the following noise and vibration information in the environmental document, as described in Section 8.1:

- The existing conditions (affected environment)
- The direct impacts from operation (environmental consequences)
- The construction impacts (environmental consequences)

## Step 2: Organize information in the Environmental Document

*Include information in the following sections of the environmental document separating out the noise and vibration information.*

**2a. Existing Conditions (Affected Environment)** – Describe the existing conditions (conditions without the project) in terms of the existing noise and vibration conditions in this section of the document. The primary function of this section is to establish the focus and baseline conditions for the discussion of environmental impacts. Include the following basic information and separate the noise and vibration sections.

- **Description of noise/vibration metrics, effects and typical levels** – Include a targeted summary of relevant information from Section 3 of this manual. This will serve as background for the discussions of noise/vibration levels and characteristics that will follow in later sections. Provide illustrative material to convey typical levels to the public.

- **Inventory of noise/vibration-sensitive sites** – Describe the approach for identifying noise- and vibration-sensitive sites as well as the identified sites and site descriptions. Use sufficient detail to demonstrate completeness. Document these results on a map.

- **Noise/vibration measurements** – Document the basis for selecting measurement sites, including tables of sites coordinated with maps showing locations of sites. Summarize the measurement approach and include the justification for the measurement procedures used.

  Present measurement data in well-organized tables and figures with a summary and interpretation of measured data. Measurements are often included in the table of measurement sites described in the previous paragraph. In some cases, measurements may be supplemented or replaced by collected data relevant to the noise and vibration characteristics of the area. For example, soil information for estimating ground-borne vibration propagation characteristics may be available from other projects in the area.



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A summary and interpretation of how the collected data define the project setting is fundamental to this section.

**2b. Direct Impacts** – Include the following in the discussion on direct impacts due to project operation:

- **Overview of approach** – Provide a targeted summary of relevant information on the assessment procedure for determining noise/vibration impacts as a framework for the following sections.

- **Estimated noise/vibration levels** – Provide a general description of prediction models used to estimate project noise/vibration levels. Describe any distinguishing features unique to the project, such as source levels associated with various technologies.

  Describe the results of the predictions in general terms first, followed by a detailed accounting of predicted noise levels. Supplement this information with tables and illustrate by contours, cross-sections, or shaded mapping. If contours are included in a technical report, it is not necessary to repeat them in this section.

- **Criteria for noise/vibration impact** – Describe the impact criteria for the project in detail and reference the appropriate section in this manual. Include tables listing the criteria levels or the figures included in this manual.

- **Noise/vibration impact assessment** – Present the impact assessment in its own section or combined with the section above.

  Describe the locations, as identified in the screening procedure, where noise/vibration impact is expected to occur without implementation of mitigation measures, based on the screening results, predicted future levels, existing levels, and application of the impact criteria.

  Include inventory tables of impacted noise- and vibration-sensitive sites to quantify the impacts for all noise/vibration-sensitive sites included in the Affected Environment (Existing Conditions) as described in the Existing Conditions section above.

- **Noise/vibration mitigation measures** – Perhaps the greatest difference between the technical report and the environmental document is with mitigation. The technical report discusses mitigation options and recommendations, while the environmental document provides the vehicle for reaching decisions on appropriate mitigation measures.

  Begin this section with a summary of the noise/vibration mitigation measures considered for the impacted locations. Describe the specific measures selected for implementation in detail. Also, include any

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applicable, specific noise or vibration policies the project sponsor may have in place.

In cases where it is not possible to commit to a specific mitigation measure in the final environmental document, it may be possible to commit to a certain noise/vibration level. For example, the environmental document could include a commitment to meet or exceed the impact criteria specified in Sections 4.1 and 6.2.

- **Unavoidable adverse environmental effects** – If it is projected that adverse noise/vibration impacts will result after all reasonable abatement measures have been incorporated, identify these impacts in this section.

**2c. Construction Impacts** – Discuss construction impacts in the environmental document's section on construction impacts, if present. If, because of the scale of the project, the environmental document does not have a separate construction impacts section, then the construction impacts should be discussed with the rest of the resource impacts.

When a special section on construction noise/vibration impacts is included in the document, it should be organized according to the comprehensive outline on long-term impacts described above. For projects with relatively minor effects, include a brief summary of impact.

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## 8.2 Technical Report on Noise and Vibration

The technical report is intended to present complete technical data and descriptions in a manner that can be understood by the general public, but is more technical than the information found in the environmental document. All necessary background information should be present in the technical report, including tables, maps, charts, drawings, and references that may be too detailed for the environmental document, but which are important in helping to draw conclusions about the project's noise and vibration impacts and mitigation options.

Include the following major subject headings and key information described below. If both noise and vibration have been assessed, include separate sections for noise and vibration with subsections for key information as described below. Additional details on documentation requirements for the technical report of non-standard procedures and methodologies are included in Appendix G.

- **Overview** – Include a brief description of the project and an overview of the noise/vibration concerns to highlight initial considerations in framing the scope of the study.

- **Inventory of Noise/Vibration-Sensitive Sites** – Describe the approach for identifying noise- and vibration-sensitive sites as well as the identified sites and site descriptions. Use sufficient detail to demonstrate completeness. Document results on a map.

- **Measurements of Existing Noise/Vibration Conditions**
  - Document the basis for selecting measurement sites, including tables of sites coordinated with maps showing locations of sites. Summarize the measurement approach with justification for the measurement procedures used.
  - If the measurement data are used to estimate existing conditions at other locations, include the rationale and the method of estimation. Describe measurement procedures in detail.
  - Include tables of measurement instruments documenting manufacturer, type, serial number, and date of most recent calibration by authorized testing laboratory. Document measurement periods, including the time of day and length of time at each site to demonstrate adequate representation of ambient conditions.
  - Present measurement data in well-organized tables and figures with a summary and interpretation of measured data.

- **Additional Measurements Related to the Project** – Include detailed description of measurements and results for projects that require specialized measurements at noise- and vibration-sensitive sites. Examples include:
  - Outdoor-to-indoor noise level reduction of homes
  - Transmission of vibration into concert halls and recording studios
  - Special source-level characterization

- **Predictions of Noise/Vibration from the Project**
  - Describe the prediction model used to estimate future project conditions and specific data used as input to the models. Reference the appropriate section in this manual. Document any change or extension to the models recommended in this manual, so that the validity of the adjustments can be confirmed. See Appendix G for more information.
  - Describe in detail the modeled scenarios and why the scenarios were chosen.
  - Tabulate computed levels and illustrate by contours, cross-sections, or shaded mapping. Illustrate noise/vibration impacts with base maps at a scale with enough detail to provide reference for the location.

- **Noise/Vibration Criteria**
  - Describe the impact criteria for the project in detail and reference the appropriate section in this manual. Include tables specifying the criteria levels or the figures included in this manual.
  - If construction noise and/or vibration assessments were conducted, include the construction criteria in a separate section with the construction assessment details. See below for more information.

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- **Noise/Vibration Impact Assessment**
  - Describe the impact assessment according to the appropriate noise and/or vibration impact assessment sections in this manual.
  - If an alternatives analysis was conducted, present a resulting impact inventory for each alternative mode or alignment in a format that allows comparison among alternatives.
  - Tabulate the inventory according to the different types of affected noise- and vibration-sensitive sites. Present the results of the assessment both before and after mitigation.

- **Noise/Vibration Mitigation**
  - Begin this section with a summary of all treatments considered, including those not carried to final consideration.
  - Consider final candidate mitigation treatments separately and provide a description of the features of the treatment, including costs, expected benefit in reducing impacts, locations where the benefit would be realized, and a discussion of the practicality of alternative treatments.
  - Include enough noise and vibration impact information to allow the project sponsor and FTA to reach decisions on mitigation prior to issuance of an environmental decision document.

- **Construction Noise/Vibration Impacts**
  - Describe criteria adopted for construction noise or vibration if construction noise and/or vibration assessments were conducted.
  - Describe the method used for predicting construction noise or vibration and include inputs to the models such as equipment roster by construction phase, equipment source levels, assumed usage factors, and other assumed site characteristics.
  - Present predicted levels for noise- and vibration-sensitive sites and identify short-term impacts.
  - In cases where construction impacts are identified, discuss feasible abatement methods using enough detail to allow construction contract documents to include mitigation measures.

- **References** – Provide references for all criteria, approaches, and data used in the analyses, as well as other reports related to the project that may be relied on for information, e.g., geotechnical reports.

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# Appendix A: Glossary of Terms

Terminology used through the manual is defined in this appendix.[49][72]

| | |
|---|---|
| A-weighting | A standardized filter used to alter the sensitivity of a sound level meter with respect to frequency so that the instrument is less sensitive at low and high frequencies where the human ear is less sensitive. Abbreviated as dBA. |
| Absolute Noise Impact | Noise that interferes with activities independent of existing noise levels and is expressed as a fixed level threshold. |
| Accelerometer | A transducer that converts vibratory motion to an electrical signal proportional to the acceleration of that motion. |
| Ambient | The pre-project background noise or vibration level, which is often used interchangeably with "existing noise" in this manual. |
| Amplitude | Difference between the extremes of an oscillating signal. |
| Alignment | The horizontal location of a railroad or transit system as described by curved and tangent track. |
| At-grade | Tracks on the ground surface. |
| Automated Guideway Transit (AGT) | Guided steel-wheel or rubber-tired transit passenger vehicles operating singly or in multi-car trains with a fully automated system on fixed-guideways along an exclusive ROW. AGT includes personal rapid transit, group rapid transit, and automated people mover systems. |
| Auxiliaries | The term applied to a number of separately driven machines, operated by power from the main engine or electric generation. They include the air compressor, radiator fan, traction motor blower, and air conditioning equipment. |
| Ballast mat | A 2- to 3-inch-thick elastomer mat placed under the normal track ballast on top of a rigid slab or packed sub-grade. |
| Ballast | Granular material placed on the trackbed for the purpose of holding the track in line and at surface. |
| Bus Rapid Transit (BRT) | A type of limited-stop bus operation that relies on technology to help speed up the service. Buses can operate on exclusive transitways, high-occupancy-vehicle lanes, expressways, or ordinary streets. |
| Catenary | On electric railroad and LRT systems, the term describing the overhead conductor that is contacted by the pantograph or trolley, and its support structure. |
| Commuter rail | Conventional passenger railroad serving areas surrounding an urban center. Most commuter railroads utilize locomotive-hauled coaches, often in push-pull configuration. |
| Consist | The total number and type of cars, locomotives, or transit vehicles in a trainset. |
| Continuous welded rail | A number of rails welded together to form unbroken lengths of track without gaps or joints. |
| Corrugated rail | A rough condition of alternating ridges and grooves which develops on the rail head in service. |
| Crest factor | The ratio of peak particle velocity to maximum RMS amplitude in an oscillating signal. |
| Criteria | Plural form of "criterion," the relationship between a measure of exposure (e.g., sound or vibration level) and its corresponding effect. |
| Cross tie | The transverse member of the track structure to which the rails are spiked or otherwise fastened to provide proper gage and to cushion, distribute, and transmit the stresses of traffic through the ballast to the trackbed. |
| Crossover | Two turnouts with the track between the frogs arranged to form a continuous passage between two nearby and generally parallel tracks. |
| Cumulative | The summation of individual sounds into a single total value related to the effect over time. |
| Cut | A terrain feature typically created to allow for a trackbed to be at a lower level than the surrounding ground. |



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| | |
|---|---|
| dB | See Decibel. |
| dBA | See A-weighting. |
| Decibel | The standard unit of measurement for sound pressure level and vibration level. Technically, a decibel is the unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm of this ratio. Abbreviated as dB. |
| DMU | Diesel-powered multiple unit. See Multiple Unit. |
| DNL | See $L_{dn}$. |
| Electrification | A term used to describe the installation of overhead wire or third rail power distribution facilities to enable operation of trains. |
| Embankment | A bank of earth, rock, or other material constructed above the natural ground surface. |
| Equivalent level | The level of a steady sound, which, in a stated time period and at a stated location, has the same sound energy as the time-varying sound. Also, written as $L_{eq}$. |
| Event | A passby of a vehicle (e.g., train, bus, or car) of any size consist. |
| Ferry boat | A transit mode comprised of vessels to carry passengers and/or vehicles over a body of water. |
| Fixed-guideway | A public transportation facility with a separate ROW for the exclusive use of public transportation and other high-occupancy vehicles. |
| Flange | The vertical projection along the inner rim of a wheel that serves, together with the corresponding projection of the mating wheel of a wheel set, to keep the wheel set on the track. |
| Floating slab | A special track support system for vibration isolation, consisting of concrete slabs supported on resilient elements, usually rubber or similar elastomer. |
| Force density | Force density is the force per root distance along the track in $lb/ft^{1/2}$. The force density level is the level in decibels of the force density relative to 1 $lb/ft^{1/2}$ and describes the vehicle force that excites the soil/rock surrounding the transit structure. |
| Frequency | The number of times that a periodically occurring quantity repeats itself in a specified period. With reference to noise and vibration signals, the number of cycles per second. |
| Frequency spectrum | Distribution of frequency components of a noise or vibration signal. |
| Frog | A track structure used at the intersection of two running rails to provide support for wheels and passageways for their flanges, thus permitting wheels on either rail to cross the other. |
| Gage (of track) | The distance between the rails on a track. |
| Grade crossing | The point where a rail line and a motor vehicle road intersect at the same vertical elevation. |
| Guideway | Supporting structure to form a track for rolling or magnetically-levitated vehicles. |
| Head-End Power (HEP) | A system of furnishing electric power for a complete railway train from a single generating plant in the locomotive. |
| Heavy rail | See Rail Rapid Transit. |
| Hertz (Hz) | The unit of acoustic or vibration frequency representing cycles per second. |
| Hourly average sound level | The time-averaged A-weighted sound level, over a 1-hour period, usually calculated between integral hours. Abbreviated as $L_{(1h)}$. |
| Hybrid Bus | A rubber-tired vehicle that features a hybrid diesel-electric propulsion system. A diesel engine runs an electric generator that powers the entire vehicle including electric drive motors that deliver power to the wheels. |
| Idle | The speed at which an engine runs when it is not under load. |
| Intermediate Capacity Transit (ICT) | A transit system with less capacity than rail rapid transit (RRT), but more capacity than typical bus operations. Examples of ICT include bus rapid transit (BRT), automated guideway transit (AGT), monorails, and trolleys. |
| Intermodal facility | Junction of two or more modes of transportation where transfers may occur. |
| Jointed rail | A system of joining rails with steel members designed to unite the abutting ends of contiguous rails. |



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|---|---|
| $L_{(1h)}$ | See Hourly Average Sound Level. |
| $L_{dn}$ | Day-Night Sound Level. The sound exposure level for a 24-hour day calculated by adding the sound exposure level obtained during the daytime (7 a.m. to 10 p.m.) to 10 times the sound exposure level obtained during the nighttime (10 p.m. to 7 a.m.). This unit is used throughout the United States for environmental impact assessment. Also, written as DNL. |
| $L_{eq(1hr)}$ | Equivalent Sound Level. The metric for cumulative noise exposure over a specific time interval is the equivalent sound level |
| Light Rail Transit (LRT) | A mode of public transit with tracked vehicles in multiple units operating in mixed traffic conditions on streets as well as sections of exclusive ROW. Vehicles are generally powered by electricity from overhead lines. |
| Locomotive | A self-propelled, non-revenue rail vehicle designed to convert electrical or mechanical energy into tractive effort to haul railway cars. See also Power Unit. |
| Main line | The principal line or lines of a railway. |
| Maglev | Magnetically-levitated vehicle; a vehicle or train of vehicles with guidance and propulsion provided by magnetic forces. Support can be provided by either an electrodynamic system wherein a moving vehicle is lifted by magnetic forces induced in the guideway or an electromagnetic system wherein the magnetic lifting forces are actively energized in the guideway. |
| Maximum sound level | The highest exponential-time-average sound level, in decibels, that occurs during a stated time period. Abbreviated as $L_{max}$. The standardized time periods are 1 second for $L_{max,}$ slow, and 0.125 second for $L_{max,}$ fast. |
| Metric | Measurement value or a quantitative descriptor used to identify a specific measure of sound level. |
| Monorail | Guided transit vehicles operating on or suspended from a single rail, beam, or tube. |
| Multimodal Project | In this manual, the term multimodal project is used to describe a project that includes changes to both transit and highway components in segments of the project. |
| Multiple Unit (MU) | A term referring to the practice of coupling two or more diesel-powered or electric-powered passenger cars together with provision for controlling the traction motors on all units from a single controller. |
| Noise | Any disagreeable or undesired sound or other audible disturbance. |
| Octave band | A standardized division of a frequency spectrum in which the interval between two divisions is a frequency ratio of 2. |
| One-third octave band | A standardized division of a frequency spectrum in which the octave bands are divided into thirds for more detailed information. The interval between center frequencies is a ratio of 1.25. |
| Pantograph | A device for collecting current from an overhead conductor (catenary), consisting of a jointed frame held up by springs or compressed air and having a current collector at the top. |
| Park-and-ride facility | A parking garage and/or lot used for parking passengers' automobiles while they use transit agency facilities and vehicles. |
| Peak factor | See Crest factor. |
| Plan-and-profile | Mapping used by transportation planners that shows two-dimensional plan views (x- and y- axes) on the same page as two-dimensional profiles (x- and z-axes) of a road or track. |
| Peak Particle Velocity (PPV) | The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States. |
| Peak-to-Peak (P-P) Value | Of an oscillating quantity, the algebraic difference between the extreme values of the quantity. |
| Power unit | A self-propelled vehicle, running on rails and having one or more electric motors that drive the wheels and thereby propel the locomotive and train. The motors obtain electrical energy either from a rail laid near, but insulated from, the track rails, or from a wire suspended above the track. Contact with the overhead wire is made by a pantograph mounted on top of the unit. |
| Project segment | Portions of a project with similar characteristics. |



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|---|---|
| Pure tone | Sound of a single frequency. |
| Radius of curvature | A measure of the severity of a curve in a track structure based on the length of the radius of a circle that would be formed if the curve were continued. |
| Rail | A rolled steel shape, commonly a T-section, designed to be laid end to end in two parallel lines on cross ties or other suitable supports to form a track for railway rolling stock. |
| Rail Rapid Transit (RRT) | Often called "Heavy Rail Transit." A mode of public transit with tracked vehicles in multiple units operating in exclusive rights-of-way. Trains are generally powered by electricity from a third rail alongside the track. |
| Receiver | A stationary far-field position at which noise or vibration levels are specified. |
| Relative Noise Impact | Noise increase above existing levels. |
| Resonance frequency | The phenomenon that occurs in a structure under conditions of forced vibration such that any change in frequency of excitation results in a decrease in response. |
| Right-of-Way | Abbreviated as ROW. Lands or rights used or held for railroad or transit operation. |
| Root Mean Square (rms) | The square root of the mean-square value of an oscillating waveform, where the mean-square value is obtained by squaring the value of amplitudes at each instant of time and then averaging these values over the sample time. |
| RMS Velocity Level (LV) | See Vibration Velocity Level. |
| SEL | See Sound Exposure Level. |
| Sound Exposure Level | The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second. Abbreviated as SEL. |
| Sound | A physical disturbance in a medium that is capable of being detected by the human ear. |
| Spectrum | See Frequency Spectrum. |
| Sub-ballast | Any material of a superior character, which is spread on the finished subgrade of the roadbed and below the top-ballast, to provide better drainage, prevent upheaval by frost, and better distribute the load over the roadbed. |
| Subgrade | The finished surface of the roadbed below the ballast and track. |
| Suburban bus | A bus similar to an intercity bus with high-backed seats but no luggage compartment, often used in express mode to city centers from suburban locations. |
| Switch | A track structure used to divert rolling stock from one track to another. |
| Tangent track | Track without curvature. |
| Track | An assembly of rail, ties, and fastenings over which cars, locomotives, and trains are moved. |
| Traction motor | A specially designed direct current series-wound motor mounted on the trucks of locomotives and self-propelled cars to drive the axles. |
| Trainset | A group of coupled cars including at least one power unit. |
| Transducer | Device designed to receive an input signal of a given kind (motion, pressure, heat, etc.) and to provide an output signal of a different kind (electrical voltage, amperage, etc.) in such a manner that desired characteristics of the input signal appear in the output signal for measurement purposes. |
| Transfer mobility | Transfer mobility is the complex velocity response produced by a point force as a function of frequency and represents the relationship between a vibration source that excites the ground and the resulting vibration of the ground surface. |
| Transit center | A fixed location where passengers interchange from one route or vehicle to another. |
| Trolley bus | A rubber-tired, electrically-powered bus operating on city streets drawing power from overhead lines. |
| Truck | The complete assembly of parts including wheels, axles, bearings, side frames, bolster, brake rigging, springs, and all associated connecting components, the function of which is to provide support, mobility, and guidance to a railroad car or locomotive. |
| Trunk line | See Mainline. The mainline of a commuter railroad where the branch line traffic is combined. |



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|---|---|
| Turnout | An arrangement of a switch and a frog with closure rails, by means of which rolling stock may be diverted from one track to another. |
| VdB | See Vibration Velocity Level. |
| Vibration Velocity Level (LV) | Ten times the common logarithm of the ratio of the square of the amplitude of the RMS vibration velocity to the square of the amplitude of the reference RMS vibration velocity. The reference velocity in the United States is one micro-inch per second. Abbreviated as VdB. |
| Vibration | An oscillation wherein the quantity is a parameter that defines the motion of a mechanical system. |
| Wheel flat | A localized flat area on a steel wheel of a rail vehicle, usually caused by skidding on steel rails, causing a discontinuity in the wheel radius. |
| Wheel squeal | The noise produced by wheel-rail interaction, particularly on curves where the radius of curvature is smaller than allowed by the separation of the axles in a wheel set. |

Additional, relevant acoustic terminology and formulas are defined in ANSI S1.1-1994 (49).

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# Appendix B: Fundamentals of Noise

Noise is generally considered to be unwanted sound. Sound is what we hear when our ears are exposed to small pressure fluctuations in the air. There are many ways in which pressure fluctuations are generated, but typically they are caused by vibrating movement of a solid object. This manual uses the terms noise and sound interchangeably because there is no physical difference between them. Noise can be described in terms of three variables: amplitude (loud or soft); frequency (pitch); and time pattern (variability).

## B.1 Amplitude

The loudness of a sound is described by the sound wave's amplitude of pressure fluctuations above and below atmospheric pressure. Pressure is measured in Pascals. The mean value of the positive and negative pressure fluctuations is the static atmospheric pressure and is not a useful metric of sound. However, the effective magnitude of the sound pressure in a sound wave can be expressed by the rms of the oscillating pressure. See Figure B-1 for an illustration of the rms pressure.

The rms pressure is calculated according to Eq. B-1. The values of sound pressure are squared and time-averaged to smooth out variations. The rms pressure is the square root of this time-averaged value.

$$P_{rms} = \sqrt{\frac{1}{N}\sum_{i=1}^{N} P_i^2} \qquad \textbf{Eq. B-1}$$

where:

$P_{rms}$ = sound pressure
$P_i$ = individual sound pressure
$N$ = number of samples
$i = 1$ = index of summation

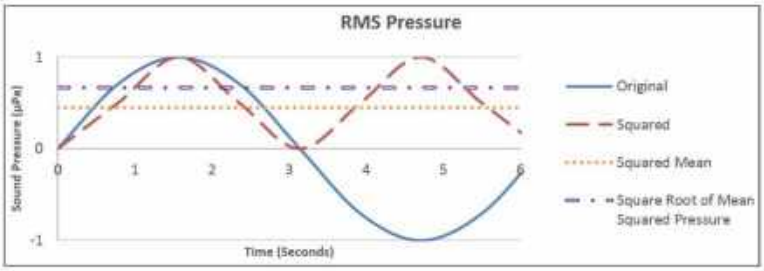


**Figure B-1 RMS Pressure Illustration**

Most humans with typical or average hearing can perceive sounds ranging from approximately 20 microPascals to 20 million microPascals or more. Because of the difficulty in dealing with such an extreme range of numbers, acousticians use a logarithmic scale to describe sound levels. Acousticians use a compressed scale based on logarithms of the ratios of the sound energy contained in the wave related to the square of sound pressures instead of the sound pressures themselves, resulting in the "sound pressure level" in decibels (dB). The 'B' in dB is always capitalized because the unit is named after Alexander Graham Bell, a leading 19th century innovator in communication.



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Sound pressure level ($L_p$) is defined as:

$$L_p = 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}); or$$

$$L_p = 20log_{10}(\frac{P_{rms}}{P_{ref}})\ dB \qquad \textbf{Eq. B-2}$$

where

$L_p$ = sound pressure level, dB
$P_{rms}$ = RMS sound pressure
$P_{ref}$ = 20 microPascals

Inserting the range of sound pressure values mentioned above into Eq. B-2 results in a typical quietest sound at 20 microPascals at 0 dB. A typical loudest sound of 20 million microPascals is 120 dB.

## B.1.1 Decibel Addition

The combination of two or more sound pressure levels at a single location requires decibel addition, which is the addition of logarithmic quantities of sound energy ($P^2_{rms}$).

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To add sound energy from multiple, unique sources, add the sound energy as shown Eq. B-3.

$$L_p = 10log_{10}(\frac{P_1{}^2 + P_2{}^2 + \cdots + P_n{}^2}{P_{ref}^2}) \qquad \textbf{Eq. B-3}$$

where

$L_p$ = sound pressure level, dB
$P_1, P_2, P_n$ = individual source RMS sound pressures to add
$P_{ref}$ = 20 microPascals

A doubling of identical sound sources results in a 3-dB increase, as shown mathematically below.

$$L_p = 10log_{10}(2\frac{p_{rms}^2}{p_{ref}^2})$$

$$= 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}) + 10log_{10}(2)$$

$$= 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}) + 3$$

To add decibel levels (instead of sound energy) use the following equation:

$$L_p = 10log_{10}(\sum_{i=1}^{N} 10^{(L_i/10)})$$

where

$L_p$ = sound pressure level, dB
$N$ = number of samples
$i$ = index of summation
$L_i$ = individual sound pressure levels, dB
$L_p$ = sound pressure level, dB
$L_1, L_2, L_n$ = individual source sound pressure levels to add

The equation above can be rewritten as follows:

$$L_p = 10log_{10}(10^{\frac{L_1}{10}} + 10^{\frac{L_2}{10}} + \cdots + 10^{\frac{L_n}{10}}) \quad \textbf{Eq. B-4}$$

where

$L_1, L_2, L_n$ = individual source sound pressure levels to add

Decibel addition can be quickly approximated using Figure B-2.

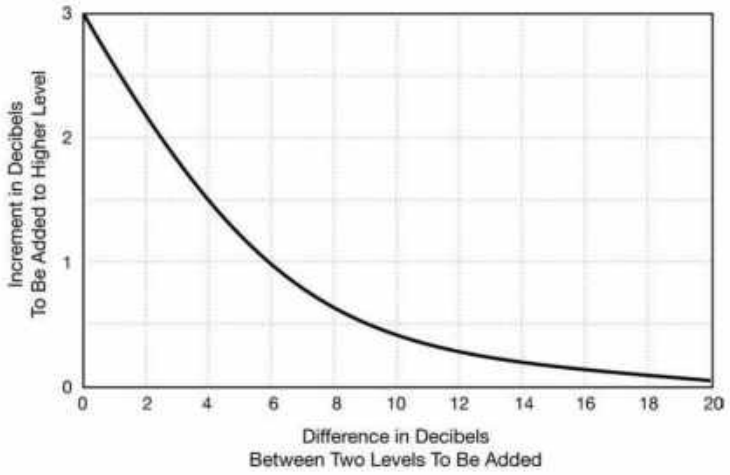


**Figure B-2 Graph for Approximate Decibel Addition**

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**Example B-1 Decibel Addition – Identical Buses**

**Decibel Addition**

What is the combined sound pressure level of two identical buses if the noise from one bus resulted in a sound pressure level of 70 dB?

Since a doubling of identical sound sources results in a 3-dB increase:

$$L_p = 70 + 3 = 73\ dB$$

**Example B-2 Decibel Addition – Two Sources**

**Decibel Addition**

What is the combined sound pressure level of 64 dB and 60 dB?

**Using Eq. B-4:**

$$L_p = 10log_{10}(10^{64/10} + 10^{60/10}) = 65.5\ dB$$

**Using Figure B-2:**
The x-axis values represent the difference between the two sound levels, 64 and 60 dB. The difference between the sound levels in this example is 4. The point on the curve corresponding to 4 on the x-axis is 1.5. The y-axis values represent the increment that is added to the higher level.

$$L_p = 64 + 1.5 = 65.5\ dB$$

## B.1.2 Frequency

Sound is a fluctuation of air pressure. The number of times the fluctuation occurs in one second is called its frequency. In acoustics, frequency is quantified in cycles per second, or Hertz (Hz). The hearing for a typical human covers the frequency range from 20 Hz to 20,000 Hz.

Some sounds, like whistles, are associated with a single frequency; this type of sound is called a pure tone. However, most often, noise is made up of many frequencies, called a spectrum. Analyzing a noise spectrum allows for identification of dominant frequency ranges and can assist in identifying noise sources. Often a frequency spectrum is divided into standardized frequency bands for analysis. Most commonly, the frequency bands for transit analyses are octave bands (where the interval between two divisions is a frequency ratio of 2) and one-third octave bands (where the interval between center frequencies is a ratio of 1.25).[73]

If the spectrum associated with a transit noise source is dominated by many low-frequency components, the noise will have a characteristic like the rumble of thunder; this is often associated with noise from a subway. Mid-range frequencies are often associated with wheel/rail noise, and high frequencies may be associated with wheel squeal due to sharp curves on a track.

The spectrum in Figure B-3 illustrates the full range of acoustical frequencies that can occur near a transit system. In this example, the noise spectrum was measured near a train on an elevated steel structure with a sharp curve.



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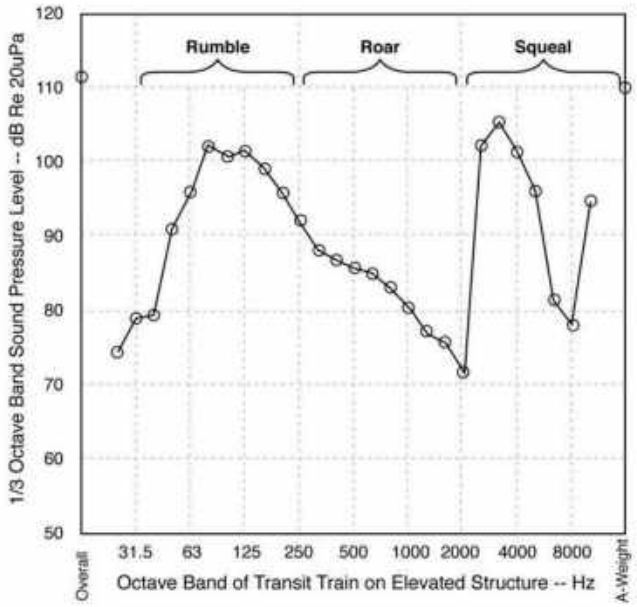


**Figure B-3 Noise Spectrum of Transit Train on Curve and Elevated Structure**

The human auditory system does not respond equally to all frequencies of sound. For sounds normally heard in our environment, low frequencies below 250 Hz and frequencies above 10,000 Hz are generally considered less audible than the frequencies in between. This is because our ears are less sensitive in those areas. To better represent human hearing, frequency response functions were developed to characterize the way people respond to different frequencies. These are referred to as A-, B-, and C-weighted curves and represent human auditory response to normal, very loud, and extremely loud sound levels, respectively. Environmental noise is generally considered to be in the normal sound level range; and, therefore, the A-weighted sound level is considered best to represent the human response.

The A-weighting curve is shown in Figure B-4. This curve illustrates that sounds at 50 Hz would have to be amplified by 30 dB to be perceived as loud as a sound at 1000 Hz at normal sound levels.



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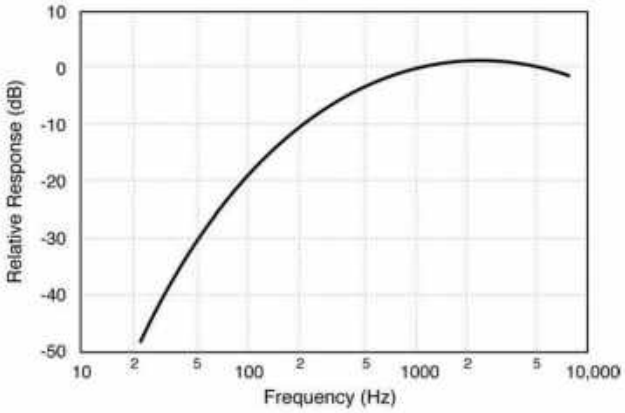


**Figure B-4 A-Weighting Curve**

Low frequencies have longer wavelengths of sound (cycles are less frequent) and, conversely, high frequencies have shorter wavelengths (cycles are more frequent). The size of the wavelength in feet is dependent on frequency and speed of sound as follows:

$$f\lambda = c \qquad \textbf{Eq. B-5}$$

where

$f$ = frequency in cycles per second, Hz
$\lambda$ = wavelength, ft
$c$ = speed of sound, ft/sec

The speed of sound in air varies with temperature; but at standard conditions, it is approximately 1000 ft per second. Therefore, at standard conditions, a frequency of 1000 Hz has a wavelength of 1 foot and a frequency of 50 Hz has a wavelength of 20 ft. The scale of these waves explains, in part, the reason humans perceive sounds of 1000 Hz better than those of 50 Hz. A wavelength of 1 foot is similar to the size of a person's head; whereas, a wavelength of 20 ft is similar to dimensions associated with a house, which is why low-frequency sounds (such as those from an idling locomotive) are sometimes not attenuated by walls and windows of a home. These sounds transmit indoors with relatively little reduction in strength.

## B.1.3 Time Pattern

The third important characteristic of noise is its variation in time. Environmental noise is considered to be a combination of all outdoor noise sources. When combined, sources such as distant traffic, wind in trees, and distant industrial or farming activities often create a low-level background noise in which no particular individual source is identifiable. Background noise is often relatively constant from moment to moment, but varies slowly over time as natural forces change or as human activity follows its daily cycle. In addition to this low-level, slowly varying background noise, a succession of identifiable noisy events of relatively brief duration may be added. These events may include single-vehicle passbys, aircraft flyovers,



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screeching of brakes, and other short-term events, which all cause the noise level to substantially fluctuate from moment to moment.

It is possible to describe these fluctuating noises in the environment using single-number metrics to allow for manageable measurements, computations, and impact assessment. The search for adequate single-number noise metrics has encompassed hundreds of attitudinal surveys and laboratory experiments in addition to decades of practical experience with many alternative metrics.

## B.1.4 Noise Metrics

The noise metrics referred to in this manual are described in the sections below.

### B.1.4.1 A-weighted Sound Level: The Basic Noise Unit

The basic noise unit for transit noise is the A-weighted sound level and is described in ANSI S1.1-1994 (49). It describes the noise level at the receiver at any moment in time and can be read directly from noise-monitoring equipment when frequency weighting is set to A-weighting. Figure B-5 shows examples of typical A-weighted sound levels for both transit and non-transit sources, ranging from approximately 30 dBA (very quiet) to 90 dBA (very loud).

The unit dBA denotes the decibel level is A-weighted. The letter "A" indicates that the sound has been filtered to reduce the strength of very low and very high-frequency sounds to emulate the human response to sound levels as described in Appendix B.1.2. This allows for events that are out of the range of human hearing, such as high-frequency dog whistles and low-frequency seismic disturbances, to be filtered out. On average, each A-weighted sound level increase of 10 dB corresponds to an approximate doubling of subjective loudness.

A-weighted sound levels are adopted as the basic noise unit for transit noise impact assessments because they:

- Can be measured easily,
- Approximate the human ear's sensitivity to sounds of different frequencies,
- Match attitudinal-survey tests of annoyance better than other basic units,
- Have been in use since the early 1930s, and
- Are endorsed as the proper basic unit for environmental noise by most agencies concerned with community noise throughout the world.

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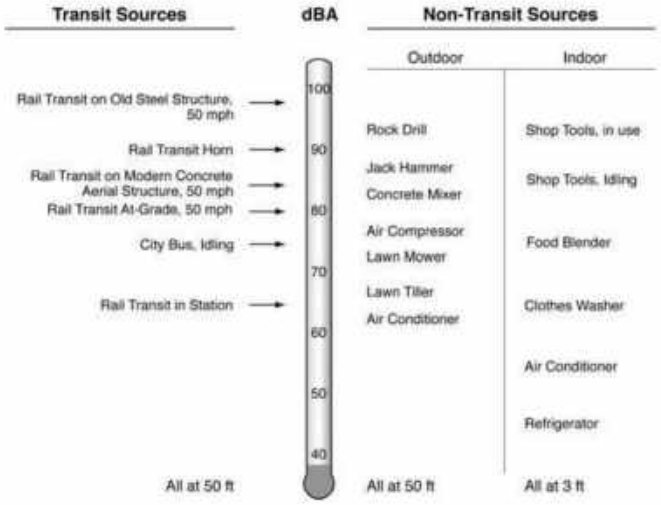


**Figure B-5 Typical A-weighted Sound Levels**

## B.1.4.2 Maximum Sound Level ($L_{max}$) During a Single Noise Event

As a transit vehicle approaches, passes by, and then recedes into the distance, the A-weighted sound level rises, reaches a maximum, and then fades into the background noise. The maximum A-weighted sound level reached during this passby is called the maximum sound level, [49] abbreviated here as $L_{max}$. $L_{max}$ is illustrated in Figure B-6 where time is plotted horizontally, and A-weighted sound level is plotted vertically.

Although $L_{max}$ is commonly used in vehicle-noise specifications,[xxi] it is not used for transit environmental noise impact assessment. $L_{max}$ does not include the number and duration of transit events, which are important for assessing people's reactions to noise. It also cannot be normalized to a one-hour or 24-hour cumulative measure of impact, and therefore, is not conducive to comparison among different transportation modes. For example, cumulative noise metrics commonly used in highway noise assessments are $L_{eq(1hr)}$ and $L_{10}$, the noise level exceeded for 10 percent of the peak hour.

[xxi] For noise compliance tests of transient sources, such as moving transit vehicles under controlled conditions with smooth wheel and rail conditions, $L_{max}$ is typically measured with the sound level meter's time weighting set to "fast." However, for tests of continuous or stationary transit sources, it is usually more appropriate to use the "slow" setting. When set to "slow," sound level meters ignore some of the very-transient fluctuations, which are negligible when assessing the overall noise level.



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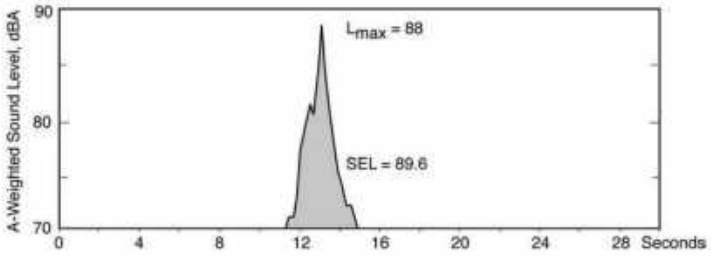


**Figure B-6 Typical Transit-Vehicle Passby**

## B.1.4.3 Sound Exposure Level (SEL): Exposure from a Single Noise Event

Sound exposure level, abbreviated here as SEL, is the cumulative noise exposure from a single noise event, normalized to one second (49). SEL contains the same overall sound energy as the actual varying sound energy during the event. It is the primary metric for the measurement of transit vehicle noise emissions and an intermediate metric in the measurement and calculation of both $L_{eq(1hr)}$ and $L_{dn}$. The SEL metric is A-weighted and is expressed in the unit dBA.

This concept is illustrated in Figure B-6 and Figure B-7 where the shaded regions are the sound exposure during and event. The example in Figure B-6 is a transit-vehicle passby and Figure B-7 is an example of a fixed-transit facility as a transit bus is started, warmed up, and then driven away. For this event, the noise exposure is large due to duration of the event.

SEL is an A-weighted cumulative measure that is referenced to one second. Louder events have greater SELs than quieter events, and events of longer duration have greater SELs than shorter events. This is generally consistent with community response to noise. Noise events of longer duration are considered more disruptive than events of shorter duration with equal maximum A-weighted sound levels.

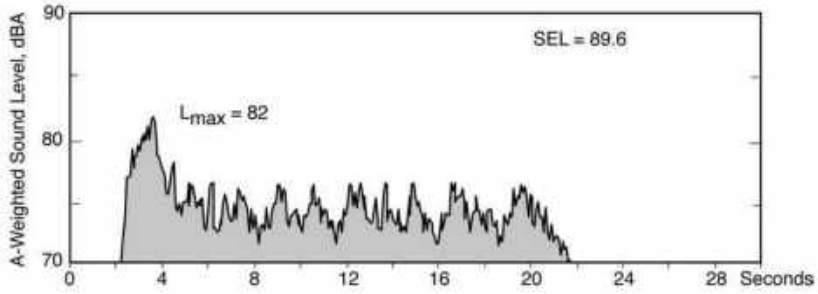


**Figure B-7 Typical Fixed-Facility Noise Event**



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Conceptually, the sound exposure level can be expressed as:

$$SEL = 10log_{10}(\frac{Total\ sound\ energy}{during\ the\ event})$$

Mathematically, the sound exposure level is computed as follows:

$$SEL = 10log_{10}(\sum_{i=1}^{N} 10^{(L_i/10)}) \qquad \textbf{Eq. B-6}$$

where

$SEL$ = Sound exposure level, dBA
$N$ = number of samples
$i$ = index of summation
$L_i$ = individual A-weighted sound level, dBA

The events shown in Figure B-6 and Figure B-7 are compared graphically in Figure B-8 using a logarithmic vertical scale. The shaded zones in these figures indicate noise exposure over time. The actual event shows the noise exposure over the time of the event, and the equivalent SEL shows the total noise exposure normalized to one second. Note that events 1 and 2 in Figure B-8 have different time periods and noise levels throughout the event, but the same resulting SEL.

SEL is used in transit noise analyses because it:

1. Accounts for both the duration and amplitude of an event,
2. Allows a uniform assessment method for both transit-vehicle passbys and fixed-facility noise events, and
3. Can be used to calculate the one-hour and 24-hour cumulative metrics for comparison across different transportation modes.

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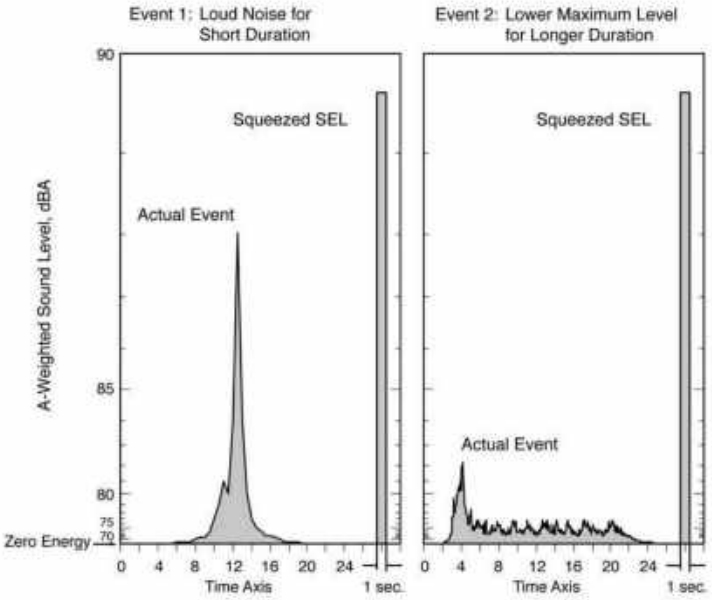


**Figure B-8 An Energy View of Noise Events**

## B.1.4.4 Equivalent Sound Level ($L_{eq(t)}$)

The metric for cumulative noise exposure over a specific time interval is the equivalent sound level (49). It is a single decibel value that accounts for total sound energy from all sound levels over a specified time interval (or time period). The time period associated with the equivalent sound level metric can vary for different types of analyses. This metric is abbreviated as $L_{eq(t)}$, where "t" is the duration of the time period. $L_{eq(t)}$ represents a hypothetical constant sound level and contains the same overall sound energy as the actual varying sound energy during the time period "t". For most transit noise analyses, an A-weighted, hourly equivalent sound level is used, abbreviated here as $L_{eq(1hr)}$. $L_{eq(1hr)}$ is expressed in the unit, dBA.

Figure B-9 shows examples of typical unmitigated hourly $L_{eq(1hr)}$'s, both for transit and non-transit sources ranging from 40 (quiet) to 80 dB (loud). Note that these $L_{eq(1hr)}$'s depend upon both the number of events during the hour as well as each event's duration, which is affected by vehicle speed. For example, doubling the number of events during the hour will increase the $L_{eq(1hr)}$ by 3 decibels, as will doubling the duration of each individual event.



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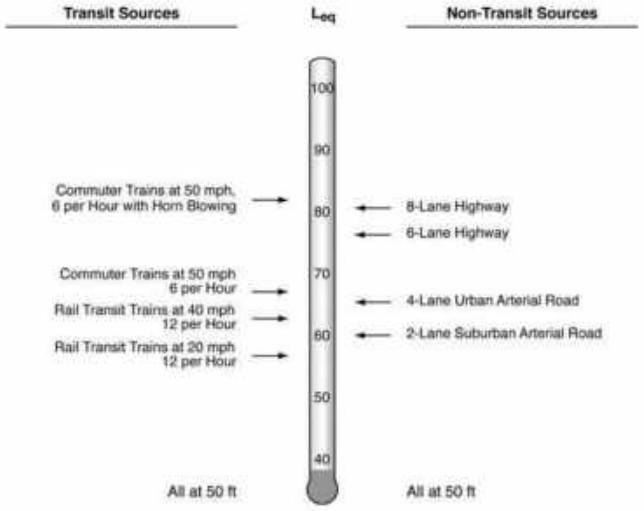


**Figure B-9 Typical Hourly $L_{eq(1hr)}$'s**

An example of sound levels over time for a single noise event such as a train passing on nearby tracks is illustrated in the top frame of Figure B-10. As the train approaches, passes by, and then recedes into the distance, the A-weighted sound level rises, reaches a maximum, and then fades into the background noise. The equivalent sound level is shown for three different time periods Figure B-10. The area under the curve in this top frame is the noise that reaches the receiver (noise exposure) over this five-minute period. The center frame of the figure shows sound levels over the one-hour period, including the five-minute period from the top frame. The area under the curve represents the noise exposure for one hour. The bottom frame shows sound levels over a full 24-hour period and is discussed in Appendix B.1.4.5.



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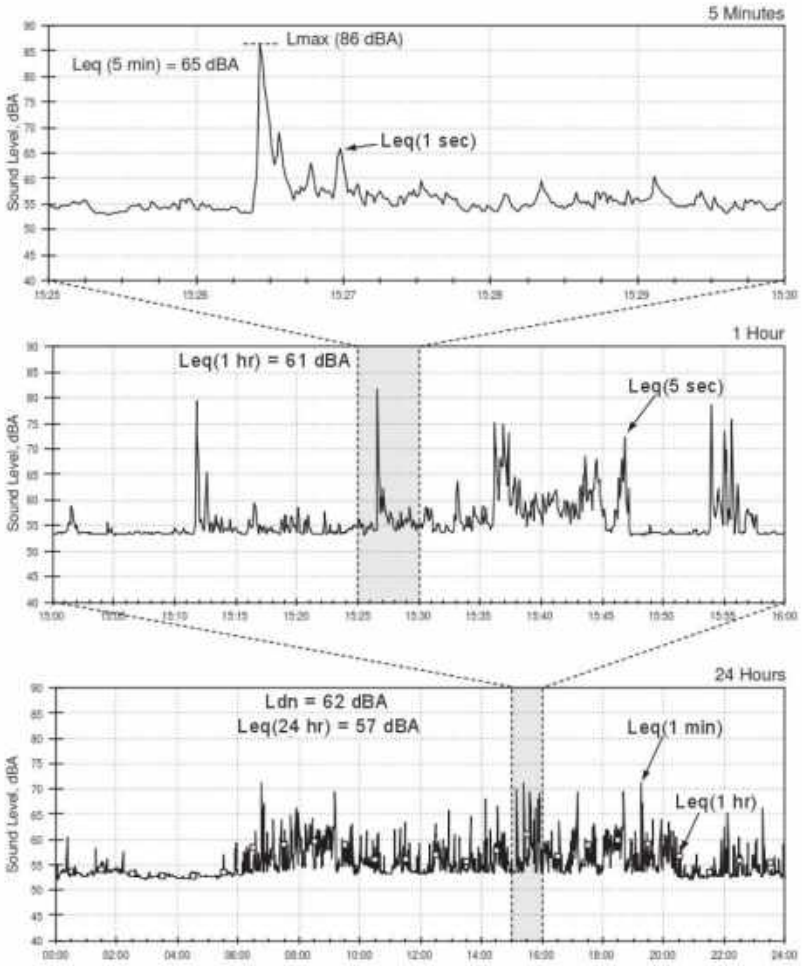


Typical A-weighted Sound Level Variation over a 24-Hour Period

**Figure B-10 Example A-weighted Sound Level Time Histories**

Conceptually, the equivalent sound level can be expressed as:

$$L_{eq}(t) = 10log_{10}(\frac{Total\ Sound\ Energy}{Time\ Period})$$

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Mathematically, the equation is as follows:

$$L_{eq}(t) = 10log_{10}(\frac{1}{T}\sum_{i=1}^{N} 10^{(L_i/10)})$$

where

$L_{eq(t)}$ = equivalent sound level of time period "t", dBA
$T$ = time period, sec (3600 for an hourly $L_{eq(1hr)}$)
$N$ = number of samples, sec (3600 for an hourly $L_{eq(1hr)}$)
$i$ = index of summation
$L_i$ = individual A-weighted sound level, dBA

The equation above can be rewritten as follows for a one-hour time period:

$$L_{eq}(1h) = 10log_{10}[Total\ Sound\ Energy\ in\ 1\ hr] - 35.6 \qquad \textbf{Eq. B-7}$$

where

35.6 = numerical adjustment for a time period of 1 hour ($10\log_{10}(t)$)

The sound energy is totaled over a full hour (3600 seconds) and is accumulated for all noise events during that hour. When computing the equivalent sound level for a time period other than one hour, T is modified in the equation to the duration of the time period in seconds. The numerical adjustment (35.6) accounts for time period of interest, in this case, one hour.

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An alternate way for computing $L_{eq(1hr)}$ for a series of transit-noise events using sound exposure levels can be expressed conceptually as follows:

$$L_{eq}(1h) = 10log_{10}(\frac{Energy\ Sum\ of}{all\ SELs}) - 35.6$$

Mathematically, the equation is as follows:

$$L_{eq}(t) = 10log_{10}(\frac{1}{T}\sum_{i=1}^{N} 10^{(SEL_i/10)}) \qquad \textbf{Eq. B-8}$$

where

$L_{eq(t)}$ = equivalent sound level of time period "t", dBA
$T$ = time period, sec (3600 for an hourly $L_{eq(1hr)}$)
$N$ = number of sample, sec (3600 for an hourly $L_{eq(1hr)}$)
$i$ = index of summation
$SEL$ = individual sound exposure level, dBA

Hourly $L_{eq(1hr)}$ is adopted as the measure of cumulative noise impact for non-residential land uses (those not involving sleep) because $L_{eq(1hr)}$:

- Correlates well with speech interference in conversation and on the telephone – as well as interruption of TV, radio, and music enjoyment;
- Increases with the duration of transit events;
- Accounts for the number of transit events over the hour, which is also important to people's reactions; and

- Is used by the Federal Highway Administration in assessing highway-traffic noise impact.(Thus, this noise metric can be used for directly comparing and contrasting highway, transit, and multimodal alternatives).

## B.1.4.5 Day-Night Sound Level ($L_{dn}$): 24-Hour Exposure from All Events

The metric for cumulative 24-hour exposure is the Day-Night Sound Level, [49] abbreviated here as $L_{dn}$. It is a single, A-weighted decibel value that accounts for total sound energy from all sound sources over 24 hours and is expressed in the unit, dBA. Events between 10 p.m. and 7 a.m. are increased by 10 dB to account for people's greater nighttime sensitivity to noise.

Figure B-11 shows examples of typical $L_{dn}$'s, both for transit and non-transit sources, ranging from 50 to 80 dB, where 50 is considered a quiet 24-hour period and 80 a loud 24-hour period. Note that these $L_{dn}$'s depend upon the number of events during day and night separately, including each event's duration, which is affected by vehicle speed.

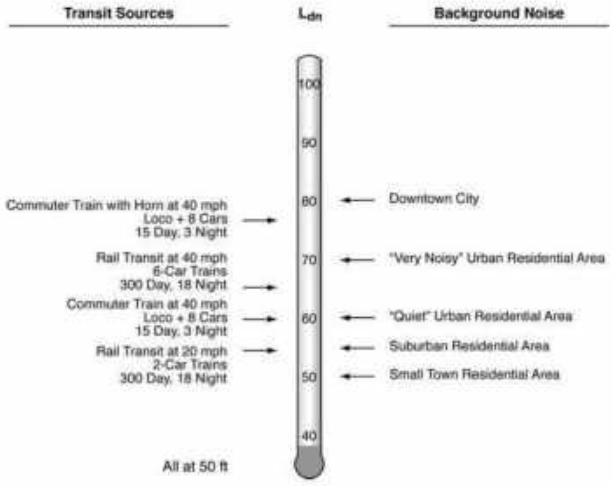


**Figure B- 11 Typical $L_{dn}$'s**

An example of sound level variation over 24 hours is visualized in the bottom frame of Figure B-10. The area under the curve represents the receiver's noise exposure over the 24 hours. Note that some vehicle passbys occur at night, when the background noise is typically lower and the 10 dB adjustment is applied.

Conceptually, the day-night level can be expressed as:

$$L_{dn} = 10log_{10}(\frac{Total\ Sound\ Energy_{Day}}{Time\ Period_{Day}\ (seconds)} + \frac{n_{adj,n} \times Total\ Sound\ Energy_{Night}}{Time\ Period_{Night}\ (seconds)})$$

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Mathematically, the equation is as follows:

$$L_{dn} = 10log_{10}\left(\frac{1}{T_d}\sum_{i=1}^{N} t_i \times 10^{(L_{d,i}/10)} + \frac{1}{T_n}\sum_{j=1}^{M} t_j \times 10^{((L_{n,j}+n_{adj,n})/10)}\right) \quad \textbf{Eq. B-9}$$

where

$L_{dn}$ = cumulative 24-hour exposure (day-night sound level), dBA
$T_d$ = time period during the daytime, between 7 a.m. and 10 p.m. sec (54,000)
$N$ = number of samples during the daytime (54,000)
$i$ = index of summation
$t_i$ = time interval of measurements in seconds (1)
$L_{d,i}$ = individual A-weighted sound level during the daytime, dBA
$T_n$ = time period during the nighttime, between 10 p.m. and 7 p.m. sec (32,400)
$M$ = number of samples during the nighttime (32,400)
$j$ = index of summation
$t_j$ = time interval of measurements, sec (1)
$L_{n,j}$ = individual A-weighted sound level during the nighttime, dBA
$n_{adj,n}$ = nighttime noise adjustment (10 dB)

The equation above can be rewritten as follows:

$$L_{dn} = 10log_{10}\left[\left(15 * Total\ Sound\ Energy_{Day}\right) + \left(9 * n_{adj,n} * Total\ Sound\ Energy_{Night}\right)\right] - 49.4$$

The sound energy is totaled over a full 24 hours, and the sound energy is accumulated from all noise events during that time period. The numerical adjustment (49.4) accounts for time period of interest, in this case, 24 hours.

An alternative way of computing $L_{dn}$ from twenty-four hourly $L_{eq(1hr)}$'s can be expressed conceptually as follows:

$$L_{dn} = 10log_{10}\left(\frac{Energy\ sum\ of\ daytime,\ hourly\ Leqs + \left(n_{adj,n} * Energy\ sum\ of\ nighttime,\ hourly\ Leqs\right)}{Time\ period\ (seconds)}\right)$$

The equation above can be rewritten as:

$$L_{dn} = 10log_{10}\left(\frac{Energy\ sum\ of\ daytime,\ hourly\ Leqs + \left(n_{adj,n} * Energy\ sum\ of\ nighttime,\ hourly\ Leqs\right)}{\left(\frac{86400}{3600}\right)}\right)$$

The equation above can be reduced further and rewritten as:

$$L_{dn} = 10log_{10}\left(Energy\ sum\ of\ daytime,\ hourly\ Leqs + \left(n_{adj,n} * Energy\ sum\ of\ nighttime,\ hourly\ Leqs\right)\right) - 13.8 \quad \textbf{Eq. B-10}$$

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$L_{dn}$ due to a series of transit-noise events can also be computed in terms of SEL. The equation below assumes that transit noise dominates the 24-hour noise environment, where nighttime SELs are increased by 10 dB before totaling:

$$L_{dn} = 10log_{10}(\underset{all\ daytime\ SELs}{Energy\ sum\ of} + (n_{adj,n} * \underset{all\ nighttime\ SELs}{Energy\ sum\ of})) - 49.4 \qquad \textbf{Eq. B-11}$$

$L_{dn}$ is adopted as the measure of cumulative noise impact for residential land uses (those involving sleep), because it:

- Correlates well with the results of attitudinal surveys of residential noise impact
- Increases with the duration of transit events
- Accounts for the number of transit events over the full twenty-four hours
- Accounts for the increased sensitivity to noise at night, when most people are asleep
- Allows composite measurements to capture all sources of community noise combined
- Allow quantitative comparison of transit noise with other community noises
- Is the designated metric of choice of other Federal agencies (e.g., HUD, FAA, and EPA) and has wide international acceptance

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# Appendix C: Background for Transit Noise Impact Criteria

The noise criteria presented in Section 4.1 of this manual have been developed based on well-documented criteria and research on human response to community noise. The primary goals in developing the noise criteria were to ensure that the impact limits are firmly founded in scientific studies, realistically based on noise levels associated with new transit projects, and represent a reasonable balance between community benefit and project costs. This appendix provides background information on the development of these criteria.

## C.1 Relevant Literature

The following is an annotated list of the documents that are particularly relevant to the noise impact criteria:

1. **U.S. EPA's "Levels Document"**[74]
   This report identifies noise levels consistent with the protection of public health and welfare against hearing loss, annoyance, and activity interference. It has been used as the basis of numerous community noise standards and ordinances.

2. **Committee on Hearing, Bioacoustics and Biomechanics (CHABA) Working Group 69, "Guidelines for Preparing Environmental Impact Statements on Noise"**[75]
   This report was the result of deliberations by a group of leading acoustical scientists with the goal of developing a uniform national method for noise impact assessment. Although the CHABA's proposed approach has not been adopted, the report serves as an excellent resource documenting research in noise effects. It provides a strong scientific basis for quantifying impacts in terms of $L_{dn}$.

3. **American Public Transportation Association (APTA) Guidelines for Design of Rapid Transit Facilities**[76]
   The noise and vibration sections of the APTA Guidelines have been used successfully in the past for the design of rail transit facilities. The APTA Guidelines include criteria for acceptable community noise and vibration. Experience has shown that meeting the APTA Guidelines will usually result in acceptable noise levels; but the metric used in the APTA Guidelines is not appropriate for environmental assessment purposes.

   The APTA Guidelines criteria are in terms of $L_{max}$ for conventional RRT vehicles, and they cannot be used to compare among different modes of transit. Since the APTA Guidelines are expressed in terms of maximum passby noise, they are not sensitive to the frequency or duration of noise events for transit modes other than conventional RRT operations with 5 to 10 minute headways. Therefore, the APTA criteria are questionable for assessing the noise impact of other transit modes that differ from conventional rapid transit with respect to source emission levels and operating characteristics (e.g., commuter rail, AGT, and a variety of bus projects).

4. **Synthesis of Social Surveys on Noise Annoyance**[77]
   In 1978, Theodore J. Schultz, an internationally known acoustical scientist, synthesized the results of a large number of social surveys concerning annoyance due to transportation noise. A group of these surveys were remarkably consistent, and the author proposed that their average



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results be taken as the best available prediction of transportation noise annoyance. This synthesis has received essentially unanimous acceptance by acoustical scientists and engineers. The "universal" transportation response curve developed by Schultz (Figure 3-7) shows that the percent of the population highly annoyed by transportation noise increases from zero at an $L_{dn}$ of approximately 50 dBA to 100% when $L_{dn}$ is approximately 90 dBA. Most importantly, this curve indicates that for the same increase in $L_{dn}$, there is a greater increase in the number of people highly annoyed at high noise levels than at low noise levels. For example, a 5 dB increase at low ambient levels (40 - 50 dB) has less impact than at higher ambient levels (65 - 75 dB). A recent update of the original research containing several railroad, transit, and street traffic noise surveys, confirming the shape of the original Schultz curve [12].

5. **HUD's Standards**[19]
   HUD has developed noise standards, criteria, and guidelines to ensure that housing projects supported by HUD achieve the goal of a suitable living environment. The HUD acceptability standards define 65 dB ($L_{dn}$) as the threshold for a normally unacceptable living environment (moderate impact for FTA) and 75 dB ($L_{dn}$) as the threshold for an unacceptable living environment (severe impact for FTA).

## C.2 Basis for Noise Impact Criteria Curves

The lower curve in Figure 4-2 represents the onset of moderate impact and is based on the following considerations:

- The EPA finding that a community noise level of $L_{dn}$ less than or equal to 55 dBA is "requisite to protect public health and welfare with an adequate margin of safety."[72]
- The conclusion by EPA and others that a 5 dB increase in $L_{dn}$ or $L_{eq(1hr)}$ is the minimum required for a change in community reaction.
- The research concludes that there are very few people highly annoyed when the $L_{dn}$ is 50 dBA, and that an increase in $L_{dn}$ from 50 dBA to 55 dBA results in an average of 2% more people highly annoyed (Figure 3-7).

The increase in noise level from an existing ambient level of 50 dBA to a cumulative level of 55 dBA because of a project is found to cause minimal impact, with 2% of people highly annoyed, as described in the bullets above. This is considered the lowest threshold where impact starts to occur. Therefore, for an existing ambient noise level of 50 dBA, the curve representing the onset of moderate impact is at 53 dBA, the combination of which yields a cumulative level of 55 dBA by decibel addition. The remainder of the lower curve in Figure 4-2 was determined from the annoyance curve (Figure 3-7) by allowing a fixed 2% increase in annoyance at other levels of existing ambient noise. As cumulative noise increases, the increment to attain the same 2% increase in highly annoyed people is smaller. While it takes a 5-dB noise increase to cause a 2% increase in highly annoyed people at an existing ambient noise level of 50 dB, an increase of only 1 dB causes a 2% increase of highly annoyed people at an existing ambient noise level of 70 dBA.

The upper curve in Figure 4-2 represents the onset of severe impact based on a total noise level, corresponding to a higher degree of impact. The severe noise impact curve is based on the following considerations:

- HUD defines an $L_{dn}$ of 65 as the onset of a normally unacceptable noise zone (moderate impact for FTA) in its environmental noise standards [19]. FAA considers that residential land uses are not compatible with noise environments where $L_{dn}$ is greater than 65 dBA (20).



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- An increase of 5 dB in $L_{dn}$ or $L_{eq(h)}$ is commonly assumed as the minimum required increase for a change in community reaction.
- The research concludes that an increase of 5 dB in $L_{dn}$ or $L_{eq(h)}$ represents a 6.5% increase in the number of people highly annoyed (Figure 3-7).

The increase in noise level from an existing ambient level of 60 dBA to a cumulative level of 65 dBA caused by a project represents a change from an acceptable noise environment to the threshold of an unacceptable noise environment. This is considered the level at which severe impact starts to occur with a 6.5% increase in the number of people highly annoyed as described in the bullets above. Therefore, for an existing ambient noise level of 60 dBA, the curve representing the onset of severe impact is at 63 dBA, the combination of which yields a cumulative level of 65 dBA by decibel addition. The remainder of the upper curve in Figure 4-2 was determined from the annoyance curve (Figure 3-7) by allowing a fixed increase of the 6.5% increase in annoyance at all existing ambient noise levels.

Both curves incorporate a maximum limit for the transit project noise in noise-sensitive areas. Independent of existing noise levels, moderate impact for land use categories 1 and 2 is considered to occur whenever the transit $L_{dn}$ equals or exceeds 65 dBA, and severe impact occurs whenever the transit $L_{dn}$ equals or exceeds 75 dBA. These absolute limits are intended to restrict activity interference caused by the transit project alone.

Both curves also incorporate a maximum limit for cumulative noise increase at low existing noise levels (below approximately 45 dBA). This is a conservative limit that reflects the lack of social survey data on people's reactions to noise at such low ambient levels. Like the FHWA approach in assessing the relative impact of a highway project, the transit noise criteria include limits on noise increase of 10 dB and 15 dB for moderate impact and severe impact, respectively, relative to the existing noise level.

Note that due to the types of land use included in category 3, the criteria allow the project noise for category 3 sites to be 5 dB greater than for category 1 and category 2 sites. This difference is reflected by the offset in the vertical scale on the right side of Figure 4-2. Aside from active parks, which are clearly less sensitive to noise than category 1 and 2 sites, category 3 sites include primarily indoor activities. Therefore, the criteria account for some noise reduction from the building structure.

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## C.3 Equations for Noise Impact Criteria Curves

The equations for the noise impact criteria curves shown in Figure 4-2 are included in this section. These equations may be useful when performing the noise assessment methodology using spreadsheets, computer programs, or other analysis tools. Otherwise, such mathematical detail is generally not necessary to implement the criteria, and direct use of Figure 4-2 is adequate and less time-consuming.

A total of four continuous curves are included in the criteria, creating two threshold curves for moderate and severe impact for category 1 and 2, and two curves for category 3 (See Table C-1). Note that for each level of impact, the overall curves for categories 1 and 2 are offset by 5 dB from category 3. While each curve is graphically continuous, each one is defined by a set of three discrete equations. These equations are approximately continuous at the transition points. The following is a description of the three equations:

- The first equation in each set is a linear relationship, representing the portion of the curve in which the existing noise exposure is low, and the allowable increase is limited to 10 dB and 15 dB for moderate impact and severe impact, respectively.

- The second equation in each set represents the impact threshold over the range of existing noise exposure for which a fixed percentage of increase in annoyance is allowed, as described in Appendix C.2. This curve is a third-order, polynomial approximation derived from the Schultz curve[75] and covers the range of noise exposure encountered in most populated areas. This curve is used for determining noise impact in most cases for transit projects.
- The third equation represents the absolute limit of project noise imposed by the criteria for areas with high existing noise exposure. For land use category 1 and 2, the absolute limit is 65 dBA for moderate impact and 70 dBA for severe impact. For land use category 3, the absolute limit is 75 dBA for moderate impact and 80 dBA for severe impact.

**Table C-1 Threshold of Moderate and Severe Impacts**

**Threshold of Moderate Impact**

***Category 1 and 2***

$$L_p = \begin{cases} 11.450 + 0.953L_E, & L_E < 42 \\ 71.662 - 1.164L_E + 0.018{L_E}^2 - 4.088 \times 10^{-5}{L_E}^3, & 42 \le L_E \le 71 \\ 65, & L_E > 71 \end{cases} \quad \text{Eq. C- 12}$$

***Category 3***

$$L_p = \begin{cases} 16.450 + 0.953L_E, & L_E < 42 \\ 76.662 - 1.164L_E + 0.018{L_E}^2 - 4.088 \times 10^{-5}{L_E}^3, & 42 \le L_E \le 71 \\ 70, & L_E > 71 \end{cases} \quad \text{Eq. C- 13}$$

**Threshold of Severe Impact**

***Category 1 and 2***

$$L_p = \begin{cases} 17.322 + 0.940L_E, & L_E < 44 \\ 96.725 - 1.992L_E + 3.02 \times 10^{-2}{L_E}^2 - 1.043 \times 10^{-4}{L_E}^3, & 44 \le L_E \le 77 \\ 75, & L_E > 77 \end{cases} \quad \text{Eq. C- 14}$$

***Category 3***

$$L_p = \begin{cases} 22.322 + 0.940L_E, & L_E < 44 \\ 101.725 - 1.992L_E + 3.02 \times 10^{-2}{L_E}^2 - 1.043 \times 10^{-4}{L_E}^3, & 44 \le L_E \le 77 \\ 80, & L_E > 77 \end{cases} \quad \text{Eq. C- 15}$$

$L_E$ = the existing noise exposure in terms of $L_{dn}$ or $L_{eq(1hr)}$
$L_p$ = the project noise exposure which determines impact in terms of $L_{dn}$ or $L_{eq(1hr)}$

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Cont.

# Appendix D: Clustering Receivers of Interest

This appendix supplements the information in Section 4.5 on clustering receivers of interest.

The general approach to selecting noise-sensitive receivers in the study area is included in Section 4.5, Step 1. General guidelines are as follows:

- Select the following types of receivers to evaluate individually:
  - Every major noise-sensitive public building
  - Every isolated residence
  - Every relatively small outdoor noise-sensitive area
- Residential neighborhoods and relatively large outdoor noise-sensitive areas can often be clustered and represented by a single receiver.

Clustering similar receivers reduces the number of computations needed later, especially for large-scale projects where a greater number of noise-sensitive sites may be affected. For this approach to be effective, it is essential that the representative receiver accurately represents the noise environment of the cluster.

The major steps in clustering receivers include:

1. First, cluster receivers according to approximately equal exposure to the primary project noise source. These areas typically run parallel to a linear project or circle major stationary sources relative to the proposed project.
2. Next, cluster receivers according to major sources of ambient noise. These areas typically run parallel to or encircle major sources of ambient noise.
3. Then, cluster receivers according to changes in the project layout or operations along the corridor.
4. Finally, select a representative receiver for each cluster.

The major steps are expanded below and include instructions on how to draw cluster boundaries on a map.

1. **Boundaries along the proposed project** – Draw cluster boundaries along the proposed project as described below to separate clusters based on distance from the project. Draw these cluster boundaries for the project sources listed as major in Table 4-19.

   **Within both residential and noise-sensitive outdoor areas:**
   - **Primary project source**
     Draw cluster boundaries at the following distances from the near edge of the primary project source: 0 ft, 50 ft, 100 ft, 200 ft, 400 ft, and 800 ft. For linear sources, such as a rail line, draw these boundaries as lines parallel to the proposed ROW line. For stationary sources, draw these boundaries as approximate circles around the source, starting at the property line.

     Do not extend boundaries beyond the noise study area, identified in the Noise Screening Procedure in Section 4.3 or the General Noise Assessment of Section 4.4.



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Cont.

- **Remaining project sources** – Repeat the process for the primary project source for all other project listed as major in Table 4-19, such as substations and crossing signals. If several project sources are located approximately together, only consider one source, since the others would produce approximately the same boundary.

  It is good practice to optimize the number of clusters for a project to simplify the procedure.

**Where rows of buildings parallel the transit corridor:**

- Ensure that cluster boundaries fall between the following rows of buildings, counting back away from the proposed project:
  - Between rows 1 and 2
  - Between rows 2 and 3
  - Between rows 3 and 4
- Add cluster boundaries between these rows if not already included.

2. **Boundaries along sources of ambient noise** – Draw cluster boundaries along all major sources of ambient noise based upon distance from these sources, as described below.
   - Draw cluster boundaries along all interstates and major roadway arterials at the following distances from the near edge of the roadway: 0 ft, 100 ft, 200 ft, and 500 ft.
   - Draw cluster boundaries along all other roadways that have state or county numbering at 0 ft and 100 ft from the near edge of the roadway.
   - For all major industrial sources of noise, draw cluster boundaries that encircle the source at the following distances from the near property line of the source: 0 ft, 100 ft, 200 ft, and 400 ft.

3. **Boundaries based on changes in project layout or operations** – Further subdivision is needed to account for changes in project noise where proposed project layout or operating conditions change considerably along the corridor. Draw a cluster boundary perpendicular to the corridor extending straight outward to both sides at the following locations:
   - Where parallel tracks previously separated by more than approximately 100 ft are moved closer together
   - Approximately where speed and/or throttle are reduced when approaching stations and where steady service speed is reached after departing stations
   - Approximately 200 ft up and down the line from grade crossing bells
   - At transitions from jointed to welded rail
   - At transitions from one type of cross section to another including on structure, on fill, at-grade and in cut
   - At transitions from open terrain to heavily wooded terrain
   - At transitions between areas free of locomotive horn noise and areas subject to this noise source
   - Any other positions along the line where project noise is expected to change considerably, such as up and down the line from tight curves where wheels may squeal

4. **Selection of a representative receiver from each cluster** – Determine a representative receiver for each cluster boundary drawn in the steps above.
   - **Residential clusters**
     Select a representative receiver within the cluster at the house closest to the proposed project. If this receiver is not the clear choice, select the receiver furthest from major sources of ambient noise.
   - **Outdoor noise-sensitive clusters (e.g., urban park or amphitheater)**



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Cont.

Select a representative receiver within the cluster at the closest point of active noise-sensitive use. If this receiver is not the clear choice, select the receiver farther from major sources of ambient noise.

Note that some clusters may fall between areas with receivers of interest. This could occur when operational changes or track layouts change in an open, undeveloped area. Retain these clusters. Do not merge them with adjacent clusters. Do not select a representative receiver of interest from them.

## Example D-1 Clustering Receivers

**Receivers of Interest and Clustering Receivers**

In this hypothetical situation, a new rail transit line, labeled "new rail line" in Figure D-1, is proposed along a major urban street with commercial land use. A residential area is located adjacent to the commercial strip, located approximately one-half block from the proposed transit alignment. A major arterial, labeled "highway," crosses the alignment.

**Cluster Receivers Along the Primary Project Source**

*Primary Project Source*

The primary project source in this example is the new rail line. Boundaries are first drawn at distances of 0 ft from the right-of- way line (edge of the street in this example), 50 ft, 100 ft, 200 ft, 400 ft, and 800 ft, (Figure D-1). Distances are labeled at the top of the figure.

This is proposed to be a constant speed section of track, so there are no changes in boundaries due to changes in operations along the corridor. Moreover, no other project sources are shown here, but if there had been a station with a parking lot, lines would have been drawn enveloping the station site at the specified distances from the property line.

*Rows of Buildings Parallel to the Transit Corridor*

This example includes rows of buildings parallel to the transit corridor. The first set of boundary lines satisfies the requirement that cluster boundaries fall between rows 1 and 2, and between rows 2 and 3, but there is no line between rows 4 and 5. Consequently, a cluster boundary labeled "R" at the top of the figure has been drawn between the 4th and 5th row of buildings.

**Cluster Receivers Along the Primary Project Source**

The roadway arterial (labeled "highway") is the only major source of ambient noise shown.

Cluster boundaries are drawn at 0 ft, 100 ft, 200 ft and 500 ft from the near edge of the roadway on both sides. These lines are shown with distances labeled at the side of the figure.

**Select a Representative Receiver from Each Cluster**

Representative receivers are shown as filled circles in Figure D-1. Note that the receivers labeled with "REC" are primarily for use in Appendix E.

Locate receiver, "REC 3". Note that this cluster is located at the outer edge of influence from the major source ("highway") where local street traffic is the dominant source for ambient noise (in practice, this would be verified by a measurement).

"REC 3" is chosen to represent this cluster because it is among the houses closest to the proposed project source in this cluster and it is in the middle of the block affected by the dominant local street. Ambient noise levels at one end of the cluster may be influenced more by the highway and the other end may be affected more by the cross street, but the majority of the cluster would be represented by receiver site "REC 3."

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Cont.




Figure D-1 Example of Receiver Map Showing Cluster Boundaries

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Cont.

# Appendix E: Determining Existing Noise

Different options of determining existing noise, including full measurement, computation from partial measurements, and tabular look-up, are described in Section 4.5, Step 5. This appendix provides additional details associated with each method and examples of when each method could be used.

Additional details on the methods for estimating existing noise are provided below:

**Option 1: $L_{eq(1hr)}$ measurement (non-residential)** – Full one-hour measurements are recommended to determine existing noise for non-residential receivers of interest. These measurements are preferred over all other options and will accurately represent the $L_{eq(1hr)}$. The following procedures apply to these full-duration measurements:

- Measure $L_{eq(1hr)}$ at the receiver of interest during a typical hour of use on two non-successive days. Choose the hour in which maximum project activity will occur. The $L_{eq(1hr)}$ will be accurately represented using this method. Typically, measuring between noon Monday and noon Friday is recommended, but weekend days may be more appropriate for places of worship.
- Position the measurement microphone for all sites as shown in Figure 4-19, considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.

**Option 2: $L_{dn}$ measurement (residential) –** Full 24-hour measurements are recommended to determine ambient noise for residential receivers of interest. These measurements are preferred over all other options and will accurately represent the $L_{dn}$. The following procedures apply to these full-duration measurements:

- Measure a full 24-hour $L_{dn}$ at the receiver of interest for a single weekday (generally between noon Monday and noon Friday).
- Position the measurement microphone for all sites as shown in Figure 4-19 considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.

**Option 3: $L_{dn}$ computation of $L_{dn}$ from 3 partial $L_{eq(1hr)}$ measurements (residential)** – An alternative way to determine $L_{dn}$ is to measure $L_{eq(1hr)}$ for three typical hours of the day, then compute the $L_{dn}$ from these three $L_{eq(1hr)}$ measurements. This method is less precise than its full-duration measurement. The following procedures apply to this partial-duration measurement method for $L_{dn}$:

- Measure the $L_{eq(1hr)}$ during each of the following time periods:
  - During peak-hour roadway traffic
  - Midday, between the morning and afternoon roadway-traffic peak hours
  - During late night between midnight and 5 a.m.
- Position the measurement microphone for all sites as shown in Figure 4-19 considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.
- Compute the $L_{dn}$ using the equation below



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Cont.

$$L_{dn} \approx 10\log(3 \times 10^{\frac{L_{eq,peakhour}-2}{10}} + 12 \times 10^{\frac{L_{eq,midday}-2}{10}} + 9 \times 10^{\frac{L_{eq,latenight}+8}{10}}) - 13.8 \quad \textbf{Eq. E-1}$$

The resulting $L_{dn}$ will be slightly underestimated due to the adjustment to the measured levels in these equations. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$. If using this method, a minimum time duration of one hour should be used for each measurement period in computing an Ldn.

**Option 4: Computation of $L_{dn}$ from 1 partial $L_{eq(1hr)}$ measurement (residential)** – $L_{dn}$ can also be determined by measuring $L_{eq(1hr)}$ for one hour of the day, and then computing $L_{dn}$ from the $L_{eq(1hr)}$. This method is less precise than computing $L_{dn}$ from 3 $L_{eq(1hr)}$ measurements. This method may be useful for projects with are many sites assessed by the General Noise Assessment. This method may also be appropriate when determining if a particular receiver of interest represents a cluster in a Detailed Noise Analysis. The following procedures apply to this partial-duration measurement option for $L_{dn}$:

- Measure the $L_{eq(1hr)}$ for the loudest hour of project-related activity during hours of noise sensitivity. If this hour is not selected, other hours may be used with the understanding that the estimate is less precise.
- Position the measurement microphone for all sites as shown in Figure 4-19, considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.
- Convert the measured hourly $L_{eq(1hr)}$ to $L_{dn}$ with the appropriate equation below.

For measurements between 7 a.m. and 7 p.m.:

$$L_{dn} \approx L_{eq} - 2 \quad \textbf{Eq. E-2}$$

For measurements between 7 p.m. and 10 p.m.:

$$L_{dn} \approx L_{eq} + 3 \quad \textbf{Eq. E-3}$$

For measurements between 10 p.m. and 7 a.m.:

$$L_{dn} \approx L_{eq} + 8 \quad \textbf{Eq. E-4}$$

The resulting $L_{dn}$ will be moderately underestimated due to the use of the adjustment constants in these equations. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$. If using this method, a minimum time duration of one hour should be used for each measurement period in computing an Ldn.

**Option 5: Computation of $L_{eq(1hr)}$ or $L_{dn}$ from $L_{eq(1hr)}$ or $L_{dn}$ of a comparable site (all land uses)** – Computing $L_{eq(1hr)}$ or $L_{dn}$ from the $L_{eq(1hr)}$ or $L_{dn}$ of a comparable site where the ambient noise is dominated by the same source that is comparable in precision to Option 4. This method can be used to characterize noise in several neighborhoods by using a single representative receiver. It is critical that the measurement site has a similar noise environment to all areas represented. If measurements made by others are available and the sites are equivalent, the existing measurements can be used to reduce the amount of project noise monitoring. The following procedures apply to this method of determining of ambient noise:

- Choose another receiver that is comparable to the receiver (CompRec) of interest with the following:
  - The same source of dominant ambient noise

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Cont.

- The ambient level of the comparable receiver was measured according to Option 1 or Option 2 above
- The ambient measurement at the comparable receiver was made in direct view of the major source of ambient noise, unshielded by noise barriers, terrain, rows of buildings, or dense tree zones

- Determine the following from a plan or aerial photograph:
  - The distance ($D_{CompRec}$) from the comparable receiver to the near edge of the ambient source
  - The distance ($D_{Rec}$) from this receiver of interest to the near edge of the ambient source
- Determine the number of rows of buildings (N) that intervene between the receiver of interest and the ambient source.
- Compute the ambient level at the receiver of interest (Rec) with the appropriate equation below

If roadway sources dominate:

$$L_{Rec} \approx L_{CompRec} - 15\log(\frac{D_{Rec}}{D_{CompRec}}) - 3N \qquad \textbf{Eq. E-5}$$

If other sources dominate:

$$L_{Rec} \approx L_{CompRec} - 25\log(\frac{D_{Rec}}{D_{CompRec}}) - 3N \qquad \textbf{Eq. E-6}$$

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The resulting $L_{Rec}$ will be moderately underestimated. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$.

**Option 6: Estimation of $L_{dn}$ by table look-up (all land uses)** – The least precise way to determine the ambient noise is to estimate the level using a table. A tabular look-up can be used to establish baseline conditions for a General Noise Assessment if a noise measurement cannot be made. This method should not be used for a Detailed Noise Analysis. The following instruction applies to this method of determining of ambient noise:

Estimate either the $L_{eq(1hr)}$ or the $L_{dn}$ using Table 4-17 based on distance from major roadways, rail lines, or upon population densities. In general, these tabulated values are substantially underestimated.

The underestimation is intended to compensate for the reduced precision of the estimated ambients.

**Examples –** Examples of when each method of determining existing noise may be appropriate are provided below using the example from Appendix D. Existing noise at the receivers labeled "REC" in Figure D-1 could be estimated as follows:

- **Option 1: $L_{eq(1hr)}$ measurement** – Existing noise at REC 1 is due to the highway at the side of this church. $L_{eq(1hr)}$ can be measured during a typical church hour.
- **Option 2: $L_{dn}$ measurement –** Existing noise at the residence REC 2 is due to a combination of the highway and local streets. $L_{dn}$ can be measured for a full 24-hours.
- **Option 3: $L_{dn}$ computation of $L_{dn}$ from 3 partial $L_{eq(1hr)}$ measurements** – Existing noise at the residence REC 3 is due to the street in front of this residence. $L_{dn}$ can be computed from three $L_{eq(1hr)}$ measurements.

- **Option 4: Computation of $L_{dn}$ from 1 partial $L_{eq(1hr)}$ measurement** – Existing noise at the residence REC 4 is due to the highway. Because the highway has a predictable diurnal pattern, $L_{dn}$ can be computed from one $L_{eq(1hr)}$ measurement.
- **Option 5: Computation of $L_{dn}$ from $L_{dn}$ of a comparable site** – Existing noise at the residence REC 5 is due to Kee Street. REC 3 is also affected by local street traffic and is a comparable distance from the highway. $L_{dn}$ for REC 5 can be computed based on the $L_{dn}$ at REC-3.
- **Option 6: Estimation of $L_{dn}$ by table look-up** – Existing noise at the residence REC 6 is due to local traffic. $L_{dn}$ can be estimated by tables based on population density along this corridor.

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Cont.

# Appendix F: Computing Source Levels from Measurements

This appendix contains the procedures for computing source reference levels ($SEL_{ref}$) from source measurements in cases where the source reference tables in Section 4.5, Step 2 indicate measurements are preferred, data are not available for the source of interest, or more precise data are required than available in the table.

Close-by source measurements for vehicle passbys may capture either the vehicle's sound exposure level (SEL) or maximum noise level ($L_{max}$). Both metrics can be measured directly by commonly available sound level meters. While the $L_{max}$ metric is not used for transit noise impact assessments, it can be used to compute SEL source reference levels. $L_{max}$ measurements are often available from transit-equipment manufacturers and some transit system equipment specifications may limit close-by $L_{max}$ levels.

Close-by source measurements for stationary sources capture the source's SEL over one source event, where the event duration may be chosen based on measurement convenience. The duration will factor out of the computation when the measured value is converted to reference operating conditions.

This manual does not specify elaborate methods for undertaking the close-by source measurements, but rather, provides general processes. It is required that all measurements conform to good engineering practice, guided by the standards of the American National Standards Institute and other such organizations (27, 28, 29).

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Cont.

This appendix presents information according to noise source as follows:

- Appendix F.1: Highway and rail vehicle passbys for vehicles of the same type
- Appendix F.2: Stationary sources
- Appendix F.3: $L_{max}$ for single train passbys (for trains of mixed consists)

## F. 1 Highway and Rail Vehicle Passbys

This section provides information on appropriate conditions for vehicle passby measurements, instructions on converting measurements made under non-reference conditions to source reference levels, and examples of these computations.

The following conditions are required for vehicle passbys, in addition to good engineering practice:

- Measured vehicles must be representative of project vehicles in all aspects, including representative acceleration and speed conditions for buses.
- Track must be relatively free of corrugations and train wheels relatively free of flats, unless these conditions are typical of the proposed project.
- Road surfaces must be smooth and dry, unless these conditions are typical of the proposed project.
- Perpendicular distance between the measurement position and the source's centerline must be 100 ft or less.
- Vehicle speed must be 30 mph or greater, unless typical project speeds are less than that.
- No noise barriers, terrain, buildings, or dense tree zones may break the lines-of-sight between the source and the measurement position.

When close-by source measurements are made under non-reference conditions, use the instructions below and the equations in Table F-1 to convert the measured values to source reference levels. For rail vehicles, measure/convert a group of locomotives or a group of cars separately. This computation requires that all measured vehicles be of the same type. For trains of mixed consists, see Appendix F.3.

**SEL measured for a highway-vehicle passby, or a passby of a group of identical rail vehicles**

- Collect the following input information:
  - $SEL_{meas}$, the measured SEL for the vehicle passby
  - N, the consist of the measured group of rail cars or group of locomotives
  - T, the average throttle setting of the measured diesel-powered locomotive(s)
  - $S_{meas}$, the measured passby speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the Source Reference Level $SEL_{ref}$, using Eq. F-1.

**$L_{max}$ measured for a passby of a group of identical rail vehicles**

- Collect the following input information:
  - $L_{max}$, measured for the group passby
  - N, the consist of the measured group of rail cars or group of locomotives
  - T, the average throttle setting of the measured diesel-powered locomotive(s)
  - $S_{meas}$, the measured passby speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
  - $L_{meas}$, the total length of the measured group of locomotives or group of rail cars, in feet
- Compute the Source Reference Level $SEL_{ref}$, using either Eq. F-2 or Eq. F-3, as appropriate, for locomotives or rail cars.

**$L_{max}$ measured for a highway-vehicle passby**

- Collect the following input information:
  - $L_{max}$, measured for the highway-vehicle passby
  - $S_{meas}$, the vehicle speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the Source Reference Level, SELref, using Eq. F-4.

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Cont.

**Table F-1 Conversion to Source Reference Levels at 50 ft – Highway and Rail Sources**

| Measured | Source | Equation | |
|---|---|---|---|
| SEL | Vehicle passby | $SEL_{ref} = SEL_{meas} + 10\log(\frac{S_{meas}}{50}) + 10log(\frac{D_{meas}}{50}) + C_{consist} + C_{emissions}$ | Eq. F-1 |
| $L_{max}$ | Rail-vehicle passby, locomotives only | $SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log(2\propto) + C_{consist} + C_{emissions} + 3.3$ | Eq. F-2 |
| | Rail-vehicle passby, cars only | $SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log\,[2\propto + \sin(2\propto)] + C_{consist} + C_{emissions} + 3.3$ | Eq. F-3 |
| | Highway-vehicle passby | $SEL_{ref} = L_{Amax} + 20\log(\frac{D_{meas}}{50}) + C_{emissions} + 3.3$ | Eq. F-4 |

$S_{meas}$ = speed of measured vehicle(s), mph

$D_{meas}$ = closest distance between measurement position and source, ft

$C_{consist}$ = 0 for buses and automobiles
$-10\log(N_{Cars})$ for locomotives and rail cars
where N is the number of locomotives or rail cars in the measured group

$C_{emissions}$ = 0 for T < 6 for locomotives
-2 (T-5) for T ≥ 6
where T is average throttle setting of measured diesel – electric locomotive(s)

$-30\log(\frac{S_{meas}}{50})$ for rail cars

$-25\log(\frac{S_{meas}}{50})$ for buses

$-38.1\log(\frac{S_{meas}}{50})$ for automobiles

$E_{meas}$ = event duration of measurement, sec

$L_{meas}$ = total length of measured group of locomotives or rail cars, ft

$\propto$ = $\arctan(\frac{L_{meas}}{2D_{meas}})$, rad

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Cont.

## Example F-1 Calculate $SEL_{ref}$ – Locomotives

**Computation of $SEL_{ref}$ from SEL Measurement of Fixed-guideway Source**

SEL was measured for a passby of two diesel-powered locomotives with the following conditions:

$SEL_{meas}$ = 90 dBA
$N_{Cars}$ = 2
T = 6
$S_{meas}$ = 55 mph
$D_{meas}$ = 65 ft

Compute the source reference level using Eq. F-1.

$$SEL_{ref} = SEL_{meas} + 10\log\left(\frac{S_{meas}}{50}\right) + 10log\left(\frac{D_{meas}}{50}\right) + C_{consist} + C_{emissions}$$
$$= 90 + 10\log\left(\frac{55}{50}\right) + 10\log\left(\frac{65}{50}\right) - 10\log(2) + (-2(6-5))$$
$$= 86.5 \text{ dBA}$$

## Example F-2 Calculate $SEL_{ref}$ – Rail Cars

**Computation of $SEL_{ref}$ from $L_{max}$ Measurement of Fixed-Guideway Source**

$L_{max}$ was measured for a passby of a 4-car consist of 70-ft long rail cars with the following conditions:

$L_{max}$ = 90 dBA
$N_{Cars}$ = 4
$S_{meas}$ = 70 mph
$D_{meas}$ = 65 ft
$L_{meas}$ = 280 ft
$\propto$ = 1.14

Compute the source reference level using Eq. F-3.

$$SEL_{ref} = L_{Amax} + 10\log\left(\frac{L_{meas}}{50}\right) + 10\log\left(\frac{D_{meas}}{50}\right) - 10\log\left[2\propto + \sin(2\propto)\right] + C_{consist} + C_{emissions} + 3.3$$
$$= 90 + 10\log\left(\frac{280}{50}\right) + 10\log\left(\frac{65}{50}\right) - 10\log\left[2(1.14) + \sin(2(1.14))\right] - 10\log(4) - 30\log\left(\frac{70}{50}\right) + 3.3$$
$$= 86.7 \text{ dBA}$$

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Cont.

**Example F-3 Calculate $SEL_{ref}$ – Bus**

**Computation of $SEL_{ref}$ from $L_{max}$ Measurement of Highway Vehicle Source**

$L_{max}$ was measured for a bus with the following conditions:

$L_{max}$ = 78 dBA
$D_{meas}$ = 80 ft
$S_{meas}$ = 40 mph

Compute the source reference level using Eq. F-4

$$SEL_{ref} = L_{max} + 20\log(\frac{D_{meas}}{50}) + C_{emissions} + 3.3$$
$$= 78 + 20\log(\frac{80}{50}) - 25\log(\frac{40}{50}) + 3.3$$
$$= 87.8 \text{ dBA}$$

## F.2 Stationary Sources

This section provides information on appropriate conditions for stationary source measurements, instructions on converting measurements made under non-reference conditions to source reference levels, and an example of this type of computation.

The following conditions are required for stationary sources, in addition to good engineering practice:

- Measured source operations must be representative of project operations in all aspects.
- The following ratio must be 2 or less, and the distance to the closest source component must be 200 ft or less.

$$\frac{Distance\ to\ the\ farthest\ source\ component}{Distance\ to\ the\ closest\ source\ component}$$

  If both conditions cannot simultaneously be met, separate close-by measurements of individual components of this source must be made, for which these distance conditions can be met.

- The following ratio must be 2 or less:

$$\frac{Lateral\ length\ of\ the\ source\ area}{Distance\ to\ the\ closest\ source\ component}$$

  The lateral length of the source area is measured perpendicular to the general line-of-sight between source and measurement positions.

  If this condition cannot be met, then make separate close-by measurements of individual components of this source, for which this condition can be met.

- No noise barriers, terrain, buildings, or dense tree zones may break the lines-of-sight between the source and the measurement position.

When close-by source measurements are made under non-reference conditions, use the instructions below and the equation in Table F- 2 to convert the measured values to source reference levels.

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**SEL was measured for a stationary noise source**

- Collect the following input information:
  - $SEL_{meas}$, the measured SEL for the noise source, for whatever source "event" is convenient to measure
  - $E_{meas}$, the event duration, in seconds
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the source reference level, SELref using Eq. F- 5.

**Table F-2 Conversion to Source Reference Levels at 50 ft - Stationary Sources**

| Measured | Source | Equation |
|---|---|---|
| SEL | Stationary noise source | $SEL_{ref} = SEL_{meas} - 10\log(\frac{E_{meas}}{3600}) + 20\log(\frac{D_{meas}}{50})$ Eq. F- 5 |

$S_{meas}$ = speed of measured vehicle(s), in miles per hour
$E_{meas}$ = event duration of measurement, in seconds
$D_{meas}$ = closest distance between measurement position and source, in feet

**Example F-4 Calculate $SEL_{ref}$ – Signal Crossing**

**Computation of $SEL_{ref}$ from SEL Measurement of Stationary Source**

SEL was measured for a signal crossing with the following conditions:

$SEL_{meas}$ = 70 dBA
$E_{meas}$ = 10 sec
$D_{meas}$ = 65 ft

Compute the source reference level using Eq. F-5.

$$SEL_{ref} = SEL_{meas} - 10\log(\frac{E_{meas}}{3600}) + 20\log(\frac{D_{meas}}{50})$$
$$= 70 - 10\log(\frac{10}{3600}) + 20\log(\frac{65}{50})$$
$$= 97.8 \text{ dBA}$$

## F.3 $L_{max}$ for Single Train Passby

This section provides procedures for the computation of $L_{max}$ for a single train passby. This procedure can be used to characterize trains of mixed consists using $L_{max}$. Follow the instructions below.

- Collect the following input information:
  - $SEL_{ref}$, from Section 4.5, specific to both the locomotive type and car type of the train
  - $N_{loco}$, the number of locomotives in the train
  - $N_{cars}$, the number of cars in the train
  - $L_{loco}$, the total length of the train's locomotive(s), in feet (or $N_{loco}$ unit length)
  - $L_{cars}$, the total length of the train's set of rail car(s), in feet (or $N_{cars}$ unit length)
  - S, the train speed, in miles per hour
  - D, the closest distance between the receiver of interest and the train, in feet

- Use the equations in Table F-3 to compute the following:
  - $L_{max/loco}$ for the locomotive(s) using Eq. F-6



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Cont.

- $L_{max,cars}$ for the rail car(s) using the Eq. F-7
- $L_{max,total}$, the larger $L_{max}$ from the locomotives(s) and rail car(s) is the $L_{max}$ for the total train passby, see Eq. F- 8.

**Table F-3 Conversion to Lmax at the Receiver, for a Single Train Passby**

| Source | Equation | |
|---|---|---|
| Locomotives | $L_{max\,Loco} = SEL_{Locos} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2\propto) - 3.3$ | Eq. F-6 |
| Rail Cars | $L_{max\,Rcars} = SEL_{Rcars} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto + \sin(2\propto)) - 3.3$ | Eq. F-7 |
| Total Train | $L_{max\,total} = max(L_{max\,Loco}\ or\ L_{max\,RCars})$ | Eq. F-8 |

L = total length of measured group of locomotive(s) or rail car(s), ft
S = vehicle speed, mph
$\propto$ = arctan $\left(\frac{L}{2D}\right)$, rad
D = closest distance between receiver and source, ft

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## Example F-5 Calculate $L_{max}$ – Train Passby

### Computation of $L_{max}$ for Train Passby

Calculate the $L_{max}$ of commuter train at receiver of interest according to the following conditions:

$SEL_{ref}$ = 92 dBA for locomotives
= 82 dBA for rail cars
$N_{Loco}$ = 1
$N_{Cars}$ = 6
S = 43 miles per hour
D = 125 ft
$\propto_{locos}$ = 0.27
$\propto_{cars}$ = 1.03

The locomotive and rail cars each have a unit length (L) of 70 ft.

Determine the total length of the locomotive and rail cars.
$L_{Locs}$ = 70 ft
$L_{cars}$ = 420 ft

Compute $L_{max}$ for the locomotive using Eq. F-6:

$$L_{max\,Loco} = SEL_{loco} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2\propto) - 3.3$$
$$= 92 + 10log\left(\frac{43}{50}\right) - 10log\left(\frac{70}{50}\right) + 10\log(2 \times 0.27) - 3.3$$
$$= 84.0 \text{ dBA}$$

Compute $L_{max}$ for the rail cars using Eq. F-7:

$$L_{max\,Rcars} = SEL_{Rcars} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2\propto + \sin(2\propto)) - 3.3$$
$$= 82 + 10log\left(\frac{43}{50}\right) - 10log\left(\frac{420}{50}\right) + 10\log((2 \times 1.03) + \sin(2 \times 1.03)) - 3.3$$
$$= 73.5 \text{ dBA}$$

Find the total $L_{max}$ for the train passby using Eq. F-8.
$L_{max\,total} = max(L_{max\,Loco}\ or\ L_{max\,Rcars})$
=84.0 dBA



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Cont.

# Appendix G: Non-Standard Modeling Procedures and Methodology

This manual provides guidance for preparing and reviewing the noise and vibration sections of environmental documents, as well as FTA-approved methods and procedures to determine the level of noise and vibration impact resulting from most federally-funded transit projects. Situations may arise, however, that are not explicitly covered in this manual. Professional judgment may be used to extend the basic methods to cover these cases, when appropriate. It is important to note that each project is unique and must be evaluated on a case-by-case basis. This appendix provides procedures for the use of non-standard noise and vibration modeling procedures and methodologies on public transportation projects.

**Submittal Procedure** – The procedure for using non-standard modeling procedures and methodology is as follows:

1. The transit project manager should contact the FTA Regional office to discuss the proposed methods and/or data not described in this manual prior to use of the non-standard approach.
2. The non-standard methodology should be documented according to the guidelines below as part of the technical report described in Section 8.2.

**Examples of Methods that Require Communication and Documentation** – The following noise and vibration analysis methods and data require communication with the FTA Regional office and documentation:

- Non-standard transit noise and vibration modeling and analysis methods not described in this manual (including non-standard adjustments, computations, and assumptions). This includes modifications to standard FTA noise and vibration methods.
- Non-standard transit noise and vibration reference data not described in this manual (including measured data, substitution data, data at non-standard reference distances and/or speeds, new transit noise sources, and transit noise sources operating in non-standard conditions).
- Non-standard transit noise and vibration impact criteria not described in this manual, including the maximum sound pressure level metric.
- Non-standard methods of evaluating construction noise, including non-standard construction noise impact criteria.
- Other noise modeling tools besides the FTA Noise Impact Assessment Spreadsheet or Traffic Noise Model (TNM®) for highway noise modeling, such as the development of a finite element method model.
- Any transit noise and vibration analysis that involves an impact area or noise source that is controversial.

**Documentation Guidelines** – The use of non-standard noise and vibration analysis methods or data requires the following documentation components in a technical memorandum attached to the environmental document:

- **Background**
  Briefly describe the transit project for which non-default methods or data are needed. State the dominant noise sources, type of analysis, and the impact criteria. Include any additional relevant information.



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- **Statement of Benefit**
  Briefly describe the benefit of the non-default noise and vibration methods or data to the transit project. Describe the appropriateness of the non-default methods or data, as well as why the standard method or data are insufficient or problematic.

- **Non-standard Data Description**
  Describe the non-standard noise or vibration data in detail. Include source type, manufacturer, reference conditions (speed, distance, and operational conditions), name of data supplier, and a date associated with data development/measurement. For measured noise or vibration data, provide corresponding data documentation (such as a data measurement or a development report). For substitution data, a comparison between the non-standard data and corresponding standard data should be provided. Furthermore, if outside sources recommend the use of the non-standard data (such as a technical society, a standards organization, or a vehicle manufacturer), references for those recommendations should be included.

- **Non-standard Methods Description**
  Describe the non-standard noise or vibration analysis method in detail. This should include a detailed description and derivation of the method (including data used in the development of the method), a description of the usage of the method, and a comparison between the non-standard method and the corresponding standard method in the context of the transit analysis. If the method has been validated against measurement data, a description of that validation analysis should be provided. If the method is derived from another source (such as a different transportation noise or vibration method), provide corresponding documentation for that source. A description of how the method is conservative (for example, estimating the worst-case scenario) or some discussion on the probability of exceeding the predicted level should be provided. Furthermore, if outside sources recommend the use of the non-standard method (such as a technical society or standards organization), references for those recommendations should be included.

- **Non-standard Tools Description**
  Describe in detail any non-standard noise or vibration models that have not been explicitly recommended in this manual. This should include a detailed description of the tool (including data used, the computations implemented in the tool, any modifications or adjustments to the tool or the corresponding data, and the usage of the tool), a description of the validation of the tool (including reference documentation and validation analyses), and a comparison between the non-standard tool and the equivalent standard tool in the context of the transit analysis. Quantitative comparisons, such as the standard deviation of the non-standard tool and an estimate of the least mean square of differences between the standard and non-standard tools, should be provided and explained. A description of how the method is conservative (for example, estimating the worst-case scenario) or some discussion on the probability of exceeding the predicted level should be provided. If outside sources recommend the use of the non-standard tool (such as a technical society or standards organization), references for those recommendations should be included.

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**EXHIBIT E**

## Conservancy Territory Map

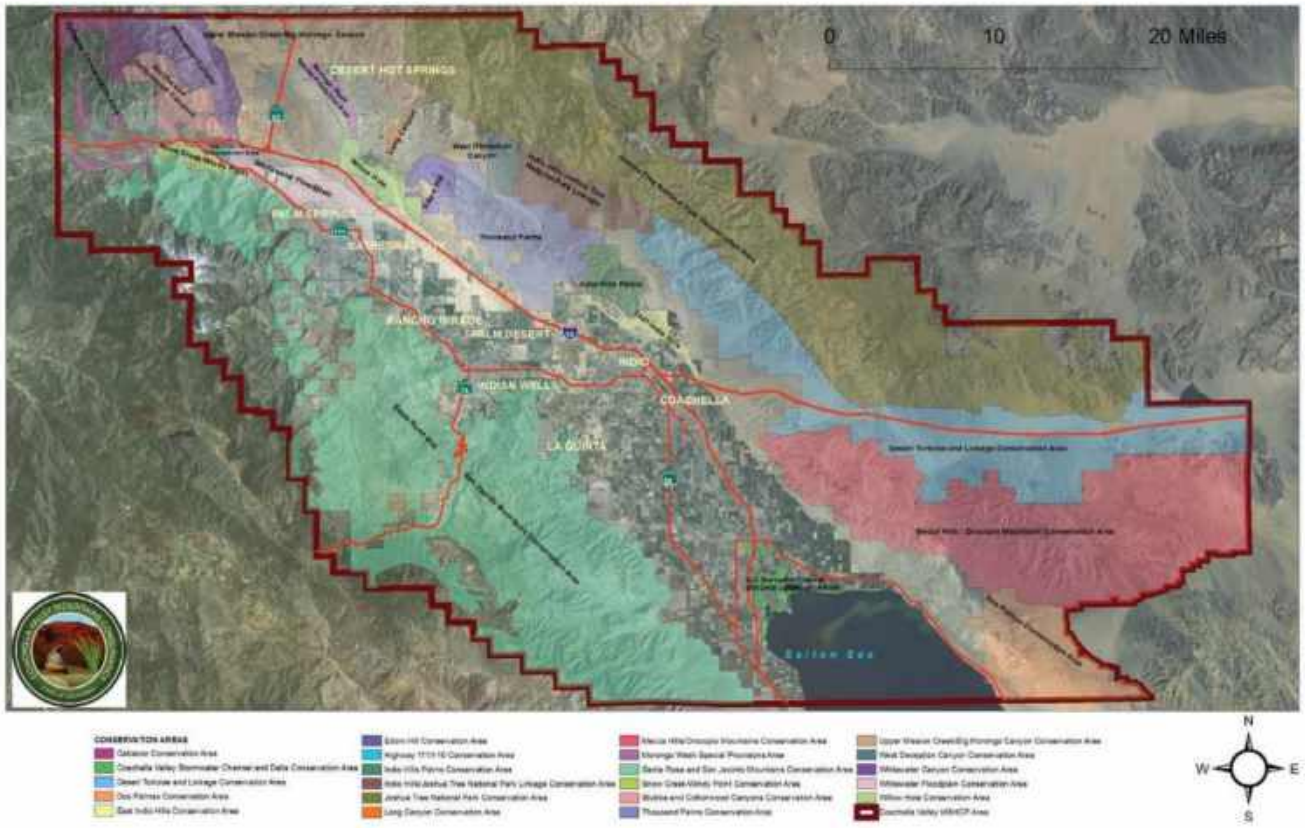


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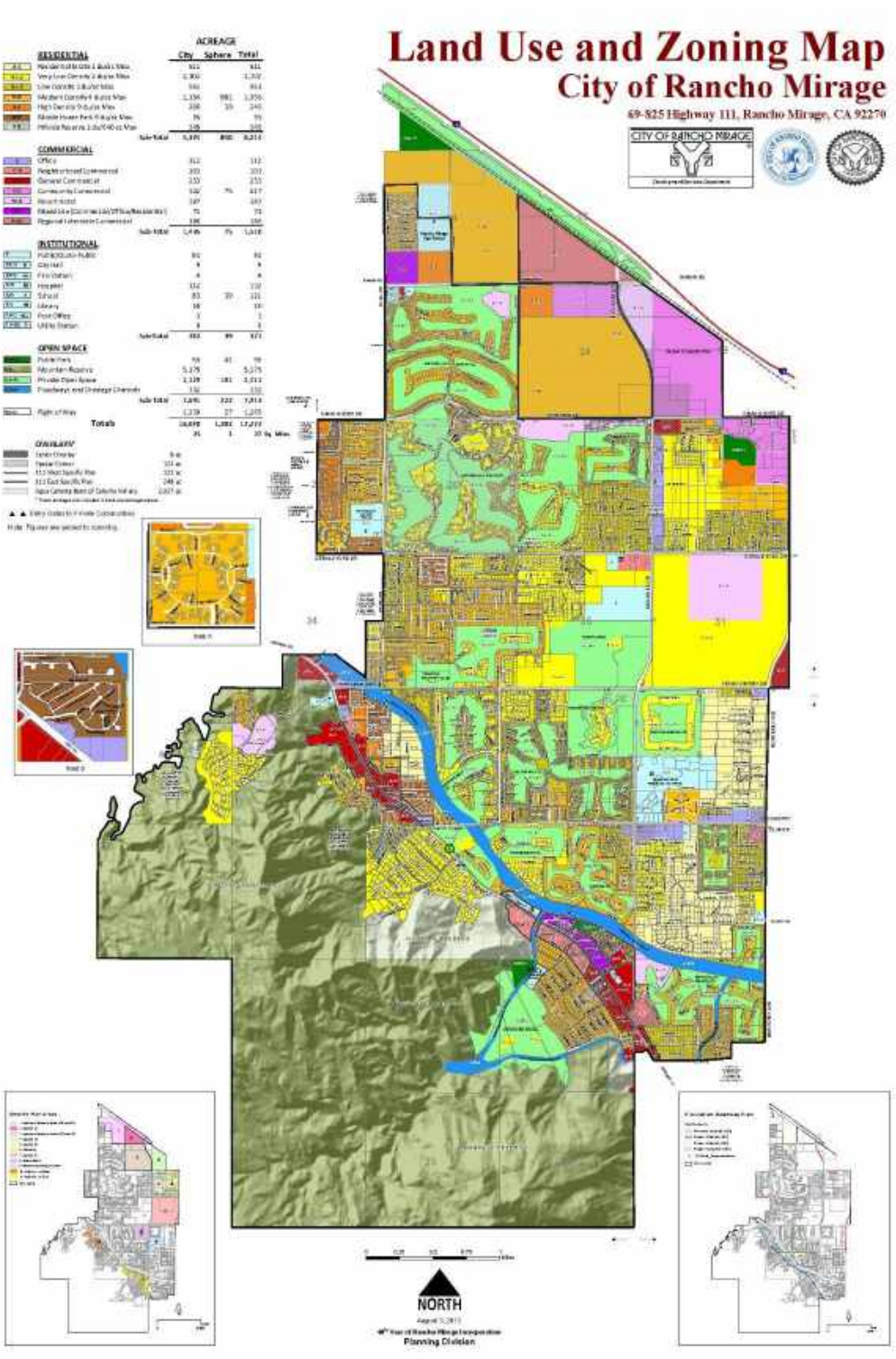
**EXHIBIT F**

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# Response to Comment Letter O1

**Western States Council of Carpenters**
**April 9, 2024**

**O1-1** The City acknowledges the comment as an introduction to comments that follow. This comment is included in the Final MND for review and consideration by the decision-makers prior to a final decision on the project. No further response is required.

**O1-2** The comment provides a summary of the project description and project location. The commenter incorrectly identifies the acreage, square footage of buildings, total parking spaces, inclusion of the existing Ritz-Carlton Rancho Mirage, and Assessor's Parcel Numbers identified in the MND project description, see Chapter 1, Project Description. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O1-3** The comment provides background information on the Western States Regional Council of Carpenters and an introduction to the comments that follow. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O1-4** The comment recommends the use of local workers who have graduated from a Joint Labor-Management Apprenticeship Program or similar for the project to benefit the local economy and to reduce environmental impacts by mitigating GHG emissions, improving air quality, and reducing transportation impacts. The comment provides information from Exhibit A, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling, and other resources.

The City appreciates the comment and notes that the Draft IS/MND analyzed the project's air quality, greenhouse gas, and transportation-related impacts in Section III, Air Quality; Section VIII, Greenhouse Gas Emissions; and Section XVII, Transportation. As discussed in these sections, the Draft IS/MND concluded that the project would result in less-than-significant impacts with regard to these resource topics (in the case of the project's transportation impacts, implementation of MM-TRA-1 and MM-TRA-2 are required to reduce the project's operation-related transportation impacts to less than significant). Because the project would not result in significant environmental impacts, no further mitigation is required per Section 15126.4(a)(3) of the CEQA Guidelines.

**O1-5** The comment makes general recommendations for the City to adopt training, certification, and safe on-site construction work practices for construction workers on any developments within the City's General Plan Area. The comment also recommends that the project include construction site designs, testing, and planning practices to prevent community spread of COVID-19 and other infectious diseases. COVID-19 is a topic outside the purview of CEQA and CEQA requires the evaluation of potential physical environmental impacts of the project on the environment. Additionally, the comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O1-6** The comment provides background information on Environmental Impact Reports under CEQA. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

01-7 The comment provides background information on Initial Studies, Negative Declarations, and Mitigated Negative Declarations under CEQA. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

01-8 The comment is an introduction to the detailed concerns provided later in the comment letter. The comment states that the MND fails to support all of its findings with sufficient analysis and substantial evidence and fails to incorporate mitigation measures. The commenter incorrectly identifies the acreage and square footage of buildings identified in the MND project description, see Chapter 1, Project Description. The comment also states that the project will have a significant impact on the environment and an EIR is required. The project will not have a significant effect on the environment with the proposed mitigation measures, as discussed in the Draft IS/MND and an EIR is not required. The specific concerns about the adequacy of analysis and mitigation measures brought up by the commenter are addressed in Responses to Comments 01-10 through 01-19.

01-9 The comment states that the mitigation measures in the MND fail to adequately analyze or mitigate the project's impacts and are improperly deferred, so an EIR is required. The MND includes specific mitigation measures that reduce impacts to less than significant, so an EIR is not required. The detailed concerns about the adequacy of mitigation measures are addressed in Responses to Comments 01-10 through 01-19.

01-10 The comment provides background on significant effects under CEQA. The comment states that the MND fails to provide analysis on the project's biological resource impacts The comment states that the MND cannot conclude that the proposed mitigation measures will reduce biological resource impacts to less than significant without first conducting field surveys and subsequent analysis. The comment states that the project should be subject to a more comprehensive EIR review due to the potential occurrence of special-status species. The comment also states that at a minimum, pre-construction biological surveys specifications should be disclosed as part of the proposed mitigation measures.

As discussed in the *Biological Resources Assessment* dated *February 21, 2022*, the general reconnaissance surveys conducted provide an accurate representation of the potential for special-status species to occur. The *Biological Resources Assessment* describes the existing conditions of special-status biological resources on the project site (proposed project footprint) and within a 500-foot buffer where access was granted (study area), quantifies impacts to special-status biological resources that would result from implementation of the project and describes those impacts in terms of biological significance under both CEQA and compliance with the CVMSHCP, and provides recommended avoidance, minimization, and mitigation measures to avoid and reduce impacts to special-status biological resources, if necessary. A species' potential to occur is decided by determining whether the project site and surrounding area include suitable habitat for that species as documented during the site visit, as well as a review of know/documented occurrences of that species as kept in the CDFW CNDDB database. A combination of these factors goes into generating the low, moderate, high or not expected potential to occur of the species. The species with potential to occur were not incidentally detected during the June 2021 survey and focused species surveys are not required by CEQA to assess the impacts to species with the potential to occur. The MND includes MM-BIO-1, which would ensure consistency with the CVMSHCP which would mitigate impacts to CVMSHCP covered species, including the Peninsular bighorn sheep and burrowing owl to less than significant without the need for focused surveys. For species not covered under the CVMSHCP, such as the red diamondback rattlesnake, impacts would still be reduced to less than significant with the implementation of MM-BIO-

2, construction best management practices. The MND already includes pre-construction surveys for nesting birds under MM-BIO-3 and burrowing owls identified under MM-BIO-4. With the inclusion of these mitigation measures, the project would have a less than significant impact to biological resources and an EIR is not required.

01-11 The comment states that the language of MM-CUL-1 is ambiguous on whether the qualified archeologist and Native American monitor are required to be present at the commencement of, and continuously during, any ground disturbing activities, or whether they will only be called to the project in the event of the unanticipated discovery. The comment requests that the mitigation measure be revised to require that both monitors be present for all initial ground-disturbing activities at the project for the purpose of evaluating and addressing any unanticipated discoveries. The comment also states that MM-CUL2 should also require a qualified archeologist and Native American monitor to evaluate the initial discovery of any human remains rather than the project laborers.

As stated in the MND, MM-CUL-1 states that a qualified archaeologist and a Native American monitor shall be present for initial ground disturbing activities. In the case of an unanticipated discovery, work would stop until the archeologist or Native American Monitor evaluated the discovery. Changes were made to MM-CUL-1 to provide further clarification. These clarifications do not change the analyzed impacts or findings in the MND and do not represent new information or significant changes that alter the conclusions of the MND. MM-CUL-2 states that the County Coroner will be contacted to make the determination regarding human remains. The responsibility of the construction personnel is to contact the County Coroner, rather than to make the determination and manage the discovery.

01-12 The comment states that the mitigation measures do not provide for any pre-construction training for the project's construction workers to properly identify sensitive cultural resources or human remains. The comment also states the MND does not specify due diligence for Tribal coordination. Because of these, the comment states that the analysis as related to cultural resources is inadequate. The comment requests that MM-CUL-1 and MM-CUL-2 at a minimum be revised to adequately mitigate potential significant impacts to cultural resources.

Impacts to cultural resources would be less than significant with the application of MM-CUL-1 and MM-CUL-2. Additional mitigation measures are not necessary. Additionally, pre-construction training for construction workers to properly identify sensitive cultural resources or human remains is not specifically required by CEQA. Nonetheless, the role of the construction personnel is to contact the qualified archeologist, Native American Monitor, or the County Coroner in the cases of potential discovery. It is not the role of construction personnel to make final determinations.. Also, due diligence for tribal consultation has been completed for this project. As stated in the MND, an updated historical and archeological resources survey was prepared by CRM TECH in September 2019 and included consultation with Native American representatives. Additionally, comments were received from the Agua Caliente Band of Cahuilla Indians which will be included in the Final MND.

01-13 The comment states that an EIR must prepared because the project may have a significant noise impact. The comment states that the MND fails to measure ambient noise levels near the most sensitive receptors at the southern edge of the project and that the three locations (L1, L2, and L3) are inadequate.

As discussed in the MND, noise impacts are less than significant and an EIR is not required. Also as discussed in the MND, noise measurement locations were chosen using Caltrans and FTA guidance. The recommended approach is to characterize the noise environment for clusters of sites based on the measures or estimates at representative locations in the community and the monitored levels are only used to estimate the general ambient noise levels in the area. The impact determination is based on predicted noise levels and the residential communities to the south of the project site (represented by locations R3 to R8) were analyzed using the appropriate prediction methodology. The calculated values at these locations (not the monitored locations) were used to evaluate the potential impacts.

01-14 The comment states that the MND incorrectly concludes that there will be no significant impact to sensitive receptors and uses the 85 dBA identified in NIOSH Occupational Noise Exposure as the threshold for significant impact. The comment notes that NIOSH Occupational Noise Exposure does not provide an adequate threshold to assess external noise levels for private property and identifies FTA Transit Noise and Vibration Impact Assessment as the preferred source. The comment notes that the FTA Transit Noise and Vibration Impact Assessment states that any noise increase of 15 dBA or greater for a residence is considered a severe impact. The comment states that the selected survey locations, although inadequate, have the potential to exceed thresholds using FTA standards and have a significant noise impact.

The analysis has been updated to include the FTA criteria, for which the limit would be 80 dBA Leq for residential properties, assuming there would be no nighttime construction. As identified in Table 13-3 of the MND, the highest predicted construction noise level at any noise sensitive receptor is 70.3 dBA Leq. As stated in section 13.2 of the MND, construction of the project would be restricted to the daytime hours between 7 am and 6 pm. Since there will be no nighttime construction activities, this complies with the FTA limit. The 15 dBA increase criterion is not relevant to construction noise. The adequacy of the survey locations is addressed in Response to Comment 01-13.

01-15 The comment states that MM-NOI-1 would have little to no mitigating effect on the exposure of nearby sensitive receptors to overall project construction noise and should include provisions for noise barriers near the southern edge of the project. The comment calls for at least a revised MND with updated mitigation measures if a full EIR is not prepared.

MM-NOI-1 does not deal with noise and it only deals with construction vibration. Noise impacts are less than significant and additional mitigations and an EIR are not required. Implementation of MM-NOI-1 will reduce the impact of ground-borne vibration to be less than significant as intended. Other mitigation measures for ambient or ground-borne noise are not proposed because these impacts are less than significant and mitigation is not required.

01-16 The comment states that additional measures are necessary to reduce operational GHG emissions and energy use. The comment states that the MND is not consistent with the GBC, noting the lack of EV vehicle accommodations. The comment states that because this analysis is missing, the MND conclusions regarding significance of impacts is flawed. The comment also states that project has the potential to result in significant impacts in the form of GHG emissions and conflicting with the 2022 CARB Scoping Plan and GBC because the project would not construct EVCS while proclaiming compliance. Additionally, the comment states that the MND is missing an analysis of energy use and GHG emissions impacts with and without EVCS infrastructure, which results in a potentially significant impact and requires an EIR.

As identified in the MND, the project's operation is considered more in line with a commercial hotel use than a traditional residential project, as the 106 residential suites would be treated as a condo hotel in which residents are allowed to live at the residence only during a specified time frame. As such, the CARB Scoping Plan recommendations for residential and mixed-use projects are not appropriate. Nevertheless, many of the measures and programs included in the Scoping Plan would result in the reduction of project-related GHG emissions with no action required at the project-level, including GHG emission reductions through increased energy efficiency and renewable energy production (SB 350), reduction in carbon intensity of transportation fuels (LCFS), and the accelerated efficiency and electrification of the statewide vehicle fleet (Mobile Source Strategy).

The commenter incorrectly states that because the CARB requirements are deemed not appropriate, that the project would be relieved of the GBC EVCS requirements. The MND states that the project would provide EV charging infrastructure that meets the California GBC. Further analysis of the impact of EV charging infrastructure is not required in the GHG analysis as the project would comply with California GBC and GHG impacts would be less than significant. Because impacts are less than significant, mitigation and an EIR are not required. The detailed engineering project specifications and how the project meets all the applicable requirements of the GBC will be specified in the City building permit plan review and the City's departmental review will ensure compliance with GBC regulations and requirements. As such, the commenter incorrectly states that "under the current framework in the MND, the Applicant could very well construct no EVCS's whatsoever in connection with the Project…" The project will meet the requirements of GBC.

01-17 The comment provides background on general plans in California. The comment states the analysis regarding rezoning on significance of impact is flawed. The comment states that the biological mitigation measures do not adequately mitigate potential impacts associated with rezoning Mountain Reserve Land to Resort/Hotel use. The comment states that the only way for the rezoning impacts to be properly mitigated to less than significant is if the project creates protections for other natural lands multiple times larger than the Mountain Reserve Land targeted for development.

As discussed in the MND, the Sky Mesa Recreational Area is the portion of the project that is on the area zoned as Mountain Reserve and the applicant is proposing an amendment to the City's General Plan and Zoning Map that would rezone the Sky Mesa Recreational Area as Resort Hotel. Appendix G land use threshold b) asks if the project would "(c)ause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect". Conflict with the general plan designation and zoning code does not inherently result in an environmental impact. As discussed in MND Section 11.2, the project and associated discretionary actions associated with the General Plan and Zoning Map amendment, the project would not conflict with the City's land use policies, including protecting sensitive species with the incorporation of biological resource mitigation measures, and therefore does not require further mitigation. Further, if approved, it would be consistent with the general plan land use designation and zoning of the site.

01-18 The comment states that project requires significant revisions and resolutions of evidence which at least calls for a revision and recirculation of the MND if it does not prepare an EIR.

CEQA Guidelines Section 15073.5 provides the legal criteria that a lead agency is to consider when deciding whether is required to recirculate the MND. Recirculation is required when the document must

be substantially revised after public notice of its availability. A substantial revision is defined as a new, avoidable significant effect where mitigation measures or project revisions must be added to reduce the effect to insignificant (CEQA Guidelines Section 15073.5(b)). The concerns raised by the commenter that call for significant revisions were addressed in Responses to Comments O1-10 through O1-16 and there are no substantial revisions to the MND. Rather, new information is added to the MND which merely clarifies, amplifies, or makes insignificant modification, which does not require Recirculation of the MND per CEQA Guidelines Section 15073.5(c)(4). Additionally, potential impacts are less than significant with the mitigation measures proposed and an EIR is not required.

**O1-19** The comment provides background information on project descriptions. The comment requests that the project include an adequate project description with the details listed in CEQA Guidelines Section 15124.

Section 15071 of the CEQA Guidelines provides the minimum requirements for an Initial Study and Negative Declaration or Mitigated Negative Declaration. Among these requirements are a brief description of the project, including a commonly used name for the project, if any; and the location of the project, preferably shown on a map, and the name of the project proponent., Additional guidance regarding the contents of an EIR's project description is provided in Section 15124 (According to Section 15124, a project description shall reflect the specifics of the project, the project site, and its surroundings, but should not provide extensive detail beyond that needed for evaluating environmental impacts. Section 15124 provides the requirements for an EIR, not an IS/MND. However, the project Description section of the Draft IS/MND includes a detailed description of the project, the project site and its surroundings, and the anticipated operational and construction characteristics of the project. The narrative project description and accompanying figures meet the specifications required by the CEQA Guidelines and provide sufficient detail to evaluate environmental impacts.

**O1-20** The comment states that the project must be approved by a two-thirds vote of the Rancho Mirage electorate in addition to the City. The comment states that the intention is to make ensure that proper approval procedures are followed. The project site is located on private land adjacent to the Santa Rosa and San Jacinto Conservation Areas. The project site is not considered mountainous lands and would not require the project to be approved by a two-thirds vote of the electorate. As described in the MND, the project would not result in any significant impacts related to land use. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O1-21** The comment provides concluding remarks and summarizes the recommendations identified earlier in the comment letter. These recommendations are addressed in Responses to Comments O1-4, O1-5, O1-08, and O1-17.

**O1-22** The comment provides background information on CalEEMod and how it is used to calculate VMT and quantify GHG Emissions, and states that vehicle running emissions can be reduced by decreasing overall trip length, by local hire or otherwise. The comment explains how local hire requirements and associated worker trip length reductions impact GHG calculations using CalEEMod. The comment assumes that the efficacy of a local hire requirement is dependent on the urbanization of the project site as well as the location. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

01-23 The comment uses the City of Claremont as an example of the impact of a local hire requirement on construction-related GHG emissions. The example project GHG emissions associated with construction work trips would decrease if a local hire provision with a 10-mile radius was implemented, but the comment states that this example does not indicate that local hire requirements would result in reduced construction-related GHG emissions for all projects. The comment does not identify specific issues with the adequacy of the MND. No further response is required. Also, as discussed in the MND, VMT and GHG impacts were determined to be less than significant with. No mitigation measures is required.

01-24 The comment is a disclaimer and provides concluding remarks. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

01-25 The comment includes Attachment A through Attachment C for Exhibit A. The comment includes supporting Air Basin and Specific Plan data for Exhibit A. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

01-26 The comment includes the resume of Paul Rosenfeld. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

01-27 The comment includes the resume of Matthew F. Hagemann. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

01-28 The comment includes the Transit Noise and Vibration Impact Assessment Manual from the Federal Transit Administration as supporting information for the comment letter. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

01-29 The comment includes the Conservancy Territory Map for Coachella Valley Mountain Conservancy as supporting information for the comment letter. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

01-30 The comment includes the Land Use and Zoning Map for the City of Rancho Mirage as supporting information for the comment letter. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

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Comment Letter O2

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April 9, 2024

**VIA EMAIL AND OVERNIGHT MAIL**
ATTN: Ben Torres, Planning Manager
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**Re: Preliminary Comments on the Initial Study/Mitigated Negative Declaration for the Ritz-Carlton Rancho Mirage Project (SCH 2024030267; Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004, and TPM23-0002).**

Dear Mr. Torres:

We are writing on behalf of Californians Allied for a Responsible Economy ("CARE CA") to provide preliminary comments on the Initial Study/Mitigated Negative Declaration ("IS/MND") prepared by the City of Rancho Mirage ("City") for the Ritz-Carlton Rancho Mirage (SCH 2024030267; Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004, and TPM23-0002) ("Project"), proposed by Kam Sang International ("Applicant"). O2-1

The Project proposes the construction of the Ritz Carlton residences consisting of 106 units (48 residential suites & 58 villas) ranging in size from 1 to 3 bedrooms, 23,840 square feet of event space, 5,510 square feet for amenities, a 381-space subterranean parking structure, and 116 additional residential spaces. The Project also proposes the construction of the 6,273-square-foot Sky Mesa Recreation Area, which would provide event space, restaurant, and amenities such as a pool terrace. A General Plan Zoning Map Amendment from Mountain Reserve ("MR") to Resort Hotel ("Rs-H") is concurrently proposed for the Sky Mesa Recreation Area. Overall, the 35.07- acre project site which includes the existing hotel will expand by a total of approximately 236,748 square feet of new interior spaces. O2-2

We reviewed the IS/MND with the assistance of air quality and health risk experts Paul E. Rosenfeld, PhD from Soil / Water / Air Protection Enterprise O2-3

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("SWAPE"),[1] and transportation expert Norm Marshall.[2] The City must separately respond to these technical comments.

02-3 Cont.

Based upon our review of the IS/MND and supporting documentation, we conclude that the IS/MND fails to comply with the requirements of CEQA. The IS/MND lacks substantial evidence to support its conclusions and fails to properly mitigate the Project's potentially significant impacts. These include impacts on public health, air quality, energy, and transportation. Substantial evidence supports a fair argument that the Project will result in significant and unmitigated impacts in these areas. For example, the emissions of toxic air contaminants ("TACs") during construction and operation of the Project would exceed the maximum incremental cancer risk of 10 in one million. The City cannot approve the Project until the errors in the IS/MND are remedied by preparing an environmental impact report ("EIR") which fully discloses and mitigates the Project's potentially significant impacts.

02-4

We reserve the right to supplement these comments at later proceedings and hearings related to the Project.[3]

## I. STATEMENT OF INTEREST

CARE CA is an unincorporated association of individuals and labor organizations that may be adversely affected by the potential public and worker health and safety hazards, and the environmental impacts of the Project. The coalition includes Rancho Mirage residents Norman Gerler and Michael Sanholtzer, the District Council of Ironworkers and Southern California Pipe Trades DC 16, along with their members, their families, and other individuals who live and work in the City of Rancho Mirage and in Riverside County.

CARE CA advocates for protecting the environment and the health of their communities' workforces. CARE CA seeks to ensure a sustainable construction industry over the long-term by supporting projects that offer genuine economic and employment benefits, and which minimize adverse environmental and other impacts on local communities. CARE CA members live, work, recreate, and raise their families in the City of Rancho Mirage and surrounding communities.

02-5

[1] Dr. Rosenfeld's comments and curricula vitae are attached hereto as **Exhibit A** ("SWAPE Comments").
[2] Mr. Marshall's comments and curricula vitae and are attached hereto as **Exhibit B** ("Marshall Comments").
[3] Gov. Code § 65009(b); PRC § 21177(a); *Bakersfield Citizens for Local Control v. Bakersfield* ("*Bakersfield*") (2004) 124 Cal. App. 4th 1184, 1199-1203; *see Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal. App. 4th 1109, 1121.

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Accordingly, they would be directly affected by the Project's environmental and health and safety impacts. Individual members may also work on the Project itself. They will be first in line to be exposed to any health and safety hazards that exist onsite.

In addition, CARE CA has an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for its members. Environmentally detrimental projects can jeopardize future jobs by making it more difficult and more expensive for business and industry to expand in the region, and by making the area less desirable for new businesses and new residents. Indeed, continued environmental degradation can, and has, caused construction moratoriums and other restrictions on growth that, in turn, reduce future employment opportunities.

02-5 Cont.

## II. THE CITY MUST PREPARE AN ENVIRONMENTAL IMPACT REPORT TO COMPLY WITH CEQA

CEQA requires that lead agencies analyze any project with potentially significant environmental impacts in an EIR.[4] "Its purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, the EIR protects not only the environment, but also informed self-government."[5] The EIR has been described as "an environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return."[6]

02-6

CEQA's purpose and goals must be met through the preparation of an EIR, except in certain limited circumstances.[7] CEQA contains a strong presumption in favor of requiring a lead agency to prepare an EIR. This presumption is reflected in the "fair argument" standard. Under that standard, a lead agency "shall" prepare an EIR whenever substantial evidence in the whole record before the agency supports a fair argument that a project may have a significant effect on the environment.[8]

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[4] *See* Pub. Resources Code, § 21000; CEQA Guidelines, § 15002.
[5] *Citizens of Goleta Valley v. Bd. of Supervisors* ("*Goleta Valley*") (1990) 52 Cal.3d 553, 564, internal citations omitted.
[6] *County of Inyo v. Yorty* (1973) 32 Cal.App.3d 795, 810.
[7] *See* Pub. Resources Code, § 21100
[8] Pub. Resources Code, §§ 21080, subd. (d), 21082.2, subd. (d); CEQA Guidelines, §§ 15002, subd. (k)(3), 15064, subds. (f)(1), (h)(1); *Laurel Heights Improvement Assn. v. Regents of the Univ. of Cal.* ("*Laurel Heights II*") (1993) 6 Cal.4th 1112, 1123; *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 75, 82; *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 150-



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In contrast, a mitigated negative declaration may be prepared only when, after preparing an initial study, a lead agency determines that a project may have a significant effect on the environment, but:

> (1) revisions in the project plans or proposals made by, or agreed to by, the applicant before the proposed negative declaration and initial study are released for public review *would avoid the effects or mitigate the effects to a point where clearly no significant effect on the environment would occur*, and (2) there is *no substantial evidence* in light of the whole record before the public agency that the project, as revised, *may* have a significant effect on the environment.[9]

Courts have held that if "no EIR has been prepared for a nonexempt project, but substantial evidence in the record supports a fair argument that the project may result in significant adverse impacts, the proper remedy is to order preparation of an EIR."[10] The fair argument standard creates a "low threshold" favoring environmental review through an EIR, rather than through issuance of a negative declaration.[11] An agency's decision not to require an EIR can be upheld only when there is no credible evidence to the contrary.[12]

"Substantial evidence" required to support a fair argument is defined as "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached."[13] According to the CEQA Guidelines, when determining whether an EIR is required, the lead agency is required to apply the principles set forth in Section 15064, subdivision (f):

> [I]n marginal cases where it is not clear whether there is substantial evidence that a project may have a significant effect on the environment, the lead agency shall be guided by the following principle: If there is disagreement

O2-6
Cont.

151; *Quail Botanical Gardens Found., Inc. v. City of Encinitas* ("*Quail Botanical*") (1994) 29 Cal.App.4th 1597, 1601- 1602.
[9] Pub. Resources Code, § 21064.5 (emphasis added).
[10] *See, e.g., Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal.4th 310, 319-320.
[11] *Citizens Action to Serve All Students v. Thornley* (1990) 222 Cal.App.3d 748, 754
[12] *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th, 1307, 1318; *see also Friends of B Street v. City of Hayward* (1980) 106 Cal.App.3d 988, 1002 ("*Friends of B Street*") ("If there was substantial evidence that the proposed project might have a significant environmental impact, evidence to the contrary is not sufficient to support a decision to dispense with preparation of an EIR and adopt a negative declaration, because it could be 'fairly argued' that the project might have a significant environmental impact").
[13] CEQA Guidelines, § 15384, subd. (a).



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> among expert opinion supported by facts over the significance of an effect on the environment, the Lead Agency shall treat the effect as significant and shall prepare an EIR.[14]

Furthermore, CEQA documents, including EIRs and MNDs, must mitigate significant impacts through measures that are "fully enforceable through permit conditions, agreements, or other legally binding instruments."[15] Deferring formulation of mitigation measures to post-approval studies is generally impermissible.[16] Mitigation measures adopted after Project approval deny the public the opportunity to comment on the Project as modified to mitigate impacts.[17] If identification of specific mitigation measures is impractical until a later stage in the Project, specific performance criteria must be articulated and further approvals must be made contingent upon meeting these performance criteria.[18] Courts have held that simply requiring a project applicant to obtain a future report and then comply with the report's recommendations is insufficient to meet the standard for properly deferred mitigation.[19]

With respect to this Project, the IS/MND fails to satisfy the basic purposes of CEQA. The IS/MND fails to adequately disclose, investigate, and analyze the Project's potentially significant impacts, and fails to provide substantial evidence to conclude that impacts will be mitigated to a less than significant level. Because the IS/MND lacks basic information regarding the Project's potentially significant impacts, the IS/MND's conclusion that the Project will have a less than significant impact on the environment is unsupported.[20] Moreover, substantial evidence shows that the Project may result in potentially significant impacts that are not reduced to less than significant levels with the mitigation measures included in the IS/MND. Therefore, a fair argument can be made that the Project may cause significant impacts requiring the preparation of an EIR.

O2-6
Cont.

[14] Pub. Resources Code, § 21064.5.
[15] CEQA Guidelines, § 15126.4, subd. (a)(2).
[16] *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 308-309; Pub. Resources Code, § 21061.
[17] *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1393; *Quail Botanical, supra*, 29 Cal.App.4th at pg. 1604, fn. 5.
[18] *Id.*
[19] *Id.*
[20] Pub. Resources Code, § 21064.5.

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**A. The IS/MND Fails to Disclose and Mitigate Significant Health Risk Impacts**

**1. The IS/MND Fails to Disclose Significant Health Risks from the Project's Construction and Operational Emissions**

Project construction and operation would generate diesel particulate matter ("DPM"), a type of TAC.[21] DPM would be emitted during construction by heavy equipment and diesel trucks, and during operations by the Project's backup generator.[22] DPM has been linked to a range of serious health problems including an increase in respiratory disease, lung damage, cancer, and premature death.[23] The Project's emissions of DPM would impact numerous sensitive receptors located as close as 25 meters south of the Project's limits of construction.[24] Although the IS/MND provides a quantitative analysis of health risks from exposure to sources of operational emissions, the IS/MND fails to adequately analyze and mitigate health risk from construction activities or evaluate the combined lifetime risk of exposure to both the Project's construction and operational TAC emissions.

02-7

CEQA requires analysis of human health impacts. CEQA Guidelines Section 15065(a)(4) provides that the City is required to find a project will have a significant impact on the environment and prepare an EIR if the environmental effects of a project will cause a substantial adverse effect on human beings.[25] The Supreme Court has also explained that CEQA requires the lead agency to disclose the health consequences that result from exposure to a project's air emissions.[26] Courts have held that an environmental review document must disclose a project's potential health risks to a degree of specificity that would allow the public to make the correlation between the project's impacts and adverse effects to human health.[27]

02-8

In *Bakersfield Citizens for Local Control v. City of Bakersfield*, the court found that the EIR's description of health risks were insufficient and that after reading them, "the public would have no idea of the health consequences that result

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[21] IS/MND, pg. 80.
[22] IS/MND, pg. 76; South Coast Air Quality Management District ("SCAQMD"), Fact Sheet on Emergency Backup Generators, http://www.aqmd.gov/home/permits/emergency-generators ("Most of the existing emergency backup generators use diesel as fuel").
[23] *See* IS/MND, pg. 82.
[24] IS/MND, pg. 63.
[25] PRC § 21083(b)(3), (d).
[26] *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 516, 523.
[27] *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184.



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when more pollutants are added to a nonattainment basin."[28] Likewise, in *Sierra Club*, the California Supreme Court held that the EIR's discussion of health impacts associated with exposure to the named pollutants was too general and the failure of the EIR to indicate the concentrations at which each pollutant would trigger the identified symptoms rendered the report inadequate.[29] Some connection between air quality impacts and their direct, adverse effects on human health must be made. As the Court explained, "a sufficient discussion of significant impacts requires not merely a determination of whether an impact is significant, but some effort to explain the nature and magnitude of the impact."[30] CEQA mandates discussion, supported by substantial evidence, of the nature and magnitude of impacts of air pollution on public health.[31]

02-8 Cont.

For development projects like this one, the Office of Environmental Health Hazard Assessment's ("OEHHA") risk assessment guidelines also recommend a formal health risk analysis ("HRA") for short-term construction exposures to TACs lasting longer than 2 months and exposures from projects lasting more than 6 months should be evaluated for the duration of the project.[32] In an HRA, lead agencies must first quantify the concentration released into the environment at each of the sensitive receptor locations through air dispersion modeling, calculate the dose of each TAC at that location, and quantify the cancer risk and hazard index for each of the chemicals of concern.[33] Following that analysis, then the City can make a determination of the relative significance of the emissions. The significance threshold for this Project is that a significant health risk impact occurs if the Project would expose sensitive receptors to air contaminants that exceed the maximum incremental cancer risk of 10 in one million.[34]

02-9

The City failed to conduct this analysis. Despite acknowledging that exposure is the primary factor used to determine health risk, the IS/MND does not quantify sensitive receptors' exposure to DPM emitted during Project construction.[35] The MND's qualitative analysis instead assumes, without supporting evidence, that the

[28] *Id.* at 1220.
[29] *Sierra Club*, at 521.
[30] *Id.* at 519, citing *Cleveland National Forest Foundation v. San Diego Assn. of Governments* (2017) 3 Cal.5th 497, 514–515.
[31] *Sierra Club*, 6 Cal.5th at 518–522.
[32] Office of Environmental Health Hazard Assessment (OEHHA), Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments, February 2015 (OEHHA 2015), Section 8.2.10: Cancer Risk Evaluation of Short Term Projects, pp. 8-17/18; https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.
[33] *Id.*
[34] IS/MND, pg. 80.
[35] *Id.*

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health risk would be less than significant simply because construction would last 22 months, and not constitute a long-term (30-year) source of TAC emissions.[36] This reasoning is incorrect, as it assumes that exposure to TACs over a term shorter than 30 years cannot result in significant health effects. Rather, the Project's 22-month construction schedule exceeds the two-month threshold recommended by OEHHA. Thus, to comply with CEQA's analytical requirements and the health-based recommendations of the regulatory agency responsible for providing guidance on conducting HRAs in California, the City must prepare quantitative analysis of this Project's health risk impacts.

O2-9 Cont.

The City also reasons, incorrectly, that the Project's localized air quality impacts would not expose sensitive receptors to substantial air pollutant concentrations because the Project's emissions would not exceed Localized Significance Thresholds ("LSTs").[37] LSTs are based on the number of pounds of emissions per day that can be generated by a project that would cause or contribute to adverse localized air quality impacts. But LSTs only apply to four criteria pollutants: $NO_x$, CO, $PM_{10}$, and $PM_{2.5}$. LSTs do not apply to DPM or other TACs, and thus do not disclose the magnitude of the Project's TAC emissions or the resulting resultant health impacts.[38] Thus, the IS/MND's analysis of LSTs is no substitute for the IS/MND's failure to analyze health risk impacts from exposure to TACs.

O2-10

The IS/MND fails to comply with CEQA by failing to provide the necessary information to evaluate the health risk impacts of the Project. Due to the proximity of the nearest sensitive receptors to construction and operational sources of DPM, there is no dispute that the Project may result in potentially significant health risk impacts if exposure to DPM emissions causes cancer risk to those receptors to exceed SCAQMD's CEQA thresholds. The City must prepare a health risk analysis to evaluate the magnitude of the Project's health risk impacts in accordance with CEQA.

O2-11

[36] IS/MND, pg. 81.
[37] *Id.*
[38] South Coast Air Quality Management District, Final Localized Significance Threshold Methodology (June 2003, Revised July 2008) www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2; http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.



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**2. Health Risks from Exposure to the Project's Construction Emissions Is Significant and Unmitigated**

Substantial evidence shows that health risks from exposure to construction emissions would be significant. SWAPE prepared a health risk analysis using AERMOD, the US EPA's preferred air dispersion model, in accordance with OEHHA's Toxic Hot Spot Emissions Guidance.[39] SWAPE's analysis combines the Project's construction and operational health risks together and sums them to compare to the SCAQMD threshold of 10 in one million.[40] This quantitative analysis relies on emissions data from the IS/MND's own air quality analysis.[41] The results of the air model and the health risk analysis are attached as an appendix to this letter.

SWAPE found that the excess cancer risks to the 3rd trimester of pregnancy and infant receptors at the maximally exposed individual resident, located approximately 175 meters away, over the course of Project construction, are approximately 3.03 and 54.7 in one million, respectively.[42] SWAPE calculates that the total excess cancer risk associated with Project construction is approximately 57.7 in one million, which alone exceeds the SCAQMD threshold of 10 in one million. And when the Project's construction-related cancer risk is summed with the IS/MND's operational cancer risk of 0.56 in one million, SWAPE estimates an excess cancer risk of approximately 58.3 in one million over the course of a 30-year residential lifetime. The combined cancer risk further exceeds the SCAQMD threshold of 10 in one million. These exceedances of the health risk significance threshold are substantial evidence of a significant impact, requiring preparation of an EIR. SWAPE's comments propose feasible mitigation measures to reduce the Project's significant health risk impact.[43]

02-12

This health risk exceeds SCAQMD's 10 in 1,000,000 threshold, resulting in a significant impact. The City must revise the EIR to include analysis and mitigation of the Project's significant health risk impacts.

[39] SWAPE Comments, pg. 3.
[40] *Id.*
[41] *Id.*
[42] *Id.* at 4.
[43] *Id.* at 7.



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**B. The Project Conflicts with Implementation of the Applicable Air Quality Plan**

The CEQA Guidelines provide that a significant air quality impact would occur when a project "[c]onflict[s] with or obstruct implementation of the applicable air quality plan."[44] Further, the Guidelines provide that a significant impact would occur if a project conflicts with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect.[45]

The air quality levels projected in the SCAQMD's 2022 Air Quality Management Plan ("AQMP") are based on the assumption that development associated with general plans, specific plans, residential projects, and wastewater facilities will be constructed in accordance with population growth projections identified by Southern California Association of Governments ("SCAG") in its 2020 RTP/SCS. SCAG's forecasts rely on jurisdictional existing land use and general plan land use data.[46] But the 2022 AQMP does not reflect the proposed land use designation for the Project site as proposed in the IS/MND. The Project proposes changing the land use designation for the Project site from "Mountain Reserve" to "Resort Hotel," which would introduce additional residents to the City, as well as new hotel uses. For this reason, there is the potential for the Project to exceed air quality impact assumptions in the AQMP.

02-13

The IS/MND argues that the Project is consistent with the AQMP because the 216 additional residents anticipated by the Project is within SCAG's projected population increase from the City.[47] But the magnitude of the population growth does not change the fact that this increase would result from a new residential land use designation not previously accounted for in SCAG's forecast. The development of the Project site as proposed would generate operational-source emissions not reflected within the current 2022 AQMP regional emissions inventory for the South Coast Air Basin. Any increase in emissions due to this Project would be in addition to the land use designations already accounted for by SCAG. Thus, the Project would be inconsistent with the AQMP according to this criterion. This significant impact must be disclosed and mitigated in an EIR.

[44] CEQA Guidelines, Appendix G, subd. III.
[45] CEQA Guidelines, Appendix G, subd. X.
[46] SCAG, Connect SoCal Demographics and Growth Forecast (September 3, 2020), Pg. 23, available at https://scag.ca.gov/sites/main/files/file-attachments/0903fconnectsocal_demographics-and-growth-forecast.pdf?1606001579.
[47] IS/MND, pg. 71.



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**C. The IS/MND Fails to Include Sufficient Investigation into Energy Conservation Measures**

The IS/MND does not include sufficient investigation into energy conservation measures that might be available or appropriate for the Project. The IS/MND concludes that operational energy impacts of the Project would be less than significant because the buildings would be designed and constructed in accordance with the State's Title 24 guidelines and regulations.[48] However, compliance with Title 24 regulations alone does not support a conclusion that energy impacts are less than significant, and the IS/MND does not sufficiently consider energy conservation measures like solar facilities, use of alternate fuel sources, or passive energy efficiency measures to ensure the Project's energy consumption would not be wasteful, inefficient, or unnecessary. This lack of analysis violates CEQA.

CEQA requires an environmental document to discuss mitigation measures for significant environmental impacts, including "measures to reduce the wasteful, inefficient, and unnecessary consumption of energy."[49] The CEQA Guidelines require discussion of energy conservation measures when relevant, and provide examples in Appendix F:[50]

1) Potential measures to reduce wasteful, inefficient and unnecessary consumption of energy during construction, operation, maintenance and/or removal. The discussion should explain why certain measures were incorporated in the project and why other measures were dismissed.
2) The potential of siting, orientation, and design to minimize energy consumption, including transportation energy, increase water conservation and reduce solid waste.
3) The potential for reducing peak energy demand.
4) Alternate fuels (particularly renewable ones) or energy systems.
5) Energy conservation which could result from recycling efforts.

Courts have rejected EIRs that fail to include adequate analysis investigation into energy conservation measures that might be available or appropriate for a project.[51] In *California Clean Energy Commission v. City of Woodland* ("*CCEC*"),[52] the Court of Appeal reviewed an EIR for a shopping center on undeveloped

02-14

[48] IS/MND, pg. 98-101.
[49] Pub. Resources Code, § 21100(b)(3); *Tracy First v. City of Tracy* (2009) 177 Cal.App.4th 912, 930.
[50] 14 Cal. Code Regs., § 15126.4(a)(1)(C) (stating "Energy conservation measures, as well as other appropriate mitigation measures, shall be discussed when relevant.").
[51] *Uhiah Citizens for Safety First v. City of Ukiah* (2016) 248 CA4th 256; *Spring Valley Lake Ass'n v. City of Victorville* (2016) 248 CA4th 91.
[52] (2014) 225 CA4th 173.



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agricultural land. Similar to the IS/MND here, the EIR in *CCEC* concluded that, due to the proposed project's compliance with Title 24 guidelines and regulations, the project would be expected to have a less-than-significant impact regarding the wasteful, inefficient, or unnecessary consumption of energy. But the lead agency's EIR did not include discussion regarding the different renewable energy options that might be available or appropriate for the project. The Court held "the City's EIRs failed to comply with the requirements of Appendix F to the Guidelines by not discussing or analyzing renewable energy options."[53] The lead agency argued that compliance with the Building Code sufficed to address energy impact concerns for the project.[54] But the Court explained:

> Although the Building Code addresses energy savings for components of a new commercial construction, it does not address many of the considerations required under Appendix F of the CEQA Guidelines... These considerations include whether a building should be constructed at all, how large it should be, where it should be located, whether it should incorporate renewable energy resources, or anything else external to the building's envelope. Here, a requirement that Gateway II comply with the Building Code does not, by itself, constitute an adequate assessment of mitigation measures that can be taken to address the energy impacts during construction and operation of the project.[55]

Here, the IS/MND lacks basic analysis of energy consumption measures in violation of CEQA Guidelines Appendix F. The IS/MND fails to analyze the feasibility of onsite solar facilities, such as rooftop, parking lot, or ground-level solar photovoltaics. This analysis must address considerations such as the technical and economic feasibility of installing solar facilities on the Project site, the potential size of the Project's solar zone, and the potential magnitude of mitigation provided by installing solar facilities.

The IS/MND also fails to evaluate the extent to which mobile source energy consumption could be reduced during Project operations through electric vehicle charging infrastructure (above what is required by existing regulations). A detailed analysis is necessary to evaluate the Project's consistency with Policies AQ 1.4B ("Require the installation of electric vehicle charging stations, as a ratio of total required parking, for new commercial projects") and AQ 1.5D ("Require all building, both residential and commercial, to be electric vehicle charging station ready").

O2-14 Cont.

O2-15

[53] *Id.* at 213.
[54] *Id.* at 210, 211.
[55] *CECC* (2014) 225 CA4th 173, 213.

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The IS/MND states that a diesel backup generator would be required for Project operations,[56] but fails to evaluate measures to reduce this source of energy consumption, such as use of alternative fuel sources.

02-16

The IS/MND states that the Project would obtain electricity from the Rancho Mirage Energy Authority, which supplies power to homes and businesses with an opportunity to opt up to 100% renewable energy.[57] But the MND fails to evaluate the feasibility of opting in to the 100% renewable program and makes no commitment to the program.

02-17

The IS/MND's discussion of construction energy conservation measures also violates CEQA Guidelines Appendix F. The IS/MND fails to evaluate the feasibility of utilizing existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.

02-18

In sum, the IS/MND's energy analysis fails adequately analyze measures to reduce the wasteful, inefficient, and unnecessary consumption of energy, and fails to meaningfully address Appendix F's considerations of whether a building should be constructed at all, how large it should be, where it should be located, whether it should incorporate renewable energy resources, or anything else external to the building's envelope.[58] Analysis of energy-reducing measures is also necessary to address consistency with General Plan Policy AQ 1.4, which provides that "[t]he City shall encourage the use of clean alternative energy sources for transportation, heating, and cooling whenever practical." This analysis must be provided in an EIR.

02-19

**D. The IS/MND Fails to Disclose or Mitigate Potentially Significant VMT Impacts**

The IS/MND finds that the Project's VMT impact of 8.60 VMT per resident is less than significant because it would not exceed the City's threshold of 15 percent below the regional VMT per resident, which is 15.2.[59] Mr. Marshall explains that the IS/MND's conclusions are not supported by substantial evidence and that VMT likely exceeds the City's threshold. An EIR must be prepared to accurately analyze this impact.

02-20

[56] IS/MND, pg. 76.
[57] IS/MND, pg. 99.
[58] *Ukiah Citizens for Safety First v. City of Ukiah* (2016) 248 CA4th 256, 264.
[59] IS/MND, pg. 196.

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Mr. Marshall explains that the IS/MND mischaracterizes the resort hotel rooms proposed by the Project as multi-family housing,[60] significantly underestimating trip generation from these units, and misrepresenting the peak travel direction. Treating the Project's residential component as multi-family housing is inappropriate because the Project's units are proposed as time-share properties. Time-shares function differently from residential units because future residents would not be in the proposed units year-round.[61] VMT from guests is higher than VMT from long-term residents because guests are more likely to travel farther distances to and from the Project.[62] Further, the proposed resort hotel-style residences can be reasonably expected to call for a large support staff not reflected in trip generation assumptions for ordinary residential housing.[63]

O2-20
Cont.

In the figures below, Mr. Marshall compares the trip generation estimated by the IS/MND to the trip generation of a resort hotel room.

[60] IS/MND, VMT Impact Analysis, Attachment A: Project Trip Generation (PDF pg. 1122).
[61] IS/MND, pg. 71.
[62] Marshall Comments, pg. 4.
[63] Marshall Comments, pg. 3.



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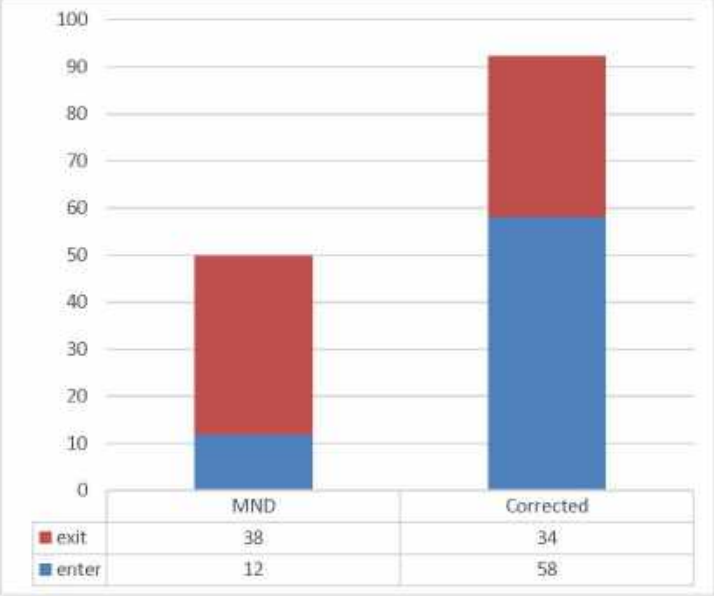
Figure 1: Morning Peak Hour Trip Generation for 206 Resort Hotel rooms vs. IS/MND Estimate[64]




O2-20
Cont.

[64] *Id.*



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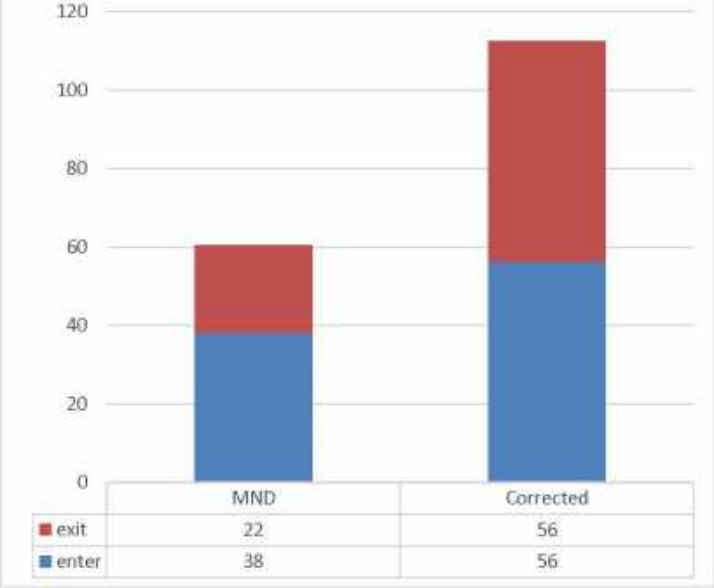
Figure 2: Afternoon Peak Hour Trip Generation for 206 Resort Hotel rooms vs. IS/MND Estimate




The figures above show that the IS/MND's characterization of the Project as multi-family housing significantly underestimates trip generation and misrepresents the peak travel direction.[65]

Mr. Marshall also comments that VMT is underestimated by omitting analysis of VMT generated by the proposed 23,840 sf event venue.[66] The IS/MND's VMT analysis suggests that the venue, as part of the open space area, is local-serving, and thus does not require inclusion in the VMT analysis.[67] Substantial evidence suggests that the venue is not local-serving, as the traffic analysis estimates 416 weekend peak hour trips for the venue, and a large amount of parking is made available for the venue.[68] The Project's VMT impacts are underestimated when components such as the venue are omitted from the analysis.

02-20 Cont.

[65] *Id.*
[66] IS/MND, pg. 10.
[67] IS/MND, VMT Analysis, pg. 2-3.
[68] Marshall Comments, pg. 5.



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These errors demonstrate that the IS/MND's VMT impacts are underestimated, not supported by substantial evidence, and are potentially significant. An EIR must be prepared.

02-20 Cont.

## III. CONCLUSION

The City lacks substantial evidence to support the conclusions in the IS/MND that the Project will have less than significant impacts. Moreover, substantial evidence supports a fair argument that the Project's impacts may be significant and unmitigated. Due to the IS/MND's deficiencies, the City cannot conclude that the Project's impacts have been mitigated to a less than significant level.

The CEQA Guidelines require that an EIR be prepared if there is substantial evidence supporting a fair argument that any aspect of a project, either individually or cumulatively, may cause a significant effect on the environment, regardless of whether the overall effect of the project is adverse or beneficial.[69] As discussed in detail above, there is a fair argument based on substantial evidence that the Project would result in significant adverse impacts not identified in the IS/MND.

02-21

We urge the City to fulfill its responsibilities under CEQA by withdrawing the IS/MND and preparing an EIR to address the issues raised in this preliminary comment letter. This is the only way the City and the public can ensure the Project's significant environmental impacts are mitigated to less than significant levels.

Sincerely,

Aidan P. Marshall

Attachments
APM:acp

[69] CEQA Guidelines § 15063(b)(1).



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# EXHIBIT A

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April 8, 2024

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**Subject: Comments on the Rancho Mirage Ritz-Carlton Project (SCH No. 2024030267)**

Dear Mr. Marshall,

We have reviewed the February 2024 Initial Study and Mitigated Negative Declaration ("IS/MND") for the Rancho Mirage Ritz-Carlton Project ("Project") located in the City of Rancho Mirage ("City"). The Project proposes to construct 200,474-square-feet ("SF") of hotel space, including 6,273-SF of commercial space and 499 parking spaces, on the 16.13-acre site. 02-22

Our review concludes that the IS/MND fails to adequately evaluate the Project's health risk impacts. As a result, emissions and health risk impacts associated with construction and operation of the proposed Project may be underestimated and inadequately addressed. An Environmental Impact Report ("EIR") should be prepared to adequately assess and mitigate the potential health risk impacts that the project may have on the environment. 02-23

## Air Quality

### Diesel Particulate Matter Emissions Inadequately Evaluated

The IS/MND concludes that the Project would have a less-than-significant health risk impact without conducting a quantified construction health risk analysis ("HRA"). Regarding the health risk impacts associated with the Project construction, the IS/MND states: 02-24

> "The construction period for the proposed project would be approximately 22 months, after which construction-related TAC emissions would cease. Due to this relatively short period of exposure and minimal particulate emissions on site, TACs generated during construction would not be expected to result in concentrations causing significant health risks" (p. 81).

As demonstrated above, the IS/MND states that due to the relatively short construction duration, the Project will result in a less-than-significant health risk impact. However, the IS/MND's evaluation of the Project's potential health risk impacts, as well as the subsequent less-than-significant impact conclusion, is incorrect for three reasons.

O2-24 Cont.

First, by failing to prepare a quantified construction HRA, the IS/MND is inconsistent with the California Environmental Quality Act's ("CEQA") requirement to correlate the increase in emissions that the Project would generate to the adverse impacts on human health caused by those emissions.[1] This is incorrect, as construction of the proposed Project will produce diesel particulate matter ("DPM") emissions through the exhaust stacks of heavy equipment operations and heavy-duty trucks over a total construction duration of 22 months (p. 34). However, the IS/MND fails to evaluate the potential Project-generated TACs or indicate the concentrations at which such pollutants would trigger adverse health effects. Without making a reasonable effort to connect the Project's construction-related TAC emissions to the potential health risks posed to nearby receptors, the IS/MND is inconsistent with CEQA's requirement to correlate the increase in emissions generated by the Project with the potential adverse impacts on human health.

O2-25

Second, the Office of Environmental Health Hazard Assessment ("OEHHA"), the organization responsible for providing guidance on conducting health risk assessments ("HRAs") in California, released its most recent *Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments* in February 2015. This guidance document describes the types of projects that warrant the preparation of an HRA. Specifically, OEHHA recommends that all short-term projects lasting at least 2 months assess cancer risks.[2] Furthermore, according to OEHHA:

> "Exposure from projects lasting more than 6 months should be evaluated for the duration of the project. In all cases, for assessing risk to residential receptors, the exposure should be assumed to start in the third trimester to allow for the use of the ASFs (OEHHA, 2009)."[3]

O2-26

As the Project's anticipated construction duration exceeds the 2-month and 6-month requirements set forth by OEHHA, construction of the Project meets the threshold warranting a quantified HRA under OEHHA guidance and should be evaluated for the entire 22-month construction period. These recommendations reflect the most recent state health risk policies, and an EIR should be prepared to include an analysis of health risk impacts posed to nearby sensitive receptors from Project-generated DPM emissions.

[1] "Sierra Club v. County of Fresno." Supreme Court of California, December 2018, *available at:* https://ceqaportal.org/decisions/1907/Sierra%20Club%20v.%20County%20of%20Fresno.pdf.
[2] "Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 8-18.
[3] "Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 8-18.

Third, while the IS/MND estimates a maximum residential cancer risk from Project operations to nearby, existing receptors to be 0.56 in one million, the HRA fails to evaluate the combined lifetime cancer risk to nearby, existing receptors as a result of Project construction and operation together (Appendix A, pp. 225). According to OEHHA guidance "the excess cancer risk is calculated separately for each age grouping and then summed to yield cancer risk at the receptor location."[4] However, the Project's HRA fails to sum each age bin to evaluate the total cancer risk over the course of the Project's total construction and operation. This is incorrect, and an updated analysis should quantify the entirety of the Project's construction and operational health risks together and sum them to compare to the South Coast Air Quality Management District ("SCAQMD") CEQA health risk threshold of 10 in one million, as referenced by the IS/MND (p. 34).

02-27

## Screening-Level Analysis Demonstrates Potentially Significant Health Risk Impact

In order to conduct our screening-level risk assessment we relied upon AERSCREEN, which is a screening level air quality dispersion model.[5] The model replaced SCREEN3, and AERSCREEN is included in the OEHHA and the California Air Pollution Control Officers Associated ("CAPCOA") guidance as the appropriate air dispersion model for Level 2 health risk screening assessments ("HRSAs").[6, 7] A Level 2 HRSA utilizes a limited amount of site-specific information to generate maximum reasonable downwind concentrations of air contaminants to which nearby sensitive receptors may be exposed. If an unacceptable air quality hazard is determined to be possible using AERSCREEN, a more refined modeling approach is required prior to approval of the Project.

02-28

We prepared a preliminary HRA of the Project's construction-related health risk impact to residential sensitive receptors using the annual $PM_{10}$ exhaust estimates from the IS/MND's CalEEMod output files. Consistent with recommendations set forth by OEHHA, we assumed residential exposure begins during the third trimester stage of life.[8] The IS/MND's CalEEMod model indicates that construction activities will generate approximately 367 pounds of DPM over the 636-day construction period.[9] The AERSCREEN model relies on a continuous average emission rate to simulate maximum downward concentrations from point, area, and volume emission sources. To account for the variability in equipment usage and truck trips over Project construction, we calculated an average DPM emission rate by the following equation:

[4] "Guidance Manual for preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf p. 8-4

[5] "AERSCREEN Released as the EPA Recommended Screening Model," U.S. EPA, April 2011, *available at:* http://www.epa.gov/ttn/scram/guidance/clarification/20110411_AERSCREEN_Release_Memo.pdf

[6] "Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

[7] "Health Risk Assessments for Proposed Land Use Projects." CAPCOA, July 2009, *available at:* https://www.valleyair.org/transportation/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf.

[8] "Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 8-18.

[9] See Attachment B for health risk calculations.

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{366.6\ lbs}{636\ days} \times \frac{453.6\ grams}{lbs} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.00303\ g/s}$$

Using this equation, we estimated a construction emission rate of 0.00303 grams per second ("g/s"). Construction was simulated as a 16.13-acre rectangular area source in AERSCREEN, with approximate dimensions of 361- by 181-meters. A release height of three meters was selected to represent the height of stacks of operational equipment and other heavy-duty vehicles, and an initial vertical dimension of one and a half meters was used to simulate instantaneous plume dispersion upon release. An urban meteorological setting was selected with model-default inputs for wind speed and direction distribution. The population of Rancho Mirage was obtained from U.S. 2022 Census data.[10]

The AERSCREEN model generates maximum reasonable estimates of single-hour DPM concentrations from the Project Site. The United States Environmental Protection Agency ("U.S. EPA") suggests that the annualized average concentration of an air pollutant be estimated by multiplying the single-hour concentration by 10% in screening procedures.[11] According to the IS/MND the nearest sensitive receptors are residences located immediately adjacent to the Project site (p. 80). However, review of the AERSCREEN output files demonstrates that the maximally exposed individual resident ("MEIR") is located approximately 175 meters from the Project site. Thus, the single-hour concentration estimated by AERSCREEN for Project construction is approximately 2.231 µg/m$^3$ DPM at approximately 175 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.2231 µg/m$^3$ for Project construction at the MEIR.

We calculated the excess cancer risk to the MEIR using applicable HRA methodologies prescribed by OEHHA, as recommended by SCAQMD.[12] Specifically, guidance from OEHHA and the California Air Resources Board ("CARB") recommends the use of a standard point estimate approach, including high-point estimate (i.e. 95th percentile) breathing rates and age sensitivity factors ("ASF") in order to account for the increased sensitivity to carcinogens during early-in-life exposure and accurately assess risk for susceptible subpopulations such as children. The residential exposure parameters, such as the daily breathing rates ("BR/BW"), exposure duration ("ED"), ASFs, fraction of time at home ("FAH"), and exposure frequency ("EF") utilized for the various age groups in our screening-level HRA are as follows:

O2-28
Cont.

[10] "Rancho Mirage." U.S. Census Bureau, 2022, *available at:* https://datacommons.org/place/geoId/0659500.
[11] "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources Revised." U.S. EPA, October 1992, *available at:* http://www.epa.gov/ttn/scram/guidance/guide/EPA-454R-92-019_OCR.pdf.
[12] "Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics 'Hot Spots' Information and Assessment Act." SCAQMD, October 2020, available at: http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab-2588-supplemental-guidelines.pdf?sfvrsn=19, p. 19; see also "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

**Exposure Assumptions for Residential Individual Cancer Risk**

| Age Group | Breathing Rate (L/kg-day)[13] | Age Sensitivity Factor[14] | Exposure Duration (years) | Fraction of Time at Home[15] | Exposure Frequency (days/year)[16] | Exposure Time (hours/day) |
|---|---|---|---|---|---|---|
| 3rd Trimester | 361 | 10 | 0.25 | 1 | 350 | 24 |
| Infant (0 - 2) | 1090 | 10 | 2 | 1 | 350 | 24 |
| Child (2 - 16) | 572 | 3 | 14 | 1 | 350 | 24 |
| Adult (16 - 30) | 261 | 1 | 14 | 0.73 | 350 | 24 |

For the inhalation pathway, the procedure requires the incorporation of several discrete variates to effectively quantify dose for each age group. Once determined, contaminant dose is multiplied by the cancer potency factor ("CPF") in units of inverse dose expressed in milligrams per kilogram per day (mg/kg/day$^{-1}$) to derive the cancer risk estimate. Therefore, to assess exposures, we utilized the following dose algorithm:

$$Dose_{AIR,per\ age\ group} = C_{air} \times EF \times \left[\frac{BR}{BW}\right] \times A \times CF$$

where:

$Dose_{AIR}$ = dose by inhalation (mg/kg/day), per age group
$C_{air}$ = concentration of contaminant in air (µg/m3)
EF = exposure frequency (number of days/365 days)
BR/BW = daily breathing rate normalized to body weight (L/kg/day)
A = inhalation absorption factor (default = 1)
CF = conversion factor (1x10-6, µg to mg, L to m3)

To calculate the overall cancer risk, we used the following equation for each appropriate age group:

$$Cancer\ Risk_{AIR} = Dose_{AIR} \times CPF \times ASF \times FAH \times \frac{ED}{AT}$$

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[13] "Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics 'Hot Spots' Information and Assessment Act." SCAQMD, October 2020, available at: http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab-2588-supplemental-guidelines.pdf?sfvrsn=19, p. 19; see also "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.
[14] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 8-5 Table 8.3.
[15] "Risk Assessment Procedures." SCAQMD, August 2017, available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1401/riskassessmentprocedures_2017_080717.pdf, p. 7.
[16] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 5-24.

where:

$Dose_{AIR}$ = dose by inhalation (mg/kg/day), per age group
CPF = cancer potency factor, chemical-specific $(mg/kg/day)^{-1}$
ASF = age sensitivity factor, per age group
FAH = fraction of time at home, per age group (for residential receptors only)
ED = exposure duration (years)
AT = averaging time period over which exposure duration is averaged (always 70 years)

Consistent with the 636-day construction schedule, the annualized average concentration for construction was used for the entire third trimester of pregnancy (0.25 years) and first 1.49 years of the infantile stage of life (0 – 2 years). The results of our calculations are shown in the table below.

**The Maximally Exposed Individual at an Existing Residential Receptor**

| Age Group | Emissions Source | Duration (years) | Concentration (ug/m3) | Cancer Risk |
|---|---|---|---|---|
| 3rd Trimester | Construction | 0.25 | 0.2231 | 3.03E-06 |
| | *Construction* | *1.49* | *0.2231* | *5.47E-05* |
| | *Operation* | *0.51* | * | * |
| Infant (0 - 2) | Total | 2 | | 5.47E-05 |
| Child (2 - 16) | Operation | 14 | * | * |
| Adult (16 - 30) | Operation | 14 | * | * |
| **Lifetime** | | **30** | | **5.77E-05** |

As demonstrated in the table above, the excess cancer risks to the 3rd trimester of pregnancy and infant receptors at the MEIR located approximately 175 meters away, over the course of Project construction, are approximately 3.03 and 54.7 in one million, respectively. The total excess cancer risk associated with Project construction is approximately 57.7 in one million, which alone exceeds the SCAQMD threshold of 10 in one million. When summing the Project's construction-related cancer risk, as estimated by SWAPE, with the IS/MND's operational cancer risk of 0.56 in one million, we estimate an excess cancer risk of approximately 58.3 in one million over the course of a 30-year residential lifetime (Appendix A, pp. 225).[17] As such, the lifetime cancer risks also exceed the SCAQMD threshold of 10 in one million, resulting in a potentially significant impact not previously addressed or identified by the IS/MND.

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[17] Calculated: 57.7 in one million + 0.561 in one million = 58.261 in one million.

An agency must include an analysis of health risks that connects the Project's emissions with the health risk posed by those emissions. Our analysis represents a screening-level HRA, which is known to be conservative and tends to err on the side of health protection. The purpose of the screening-level HRA is to demonstrate the link between Project-generated emissions and potential adverse health risk impacts. According to the U.S. EPA:

> "EPA's Exposure Assessment Guidelines recommend completing exposure assessments iteratively using a *tiered approach* to *'strike a balance between the costs of adding detail and refinement to an assessment and the benefits associated with that additional refinement' (U.S. EPA, 1992).*
>
> In other words, an assessment using basic tools (e.g., simple exposure calculations, default values, rules of thumb, conservative assumptions) can be conducted as the first phase (or tier) of the overall assessment (i.e., a screening-level assessment).
>
> The exposure assessor or risk manager can then determine whether the results of the screening-level assessment warrant further evaluation through refinements of the input data and exposure assumptions or by using more advanced models."[18]

As demonstrated above, screening-level analyses warrant further evaluation in a refined modeling approach. As our screening-level HRA demonstrates that construction and operation of the Project could result in a potentially significant health risk impact, an EIR should be prepared to include a refined health risk analysis which adequately and accurately evaluates health risk impacts associated with both Project construction and operation.

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## Mitigation

### Feasible Mitigation Measures Available to Reduce Emissions

Our analysis demonstrates that the Project would result in potentially significant health risk impacts that are not mitigated, because the IS/MND incorrectly concludes that "No mitigation is required" for the Project's air quality and health risk impacts.[19]

In an effort to reduce the Project's emissions, we identified several mitigation measures that are applicable to the proposed Project. To reduce the Project's emissions, we recommend consideration of SCAG's 2020 *RTP/SCS* PEIR's Air Quality Project Level Mitigation Measures ("PMM-AQ-1"), as described below.[20] In particular, to reduce the Project's significant DPM emissions from construction equipment,

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[18] "Exposure Assessment Tools by Tiers and Types - Screening-Level and Refined." U.S. EPA, *available at:* https://www.epa.gov/expobox/exposure-assessment-tools-tiers-and-types-screening-level-and-refined.
[19] IS/MND, p. 82.
[20] "4.0 Mitigation Measures." Connect SoCal Program Environmental Impact Report Addendum #1, September 2020, available at: https://scag.ca.gov/sites/main/files/file-attachments/fpeir_connectsocal_addendum_4_mitigationmeasures.pdf?1606004420, p. 4.0-2 – 4.0-10; 4.0-19 – 4.0-23; See also: "Certified Final Connect SoCal Program Environmental Impact Report." Southern California Association of Governments (SCAG), May 2020, *available at:* https://scag.ca.gov/peir.

the Project should be required to use Tier 4 construction equipment for all engines above 25 horsepower (hp). Additional feasible measures are described below:

| SCAG RTP/SCS 2020-2045 |
|---|
| **Air Quality Project Level Mitigation Measures – PMM-AQ-1:**<br>In accordance with provisions of sections 15091(a)(2) and 15126.4(a)(1)(B) of the *State CEQA Guidelines*, a Lead Agency for a project can and should consider mitigation measures to reduce substantial adverse effects related to violating air quality standards. Such measures may include the following or other comparable measures identified by the Lead Agency: |
| a) Minimize land disturbance. |
| b) Suspend grading and earth moving when wind gusts exceed 25 miles per hour unless the soil is wet enough to prevent dust plumes. |
| c) Cover trucks when hauling dirt. |
| d) Stabilize the surface of dirt piles if not removed immediately. |
| e) Limit vehicular paths on unpaved surfaces and stabilize any temporary roads. |
| f) Minimize unnecessary vehicular and machinery activities. |
| g) Sweep paved streets at least once per day where there is evidence of dirt that has been carried on to the roadway. |
| h) Revegetate disturbed land, including vehicular paths created during construction to avoid future off-road vehicular activities. |
| j) Require contractors to assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that could be used an aggregate of 40 or more hours for the construction project. Prepare a plan for approval by the applicable air district demonstrating achievement of the applicable percent reduction for a CARB-approved fleet. |
| k) Ensure that all construction equipment is properly tuned and maintained. |
| l) Minimize idling time to 5 minutes—saves fuel and reduces emissions. |
| m) Provide an operational water truck on-site at all times. Use watering trucks to minimize dust; watering should be sufficient to confine dust plumes to the project work areas. Sweep paved streets at least once per day where there is evidence of dirt that has been carried on to the roadway. |
| n) Utilize existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators. |
| o) Develop a traffic plan to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites. |
| p) As appropriate require that portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, obtain CARB Portable Equipment Registration with the state or a local district permit. Arrange appropriate consultations with the CARB or the District to determine registration and permitting requirements prior to equipment operation at the site. |
| q) Require projects within 500 feet of residences, hospitals, or schools to use Tier 4 equipment for all engines above 50 horsepower (hp) unless the individual project can demonstrate that Tier 4 engines would not be required to mitigate emissions below significance thresholds. |

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|---|
| r) Projects located within the South Coast Air Basin should consider applying for South Coast AQMD "SOON" funds which provides funds to applicable fleets for the purchase of commercially available low-emission heavy-duty engines to achieve near-term reduction of NOx emissions from in-use off-road diesel vehicles. |
| s) Projects located within AB 617 communities should review the applicable Community Emissions Reduction Plan (CERP) for additional mitigation that can be applied to individual projects. |
| t) Where applicable, projects should provide information about air quality related programs to schools, including the Environmental Justice Community Partnerships (EJCP), Clean Air Ranger Education (CARE), and Why Air Quality Matters programs. |
| u) Projects should work with local cities and counties to install adequate signage that prohibits truck idling in certain locations (e.g., near schools and sensitive receptors). |
| v) Projects that will introduce sensitive receptors within 500 feet of freeways and other sources should consider installing high efficiency of enhanced filtration units, such as Minimum Efficiency Reporting Value (MERV) 13 or better. Installation of enhanced filtration units can be verified during occupancy inspection prior to the issuance of an occupancy permit. |
| z) Develop an ongoing monitoring, inspection, and maintenance program for the MERV filters. |
| aa) Consult the SCAG Environmental Justice Toolbox for potential measures to address impacts to low-income and/or minority communities. |
| bb) The following criteria related to diesel emissions shall be implemented on by individual project sponsors as appropriate and feasible:<br>- Diesel nonroad vehicles on site for more than 10 total days shall have either (1) engines that meet EPA on road emissions standards or (2) emission control technology verified by EPA or CARB to reduce PM emissions by a minimum of 85%<br>- Diesel generators on site for more than 10 total days shall be equipped with emission control technology verified by EPA or CARB to reduce PM emissions by a minimum of 85%.<br>- Nonroad diesel engines on site shall be Tier 2 or higher.<br>- Diesel nonroad construction equipment on site for more than 10 total days shall have either (1) engines meeting EPA Tier 4 nonroad emissions standards or (2) emission control technology verified by EPA or CARB for use with nonroad engines to reduce PM emissions by a minimum of 85% for engines for 50 hp and greater and by a minimum of 20% for engines less than 50 hp.<br>- Emission control technology shall be operated, maintained, and serviced as recommended by the emission control technology manufacturer.<br>- Diesel vehicles, construction equipment, and generators on site shall be fueled with ultra-low sulfur diesel fuel (ULSD) or a biodiesel blend approved by the original engine manufacturer with sulfur content of 15 ppm or less.<br>- The construction contractor shall maintain a list of all diesel vehicles, construction equipment, and generators to be used on site. The list shall include the following:<br>i. Contractor and subcontractor name and address, plus contact person responsible for the vehicles or equipment.<br>ii. Equipment type, equipment manufacturer, equipment serial number, engine manufacturer, engine model year, engine certification (Tier rating), horsepower, engine serial number, and expected fuel usage and hours of operation.<br>iii. For the emission control technology installed: technology type, serial number, make, model, manufacturer, EPA/CARB verification number/level, and installation date and hour-meter reading on installation date.<br>- The contractor shall establish generator sites and truck-staging zones for vehicles waiting to load or unload material on site. Such zones shall be located where diesel emissions have the least impact on abutters, the general public, and especially sensitive receptors such as hospitals, schools, daycare facilities, elderly housing, and convalescent facilities.<br>- The contractor shall maintain a monthly report that, for each on road diesel vehicle, nonroad construction equipment, or generator onsite, includes: |

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i. Hour-meter readings on arrival on-site, the first and last day of every month, and on off-site date.
ii. Any problems with the equipment or emission controls.
iii. Certified copies of fuel deliveries for the time period that identify:
    1. Source of supply
    2. Quantity of fuel
    3. Quantity of fuel, including sulfur content (percent by weight)

cc) Project should exceed Title-24 Building Envelope Energy Efficiency Standards (California Building Standards Code). The following measures can be used to increase energy efficiency:

- Provide pedestrian network improvements, such as interconnected street network, narrower roadways and shorter block lengths, sidewalks, accessibility to transit and transit shelters, traffic calming measures, parks and public spaces, minimize pedestrian barriers.
- Provide traffic calming measures, such as:
    i. Marked crosswalks
    ii. Count-down signal timers
    iii. Curb extensions iv. Speed tables
    iv. Raised crosswalks
    v. Raised intersections
    vi. Median islands
    vii. Tight corner radii
    viii. Roundabouts or mini-circles
    ix. On-street parking
    x. Chicanes/chokers
- Create urban non-motorized zones
- Provide bike parking in non-residential and multi-unit residential projects
- Dedicate land for bike trails
- Limit parking supply through:
    i. Elimination (or reduction) of minimum parking requirements
    ii. Creation of maximum parking requirements
    iii. Provision of shared parking
- Require residential area parking permit.
- Provide ride-sharing programs
    i. Designate a certain percentage of parking spacing for ride sharing vehicles
    ii. Designating adequate passenger loading and unloading and waiting areas for ride-sharing vehicles
    iii. Providing a web site or messaging board for coordinating rides
    iv. Permanent transportation management association membership and finding requirement.

These measures offer a cost-effective, feasible way to incorporate lower-emitting design features into the proposed Project, which subsequently, reduce emissions released during Project construction and operation.

An EIR should be prepared to include all feasible mitigation measures, as well as include updated health risk analysis to ensure that the necessary mitigation measures are implemented to reduce emissions to the maximum extent feasible. The EIR should also demonstrate a commitment to the implementation of these measures prior to Project approval, to ensure that the Project's significant emissions are reduced to the maximum extent possible.

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## Disclaimer

SWAPE has received limited discovery regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

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Sincerely,

Paul Rosenfeld

Paul E. Rosenfeld, Ph.D.

Attachment B

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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## *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**Risk Assessment & Remediation Specialist**

### Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

### Professional Experience

Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, industrial, military and agricultural sources, unconventional oil drilling operations, and locomotive and construction engines. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities. Dr. Rosenfeld has also successfully modeled exposure to contaminants distributed by water systems and via vapor intrusion.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, creosote, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at sites and has testified as an expert witness on numerous cases involving exposure to soil, water and air contaminants from industrial, railroad, agricultural, and military sources.

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## Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex $H_2O$ Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

## Publications:


Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

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**Rosenfeld, P. E.** (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International*

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*Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld P. E.** (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

**Rosenfeld P. E.** (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting*. Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition*. Lecture conducted from Boston Massachusetts.

**Paul Rosenfeld Ph.D**. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference*. Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel in Irvine, California.

**Paul Rosenfeld Ph.D**. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference*. Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

**Paul Rosenfeld Ph.D**. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association, Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

**Paul Rosenfeld, Ph.D.** (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

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Cont.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

**Paul Rosenfeld, Ph.D.** (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

**Rosenfeld, P. E.**, Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

**Paul Rosenfeld, Ph.D.** (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

**Paul Rosenfeld, Ph.D**. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

**Rosenfeld, P.E**. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conference*. Lecture conducted from Indianapolis, Maryland.

**Rosenfeld, P.E.** (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation*. Lecture conducted from Anaheim California.

**Rosenfeld. P.E. (**October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest*. Lecture conducted from Ocean Shores, California.

**Rosenfeld, P.E. (**2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell*. Lecture conducted from Seattle Washington.

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**Rosenfeld, P.E.**, C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest*. Lecture conducted from Lake Chelan, Washington.

**Rosenfeld, P.E,** C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

## Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association, Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

## Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.



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Cont.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

## Deposition and/or Trial Testimony:

In the Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 5-14-2021
Trial, October 8-4-2021

In the Circuit Court of Cook County Illinois
Joseph Rafferty, Plaintiff vs. Consolidated Rail Corporation and National Railroad Passenger Corporation d/b/a AMTRAK,
Case No.: No. 18-L-6845
Rosenfeld Deposition, 6-28-2021

In the United States District Court For the Northern District of Illinois
Theresa Romcoe, Plaintiff vs. Northeast Illinois Regional Commuter Railroad Corporation d/b/a METRA Rail, Defendants
Case No.: No. 17-cv-8517
Rosenfeld Deposition, 5-25-2021

In the Superior Court of the State of Arizona In and For the Cunty of Maricopa
Mary Tryon et al., Plaintiff vs. The City of Pheonix v. Cox Cactus Farm, L.L.C., Utah Shelter Systems, Inc.
Case Number CV20127-094749
Rosenfeld Deposition: 5-7-2021

In the United States District Court for the Eastern District of Texas Beaumont Division
Robinson, Jeremy et al *Plaintiffs*, vs. CNA Insurance Company et al.
Case Number 1:17-cv-000508
Rosenfeld Deposition: 3-25-2021

In the Superior Court of the State of California, County of San Bernardino
Gary Garner, Personal Representative for the Estate of Melvin Garner vs. BNSF Railway Company.
Case No. 1720288
Rosenfeld Deposition 2-23-2021

In the Superior Court of the State of California, County of Los Angeles, Spring Street Courthouse
Benny M Rodriguez vs. Union Pacific Railroad, A Corporation, et al.
Case No. 18STCV01162
Rosenfeld Deposition 12-23-2020

In the Circuit Court of Jackson County, Missouri
Karen Cornwell, *Plaintiff*, vs. Marathon Petroleum, LP, *Defendant*.
Case No.: 1716-CV10006
Rosenfeld Deposition. 8-30-2019

In the United States District Court For The District of New Jersey
Duarte et al, *Plaintiffs*, vs. United States Metals Refining Company et. al. *Defendant*.
Case No.: 2:17-cv-01624-ES-SCM
Rosenfeld Deposition. 6-7-2019



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In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk, *Plaintiffs*, vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" *Defendant.*
Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No.: No. BC615636
Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No.: No. BC646857
Rosenfeld Deposition, 10-6-2018, Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiff vs. The 3M Company et al., Defendants
Case No.: 1:16-cv-02531-RBJ
Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No.: 1923
Rosenfeld Deposition, 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No C12-01481
Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 8-23-2017

In United States District Court For The Southern District of Mississippi
Guy Manuel vs. The BP Exploration et al., Defendants
Case: No 1:19-cv-00315-RHW
Rosenfeld Deposition, 4-22-2020

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No.: LC102019 (c/w BC582154)
Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., *Plaintiffs*, vs. Meritor Inc., et al., *Defendants*
Case Number: 4:16-cv-52-DMB-JVM
Rosenfeld Deposition: July 2017

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In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No.: No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial, March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No.: RG14711115
Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No.: LALA002187
Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action N0. 14-C-30000
Rosenfeld Deposition, June 2015

In The Iowa District Court For Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No 4980
Rosenfeld Deposition: May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case Number CACE07030358 (26)
Rosenfeld Deposition: December 2014

In the County Court of Dallas County Texas
Lisa Parr et al, *Plaintiff*, vs. Aruba et al, *Defendant*.
Case Number cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial: April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., *Plaintiffs*, vs. Republic Services, Inc., et al., *Defendants*
Case Number: 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition: October 2012

In the United States District Court for the Middle District of Alabama, Northern Division
James K. Benefield, et al., *Plaintiffs*, vs. International Paper Company, *Defendant*.
Civil Action Number 2:09-cv-232-WHA-TFM
Rosenfeld Deposition: July 2010, June 2011

In the Circuit Court of Jefferson County Alabama
Jaeanette Moss Anthony, et al., *Plaintiffs*, vs. Drummond Company Inc., et al., *Defendants*
Civil Action No. CV 2008-2076
Rosenfeld Deposition: September 2010

In the United States District Court, Western District Lafayette Division
Ackle et al., *Plaintiffs*, vs. Citgo Petroleum Corporation, et al., *Defendants*.
Case Number 2:07CV1052
Rosenfeld Deposition: July 2009



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Cont.

# EXHIBIT B

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Thetford Center VT 05075

Norman Marshall, President
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April 9, 2024

Aidan P. Marshall
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

**Subject: Comments on the Ritz Carlton Rancho Mirage Project**

Dear Mr. Marshall,

I have reviewed traffic, vehicle miles traveled ("VMT") and workforce housing impacts in the Ritz-Carlton Rancho Mirage Initial Study/Mitigated Negative Declaration ("MND") dated February 2024. I make the following findings:

1) The MND mischaracterizes Resort Hotel rooms as multi-family housing, significantly underestimating trip generation from these units, and misrepresenting the peak travel direction. These errors invalidate the MND's traffic analyses including forecasted traffic volumes and levels of service.
2) The MND VMT analysis falsely treats Resort Hotel rooms as "residential dwelling units. To analyze the VMT impacts of the Resort Hotel rooms correctly, it is necessary to consider both guest VMT and support worker VMT. Neither of these VMT impacts is analyzed in the MND and both are likely to be highly significant. Significant VMT impacts should be mitigated.
3) The MND'S VMT analysis falsely labels this venue space within the phrase "swimming pool and adjacent open space area" and considers it "local serving" for hotel guests. The MND documents that this use would create a significant number of new trips and it requires a separate VMT analysis.
4) Adding service jobs in this area would aggravate an existing workforce housing problem and may result in significant VMT impacts. These impacts should be analyzed in an EIR. If significant, they should be mitigated.

02-32

1

## The MND Inaccurately Characterizes Resort Hotel Rooms as Multi-Family Housing and Underestimates Trip Generation

The proposed project includes 58 "Hotel Villas" and 48 "Residential Suites." The difference appears to be architectural, with the "Villas" being two stories with private garages, and the "Residential Suites" being single-story over shared parking. (MND, p. 11)

As shown in MND Table 1-1 copied below, most of the units will have more than one bedroom. Each of the units has a separate bathroom for each bedroom.

**Table 1-1. Proposed Residential Suite and Hotel Villa Unit Types**

| Location | Unit Type | Count |
|---|---|---|
| Residential Suites | 1 bedroom/1 bath | 26 |
| | 2 bedroom/2 bath | 12 |
| | 3 bedroom/3 bath | 10 |
| | *Residential Suite Subtotal* | *48* |
| Hotel Villas | 2 bedroom/2 bath | 29 |
| | 3 bedroom/3 bath | 29 |
| | *Hotel Villas Subtotal* | *58* |
| | **Total Units** | **106** |

02-33

While the MND represents this as 106 "units", the project should be characterized as 225 Resort Hotel rooms.

Ritz and Westin are both part of the Marriott hotel family, and "Villa" is a term that Marriott uses in describing guest lodging. Here is an image from the promotional materials for the Westin Mission Hills Villas, Palm Springs[1] – located 5 miles from the Rancho Mirage Ritz.

The Villa Difference

Enjoy all the comforts and conveniences of home including a fully equipped kitchen or well-equipped kitchenette and separate dining area. Prepare your favorite meal or grab a snack after a fun-filled day by the pool or out exploring Palm Springs.



[1] https://www.marriott.com/en-us/hotels/pspwm-the-westin-mission-hills-resort-villas-palm-springs/rooms/#roomPoolCode=zzbb

2

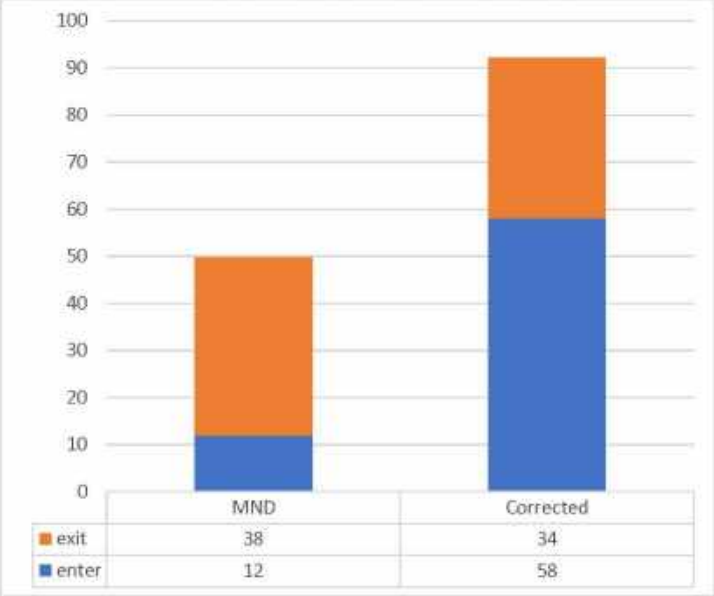
Elsewhere, the MND makes it clear that these units are not multi-family housing:

> The proposed project would construct 106 residential units. However, these residential units would operate similar to time-share properties and therefore future residents would not be in the proposed residential units year-round. Because the proposed residential units are not typical residential units that residents cannot occupy year-round, these housing units do not count towards the RHNA housing unit determination. (MND, p. 71)

02-33 Cont.

This mischaracterization of the Resort Hotel rooms causes the MND to underestimate trip generation from these units, and to misrepresent the peak travel direction. Figures 1 and 2 summarize trip generation for the weekday morning and afternoon peak hours using data from ITE Trip Generation 11th Edition. (This reference does not include a daily trip generation rate for Resort Hotel rooms).

Figure 1: Morning Peak Hour Trip Generation for 206 Resort Hotel rooms vs. MND Estimate

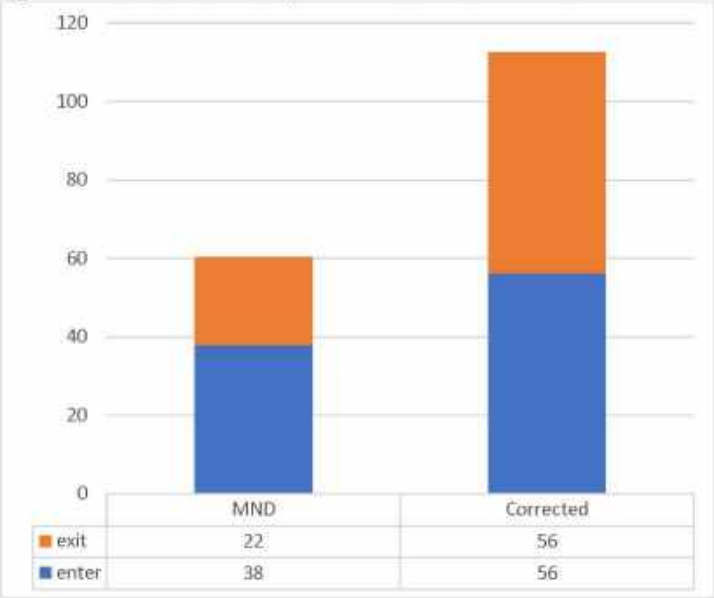



As shown in Figure 1, the corrected morning peak hour trip generation is almost twice what is presented in the MND. Furthermore, the directional split is completely wrong. With multi-family housing, most trips exit the units in the morning peak hour. With Resort Hotels, the larger number of trips enter during the morning peak hour, because of the need for a large support staff including many who arrive at work in the morning peak period.

02-34

3

Figure 2: Afternoon Peak Hour Trip Generation for 206 Resort Hotel rooms vs. MND Estimate




As with the morning peak hour, the corrected afternoon peak hour trip generation is almost twice that reported in the MND, and the MND's directional split also is wrong.

These errors invalidate the MND's traffic analyses including forecasted traffic volumes and levels of service.

O2-34 Cont.

## The MND Falsely Characterizes Resort Hotel Rooms as Residential and Underestimates VMT Impacts

The MND VMT analysis (MND, Appendix F2, p. 1) falsely analyzes the Resort Hotel rooms as "residential dwelling units." It doubles down on this mischaracterization in converting 106 units into 218 population (MND, Appendix F2, p. 4), i.e. even less than the number of Resort Hotel rooms or bathrooms. The MND reports that adding residences in this location would generate less VMT per person than the City's threshold and that there would not have a significant VMT impact.

The MND's analysis of the Resort Hotel rooms is completely wrong. To analyze the VMT impacts of the Resort Hotel rooms correctly, it is necessary to consider both the VMT from the guests, who may be traveling long distances to get to the resort, and support worker VMT. Neither of these VMT impacts is analyzed in the MND and both are likely to be highly significant. Significant VMT impacts should be mitigated.

O2-35

## The MND Fails to Analyze the VMT Impacts of the Event Space and Parking

The MND states:

> The proposed project would include 499 parking spaces total, with 381 subterranean parking and 116 residential parking. As mentioned above, parking for Building A-1 is provided in a parking structure where 381 spaces serve the residential suites, event space, commercial uses, and additional spaces for the existing hotel. The hotel villas would have either 1 or 2-car private garages, plus a driveway space for the one car garage hotel villas totaling 116 spaces.

02-36

The project's parking is included partly to serve the project's 23,840 square feet of venue space. (MND, p. 10) The MND analyzes trip generation for the venue as if 381 parking spaces were allocated to the venue. (Appendix F1, Table 4-2 p. 37). It estimates that the venue would generate 416 weekend peak hour trips.

The MND's VMT analysis falsely labels this venue space within the phrase "swimming pool and adjacent open space area" (MND Appendix F2, p. 2-3) and considers it "local serving" for hotel guests. The venue is clearly not just an adjunct to existing hotel uses; otherwise, it would not need so much additional parking and generate 416 weekend peak hour trips. This use requires a separate VMT analysis, including estimates of event frequency, and average travel distance to the venue.

## Workforce Housing

The proposed project would require additional service workers at the Ritz Carlton Rancho Mirage and would aggravate an existing workforce housing problem in Rancho Mirage.

> According to the City of Rancho Mirage's General Plan – Housing Element (City of Rancho Mirage 2017), the 2014 - 2021 Regional Housing Needs Allocation (RHNA) determined that the City needed a total of 95 housing units. (MND, p. 71)

02-37

This information is out of date. As shown below, the City of Mirage's 6th Cycle (2021 – 2029) Adopted Housing Element (adopted July 21, 2022) identifies a need for 1,741 housing units, including 746 low-income units, distributed across three classes.[2]

[2]https://cms3.revize.com/revize/ranchomirageca/CITY%20STAFF%20USE%20THIS%20FILE/Department%20Files/Housing/Adopted-and-Certified-Housing-Element.pdf

## Regional Housing Needs Allocation 2022 to 2029

| Income Category | Number Of Units |
|---|---|
| Extremely low income | 214 |
| Very low income | 215 |
| Low income | 317 |
| Moderate income | 327 |
| Above moderate income | 668 |
| Total | 1,741 |

Note that the extremely low and very low income categories are 50% each of the 429 units assigned for the very low category
Source: SCAG

The Housing Element links resort uses to workforce housing needs:

> The Agua Caliente Tribe is the second largest employer as owner of the Agua Caliente Resort & Casino, thereby contributing to the need of workforce housing.

While this particular resort is called out, the Housing Element also shows that the City's 3rd, 4th, and 5th largest employers are also resorts, including the Ritz Carlton Rancho Mirage and Spa.

Table 7 Major Employers, 2016

| Employer | Number of Employees | Primary Description |
|---|---|---|
| Eisenhower Medical Center | 2,480 | Hospital / Clinics |
| Agua Caliente Resort & Casino | 1,300 | Casino |
| Omni Rancho Las Palmas Resort & Spa | 500 | Hotel |
| Westin Mission Hills Resort & Spa | 470 | Hotel |
| The Ritz Carlton Rancho Mirage & Spa | 397 | Hotel |
| Hazelden Betty Ford Center | 269 | Rehabilitation Center |
| indiGO Auto Group | 225 | Auto Sales & Service |
| Mission Hills Country Club | 211 | Country Club |
| Cheesecake Factory | 180 | Restaurant |
| Home Depot | 149 | Home Improvement |

Source: Rancho Mirage Economic Profile, City of Rancho Mirage website, https://ranchomirageca.gov/residents/living-in-rancho-mirage/community-economic-profile/.

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02-37
Cont.

Each added resort room creates a need for additional service workers in roughly a one-to-one ratio, i.e. one more worker for each additional room. The employment data above is for 2016, so comparing it to current room counts is imperfect, but here are calculated ratios:

- Omni 444 rooms and 22 luxury suites[3] - 1.1 workers per unit
- Westin 512 rooms[4] - 0.9 workers per room
- Ritz 244 rooms[5] - 1.6 workers per room

It is likely that the Resort Hotel rooms in the proposed project would similarly create a need for workers on roughly a one-to-one basis, i.e., 206 more workers – primarily service workers – including housekeeping, restaurant and event, buildings and grounds maintenance, pool and exercise facility staff, etc.

The MND document that adding multi-family housing in this location would be VMT-efficient. This also suggests there is a particular need for workforce housing in this area because additional housing would result in short commutes. Adding service jobs in this area without adding a comparable amount of workforce housing would aggravate an existing workforce housing problem and result in significant VMT impacts. These impacts should be analyzed. If significant, they should be mitigated.

O2-37
Cont.

Sincerely,

Norman L. Marshall

Norman L. Marshall

[3] https://www.omnihotels.com/hotels/palm-springs-rancho-las-palmas/accommodations
[4] https://www.tripadvisor.com/Hotel_Review-g32942-d79405-Reviews-The_Westin_Rancho_Mirage_Golf_Resort_Spa-Rancho_Mirage_Greater_Palm_Springs_California.html
[5] https://www.tripadvisor.com/Hotel_Review-g32942-d77218-Reviews-The_Ritz_Carlton_Rancho_Mirage-Rancho_Mirage_Greater_Palm_Springs_California.html

7

**Resume**

**NORMAN L. MARSHALL, PRESIDENT**

nmarshall@smartmobility.com

**EDUCATION:**

Master of Science in Engineering Sciences, Dartmouth College, Hanover, NH, 1982
Bachelor of Science in Mathematics, Worcester Polytechnic Institute, Worcester, MA, 1977

**PROFESSIONAL EXPERIENCE: (32 Years, 18 at Smart Mobility, Inc.)**

Norm Marshall helped found Smart Mobility, Inc. in 2001. Prior to this, he was at RSG for 14 years where he developed a national practice in travel demand modeling. He specializes in analyzing the relationships between the built environment and travel behavior and doing planning that coordinates multi-modal transportation with land use and community needs.

**Regional Land Use/Transportation Scenario Planning**

Portland Area Comprehensive Transportation System (PACTS) – the Portland Maine Metropolitan Planning Organization. Updating regional travel demand model with new data (including AirSage), adding a truck model, and multiclass assignment including differentiation between cash toll and transponder payments.

Loudoun County Virginia Dynamic Traffic Assignment – Enhanced subarea travel demand model to include Dynamic Traffic Assignment (Cube). Model being used to better understand impacts of roadway expansion on induced travel.

Vermont Agency of Transportation-Enhanced statewide travel demand model to evaluate travel impacts of closures and delays resulting from severe storm events. Model uses innovate Monte Carlo simulations process to account for combinations of failures.

California Air Resources Board – Led team including the University of California in $250k project that reviewed the ability of the new generation of regional activity-based models and land use models to accurately account for greenhouse gas emissions from alternative scenarios including more compact walkable land use and roadway pricing. This work included hands-on testing of the most complex travel demand models in use in the U.S. today.

Climate Plan (California statewide) – Assisted large coalition of groups in reviewing and participating in the target setting process required by Senate Bill 375 and administered by the California Air Resources Board to reduce future greenhouse gas emissions through land use measures and other regional initiatives.

Chittenden County (2060 Land use and Transportation Vision Burlington Vermont region) – led extensive public visioning project as part of MPO's long-range transportation plan update.

Flagstaff Metropolitan Planning Organization – Implemented walk, transit and bike models within regional travel demand model. The bike model includes skimming bike networks including on-road and off-road bicycle facilities with a bike level of service established for each segment.

Chicago Metropolis Plan and Chicago Metropolis Freight Plan (6-county region)— developed alternative transportation scenarios, made enhancements in the regional travel demand model, and used the enhanced



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model to evaluate alternative scenarios including development of alternative regional transit concepts. Developed multi-class assignment model and used it to analyze freight alternatives including congestion pricing and other peak shifting strategies.

**Municipal Planning**

City of Grand Rapids – Michigan Street Corridor – developed peak period subarea model including non-motorized trips based on urban form. Model is being used to develop traffic volumes for several alternatives that are being additional analyzed using the City's Synchro model

City of Omaha - Modified regional travel demand model to properly account for non-motorized trips, transit trips and shorter auto trips that would result from more compact mixed-use development. Scenarios with different roadway, transit, and land use alternatives were modeled.

City of Dublin (Columbus region) – Modified regional travel demand model to properly account for non-motorized trips and shorter auto trips that would result from more compact mixed-use development. The model was applied in analyses for a new downtown to be constructed in the Bridge Street corridor on both sides of an historic village center.

City of Portland, Maine – Implemented model improvements that better account for non-motorized trips and interactions between land use and transportation and applied the enhanced model to two subarea studies.

City of Honolulu – Kaka'ako Transit Oriented Development (TOD) – applied regional travel demand model in estimating impacts of proposed TOD including estimating internal trip capture.

City of Burlington (Vermont) Transportation Plan – Led team that developing Transportation Plan focused on supporting increased population and employment without increases in traffic by focusing investments and policies on transit, walking, biking and Transportation Demand Management.

**Transit Planning**

Regional Transportation Authority (Chicago) and Chicago Metropolis 2020 – evaluated alternative 2020 and 2030 system-wide transit scenarios including deterioration and enhance/expand under alternative land use and energy pricing assumptions in support of initiatives for increased public funding.

Capital Metropolitan Transportation Authority (Austin, TX) Transit Vision – analyzed the regional effects of implementing the transit vision in concert with an aggressive transit-oriented development plan developed by Calthorpe Associates. Transit vision includes commuter rail and BRT.

Bus Rapid Transit for Northern Virginia HOT Lanes (Breakthrough Technologies, Inc and Environmental Defense.) – analyzed alternative Bus Rapid Transit (BRT) strategies for proposed privately-developing High Occupancy Toll lanes on I-95 and I-495 (Capital Beltway) including different service alternatives (point-to-point services, trunk lines intersecting connecting routes at in-line stations, and hybrid).

**Roadway Corridor Planning**

I-30 Little Rock Arkansas – Developed enhanced version of regional travel demand model that integrates TransCAD with open source Dynamic Traffic Assignment (DTA) software, and used to model I-30 alternatives. Freeway bottlenecks are modeled much more accurately than in the base TransCAD model.

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South Evacuation Lifeline (SELL) – In work for the South Carolina Coastal Conservation League, used Dynamic Travel Assignment (DTA) to estimate evaluation times with different transportation alternatives in coastal South Caroline including a new proposed freeway.

Hudson River Crossing Study (Capital District Transportation Committee and NYSDOT) – Analyzing long term capacity needs for Hudson River bridges which a special focus on the I-90 Patroon Island Bridge where a microsimulation VISSIM model was developed and applied.

**PUBLICATIONS AND PRESENTATIONS (partial list)**

DTA Love: Co-leader of workshop on Dynamic Traffic Assignment at the June 2019 Transportation Research Board Planning Applications Conference.

Forecasting the Impossible: The Status Quo of Estimating Traffic Flows with Static Traffic Assignment and the Future of Dynamic Traffic Assignment. *Research in Transportation Business and Management* 2018.

Assessing Freeway Expansion Projects with Regional Dynamic Traffic Assignment. Presented at the August 2018 Transportation Research Board Tools of the Trade Conference on Transportation Planning for Small and Medium Sized Communities.

Vermont Statewide Resilience Modeling. With Joseph Segale, James Sullivan and Roy Schiff. Presented at the May 2017 Transportation Research Board Planning Applications Conference.

Assessing Freeway Expansion Projects with Regional Dynamic Traffic Assignment. Presented at the May 2017 Transportation Research Board Planning Applications Conference.

Pre-Destination Choice Walk Mode Choice Modeling. Presented at the May 2017 Transportation Research Board Planning Applications Conference.

A Statistical Model of Regional Traffic Congestion in the United States, presented at the 2016 Annual Meeting of the Transportation Research Board.

**MEMBERSHIPS/AFFILIATIONS**

Associate Member, Transportation Research Board (TRB)

Member and Co-Leader Project for Transportation Modeling Reform, Congress for the New Urbanism (CNU)

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Cont.

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# Response to Comment Letter O2

**Californians Allied for a Responsible Economy**
**April 9, 2024**

**O2-1** The City acknowledges the comment as an introduction to comments that follow. This comment is included in the Final MND for review and consideration by the decision-makers prior to a final decision on the project. No further response is required.

**O2-2** The comment provides a summary of the project description and project location. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O2-3** The comment indicates that additional comments are included in the comment letter from Paul Rosenfeld and Norm Marshall which require response. The comment does not identify specific issues with the adequacy of the MND. No further response is required. The comments from Paul Rosenfeld and Norm Marshall are addressed in Response to Comments O2-22 through O2-39.

**O2-4** The comment summarizes comments to follow, concluding that the MND does not comply with CEQA and states that an EIR is required. The detailed concerns are addressed in Responses to Comments O2-6 through O2-20.

**O2-5** The comment provides an introduction to CARE CA. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O2-6** The comment provides background information regarding CEQA and the requirements for an EIR and MND. The comment states that the MND lacks basic information regarding potentially significant impacts and has unsupported conclusions. The comment states that there is evidence that the project may result in potentially significant impacts that are not reduced to less than significant with the proposed mitigation measures, calling for an EIR. The project will not have a significant effect on the environment with the proposed mitigation measures, as discussed in the Initial Study/MND and an EIR is not required. The detailed concerns about the adequacy of analysis and mitigation measures are addressed in Responses to Comments O2-7 through O2-20.

**O2-7** The comment states that the MND fails to adequately analyze and mitigate health risks from construction activities or evaluate the combined lifetime risk of exposure to the project's operation and construction TAC emissions, specifically diesel particulate matter.

As discussed in the MND, the assessment of the project's potential to expose sensitive receptors to substantial pollutant concentrations (Section 2.5.3, Threshold AQ-3) includes a localized significance threshold (LST) analysis and Carbon Monoxide (CO) hotspot assessment, as recommended by the SCAQMD. The MND includes quantitative analysis for construction LSTs, which includes NO2, CO PM2.5, and PM10, where PM10 is the representative of diesel particulate matter and includes diesel exhaust emissions that would constitute the TACs for the project construction. The analysis shows that proposed construction activities would not generate emissions of PM10 in excess of site specific LSTs. Localized project construction impacts would be less than significant and mitigation is not required. In response to these comments a supplemental health risk assessment has been prepared for the project and is included as Appendix A-2 . As presented in the supplemental health risk assessment, with

implementation of MM-AQ-1, the project estimated construction emissions result in a potential maximum cancer risk at the Maximally Exposed Individual Resident (MEIR) below the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold. As such, the project would result in a construction health risk impact that would be less than significant with mitigation. This determination differs from the IS/MND, which concluded that construction heath risk impacts would be less than significant with no mitigation required. (IS/MND, p. 81.) While the information contained herein demonstrates an increase in the severity of this impact relative to what was previously disclosed in the IS/MND, MM-AQ-1 would reduce this impact to a level of insignificance, and the applicant has agreed to implement MM-AQ-1 if the project is approved.

02-8 The comment provides background on CEQA requirements for analysis of human health impacts and provides case law examples. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

02-9 The comment states that a quantitative analysis of the project's health risk impacts, such as a health risk analysis as recommended by OEHHA, must be completed to comply with CEQA's analytical requirements.

As presented in response to comment O2-7, a supplemental health risk assessment has been prepared following OEHHA guidelines for the project and is included as Appendix A-2. OEHHA's most recent guidance is the Air Toxics Hot Spots Program Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments 2015 (2015 Risk Assessment Guidelines Manual) (OEHHA 2015), which supersedes the 2003 OEHHA Risk Assessment Guidelines Manual. The 2015 Risk Assessment Guidelines Manual was used to calculate the health risk impacts from project construction.

02-10 The comment states that localized significance thresholds do not apply to diesel particulate matter or others TACs and the MND still needs to analyze health risk impacts from exposure to TACs.

As, presented in response to comment O2-7, a supplemental health risk assessment has been prepared for the project and is included as Appendix A-2. As presented in the supplemental health risk assessment, with implementation of MM-AQ-1, the project estimated construction emissions result in a potential maximum cancer risk at the MEIR below the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold. As such, the project would result in a construction health risk impact that would be less than significant with mitigation. This determination differs from the IS/MND, which concluded that construction heath risk impacts would be less than significant with no mitigation required. (IS/MND, p. 81.) While the information contained herein demonstrates an increase in the severity of this impact relative to what was previously disclosed in the IS/MND, MM-AQ-1 would reduce this impact to a level of less than significant.

02-11 The comment concludes that a health risk analysis must be prepared to evaluate the magnitude of the project's health risk impacts in accordance with CEQA.

As presented in response to comment O2-7, a supplemental health risk assessment has been prepared for the project and is included as Appendix A-2.

02-12 The comment summarizes the findings and data from SWAPE using AERMOD, concluding that the health risks result in significant impact and a revision is necessary to include analysis and mitigation

of the impacts. The comment incorrectly identifies the MND as an EIR. The data and findings from SWAPE are addressed in Responses to Comments 02-22 through 02-29.

02-13 The comment states that the project conflicts with the applicable air quality plan, referencing the SCAQMD 2022 Air Quality Management Plan. The comment states that the land use designation change from Mountain Reserve to Resort Hotel would introduce additional residents and hotel users to the area, causing a potential for the project to exceed air quality impact assumptions in the Air Quality Management Plan. The comment states that the land use change was not accounted for in the SCAG forecast and the projects operational-source emissions are not accounted for in the air quality management plan. The comment states that this is a significant impact that must be disclosed.

The comment incorrectly states that the change of land use designation from Mountain Reserve (MR) to Resort Hotel would introduce additional residents to the City. The Sky Mesa Recreation Area includes a restaurant built into the natural hillside with a pool and large lawn event space below the restaurant. A restroom facility would be constructed into the hillside adjacent the restaurant and pool. The Sky Mesa Recreation Area does not include any residential units nor increase the 106 residential hotel villas proposed with the project. A pedestrian walkway network would connect the hotel villas portion of the project with the Sky Mesa Recreation Area. The pedestrian network would provide access to pools, ponds, and open space areas within the project site. Within the Sky Mesa Recreation Area, north of the proposed restaurant and pool, the pedestrian network would include viewpoints towards the north/east.

The proposed increase in 216 residents associated with the 106 residential hotel villas involves development of the hotel villas portion of the project which is consistent with the land current land use zoning of Resort Hotel (RS). Therefore, the IS/MND correctly states that the additional 216 residents would be considered in the SCAG's population projections and would be consistent with the 2022 AQMP.

Furthermore, SCAG identifies the Sky Mesa Recreation Area portion of the project as a "vacant parcel of appropriate size" within the SCAG Housing Element Parcel Tool. SCAG identifies the Sky Mesa Recreation Area parcel (APN 689020014) to have a 2019 land use as "vacant" and identifies the 2016 SCAG general plan land use code as 1830 and 1880, each defined by SCAG as follows:

> 1830 State/National Park and Recreation
>
> This category includes developed land within parks designed to serve a regional area. All facilities within the park, such as campgrounds, marinas, or boat launching facilities, are included in this class.
>
> Regional parks are typically large, and may include undeveloped areas. The photo signature shows green grass areas, as well as tree-covered areas. The park may have one or more roads winding through it, depending on the size of the park. The park usually contains a number of sports facilities, such as basketball courts, tennis courts, softball fields, soccer fields, and swimming facilities. Water bodies within regional parks that are above mapping resolution are coded 4100. Beach parks are not included (see code 1870). Where multiple uses occur within a regional park, for example golf course, agriculture, flood control, etc., the use other than Regional Park takes precedence. Most regional parks are identified on collateral sources. This

class includes such uses as zoos, wild animal parks, duck ponds, exotic animal farms, etc. Zoos appear as large areas with many buildings and much vegetation in a confined area, with numerous walkways. A large parking lot is adjacent to the facility.

1880 Other Open Space and Recreation

This category includes developed portions of public and private recreational facilities that are not described in the other open space and recreational categories above. Included are camps, campgrounds (unless within a regional park (1830)), outdoor shooting ranges, ski areas, marinas, and driving ranges not associated with a golf course. Also included are maintained grass areas not used or designated as a local park.

Most of these facilities are identified on the collateral data. Marinas are located adjacent to harbors, and contain small piers, with numerous boats. The water portion of a marina, where the boats are moored, is mapped in the Water category (see code 4300). Ski areas are typically located in mountains above 5000 feet. The area contains a series of wide linear clearings that may braid with each other. A series of towers representing the chairlift system can be seen on the aerial photo. Camp-grounds appear as an area with narrow roads circling within, with offshoot segments representing each campsite area. Campgrounds are also identified on collateral sources.

The development of the Sky Mesa Recreation Area including restaurant/swimming facilities and lawn event space would not be significantly different than what could be included in SCAG land use codes for the site as described above, which include sports facilities, swimming pools, campgrounds, and supporting roads. Additionally, the Sky Mesa Recreation Area would include a pedestrian walkway network that would connect the hotel villas portion of the project with the Sky Mesa Recreation Area and would not have vehicular access throughout nor parking which is consistent with the current MR zone requirements but would be allowed under the SCAG land uses 1830 and 1880. For these reasons the development of the Sky Mesa Recreation Area as proposed in the IS/MND is considered not result in operational emissions that could not have been considered in the SCAG projections and therefore would be consistent with the AQMP.

02-14 The comment states that the MND does not include sufficient analysis on energy conservation, such as solar facilities, alternative fuel, or passive energy efficiency measures. The comment provides background and case law on CEQA requirements regarding energy consumption. The comment states that compliance with Title 24 is not adequate to address energy impact concerns.

Energy consumption during project operation would be commensurate with typical commercial projects and would not use energy wastefully or inefficiently. Furthermore, the project would include sustainability design features to reduce potential energy and water usage, such as installation of high-efficiency lighting. Other renewable energy systems including wind turbine generation, geothermal generation, energy storage, and other renewable energy generation features are not considered technically or economically feasible and/or demonstrated for a similar project. Additionally, site constraints include limited land availability and incompatibility with land use for large-scale power generation facilities, as well as unknown interconnection feasibility and compatibility with utility provider systems. For these reasons other on-site renewable energy systems are not considered feasible for the proposed project. No further analysis is required.

02-15 The comment states that the MND needs a detailed analysis of reduced mobile source energy consumption through electric vehicle charging infrastructure consistent with policy AQ 1.4B and AQ 1.5D.

The MND directly states that the project would provide EV charging infrastructure that meets the California GBC. Further analysis of the impact of EV charging infrastructure is not required in the GHG analysis and the project would comply with California GBC. As discussed in the MND, GHG impacts would be less than significant and additional mitigation and an EIR are not required.

02-16 The comment states that the MND lacks an evaluation of measures to reduce the need for a diesel backup generator, such as alternative fuel sources.

The commenter suggests an alternative fuel source for the emergency generator should be included in the analysis, however the use of alternative fuel does not evaluate the efficient use of energy. The project would operate one diesel-fueled emergency generator for a maximum of 50 hours per year for routine testing and maintenance. This usage was accounted for in the project's operational air quality impacts, which are less than significant. Therefore, no further analysis is required.

02-17 The comment states that the MND does not evaluate the feasibility of opting in to the Rancho Mirage Energy Authority 100% renewable program and does not make a commitment to the program.

The MND states the Ritz Carlton Rancho Mirage is already enrolled in the Rancho Mirage Energy Authority. The project is an extension of the Ritz Carlton Rancho Mirage and would be subject to the requirements of the existing enrollment. A separate commitment to the program should not be necessary.

02-18 The comment incorrectly states that the MND does not evaluate the feasibility of existing power sources or clean fuel generators rather than temporary power generators.

As discussed in Section 6.1 of the MND, temporary direct electric service would be provided by Southern California Edison (SCE) for the construction of the project and would at the least provide electrical power for construction site lighting, computer equipment, and temporary construction trailer operations. Diesel-fired electric generators would be only used where electric energy is needed for construction and not available through existing or temporary construction electrical hookups. In addition, MM-AQ-1 would require prior to the commencement of construction activities for the project, the applicant shall require its construction contractor to use California Air Resources Board (CARB)-certified Tier 4 engines for all diesel-powered equipment pieces that are 75 horsepower or greater throughout all phases of construction. Tier 4 emission standards are currently the highest level of non-road engine emissions standards for engine manufacturers. No additional analysis is required.

02-19 The comment is a conclusion the previous comments. The comment states that the MND does not address whether the building should be constructed at all, how large it should be, where it should be located, whether it should incorporate renewable energy resources, etc. as identified in Appendix F. The comment concludes that an analysis of energy reducing measures must be provided in an EIR.

The project would be built to the most recent GBC standards, which include measures such as EV charging. As concluded in the MND, the project would not result in the inefficient or wasteful use of energy. Please refer to responses to Comments O2-14 through O2-18.

**O2-20** The comment summarizes the findings and data from Norman Marshall, that the project VMT will likely exceed the City's threshold and that an EIR must be prepared. The data and findings from Norman Marshall are addressed in Responses to Comments O2-33 through O2-38.

**O2-21** The comment provides a conclusion to the detailed comments provided in the comment letter. The comment concludes that the project may have significant, unmitigated impacts. The comment calls for the preparation of an EIR. As discussed in the Responses to Comments O2-5 through O2-20, the MND complies with CEQA, and impacts are less than significant with the implementation of the proposed mitigation measures. Therefore, and EIR is not required.

**O2-22** The comment provides a summary of the project description and is an introduction to the comments that follow. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O2-23** The comment summarizes the detailed comments that follow. The comment states that the MND does not evaluate the health risk impacts and emissions and an EIR should be prepared to assess and mitigate these effects. Please refer to Responses to Comments O2-25 through O2-28.

**O2-24** The comment states that the evaluation of potential health risks and conclusion of a less than significant impact is incorrect, and the comment introduces three reasons for this. The detailed reasons are addressed in Responses to Comments O2-25 through O2-27.

**O2-25** The comment states that the MND does not include a quantified construction health risk analysis and does not connect the project's construction TAC emissions to the potential health risk of nearby receptors, which makes the project inconsistent with CEQA.

In response to comments received during the public review period, a supplemental health risk assessment has been prepared for the project and is included as Attachment X. As presented in the supplemental health risk assessment, with implementation of MM-AQ-1, the project estimated construction emissions result in a potential maximum cancer risk at the MEIR below the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold. As such, the project would result in a construction health risk impact that would be less than significant with mitigation. This determination differs from the IS/MND, which concluded that construction heath risk impacts would be less than significant with no mitigation required. (IS/MND, p. 81.) While the information contained herein demonstrates an increase in the severity of this impact relative to what was previously disclosed in the IS/MND, MM-AQ-1 would reduce this impact to a level of insignificance, and the applicant has agreed to implement MM-AQ-1 if the project is approved.

**O2-26** The comment provides background on the OEHHA guidance on conducting health risk analysis, which recommends that projects lasting at least 2-months assess cancer risks. Since the project is over the OEHHA duration thresholds, the comment state that a health risk analysis should be completed for the 22-month construction period to assess impacts from diesel particulate matter and an EIR should be prepared.

In response to comments a supplemental health risk assessment has been prepared for the project and is included as Attachment X. As presented in the supplemental health risk assessment, with implementation of MM-AQ-1, the project estimated construction emissions result in a potential maximum cancer risk at the MEIR below the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold. As such, the project would result in a construction health risk impact that would be less than significant with mitigation. This determination differs from the IS/MND, which concluded that construction heath risk impacts would be less than significant with no mitigation required. (IS/MND, p. 81.) While the information contained herein demonstrates an increase in the severity of this impact relative to what was previously disclosed in the IS/MND, MM-AQ-1 would reduce this impact to a level of insignificance, and the applicant has agreed to implement MM-AQ-1 if the project is approved.

02-27 The comment states that the MND does not analyze cancer risks from combined construction and operation of the project and does not sum each age bin when assessing cancer risks. The comments states that an updated analysis is needed to accurately quantify the risks.

An HRA operational analysis was provided in the MND for the intermittent maintenance and testing of the diesel-fired emergency generator, which would be limited to 50 hours per year. SCAQMD Rule 1470 limits operation of emergency generators to 50 hours per year for maintenance and testing). Due to this relatively short period of exposure, small engine size of the emergency generator (1,200 hp), and minimal on-site particulate emissions from other sources, TACs generated during operation would not result in concentrations causing significant health risks as demonstrated through SCAQMD' Risk Assessment Tool for Rule 1401 and 212, (Version 8.1). The Risk Assessment Tool, a spreadsheet program, was used to perform a screening level evaluation of the cancer and non-cancer health effects of the emergency generator emissions pursuant to Rule 1401, see Appendix B for program results. Combining the maximum impact resulting from the SCAQMD' Risk Assessment Tool for operation with the maximum impact from the supplemental construction health risk assessment would still not exceed the construction health risk assessment thresholds for significance (0.57 + 6.65 = 7.22 versus CEQA threshold of 10), therefore no further analysis is required.

02-28 The comment provides background information on AERSCREEN, a screening-level risk assessment, and describes the methodology and inputs used to prepare a preliminary health risk analysis. The comment states that the cancer risk for the construction and operation of the project, is approximately 58.3 in one million which exceeds the SCAQMD threshold of 10 in one million and results in a potential significant impact not addressed by the MND. The comment clarifies that the results from AERSCREEN represent a screening-level analysis which warrants further evaluation and an EIR.

A screening-level HRA using AERSCREEN relies upon general non-site-specific variables to calculate concentrations at distances from the source. This model does not take into account site-specific variables that a refined HRA (using a model such as AERMOD) would, including localized meteorological data (wind and temperature), topography, and buildings. As discussed herein a supplemental health risk assessment has been prepared for the project and is included as Appendix A-2. As presented in the supplemental health risk assessment and in response to comment 02-27, with implementation of MM-AQ-1, the project estimated construction emissions and construction and operational emissions would result in a potential maximum cancer risk at the MEIR below the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold.

02-29 The comment states that mitigation measures are necessary because the project would result in potentially significant health risk impacts. The comment recommends the use of Tier 4 construction equipment for all engines above 25 hp and other mitigations identified in SCAG's TRP/SCS 2020-2045. The comment concludes that an EIR should be prepared to include the mitigation measures commitment to implementation and a health risk analysis.

In response to comments a supplemental health risk assessment has been prepared for the project and is included as Attachment X. As presented in the supplemental health risk assessment, with implementation of MM-AQ-1, the project estimated construction emissions result in a potential maximum cancer risk at the MEIR below the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold. As such, the project would result in a construction health risk impact that would be less than significant with mitigation. While the MND found that construction heath risk impacts would be less than significant with no mitigation required, the Final IS/MND includes MM-AQ-1 would reduce this impact to a level of insignificance. No further mitigation measures are required.

02-30 The comment is a disclaimer and provides concluding remarks. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

02-31 The comment includes the resume of Paul Rosenfeld. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

02-32 The comment is an introduction and summary to the comments that follow. The detailed concerns are addressed in Responses to Comments 02-32 through 02-37.

02-33 The comment states that the MND mischaracterizes Resort Hotel rooms as multi-family housing, and the project represents 225 resort hotel rooms rather than 106 units. As described in the MND, the project would consist of 106 residential units for the VMT analysis. For the Multifamily land use rate, the number of bedrooms in each unit does not impact the total number of units. Further, because the units will have characteristics that would function like a residential unit (full kitchens, individual garages, etc) the project would function more similarly to a residential unit. The quoted portion of the MND in the comment is clarifying that the project would not be utilized year-round and would not count towards the RHNA allocation and is not part of the VMT discussion.

02-34 The comment states that the mischaracterization leads to significantly underestimating trip generation and misrepresenting peak travel direction. The comment states that the morning and afternoon peak trip generation is larger than identified in the MND due to the large support staff needed for resort hotels. The comment states that these errors invalidate the traffic analysis of traffic volumes and levels of service.

As described in Response to Comment 02-34, the project would consist of 106 units, not 206 hotel rooms. The land use that most closely matches the project's land use is multi-family residential, given the provided amenities.

The project's TIA utilized trip generation rates from the 10th edition of the ITE which are higher than those in the 11th edition of the ITE for both multifamily housing and resort hotel land uses. Therefore, the project represents an even more conservative estimate of trip generation because a higher rate was used.

The comment specifically states that the project's peak hour rates were underrepresented. In both the 10th and 11th edition, the AM and PM trip generation rates are higher for multifamily housing than resort hotel land uses, therefore the use of the multi-family housing would have a higher trip generation than a hotel land use.

02-35 The comment states that the VMT analysis incorrectly treats resort hotel rooms as residential dwellings and does not analyze VMT impacts of guest and support workers. The comment states that these VMT impacts are likely highly significant and should be mitigated.

The project would consist of 106 units. Further, because the units will have characteristics that would function like a residential unit (full kitchens, individual garages, etc) the project would function more similarly to a residential unit. As discussed in the MND, the number of employees is anticipated to be minimal for the project. As detailed in the TIA, the trip generation used was not only for the residential uses but also the commercial uses onsite (the Sky Mesa portion).

02-36 The comment states that the venue space is mischaracterized as a swimming pool and open space and is falsely identified as local serving. The comment states that the venue space would create a significant number of new trips and requires a separate VMT analysis that includes event frequency and average travel distance to the venue.

As described in Chapter 1 of the MND, the Sky Mesa Recreation Area would provide additional event space, restaurant, and amenities such as a pool terrace and view opportunities of the surrounding areas. The trips associated with the event venue space are included in Table 17-6 of the MND. As shown in the traffic analysis, the internal capture applies to the Sky Mesa Restaurant, not the venue, which results in the increase of 305 trips during events, As concluded in the MND, the project would result in less than significant VMT impacts, no additional analysis is required.

02-37 The comment states that adding service jobs associated with the project would aggravate an existing workforce housing problem in Rancho Mirage. The comment provides data on housing needs by income category and employee numbers by resort. The comment estimates that the project would cause an addition of service workers at a 1:1 ratio to rooms. The comment states that this impact should be analyzed in an EIR and mitigated.

The MND addresses impacts to population and housing under MND Section 14.2. As concluded in the MND, the project would be consistent with the anticipated population and employment growth for the City, Impacts were determined to be less than significant.

02-38 The comment includes the resume of Norman Marshall. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

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Comment Letter O3

August 20, 2024

COMMENTS TO RECIRCULATED DRAFT MITIGATED NEGATIVE DECLARATION

City of Rancho Mirage
City Clerk and Planning Department

Comments to: Mr. Ben Torres, Planning Manager
Email: bent@RanchoMirageCA.gov
Kristie Ramos, City Clerk, City of Rancho Mirage
Email: kristier@ranchomirageca.gov

Deadline for Response: August 20, 2024 / SCH: 2024030267

Project Name: Ritz Carlton

Project Description: The project proposes the construction of the Ritz Carlton residences consisting of 106 units (48 residential suites & 58 villas) ranging in size from 1 to 3 bedrooms, 23,840 square feet of event space, 5,510 square feet for amenities, a 381-space subterranean parking structure, and 116 additional residential spaces. *Additionally, the Sky Mesa recreational area will consist of a 6,273 square foot restaurant and a 693 square foot restroom facility ("the Sky Mesa"). The Sky Mesa area will also provide additional lawn event space and pool area.* Overall, the 35.07-acre project site, which includes the existing hotel, will expand by a total of approximately 236,748 square feet of new interior spaces. In addition, a General Plan Zoning Map Amendment is proposed to amend the Mountain Reserve (MR) designation for the project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689- 020-012 & 689-020-014). A Tentative Parcel Map (TPM38768) proposes to establish three parcels (excluding Sky Mesa area) with Parcel 3 of the map containing 106 condo units (Ritz Carlton residences). Lastly, a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment") is proposed. (APNs: 689-330-026, -28, -31, -32, -34; 689-020- 012, -14; & 689-331-001, -18).

O3-1



OswitLandTrust.org | 760.385.8255

1

Oswit Land Trust, PO Box 4020, Palm Springs, CA 92263

To Whom It May Concern:

Oswit Land Trust is a 501C3 non-profit land conservancy dedicated to preserving critical habitat for wildlife corridors and sensitive species. We achieve our goals through the acquisition of land and advocacy. We are a proud member of the Land Trust Alliance and have over 3,000 active members who are residents within the Coachella Valley and beyond.

As always, we thank the City of Rancho Mirage for your dedication to making the city a beautiful balance between development and respect for maintaining access to the beauty and diversity of our natural lands and precious wildlife.

03-2

A primary mission of Oswit Land Trust is to advocate on behalf of biologically significant habitats, threatened and endangered species, and sensitive resources so these land areas receive the full spectrum of community oversight and attention they so richly deserve, particularly when they occur on or adjacent to biologically rich or steep hillsides where the flora and fauna and accompanying wildlife are particularly sensitive. This is our concern, particularly with the proximity to the Bighorn Sheep Reserve Area.

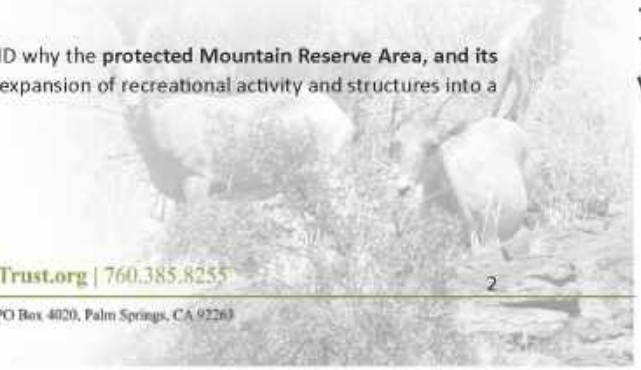
The primary emphasis of the comments from Oswit Land Trust will be devoted to biological Impacts, the MSHCP and its obligations, the Bighorn Sheep Conservation Area and its responsibilities, and the developer's proposed abandonment of the ***Mountain Reserve Zoning Designation*** to Resort Hotel. It appears that this "protective" land use and zoning designation occurred thoughtfully and in response to the City's priorities, policies, and open space objectives, completely understanding the area's proximity to the pre-existing Ritz Carlton.

03-3

Abandoning this protection to commercial use, even if it is proposed recreational use, is a major shift in land use objectives and policy, particularly because of the intensity of the use in its unique environmental setting. This "significant environmental impact" goes without assessment in the R-Draft MND.

There is no explanation in the R-Draft MND why the **protected Mountain Reserve Area, and its unique setting,** should be abandoned for expansion of recreational activity and structures into a

03-4



land area reserved for biological considerations. A concern is whether the Recirculated Draft Mitigated Negative Declaration (Recirculated D-MND) has fully assessed and achieved Land Use and Zoning consistency in its policies, plans, and objectives under the Rancho Mirage General Plan. Oswit Land Trust maintains that it has not.

O3-4 Cont.

The following represent the considerable concerns of Oswit Land Trust that the biological and land use sections of the Recirculated Draft Mitigated Negative Declaration (R-Draft MND) are incomplete in description, deficient in assessment, and conclusionary in results and attempted mitigation. We have cited the page numbers and portions of text from several sections to illustrate the concerns, followed by comments.

O3-5

**BIOLOGICAL SECTION OF THE R-DRAFT MND (Pages 87-92):**

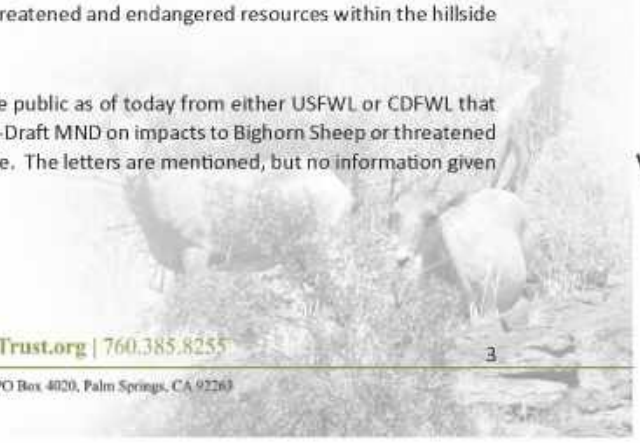
4.2 Discussion of Impacts (at p. 88):

> "Peninsular bighorn sheep is covered under the CVMSHCP. [emphasis added] One non-listed species has a moderate potential to occur within the project site: red diamondback rattlesnake. Red diamondback rattlesnake is not covered under the CVMSHCP."

Discussion of Section 4.2: The biological assessment for Peninsular bighorn sheep is one of the most sensitive biological issues for this area. The nearby USFWL and CDFWL conservation area for these species, in the same mountain chain that encompasses the Ritz Carlton Project, was covered extensively in the Draft Environmental Impact Reports for relatively nearby resort activity within the City of La Quinta; namely, Travertine and Coral Mountain. Extensive information was on file for La Quinta by both the United States Department of Fish and Wildlife (USFWL) and California Department of Fish and Wildlife (CDFWL), with extensive requirements for the project design to mitigate and avoid impacts to threatened and endangered resources within the hillside areas on the mountainside.

There are no letters on file available to the public as of today from either USFWL or CDFWL that support the biological assessment in the R-Draft MND on impacts to Bighorn Sheep or threatened and endangered species for Rancho Mirage. The letters are mentioned, but no information given

O3-6



on their content, and no indications whatsoever on what effect the comments had to correct mitigation in the Recirculated D-MND. Upon request for the comment letters to the City, after 24 hours pending a deadline, the letters still were not available to us as public members. Emails to/from the city support this.

Accordingly, Oswit Land Trust has no information to assess the sufficiency of impacts to these resources; to know if they exist; to know the jurisdictional responsibilities; to know if the city has met them as lead agency; to know if mitigation is effective! This has invalidated our comment letter. A more detailed explanation follows (immediately), because this issue has such a profound impact.

03-6 Cont.

In the Ritz Carlton Notice of Completion (NOC), presently on file with the State Clearinghouse, there is evidence that the City of Rancho Mirage, as lead agency, notified the California Department of Fish and Wildlife (CDFWL), as a trustee agency for threatened and endangered species, of the Draft Mitigated Negative Declaration. There is nothing in the NOC that shows USFWL received notice. There is nothing that indicates notification to USFWL, and nothing showing its response. Why USFWL was a major trustee of resources for La Quinta but not Rancho Mirage in the same mountain chain and Bighorn Sheep resource area is deeply problematic.

At page 1 of the Recirculated D-MND, the document states as follows:

> "During the public review period, the lead agency received four comment letters from the following entities:
>
> - **California Department of Fish and Wildlife (CDFW)** [emphasis added]
> - Agua Caliente Band of Cahuilla Indians
> - Western States Regional Council of Carpenters
> - Californians Allied for a Responsible Economy
>
> **The comment letters raised issues related to biological resources, air quality, cultural resources, Greenhouse Gases (GHG), and noise.** [emphasis added] Responses to these comment letters will be included in

03-7



the Final IS/MND after the public review period of the recirculated IS/MND has been completed."

03-7 Cont.

Upon reviewing the R-Draft MND, the first objective of Oswit Land Trust, and its consultants, were to review the involved comment letters, particularly because two of the four letters are submitted by trustee agencies with jurisdiction over the laws, responsibilities, and thresholds of significance for resources within the project "area of impact."

We have not responded (our comments usually do) to air quality, cultural resources, GHG and noise because there is inadequate foundation, considering that commentary is why the City has recirculated its draft, but none of the letters are available to the public at this stage.

03-8

Our consultant checked the State Clearinghouse website and discovered that the CDFWL comment letter, and others, were not posted on the site. Then, the consultant reviewed the Notice of Availability (NOA) for the R-Draft MND that has a link to ALL POSTED data, Exhibits, Appendices, and other materials associated with the R-Draft MND, and none of the comment letters appeared.

Twenty-four hours before the end of the comment period and following through a series of emails and phone calls stressing our critical need for the CDFWL assessment, the City claimed no staff were available to respond. The City was repeatedly advised of their failure to properly post a state trustee agency comment, as required by CEQA California Code of Regulations Section 15208. At 6:00 p.m. on August 20th, the City advised our consultant no extension would be granted until the letter was received, the letter was not presently available, and that a public record request had been issued on our behalf. By law, the city has ten days to respond, and we still do not have the letter, or any of the other letters. It takes several minutes to pull a trustee letter from the planner's file – where is it?

03-9

The CDFWL letter should have been immediately available to the public, and certainly to Oswit Land Trust, and it should have been posted. The failure to publicly issue the CDFWL letter leaves Oswit Land Trust with no foundation to understand or respond to the jurisdictional responsibilities of the city towards the Bighorn Sheep, or other



identification and responsibilities toward potentially threatened or endangered species, or sensitive habitat.

Without such critical data, our comments are devoid of a proper record to give public feedback. This has deprived our organization of a fair and informed basis to comment. The Planning Manager commented in emails that Oswit Land Trust could correct this lack of information during later hearings. Our rights are present rights to the information, by CEQA regulations. The 45-day comment period to a Recirculated Draft cannot be re-created later in the process. Oswit Land Trust maintains that this failure to release the comments of state trustee agencies for public review has deprived our organization of its legal rights to full commentary at this stage of review. We ask for a full remedy.

O3-9 Cont.

BIOLOGICAL SECTION OF THE R-DRAFT MND (Page 90):

"4.2 (d) Discussion of Impacts (at p. 90):

***Less-than-Significant Impact with Mitigation Incorporated.*** According to the City's General Plan – Conservation and Open Space element, the City offers limited opportunities for the preservation of wildlife migration corridors due to the pattern of Santa Rosa Mountains and the Whitewater River (City of Rancho Mirage 2017). The project site does not function as a wildlife corridor and does not support any wildlife nursery sites. Therefore, no impacts associated with wildlife corridors would occur."

O3-10

Discussion of Section 4.2 (d): In support of a conclusion that there are no impacts associated with wildlife corridors that would occur (in an area known for Bighorn Sheep protection), the R-Draft MND concludes without supporting evidence of any kind. The R-Draft MND talks about "patterns of Santa Rosa Mountains and the Whitewater River" without identifying what patterns it is referencing. The author concludes that General Plan policies and information in the Conservation and Open Space Elements preclude any impacts without referencing any support for the statement, here or at any other location within the R-Draft MND. This type of conclusionary analysis occurs throughout the Biological Section.



**BIOLOGICAL SECTION OF THE R-DRAFT MND (Page 91):**

"4.2 (d) Discussion of Impacts (at p. 91 (d)):

***Less-than-Significant Impact with Mitigation Incorporated.*** The City of Rancho Mirage General Plan contains several elements that were established to address potential impacts to biological resources. Specifically, the Conservation and Open Space Element establishes biological resources goals, policies, and programs that address potential impacts to candidate, sensitive, or special-status species and their habitats. The City is a Permittee of the CVMSHCP; therefore, compliance with the CVMSHCP provides Permittees with take authorization for covered species for all covered activities, which includes development outside of CVMSHCP conservation areas. Therefore, the project is a covered activity, and compliance with the CVMSHCP would provide take authorization for covered species. Therefore, with implementation of **MM-BIO-1** through **MM-BIO-6**, the project would not conflict with the City of Rancho Mirage General Plan.

03-11

Discussion of Section 4.2 (d) at page 91: The City again references general plan policies to prevent impacts to biological resources. It fails to identify the policies and programs and establish how they mitigate or whether any have been applied to this project. None of this information is referenced in this section or any another section of the R-Draft MND. The effectiveness of mitigation is conclusion reached without supporting evidence.

The reasoning of the mitigated negative declaration as it relates to the multi species plan (CVMSHCP) and whether the plan's thresholds or obligations are met is that (1) the city is covered under the plan – (2) the plan authorizes take – (3) therefore the mitigation measures MM BIO 1-6 are effective mitigation. This chain of logic is completely without discussion and supporting logic or evidence.

**BIOLOGICAL SECTION OF THE R-DRAFT MND (Page 91):**

"4.2 (d) Discussion of Impacts (at p. 91 (d)):
In addition, **a General Plan Zoning Map Amendment from Mountain Reserve (MR) to Resort Hotel (Rs-H)** [emphasis added] is concurrently proposed for the

03-12



proposed Sky Mesa Recreation Area. Under existing conditions, the proposed Sky Mesa project would conflict with the underlying land use designations. However, as part of the proposed project, the applicant is proposing an amendment to the City's General Plan that would expand the Resort Hotel (Rs-H) designation and zoning of the existing Ritz Carlton to encompass the Sky Mesa site. As noted, the MR zone was adopted for the purposed of avoiding or mitigating possible impacts on sensitive biological resources and with implementation and adherence of the above mitigation measures, the project would not conflict with the City of Rancho Mirage General Plan. Therefore, impacts would be **less than significant with mitigation incorporated**."

Discussion of Section 4.2 (d) at page 91: This section cited above appears to be one of the most vulnerable conclusions of the R-Draft MND that adequate mitigation has occurred. The lead agency, or the city, admits in the text of their evaluation that under existing conditions, the proposed Sky Mesa project conflicts with the underlying land use designation. This is an open and overt admission of conflict. It is immediately followed by a denial. The evaluation states that the Mountain Reserve Zone was adopted for the very purpose of avoiding or mitigating possible impacts to sensitive biological resources. We have concluded the same. The present manifest designation did not just happen. It was designed as a policy outcome by the city knowing full well about the Ritz Carlton development, and it was intended to buffer the hillside sensitive biological area.

O3-12 Cont.

It is only later with the expansion of the Ritz Carlton and the need to resolve the inconsistency with that designation that the device of a zoning amendment was introduced, with the unsupportable conclusion that no inconsistency can be attached to this change. This thinking not a mitigation approach, it is an unpermitted diversion from adequate environmental assessment under CEQA.

**BIOLOGICAL SECTION OF THE R-DRAFT MND (Page 92):**

"Section 4.3 MM BIO -2 (at page 92):
**Coachella Valley Multiple Species Habitat Conservation Plan Land Use Adjacency Guidelines.** The project applicant shall implement the following Land Use Adjacency Guidelines (Coachella Valley Multiple Species Habitat Conservation Plan

O3-13



[CVMSHCP], Section 4.5) to minimize and avoid indirect effects from development adjacent to conservation areas (ie., Santa Rosa and San Jacinto Mountains Conservation Area), where applicable."

Discussion of Section 4.3 at page 92: The draft document has no assessment of land use adjacency guidelines, of agency responsibilities, avoidance, or mitigation. There is no assessment or discussion of conditions, impacts, options, avoidance, or how mitigation relates to the proposed mitigation measures. Under drainage in this same section, there is no discussion of the drainage system, how it is designed, what it will impact, what effective mitigation options exist, and how any of this on drainage relates to environmental alternatives. This type of assessment in a void occurs systematically throughout the environmental assessment. Accordingly, mitigation does not have a foundation to show that it is effective.

**Land Use Assessment under the R-Draft MND:**
The land use assessment under pages 140 and 141 of the Land Use and Planning Impact Evaluation have the same inconsistencies. The conclusions of no impact are unsupportable when compared to given and assessed data in the draft document.

The draft document justifies a finding of insignificant impact in the Sky Mesa area in a discussion that states that only hiking is to be allowed. The project description is a complete contradiction to this because structures and buildings and recreational areas are part of the involved project description.

The compatibility of the proposed development within Sky Mesa is associated with its adjacency to the project itself -- the existing Ritz Carlton. The assessment ignores the position of the proposed development and its adjacency to a sensitive biological area. The conclusion of "no significant impact" uses the project itself to define what it calls surrounded uses and ignores the biology of the region that actually does surround Sky Mesa. This assessment of compatibility with general plan policies chooses only the general plan policies that address commercial development and ignores all conservation priorities related to the present land use of Mountain Reserve Zoning. This outcome shows a real bias in the approach to assessment and mitigation.

03-13 Cont.

03-14

03-15



Oswit Land Trust is grateful for the hard work of staff and decisionmakers. We hope you will consider our comments and take great care to protect the sensitive biological areas that were originally reserved for the present "Mountain Reserve Zoning Designation."

03-16

With regard,

Jane Garrison,
Executive Director Oswit Land Trust



# Response to Comment Letter O3

**Oswit Land Trust**
**August 20, 2024**

**O3-1** The comment provides a summary of the project description and project location. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O3-2** The comment provides an introduction to Oswit Land Trust. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O3-3** The comment describes the mission of the Oswit Land Trust and includes a general introduction to comments that follow regarding biological resources. Please refer to Response to Comment O3-4 through O3-15.

**O3-4** The comment states a concern regarding biological resources within the Mountain Reserve Area. Additionally, the comment states that MND does not adequately address the project's consistency with land use and zoning policies.

As discussed in the MND, the Sky Mesa Recreational Area is the portion of the project that is on the area zoned as Mountain Reserve and the applicant is proposing an amendment to the City's General Plan and Zoning Map that would rezone the Sky Mesa Recreational Area as Resort Hotel. Appendix G land use threshold b) asks if the project would "(c)ause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect". Conflict with the general plan designation and zoning code does not inherently result in a significant environmental impact. Preparation of the MND included review of the applicable land use and zoning polices for the project site. As discussed in MND Section 11.2, the project and associated discretionary actions associated with the General Plan and Zoning Map amendment, the project would not conflict with the City's land use policies, including protecting sensitive species with the incorporation of biological resource mitigation measures and would not result in a significant environmental impact. Further, if approved, it would be consistent with the general plan land use designation and zoning of the site.

**O3-5** The comment serves as an introduction to the following comments that state concerns regarding the biological resources and the land use section in the MND. The comment states that the MND failed to include detailed analyses, conclusions, and mitigations. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O3-6** The comment expresses concern regarding the Peninsular bighorn sheep and describes Draft Environmental Impact Reports in the City of La Quinta included extensive requirements by the United States Department of Fish and Wildlife (USFW) and the California Department of Fish and Wildlife (CDFW). The comment also states that there are no public letters addressing the MND from the USFWL nor the CDFW regarding mitigation. Please refer to Comment Letter A1 responses A1-1 through A1-16, where the comments made by CDFW are addressed. Further, the MND was available for public comment by CDFW and USFW during the public review period from March 11, 2024, to April 9,2024 and was recirculated from July 22nd, 2024 to August 20th, 2024. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

03-7 The comment states that the Notice of Completion (NOC) mentions that CDFW was notified about the NOC but the USFW was not mentioned as a major trustee of resources as it was mentioned for an Environmental Impact Report by the City of La Quinta. The comment also restates information on MND regarding the four comment letters received. The MND was available for public comment during the public review period from March 11, 2024 to April 9,2024 and was recirculated from July 22nd, 2024 to August 20th, 2024. These letters will be available as part of the FMND prepared for this project.

03-9 The comment expresses concern regarding the availability of the letters submitted by CDFW and expresses concern regarding the Bighorn Sheep and other wildlife. The comment further states that the CDFW letter should be available to the public to allow for comment on the MND. The MND was available for public comment during the public review period from March 11, 2024 to April 9,2024 and was recirculated from July 22nd, 2024 to August 20th, 2024. This provided opportunity for the public to comment on the adequacy of the MND. The CDFW letter and responses will be available for the public review in the Final MND.

03-10 The comment states that the MND lacks support for the conclusion that the project would be less than significant with mitigation as it relates to wildlife corridors. Further, the comment states that the MND does not describe the patterns of the Sant Rosa Mountains and the Whitewater River. As concluded in the MND, the project site would does not function as a wildlife corridor, therefore it would not result in impacts to wildfire corridors. Additionally, there is existing fencing separating the Big Horn Reserve Land (i.e., adjacent Conservation Area) from the proposed project site was previously installed to prevent Peninsular bighorn sheep from entering and grazing on the Ritz Carlton Hotel property (i.e., project). As described in Appendix B of the MND, wildlife movement within the project site is unlikely due to the steep topography and urbanized area to the west (i.e., existing Ritz-Carlton Hotel). However, the remainder of the site and the surrounding environment consist of open desert scrub habitat that likely function as open habitat but do not function as a corridor for wildlife.

Clarification has been made to describe the existing fencing and surrounding environment in the MND. These changes merely clarify or amplify information already found in the Draft MND, and do not raise important new issues about significant effects on the environment.

03-11 The comment states that the MND fails to identify the policies and programs that would mitigate the biological impacts from the City's General Plan. The comment further states that there is not explanation of how the mitigation is effective. The discussion of general plan policies is in response to the Appendix G threshold question that addresses conflicts with local policies that protect biological resources. The MND does not rely on consistency with the general plan policies to avoid impacts to biological resources. Please refer to Comment A1-10 for additional information on how the project would comply with the CVMSHCP guidelines

03-12 The comment expresses concern with the proposed change in general plan designation for the site and expresses that it would result in impacts to biological resources. Please refer to Response to Comment O1-17.

03-13 The comment states that the MND lacks discussion in regard to the Land Use Adjacency Guidelines and mitigation measures. Please refer to Comment A1-10 for additional information on how the project would comply with the CVMSHCP guidelines and revised MM-BIO-2.

03-14 This comment states that MM-BIO-2 does not include a description of the drainage system nor does it have a foundation to assess its effectiveness. The Land Use Adjacency Guidelines (Coachella Valley Multiple Species Habitat Conservation Plan [CVMSHCP], Section 4.5) were used to minimize and avoid indirect effects from development adjacent to conservation areas (i.e., Santa Rosa and San Jacinto Mountains Conservation Area) which was used as a foundation for implementing MM-BIO-2. Please refer to Comment A1-10 for additional information on how the project would comply with the CVMSHCP guidelines and revised MM-BIO-2. Additionally, included as Appendix D of the MND, the Preliminary Drainage Study shows the proposed condition hydrology map and states that the project would not substantially alter the existing drainage pattern, and runoff would not exceed the capacity of the downstream drainage system. These changes merely clarify or amplify information already found in the Draft MND, and do not raise important new issues about significant effects on the environment. The comment also recommends that drainage design plans and specifications be provided in a revised MND to allow for a meaningful review. Additional details on the drainage design plan and specification will be provided during the City's Condition of Approval (COA) process.

03-15 The comment states that the MND is not consistent in the land use analysis and the project description regarding existing zoning. The project description serves to provide the reader with an understanding of the actions being proposed by the project. As such the MND's project description serves as a detailed description of the project features, actions and activities. As stated in the MND's project description, the project is proposing "a General Plan Zoning Map Amendment from Mountain Reserve (MR) to Resort Hotel (Rs-H)".

In the land use analysis, the MND restates the MR uses which are, "limited to recreational activities, such as hiking, or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources" and states, "the Sky Mesa portion of the project would conflict with the underlying land use designation." However, as stated above and in the MND, the applicant is proposing an amendment that would expand the Resort Hotel (Rs-H) designation and zoning to encompass the Sky Mesa portion of the site, which is privately owned property and not public land. Additionally, the MND includes mitigation measures MM-BIO-1 through MM-BIO-6 to reduce the potentially significant impacts related to biological resources. The MND includes MM-BIO-1, which would ensure consistency with the CVMSHCP which would mitigate impacts to CVMSHCP covered species, including the Peninsular bighorn sheep and burrowing owl to less than significant without the need for focused surveys. For species not covered under the CVMSHCP, such as the red diamondback rattlesnake, impacts would still be reduced to less than significant with the implementation of MM-BIO-2, construction best management practices. The MND already includes pre-construction surveys for nesting birds under MM-BIO-3, burrowing owls identified under MM-BIO-4, prevention inadvertent entrapment of special-status wildlife during construction under MM-BIO-5, and the potential salvage of adult desert tortoise under MM-BIO-6.

03-16 The City acknowledges the concluding comment and will include the comment as part of the Final MND for review and consideration by the decision-makers prior to a final decision on the project. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

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Comment Letter O4

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**VIA EMAIL**

August 20, 2024

Ben Torres
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69-825 Highway 111
Rancho Mirage, California, 92270
Ph: (760) 328-2266 Ext. 253
Em: bent@ranchomirageca.gov

**RE: July 2024 Recirculated Initial Study / Mitigated Negative Declaration – City of Rancho Mirage's Ritz-Carlton Phase II Expansion Project.**

Dear Mr. Torres:

On behalf of the Western States Regional Council of Carpenters ("**WSRCC**"), our firm is submitting these comments in connection with the City of Rancho Mirage's ("**City**" or "**Lead Agency**") July 2024 Recirculated Initial Study / Mitigated Negative Declaration ("**RMND**") pertaining to the Ritz-Carlton Phase II Expansion Project (Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004) ("**Project**"). 04-1

The Project involves the construction of the Ritz-Carlton Residences Rancho Mirage and the Sky Mesa Recreation Center on a 35.07-acre site located at 68900 Frank Sinatra Drive, Rancho Mirage, CA 92270 (APNs: 689-330-026, -028, -032, -034; 689-020-012, -014; 689-331-001, -018) in Riverside County. Nestled in the foothills of the Santa Rosa Mountains 650 feet above the Coachella Valley below, the 150,000-square-foot Project will consist of a one-to three-story apartment and condominium complex, along with a parking garage, hotel, 28,843 square feet of event space, 6,273 square feet of restaurant space, and 5,513 square feet for amenities. The overall Project Site includes an existing hotel that opened as a Ritz-Carlton in 1988 and was later rebranded. The Project would provide a total of 106 new units and 381 vehicle parking spaces. 04-2

In March 2024, the City released the first Initial Study / Mitigated Negative Declaration ("MND") for the Project. On April 9, 2024, WSRCC submitted written comments to the MND during the comment period specified by the City, and raised various concerns as to deficiencies noted in the Project's environmental review. Notwithstanding those meritorious comments and concerns, the RMND does not address any of the concerns previously raised by WSRCC in its prior comments, including issues related to the Project's impacts on biological resources, cultural resources, noise, GHG emissions, energy use, land use. WSRCC expressly reiterates and incorporates it prior comments in the foregoing correspondence, and urges the City to give them full consideration as part of the CEQA environmental review process.

04-3

WSRCC is a labor union representing over 63,000 union carpenters in 10 states, including California, and has a strong interest in well-ordered land use planning and in addressing the environmental impacts of development projects. Some WSRCC members live, work, and recreate in the City and the surrounding communities and would be directly affected by the Project's environmental impacts.

WSRCC expressly reserves the right to supplement these comments at or prior to hearings on the Project, and at any later hearing and proceeding related to this Project. Gov. Code, § 65009(b); PRC, § 21177(a); see *Bakersfield Citizens for Local Control v. Bakersfield* (2004) 124 Cal.App.4th 1184, 1199-1203; see also *Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal.App.4th 1109, 1121.

WSRCC incorporates by reference all comments raising issues regarding the Project and its environmental review and associated documents and reports (including the City's Staff Report), or lack thereof. See *Citizens for Clean Energy v. City of Woodland* (2014) 225 Cal.App.4th 173, 191 (finding that any party who has objected to the project's environmental documentation may assert any issue timely raised by other parties).

04-4

Moreover, WSRCC requests that the City provide notice for any and all notices referring or related to the Project issued under the California Environmental Quality Act ("**CEQA**") (Public Resources Code, § 21000 et seq.), and the California Planning and Zoning Law ("**Planning and Zoning Law**") (Gov. Code, §§ 65000–65010). California Public Resources Code, sections 21092.2 and 21167, subsection (f) and California Government Code, section 65092 require agencies to mail such notices to

any person who has filed a written request for them with the clerk of the agency's governing body.

04-4 Cont.

## I. THE CITY SHOULD REQUIRE THE USE OF A LOCAL WORKFORCE TO BENEFIT THE COMMUNITY'S ECONOMIC DEVELOPMENT AND ENVIRONMENT.

The City should require that the Project be built using local workers who have graduated from a Joint Labor-Management Apprenticeship Program approved by the State of California, have at least as many hours of on-the-job experience in the applicable craft which would be required to graduate from such a program, or are registered apprentices in such a program.

Community benefits such as local hire can also be helpful to reduce environmental impacts and improve the positive economic impacts of the Project. Local hire provisions requiring that a certain percentage of workers reside within 10 miles or less of the Project site can reduce the length of vendor trips, reduce greenhouse gas emissions, and provide localized economic benefits. As environmental consultants Matt Hagemann and Paul E. Rosenfeld note:

> [A]ny local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

04-5

March 8, 2021, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling.

Workforce requirements promote the development of skilled trades that yield sustainable economic development. As the California Workforce Development Board and the University of California, Berkeley Center for Labor Research and Education concluded:

> [L]abor should be considered an investment rather than a cost—and investments in growing, diversifying, and upskilling California's workforce can positively affect returns on climate mitigation efforts. In other words,

> well-trained workers are key to delivering emissions reductions and moving California closer to its climate targets.[1]

Furthermore, workforce policies have significant environmental benefits given that they improve an area's jobs-housing balance, decreasing the amount and length of job commutes and the associated greenhouse gas ("**GHG**") emissions. In fact, on May 7, 2021, the South Coast Air Quality Management District found that that the "[u]se of a local state-certified apprenticeship program" can result in air pollutant reductions.[2]

Locating jobs closer to residential areas can have significant environmental benefits. As the California Planning Roundtable noted in 2008:

> People who live and work in the same jurisdiction would be more likely to take transit, walk, or bicycle to work than residents of less balanced communities and their vehicle trips would be shorter. Benefits would include potential reductions in both vehicle miles traveled and vehicle hours traveled.[3]

Moreover, local hire mandates and skill-training are critical facets of a strategy to reduce vehicle miles traveled ("**VMT**"). As planning experts Robert Cervero and Michael Duncan have noted, simply placing jobs near housing stock is insufficient to achieve VMT reductions given that the skill requirements of available local jobs must match those held by local residents.[4] Some municipalities have even tied local hire and

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[1] California Workforce Development Board (2020) Putting California on the High Road: A Jobs and Climate Action Plan 2030 at p. ii, *available at* https://laborcenter.berkeley.edu/wp-content/uploads/2020/09/Putting-California-on-the-High-Road.pdf.

[2] South Coast Air Quality Management District (May 7, 2021) Certify Final Environmental Assessment and Adopt Proposed Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions Program, and Proposed Rule 316 – Fees for Rule 2305, Submit Rule 2305 for Inclusion Into the SIP, and Approve Supporting Budget Actions, *available at* http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-May7-027.pdf?sfvrsn=10.

[3] California Planning Roundtable (2008) Deconstructing Jobs-Housing Balance at p. 6, *available at* https://cproundtable.org/static/media/uploads/publications/cpr-jobs-housing.pdf

[4] Cervero, Robert and Duncan, Michael (2006) Which Reduces Vehicle Travel More: Jobs-Housing Balance or Retail-Housing Mixing? Journal of the American Planning Association 72 (4), 475-490, 482, *available at* http://reconnectingamerica.org/assets/Uploads/UTCT-825.pdf.

other workforce policies to local development permits to address transportation issues. Cervero and Duncan note that:

> In nearly built-out Berkeley, CA, the approach to balancing jobs and housing is to create local jobs rather than to develop new housing. The city's First Source program encourages businesses to hire local residents, especially for entry- and intermediate-level jobs, and sponsors vocational training to ensure residents are employment-ready. While the program is voluntary, some 300 businesses have used it to date, placing more than 3,000 city residents in local jobs since it was launched in 1986. When needed, these carrots are matched by sticks, since the city is not shy about negotiating corporate participation in First Source as a condition of approval for development permits.

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Recently, the State of California verified its commitment towards workforce development through the Affordable Housing and High Road Jobs Act of 2022, otherwise known as Assembly Bill No. 2011 (AB2011). AB2011 amended the Planning and Zoning Law to allow ministerial, by-right approval for projects being built alongside commercial corridors that meet affordability and labor requirements.

The City should consider utilizing local workforce policies and requirements to benefit the local area economically and to mitigate GHG emissions, improve air quality, and reduce transportation impacts.

## II. THE CITY SHOULD INCORPORATE LANGUAGE IMPOSING TRAINING REQUIREMENTS FOR CONSTRUCTION ACTIVITIES TO PREVENT COMMUNITY SPREAD OF COVID-19 AND OTHER INFECTIOUS DISEASES INTO THE DEVELOPMENT AGREEMENT.

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Construction work has been defined as a Lower to High-risk activity for COVID-19 spread by the Occupations Safety and Health Administration. Recently, several construction sites have been identified as sources of community spread of COVID-19.[5]

[5] Santa Clara County Public Health (June 12, 2020) COVID-19 CASES AT CONSTRUCTION SITES HIGHLIGHT NEED FOR CONTINUED VIGILANCE IN SECTORS THAT HAVE REOPENED, *available at* https://www.sccgov.org/sites/covid19/Pages/press-release-06-12-2020-cases-at-construction-sites.aspx.

Western Carpenters recommend that the City adopt additional requirements to mitigate public health risks from various residential, commercial and mixed-use development construction activities. Western Carpenters requests that the City require safe on-site construction work practices as well as training and certification for any construction workers on residential, commercial and mixed-use developments within the City's General Plan Area.

In particular, based upon Western Carpenters' experience with safe construction site work practices, Western Carpenters recommends that the City require that while construction activities are being conducted at the proposed Project ("**Project Site**"):

**Construction Site Design:**

- The Project Site will be limited to two controlled entry points.
- Entry points will have temperature screening technicians taking temperature readings when the entry point is open.
- The Temperature Screening Site Plan shows details regarding access to the Project Site and Project Site logistics for conducting temperature screening.
- A 48-hour advance notice will be provided to all trades prior to the first day of temperature screening.
- The perimeter fence directly adjacent to the entry points will be clearly marked indicating the appropriate 6-foot social distancing position for when you approach the screening area. Please reference the Apex temperature screening site map for additional details.
- There will be clear signage posted at the project site directing you through temperature screening.
- Provide hand washing stations throughout the construction site.

**Testing Procedures:**

- The temperature screening being used are non-contact devices.
- Temperature readings will not be recorded.
- Personnel will be screened upon entering the testing center and should only take 1-2 seconds per individual.

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- Hard hats, head coverings, sweat, dirt, sunscreen or any other cosmetics must be removed on the forehead before temperature screening.
- Anyone who refuses to submit to a temperature screening or does not answer the health screening questions will be refused access to the Project Site.
- Screening will be performed at both entrances from 5:30 am to 7:30 am.; main gate [ZONE 1] and personnel gate [ZONE 2]
- After 7:30 am only the main gate entrance [ZONE 1] will continue to be used for temperature testing for anybody gaining entry to the project site such as returning personnel, deliveries, and visitors.
- If the digital thermometer displays a temperature reading above 100.0 degrees Fahrenheit, a second reading will be taken to verify an accurate reading.
- If the second reading confirms an elevated temperature, DHS will instruct the individual that he/she will not be allowed to enter the Project Site. DHS will also instruct the individual to promptly notify his/her supervisor and his/her human resources (HR) representative and provide them with a copy of Annex A.

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**Planning**

- Require the development of an Infectious Disease Preparedness and Response Plan that will include basic infection prevention measures (requiring the use of personal protection equipment), policies and procedures for prompt identification and isolation of sick individuals, social distancing (prohibiting gatherings of no more than 10 people including all-hands meetings and all-hands lunches) communication and training and workplace controls that meet standards that may be promulgated by the Center for Disease Control, Occupational Safety and Health Administration,

Cal/OSHA, California Department of Public Health or applicable local public health agencies.[6]

The United Brotherhood of Carpenters and Carpenters International Training Fund has developed COVID-19 Training and Certification to ensure that Carpenter union members and apprentices conduct safe work practices. The City should require that all construction workers undergo COVID-19 Training and Certification before being allowed to conduct construction activities at the Project Site.

Western Carpenters has also developed a rigorous Infection Control Risk Assessment ("**ICRA**") training program to ensure it delivers a workforce that understands how to identify and control infection risks by implementing protocols to protect themselves and all others during renovation and construction projects in healthcare environments.[7]

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ICRA protocols are intended to contain pathogens, control airflow, and protect patients during the construction, maintenance and renovation of healthcare facilities. ICRA protocols prevent cross contamination, minimizing the risk of secondary infections in patients at hospital facilities.

The City should incorporate language in the Development Agreement requiring that the Project be built using a workforce trained in ICRA protocols.

## III. THE CALIFORNIA ENVIRONMENTAL QUALITY ACT.

### A. Background Concerning Environmental Impacts Reports Under CEQA.

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CEQA is a California statute designed to inform decision-makers and the public about the potential significant environmental effects of a project. 14 Cal. Code of Regulations ("**CEQA Guidelines**"), § 15002(a)(1).[8] At its core, its purpose is to "inform the public

[6] *See also* The Center for Construction Research and Training, North America's Building Trades Unions (April 27 2020) NABTU and CPWR COVIC-19 Standards for U.S Constructions Sites, *available at* https://www.cpwr.com/sites/default/files/NABTU_CPWR_Standards_COVID-19.pdf; Los Angeles County Department of Public Works (2020) Guidelines for Construction Sites During COVID-19 Pandemic, *available at* https://dpw.lacounty.gov/building-and-safety/docs/pw_guidelines-construction-sites.pdf.

[7] For details concerning Western Carpenters' ICRA training program, *see* https://icrahealthcare.com/.

[8] The CEQA Guidelines, codified in Title 14 of the California Code of Regulations, section 15000 et seq., are regulatory guidelines promulgated by the state Natural Resources Agency for the implementation of CEQA. PRC, § 21083. The CEQA Guidelines are given "great

and its responsible officials of the environmental consequences of their decisions *before* they are made." *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564.

CEQA directs public agencies to avoid or reduce environmental damage, when possible, by requiring alternatives or mitigation measures. CEQA Guidelines, § 15002(a)(2)-(3); see also *Berkeley Keep Jets Over the Bay Committee v. Board of Port Comes* (2001) 91 Cal.App.4th 1344, 1354; *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553; *Laurel Heights Improvement Assn.*, 47 Cal.3d at p. 400. The Environmental Impact Report ("**EIR**") serves to provide public agencies and the public in general with information about the effect that a proposed project is likely to have on the environment and to "identify ways that environmental damage can be avoided or significantly reduced." CEQA Guidelines, § 15002, subd. (a)(2). If the project has a significant effect on the environment, the agency may approve the project only upon finding that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns" specified in Public Resources Code section 21081. See CEQA Guidelines, §§ 15092, subds. (b)(2)(A)-(B).

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While the courts review an EIR using an 'abuse of discretion' standard, the reviewing court is not to *uncritically* rely on every study or analysis presented by a project proponent in support of its position. *Berkeley Jets*, 91 Cal.App.4th at p. 1355 (quoting *Laurel Heights Improvement Assn.*, 47 Cal.3d at pp. 391, 409 fn. 12) (internal quotations omitted). A clearly inadequate or unsupported study is entitled to no judicial deference. *Id.* Drawing this line and determining whether the EIR complies with CEQA's information disclosure requirements presents a question of law subject to independent review by the courts. *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 515; *Madera Oversight Coalition, Inc. v. County of Madera* (2011) 199 Cal.App.4th 48, 102, 131. As the court stated in *Berkeley Jets*, prejudicial abuse of discretion occurs if the failure to include relevant information precludes informed decision-making and informed public participation, thereby thwarting the statutory goals of the EIR process. 91 Cal.App.4th at p. 1355 (internal quotations omitted).

The preparation and circulation of an EIR is more than a set of technical hurdles for agencies and developers to overcome. *Communities for a Better Environment v. Richmond* (2010) 184 Cal.App.4th 70, 80 (quoting *Vineyard Area Citizens for Responsible Growth, Inc.*

weight in interpreting CEQA except when . . . clearly unauthorized or erroneous." *Center for Biological Diversity v. Dept. of Fish & Wildlife* (2015) 62 Cal.4th 204, 217.

*v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 449-450). The EIR's function is to ensure that government officials who decide to build or approve a project do so with a full understanding of the environmental consequences and, equally important, that the public is assured those consequences have been considered. *Id.* For the EIR to serve these goals it must present information so that the foreseeable impacts of pursuing the project can be understood and weighed, and the public must be given an adequate opportunity to comment on that presentation before the decision to go forward is made. *Id.* The EIR requirement "is the heart of CEQA." CEQA Guidelines, § 15003(a).

Thus, a strong presumption in favor of requiring preparation of an EIR is built into CEQA. This presumption is reflected in what is known as the "fair argument" standard under which an EIR must be prepared whenever substantial evidence in the record supports a fair argument that a project may have a significant effect on the environment. *Quail Botanical Gardens Found., Inc. v. City of Encinitas* (1994) 29 Cal.App.4th 1597, 1602; *Friends of "B" St.* v. *City of Hayward* (1980) 106 Cal.3d 988, 1002.

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The fair argument test stems from the statutory mandate that an EIR be prepared for any project that "may have a significant effect on the environment." PRC, § 21151; see *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.App.3d 68, 75; accord *Jensen v. City of Santa Rosa* (2018) 23 Cal.App.5th 877, 884. Under this test, if a proposed project is not exempt and may cause a significant effect on the environment, the lead agency must prepare an EIR. PRC, §§ 21100, subd. (a), 21151; CEQA Guidelines, §§ 15064, subds. (a)(1), (f)(1). An EIR may be dispensed with only if the lead agency finds no substantial evidence in the initial study or elsewhere in the record that the project may have a significant effect on the environment. *Parker Shattuck Neighbors v. Berkeley City Council* (2013) 222 Cal.App.4th 768, 785. In such a situation, the agency must adopt a negative declaration. PRC, § 21080, subd. (c)(1); CEQA Guidelines, §§ 15063, subd. (b)(2), 15064, subd. (f)(3).

"Significant effect upon the environment" is defined as "a substantial or potentially substantial adverse change in the environment." PRC, § 21068; CEQA Guidelines, § 15382. A project "may" have a significant effect on the environment if there is a "reasonable probability" that it will result in a significant impact. *No Oil, Inc.*, 13 Cal.3d at p. 83 fn. 16; see *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 309. If any aspect of the project may result in a significant impact on the environment,

an EIR must be prepared even if the overall effect of the project is beneficial. CEQA Guidelines, § 15063(b)(1); see *County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1580.

This standard sets a "low threshold" for preparation of an EIR. *Consolidated Irrigation Dist. v. City of Selma* (2012) 204 Cal.App.4th 187, 207; *Nelson v. County of Kern* (2010) 190 Cal.App.4th 252; *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 928; *Bowman v. City of Berkeley* (2004) 122 Cal.App.4th 572, 580; *Citizen Action to Serve All Students v. Thornley* (1990) 222 Cal.App.3d 748, 754; *Sundstrom*, 202 Cal.App.3d at p. 310. If substantial evidence in the record supports a fair argument that the project may have a significant environmental effect, the lead agency must prepare an EIR even if other substantial evidence before it indicates the project will have no significant effect. See *Jensen,* 23 Cal.App.5th at p. 886; *Clews Land & Livestock v. City of San Diego* (2017) 19 Cal.App.5th 161, 183; *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 150; *Brentwood Assn. for No Drilling, Inc. v. City of Los Angeles* (1982) 134 Cal.App.3d 491; *Friends of "B" St.*, 106 Cal.App.3d 988; CEQA Guidelines, § 15064(f)(1). Substantial evidence includes "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached." CEQA Guidelines, § 15384(a).

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### B. Background Concerning Initial Studies, Negative Declarations, and Mitigated Negative Declarations.

CEQA and CEQA Guidelines are strict and unambiguous about when an MND may be used. A lead agency may adopt an MND only if "there is no substantial evidence that the project will have a significant effect on the environment." CEQA Guidelines, § 15074(b).

Evidence supporting a fair argument of a significant environmental impact triggers preparation of an EIR regardless of whether the record contains contrary evidence. *League for Protection of Oakland's Architectural and Historical Resources v. City of Oakland* (1997) 52 Cal.App.4th 896, 904-905. "Where the question is the sufficiency of the evidence to support a fair argument, deference to the agency's determination is not appropriate[.]" *County Sanitation*, 127 Cal.App.4th at 1579 (quoting *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th 1307, 1317-1318).

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Further, it is the duty of the lead agency, not the public, to conduct the proper environmental studies. "The agency should not be allowed to hide behind its own failure to gather relevant data." *Sundstrom*, 202 Cal.App.3d at p. 311. "Deficiencies in the record may actually enlarge the scope of fair argument by lending a logical plausibility to a wider range of inferences." *Id*; see also *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1382 (lack of study enlarges the scope of the fair argument which may be made based on the limited facts in the record).

Thus, refusal to complete recommended studies lowers the already low threshold to establish a fair argument. The court may not exercise its independent judgment on the omitted material by determining whether the ultimate decision of the lead agency would have been affected had the law been followed. *Environmental Protection Information Center v. Cal. Dept. of Forestry* (2008) 44 Cal.4th 459, 486 (internal citations and quotations omitted). The remedy for this deficiency would be for the trial court to issue a writ of mandate. *Id.*

Both the review for failure to follow CEQA's procedures and the fair argument test are questions of law, thus, the de novo standard of review applies. *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 435. "Whether the agency's record contains substantial evidence that would support a fair argument that the project may have a significant effect on the environment is treated as a question of law. *Consolidated Irrigation Dist.*, 204 Cal.App.4th at p. 207; Kostka and Zischke, Practice Under the Environmental Quality Act (2017, 2d ed.) at § 6.76.

In the MND context, courts give no deference to the agency. The agency or the court should not weigh expert testimony or decide on the credibility of such evidence—this is the EIR's responsibility. As stated in *Pocket Protectors v. City of Sacramento*:

> Unlike the situation where an EIR has been prepared, neither the lead agency nor a court may "weigh" conflicting substantial evidence to determine whether an EIR must be prepared in the first instance. Guidelines section 15064, subdivision (f)(1) provides in pertinent part: if a lead agency is presented with a fair argument that a project may have a significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect. Thus, as *Claremont* itself

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> recognized, [c]onsideration is not to be given contrary evidence supporting the preparation of a negative declaration.

(2004) 124 Cal.App.4th 903, 935 (internal citations and quotations omitted).

In cases where it is not clear whether there is substantial evidence of significant environmental impacts, CEQA requires erring on the side of a "preference for resolving doubts in favor of environmental review." *Mejia v. City of Los Angeles* (2005) 130 Cal.App.4th 322, 332. "The foremost principle under CEQA is that the Legislature intended the act to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language. *Friends of Mammoth v. Bd. of Supervisors* (1972) 8 Cal.3d 247, 259.

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## IV. THE PROJECT WOULD BE APPROVED IN VIOLATION OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

### A. The City Must Prepare an Environmental Impact Report for the Project.

It would be unlawful for the City to approve the Project in reliance on the incomplete and flawed RMND. As explained below, the RMND fails to support all of its findings with sufficient analysis and substantial evidence and fails to incorporate adequate mitigation measures. Moreover, there is substantial evidence on the face of the RMND that the Project will, in fact, have a significant impact on the surrounding environment. Indeed, the Project involves the new construction, use, and maintenance of a 150,000-square-foot structure with 106 units, subterranean parking for 381 automobiles, 28,843 square feet of event space, 6,273 square feet of restaurant space, and 5,513 square feet for amenities, and the alteration and removal of existing landscaping on a 35.07-acre site, a significant portion of which is currently zoned as protected Mountain Reserve land. Considering these details, along with the pristine and natural surroundings of the Site, the City must prepare and circulate a thorough, Project-specific EIR. As set forth in greater detail below, there is a fair argument that the Project will have a significant effect on the environment, triggering the "low threshold" standard for the City's preparation and circulation of an EIR for the Project.

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#### 1. <u>The RMND Perpetuates the City's Failure to Adequately Analyze the Project and Omits Information</u>

If a project has a significant effect on the environment, an agency may approve the project only upon finding that it has "eliminated or substantially lessened all

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significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns." CEQA Guidelines § 15092(b)(2)(A–B).

CEQA mitigation measures proposed and adopted are required to describe what actions will be taken to reduce or avoid an environmental impact. (CEQA Guidelines § 15126.4(a)(1)(B) [providing "[f]ormulation of mitigation measures should not be deferred until some future time."].) While the same Guidelines section 15126.5(a)(1)(B) acknowledges an exception to the rule against deferrals, such exception is narrowly proscribed to situations where it is impractical or infeasible to include those details during the project's environmental review.

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Here, the RMND's mitigation measures still fail to adequately analyze and/or mitigate the Project's impacts and are improperly deferred, such that an EIR is required.

*i. Biological Resources*

CEQA requires that an environmental document identify and discuss the significant effects of a Project, alternatives and how those significant effects can be mitigated or avoided. CEQA Guidelines § 15126.2; PRC §§ 21100(b)(1), 21002.1(a). An environmental document's discussion of potentially significant effects must "provide an adequate analysis to inform the public how its bare numbers translate to create potential adverse impacts, or it must adequately explain what the agency does know and why, given existing scientific constraints, it cannot translate potential [environmental] impacts further." *Sierra Club v. County of Fresno* (2018) 6 Cal. 5th 502, 521; *see also* citing *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 405; *see also* PRC §§ 21002.1(e), 21003(b). An EIR may not set an impermissibly narrow threshold of significance for biological impacts. *Endangered Habitats League, Inc. v. County of Orange* (2005) 131 Cal.App.4th 777.

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Here, the RMND has stilled failed to provide analysis on the Project's biological resource impacts in accordance with the above, and admits that, despite the documented potential for occurrence of special-status wildlife species within the vicinity of the Project Site, no focused special-status wildlife surveys were conducted. (Appendix B to RMND, p. 9, Attachment F, pp. 1-3.) Indeed, the RMND's biological resources study found potential for the occurrence of several special status species, including Peninsular bighorn sheep (moderate potential to occur), red diamondback rattlesnake (moderate potential to occur), burrowing owl (low potential

to occur), loggerhead shrike (low potential to occur), LeConte's thrasher (moderate potential to forage), and pocketed free-tailed bat (moderate potential to forage within Project site). (Appendix B to RMND, pp. 14-15.) Despite this likelihood of occurrence, the RMND still makes no provision for specific studies to confirm whether any special-status species are inhabiting the proposed Project Area. WSRCC resubmits that RMND cannot properly conclude that its proposed mitigation measures will reduce biological resource impacts to less than significant without first conducting field surveys and subsequent comprehensive analysis regarding these special status species.

04-11 Cont.

Given the overall potential for the occurrence of special-status species in the proposed Project area, the Project should be subject to more comprehensive EIR review. In the alternative, and at a minimum, the pre-construction biological survey specifications that WSRCC contends should be incorporated are necessary to ensure the overall adequacy of the RMND's proposed mitigation measures. Absent inclusion of such specifications in the mitigation measures, there is a fair argument that the Project may have a significant environmental impact.

*ii. Cultural Resources*

In order to mitigate impacts related to the inadvertent discovery of yet unknown historical/cultural resources, the RMND requires implementation of MM-CUL-1 and MM-CUL-2. (RMND at 97-98.) However, the RMND's proposed mitigation measures still do not provide for any pre-construction training for the Project's construction workers that will otherwise permit laborers on the Project to properly identify and address any sensitive cultural resources or human remains that may be encountered during course of construction. Accordingly, the scope of the RMND's contemplated mitigation measures is inadequate. The proposed mitigation measures MM-CUL-1 and MM-CUL-2 remain deficient in their current form and must, at a minimum, be revised to adequately mitigate against any potentially significant impacts to cultural resources.

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*iii. Noise*

WSRCC resubmits that there is also a fair argument that the Project may have a significant noise impact, such that an EIR must be prepared for the Project. To that end, the RMND has maintained its failure to measure ambient noise levels near the proposed Project's most sensitive uses/receptors at the southern edge of the proposed Project Site, and no additional noise study has been performed. (See RMND, Figure

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13-1, p. 156; see also RMND, p. 146-48, Table 13-2.) Instead, the MND/RMND only measured ambient noise levels at three locations: L1 - located in a graded area where no construction work is being contemplated for the project; L2 – at the southeastern corner of the existing Ritz-Carlton hotel property; and L3 – on the central west edge of the primary villa/residences development site and adjacent to the primary roadway for the development. (*Id.*) Meanwhile, no noise measurements were taken along the southern border of the two parcels on the Project site designated for the resort villa development identified as the Ritz-Carlton Residences (APN 689-330-026 and 689-330-028), which are directly adjacent to numerous private residences. Thus, the RMND has inexplicably declined to measure the ambient noise levels in the area adjacent to the most sensitive uses abutting the Project area, namely, numerous private residences. (*Id.*) Based on the current land uses proximate to this sensitive residential area, it is exceedingly likely that this zone at the southern edge of the proposed Project site would have the lowest ambient noise levels of any Project-adjacent area. In spite of these facts, however, the RMND inaccurately claims that "The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the project site." (RMND at p. 146.)

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The RMND has then used this faulty and incomplete ambient noise survey data to conclude that there will be no significant impact to the surrounding sensitive receptors from the Project's construction noise. In that regard, the RMND adopts the Criteria for Recommended Standard: Occupational Noise Exposure prepared by the National Institute for Occupational Safety and Health (NIOSH) as the threshold for whether the anticipated construction noise from the Project will have a significant impact upon the Project nearby sensitive receptors. (RMND at p. 150.) The RMND then concludes that the threshold of 85 dBA Leq qualifies as an "acceptable threshold[] for construction noise at the nearby sensitive receiver locations," and the "noise sensitive residential receiver locations will satisfy the 85 dBA Leq significance threshold," such that the Project will have a less than significant construction noise impact upon the sensitive receiver locations. (*Id.*)

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Notably, the NIOSH Occupational Noise Exposure standard has no proper place in evaluating the significance of construction noise impacts on nearby sensitive receptors. Rather, the NIOSH standard is aimed at protecting workers/laborers exposed to noise during the course job duties and preventing occupational harm/injury from occurring.

It has no bearing upon external noise levels that would be suitable for maintaining the quiet enjoyment of an individual's private property. In that regard, the selection of 85 dBA Leq by the MND and now the RMND as an acceptable threshold of significant construction noise impact is not only arbitrary, but it is also entirely unfounded.

The Federal Transit Administration's ("FTA") Transit Noise and Vibration Impact Assessment provides superior source of federal regulatory authority regarding a project's noise impacts and their significance on sensitive receptors. To that end, the FTA guidance on noise level impacts notes that the impacts should be assessed as a function of their increase over existing noise exposure, and that any noise increase of 15 dBA or greater for a residence is considered a "severe impact." (See Exhibit D - FTA Transit Noise and Vibration Impact Assessment, pp. 17-18, 23-31.) The MND/RMND have arbitrarily elected to use the inapplicable NIOSH standard to assess the noise impacts of the Project, without considering the widely accepted guidance on noise impacts put forth by the FTA. This added lack of study and analysis enlarges the scope of the fair argument that the Project may have significant noise impacts on the environment.

Applying the FTA noise impact guidance, the RMND's dBA estimates for anticipated Project-attributed construction noise exposure levels at the inadequately selected survey locations (L1, L2, and L3) still have the potential to exceed an FTA guidance-based threshold of "severe impact" and thereby cause a significant noise impact in the surrounding environment. (RMND at p. 147, Table 13-2; compare RMND at p. 150, Table 13-3.) Indeed, comparison of the dBA values set forth in Table 13-2 and Table 13-3 confirm that the construction noise levels nearest to the vast majority of the Project's adjacent sensitive residential receptors are anticipated to increase by greater than 15 dBA from the ambient levels detected at L1, L2, and L3. (See *id.*) Put simply, after applying the FTA guidance to the RMND noise data, there is a fair argument that the Project will have a significant noise impact on nearby sensitive residential receptors.

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Notwithstanding these demonstrable noise impacts posed by the Project, the RMND's only mitigation measure in this category pertains to vibration, requiring that large-loaded trucks and dozers not be used within 50 feet of the southern edge of the property line, substituting instead "small rubber-tired or alternative equipment...to reduce vibration effects." The mitigation measure, on its face, appears to address primarily vibration concerns, and would have little to no mitigating effect on the

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exposure of nearby sensitive receptors to overall project construction noise. Indeed, the southern border of the two parcels designated for the resort villa development identified as the Ritz-Carlton Residences (APN 689-330-026 and 689-330-028) are directly adjacent to numerous private residences.

As such, the RMND provides no tangible accommodation for the burden of construction noise exposure to be borne by the Project's adjacent residential properties. In cases where construction noise impacts are anticipated to affect nearby sensitive uses (i.e., residents, schools, hospitals, etc.) noise barriers are routinely implemented as a CEQA mitigation measure during construction in order to minimize the impingement on nearby residents' use and enjoyment of their property. The Project in this case necessitates, at a minimum, the same level of consideration and accommodation for the property owners adjacent to the Project site's southern edge. Currently, however, MM-NOI-1 makes no provision for the placement of noise barriers of any kind at any location. The failure of the RMND's mitigation measure to consider and incorporate the sensitive residential use into its scope is a critical deficiency that undermines any potential efficacy it may otherwise have in mitigating the Project's noise impacts. Absent such a provision, the mitigation measure is legally inadequate as it cannot support a finding that the Project's noise impacts will not be significant.

The RMND's current lack of proper analysis and mitigation regarding construction noise impacts violates CEQA and warrants full environmental review via the preparation of an EIR. Alternatively, and at a minimum, the RMND must be further revised and supplemented to include noise mitigation measures that will in fact protect nearby residents from the impacts of the Project's construction noise.

04-15 Cont.

*iv. Greenhouse Gas Emissions and Energy Use*

The Project requires additional measures aimed at reducing operational GHG emissions and energy use that are not specified in the RMND. Specifically, the Project is slated to develop the second of two hotel buildings with 106 rooms and 381 vehicle parking spaces, yet the RMND provides no specification or associated mitigation measures identifying how many or which of those parking spaces must be capable of supporting electric vehicle charging stations ("**EVCS**") and ready to be compliant with the 2022 Green Building Code ("**GBC**"). In fact, the RMND provides no specifics regarding any electric vehicle ("**EV**") accommodations to be constructed in connection with the Project.

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The GBC, which became effective January 1, 2023, requires new buildings to designate 20% of the total number of parking spaces as EV-capable. See GBC 5.106.5.31. Therefore, if the Project develops 381 additional parking spaces, 77 of those spaces must have electrical panel space and load capacity to support EV charging. Additionally, this must all be set forth in sufficient detail for the City and the public to thoroughly review, assess, and provide comments thereon.

Further, the GBC requires new buildings to designate 25% of the total number of EV-capable parking spaces as EV spaces with level 2 EV supply equipment ("**EVSE**"). *Ibid.* Hence, if the Project develops 381 additional parking spaces, 96 of those spaces must be equipped with a 208/240 volt 40-ampere branch circuit with the electric vehicle charging connectors, attachment plugs, and all other fittings, devices, and power outlets installed. The GBC also requires that new residential construction with more than nine units be GPR certified at minimum 50 points, hold LEED Silver certification, or have Alternate Reference Standard[9] per Section 101.10.2.

The foregoing analysis was entirely absent from the MND, and was also not performed for the RMND, thereby exposing the inherent flaws in the RMND's conclusions that the Project's will have a "less than significant impact" with regard to (1) the Project's generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment, (2) the Project's conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of GHGs (e.g., the 2022 GBC), (3) the Project's potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project operation, and (4) the Project's conflict with or obstruction of a state plan for renewable energy/energy efficiency. (See RMND, pp. 99, 112.) Indeed, the RMND states only in vague and inconclusive fashion that (1) the "project will be required to provide compliant … electric vehicle charging spaces" (pursuant to CAL

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Cont.

[9] According to Section 101.10.2 of the GBC, Applicant may request to apply an alternate green building standard for the Project in lieu of the minimum standards per Table 101.10. In making a determination in response to an application under this section, the Building Official may allow an alternate standard if they find that the proposed alternative standard complies with all of the following: (A) Addresses a comprehensive scope of green building issues including energy efficiency, water efficiency, resource efficient materials, and healthy building practices; (B) applies standards that are, when taken as a whole, as stringent as the GPR and LEED standards; (C) includes a formalized certification process that incorporates third party verification; and, (D) the project will advance the purposes of this Chapter. See Ord. 22-2245, part, 2022; Ord. 19-2193, § 2 (part), 2019.

Green Code §§ 5.106.4, 5.106.5.2, and 5.106.5.3), and (2) "[t]he Project would provide EV charging infrastructure that, meets the California Green Building Standards Code," while simultaneously concluding without justification or analysis that the Project's use will be more akin to a commercial hotel than traditional residential housing. (See Appendix A to RMND at 64; see also RMND at 121.) Upon reaching this factually and legally unsupported conclusion regarding the Project's future use, the RMND maintains its flawed determination that the EVCS guidance set forth in Appendix D to CARB's 2022 Scoping Plan is therefore "not appropriate" for the Project, and the Project should be relieved of the residential development requirements for EVCS under the GCB. (RMND at 121.)

These alleged findings in the RMND, and the grossly deficient information and analysis underpinning them, leave other stakeholder agencies and the general public with virtually no ability to assess the adequacy of the EVCS measures to be implemented in connection with the Project. Under the current framework in the RMND, the Applicant could very well construct no EVCS's whatsoever in connection with the Project while proclaiming it has provided "compliant…electric vehicle charging spaces" and met the Green Building Standards Code. Such an outcome has clear potential to result in significant impacts on the environment in the form of generating GHG emissions and conflict with the 2022 CARB Scoping Plan and the GBC.

04-16
Cont.

Additionally, the RMND still provides no comparative analysis of the energy use and GHG emissions impacts of the inclusion and operation of the EVCS infrastructure in the completed Project relative to the operational energy use and GHG emissions that would arise from the omission of the EVCS infrastructure from the project. As such, and absent revision of the Project to incorporate an impact analysis of the inclusion and omission of the EVCS infrastructure, the Project as currently proposed violates the 2022 GBC and therefore result in a potentially significant impact on the issue of GHG emissions. In that regard, an EIR for the Project is currently required to be prepared and circulated before any approval by the City can ultimately be granted.

In sum, allowing the Project to commence without consideration and analysis of the EVCS issue and its associated energy use and GHG emissions considerations would result in significant and unavoidable impacts on the local community and environment as well as on global climate change due to cumulative GHG emissions from vehicle exhaust. Further, the Project would be out of compliance with the 2022 GBC and

could provoke extensive litigation and unnecessary turbulence for both the Applicant and the City.

04-16 Cont.

*v. Land Use and Planning*

Each California city and county must adopt a comprehensive, long-term general plan governing development. *Napa Citizens for Honest Gov. v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 352, *citing* Gov. Code §§ 65030, 65300. The general plan sits at the top of the land use planning hierarchy and serves as a "constitution" or "charter" for all future development. *DeVita v. County of Napa* (1995) 9 Cal.4th 763, 773; *Lesher Communications, Inc. v. City of Walnut Creek* (1990) 52 Cal.3d 531, 540.

General plan consistency is "the linchpin of California's land use and development laws; it is the principle which infused the concept of planned growth with the force of law." *Debottari v. Norco City Council* (1985) 171 Cal.App.3d 1204, 1213. It is well established that development projects may not be approved if they interfere with, or frustrate, the general plan's policies and objectives. *See Napa Citizens*, 91 Cal.App.4th at 378-79; *see also Lesher*, 52 Cal.3d at 544.

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Here, the RMND continues to admit the Project's direct conflict with the land use consistency prescribed by the City's General plan, in that the Project continues to call for approximately 4.5 acres of dedicated Mountain Reserve Land to be re-zoned and re-purposed for Resort/Hotel use. (RMND at p. 140-141.) Despite that, the RMND then maintains the perfunctory conclusion that the proposed development's conflict with the existing land use plan will not have significant environmental impacts because of the biological resources mitigation measures already proposed in the RMND. This conclusion is wholly unsupported, and the analysis underpinning it is irreparably flawed.

The RMND's rationale is misplaced and unsupported for purposes of CEQA analysis, as the City cannot properly justify the repurposing and destruction of natural reserve lands by claiming that its biological mitigation measures have already ameliorated any environmental impacts such that the land use impacts are "less than significant." By taking this position in the MND and RMND, the City is acknowledging that, in fact, the re-zoning does have a significant impact that requires EIR review and substantial mitigation. Moreover, the City cannot permissibly conflate its mitigation measures aimed at limiting destruction of biological resources with preservation and/or creation of additional mountain reserve lands. Rather, the RMND cannot support a claim of

no significant impact without the Project first creating protections for other comparable natural lands multiple times larger than the Mountain Reserve lands being targeted for development. Only then could the land use planning impacts of the development of the Mountain Reserve lands in question be properly mitigated to a less than significant level.

04-17 Cont.

**B. The City Must, at a Minimum, Further Revise and Recirculate the RMND.**

Section 15073.5 of the CEQA Guidelines provides that a negative declaration must be recirculated whenever the document must be substantially revised. A substantial revision includes the identification of new, avoidable significant effects requiring mitigation measures or project revisions to be added to reduce the effect to less than significant levels or upon the agency determining that a proposed mitigation measure or project change would not reduce a potential impact to insignificance. *Id.*

Additionally, when new information is brought to light showing that an impact previously discussed in an MND and found to be insignificant with or without mitigation in the MND's analysis has the potential for a significant environmental impact supported by substantial evidence, the MND must consider and resolve the conflict in the evidence. See *Visalia Retail, L.P. v. City of Visalia* (2018) 20 Cal. App. 5th 1, 13, 17; see also *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal. App. 4th 1099, 1109.

04-18

Considering the RMND's ongoing failure to substantiate all of its findings, provide adequate mitigation measures, and fully analyze and assess all relevant factors as discussed in detail above, WSRC reiterates that, at a minimum, the Project requires significant revisions and resolution of conflicts in evidence. Therefore, even if the City refuses to prepare an EIR for the Project against WSRCC's objections, the City must at least further revise and recirculate the RMND if it does not prepare an EIR for the Project.

## IV. THE PROJECT APPLICATION MATERIALS MUST INCLUDE AN ADEQUATE DESCRIPTION OF THE PROJECT.

A project description must be stable and finite in order to afford a lead agency and the public an adequate opportunity to assess and comment on the project and its impacts. "[A]n accurate, stable and finite project description is the sine qua non of an informative and legally sufficient" environmental document. *County of Inyo v. City of Los*

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*Angeles* (1977) 71 Cal.App.3d 185, 200. "A curtailed or distorted project description may stultify the objectives of the reporting process" as an accurate, stable, and finite project description is necessary to allow "affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance. *Ibid.* at pp. 192-93.

CEQA Guidelines, § 15124 requires that a description describe the project in enough detail to allow for evaluation of its potential environmental impacts: (a) the project's precise location and boundaries; (b) a clearly written statement of objectives sought by the proposed project; (c) a description of the project's technical, economic, and environmental characteristics; and, (d) a statement describing a list of agencies, permits, and approval which the project expects to use.

Here, WSRCC respectfully resubmits that the Project application includes an adequate and compliant Project description with the details listed above. Should the materials fail to comply with the CEQA Guidelines, the City should demand that the Applicant resubmit its application materials with CEQA-compliant parameters.

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## V. ULTIMATE APPROVAL OF THE PROJECT CAN ONLY OCCUR VIA A TWO-THIRDS VOTE BY THE RANCHO MIRAGE ELECTORATE.

The City's Code of Ordinances § 7.06.010 provides as follows:

> All discretionary approvals, including but not limited to development agreements, general plan amendments, zone changes, development permits, grading permits and use permits approved by the city council on or after July 3, 1992 and having no building permit issued, shall require the approval of the city council, and thereafter a two-thirds vote of the electorate of the city to be considered an approved application, if the approval is an application on property located within the city "mountainous lands" area of the Santa Rosa and San Jacinto Mountains, as described within the Coachella Valley Mountains Conservancy legislative map, as of November 3, 1992.

04-20

(Rancho Mirage Code of Ordinances § 7.06.010.) Again, the Project site sits within the boundary of the Coachella Valley Mountains Conservancy territory map. (Exhibit E – Coachella Valley Mountains Conservancy Territory Map.) As confirmed in the MND and RMDN, the portion of the Project proposed for parcels 689-020-012 and

689-020-014 (the Sky Mesa Recreational Area) has a General Plan Land Use designation of "Open Space: Mountain Reserve (MR)." (See RMND, Figure 1-12, at p. 49; See also Exhibit F – Rancho Mirage Land Use and Zoning Map.) Moreover, the Rancho Mirage General Plan sets forth the following stated goal for the land use(s) applicable to the Mountain Reserve (MR) zone:

> ***This designation is assigned to*** public lands or ***property subject to conservation easements in the Santa Rosa Mountains***. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation.

(See Rancho Mirage 2017 General Plan, p. 10.) Accordingly, given the location of the Project site, coupled with the established boundaries of the Coachella Valley Mountains Conservancy and the site's land use designation under the City's General Plan, the site falls within the definition of the "city 'mountainous lands' area of the Santa Rosa…Mountains" and is therefore subject to the approval proscriptions of Code of Ordinances § 7.06.010.

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As such, the Project as contemplated must ultimately be approved by a two-thirds vote of the Rancho Mirage electorate. WSRCC's comments in this regard should not be construed as a waiver of its prior arguments regarding the inadequacies identified in the RMND and the need for the City to complete a legally-compliant EIR, nor should it be construed as a recommendation that the Project be approved via the RMND by the Planning Commission and the City Council. Rather, WSRCC is providing comments on this particular issue out of an abundance of caution to ensure that the City's proper approval procedures are followed, particularly given the Project's stated intention to re-zone and develop mountainous lands within the Santa Rosa Mountains that are currently zoned as Mountain Reserve and located within the boundaries of the Coachella Valley Mountains Conservancy.

## VI. CONCLUSION.

In sum, WSRCC reiterates its requests that the City require a local workforce, that the City impose training requirements for the Project's construction activities to prevent community spread of COVID-19 and other infectious diseases, and that the City

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prepare and circulate a thorough EIR for the Project or, at a minimum, further revise and recirculate the RMND for the Project to address the aforementioned concerns.

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Cont.

Should the City have any questions regarding this correspondence, please do not hesitate to contact our office.

Sincerely,

Jeremy Herwitt
Attorneys for Western States
Regional Council of Carpenters

Attached:

March 8, 2021, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling (Exhibit A);

Air Quality and GHG Expert Paul Rosenfeld CV (Exhibit B);

Air Quality and GHG Expert Matt Hagemann CV (Exhibit C);

FTA Transit Noise and Vibration Impact Assessment (Exhibit D);

Coachella Valley Mountains Conservancy Territory Map (Exhibit E); and

City of Rancho Mirage Land Use and Zoning Map (Exhibit F).

**EXHIBIT A**

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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March 8, 2021

Mitchell M. Tsai
155 South El Molino, Suite 104
Pasadena, CA 91101

**Subject: Local Hire Requirements and Considerations for Greenhouse Gas Modeling**

Dear Mr. Tsai,

Soil Water Air Protection Enterprise ("SWAPE") is pleased to provide the following draft technical report explaining the significance of worker trips required for construction of land use development projects with respect to the estimation of greenhouse gas ("GHG") emissions. The report will also discuss the potential for local hire requirements to reduce the length of worker trips, and consequently, reduced or mitigate the potential GHG impacts.

## Worker Trips and Greenhouse Gas Calculations

The California Emissions Estimator Model ("CalEEMod") is a "statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects."[1] CalEEMod quantifies construction-related emissions associated with land use projects resulting from off-road construction equipment; on-road mobile equipment associated with workers, vendors, and hauling; fugitive dust associated with grading, demolition, truck loading, and on-road vehicles traveling along paved and unpaved roads; and architectural coating activities; and paving.[2]

The number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[3]

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[1] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[2] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[3] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.

Specifically, the number and length of vehicle trips is utilized to estimate the vehicle miles travelled ("VMT") associated with construction. Then, utilizing vehicle-class specific EMFAC 2014 emission factors, CalEEMod calculates the vehicle exhaust, evaporative, and dust emissions resulting from construction-related VMT, including personal vehicles for worker commuting.[4]

Specifically, in order to calculate VMT, CalEEMod multiplies the average daily trip rate by the average overall trip length (see excerpt below):

> "$VMT_d = \Sigma(\text{Average Daily Trip Rate}_i * \text{Average Overall Trip Length}_i)_n$
>
> Where:
>
> n = Number of land uses being modeled."[5]

Furthermore, to calculate the on-road emissions associated with worker trips, CalEEMod utilizes the following equation (see excerpt below):

> "$\text{Emissions}_{pollutant} = VMT * EF_{running,pollutant}$
>
> Where:
>
> $\text{Emissions}_{pollutant}$ = emissions from vehicle running for each pollutant
>
> VMT = vehicle miles traveled
>
> $EF_{running,pollutant}$ = emission factor for running emissions."[6]

Thus, there is a direct relationship between trip length and VMT, as well as a direct relationship between VMT and vehicle running emissions. In other words, when the trip length is increased, the VMT and vehicle running emissions increase as a result. Thus, vehicle running emissions can be reduced by decreasing the average overall trip length, by way of a local hire requirement or otherwise.

O4-22 Cont.

### Default Worker Trip Parameters and Potential Local Hire Requirements

As previously discussed, the number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[7] In order to understand how local hire requirements and associated worker trip length reductions impact GHG emissions calculations, it is important to consider the CalEEMod default worker trip parameters. CalEEMod provides recommended default values based on site-specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California Environmental Quality Act ("CEQA") requires that such changes be justified by substantial evidence.[8] The default number of construction-related worker trips is calculated by multiplying the

[4] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14-15.
[5] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 23.
[6] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[7] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[8] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 1, 9.

number of pieces of equipment for all phases by 1.25, with the exception of worker trips required for the building construction and architectural coating phases.[9] Furthermore, the worker trip vehicle class is a 50/25/25 percent mix of light duty autos, light duty truck class 1 and light duty truck class 2, respectively."[10] Finally, the default worker trip length is consistent with the length of the operational home-to-work vehicle trips.[11] The operational home-to-work vehicle trip lengths are:

> "[B]ased on the *location* and *urbanization* selected on the project characteristic screen. These values were *supplied by the air districts or use a default average for the state*. Each district (or county) also assigns trip lengths for urban and rural settings" (emphasis added).[12]

Thus, the default worker trip length is based on the location and urbanization level selected by the User when modeling emissions. The below table shows the CalEEMod default rural and urban worker trip lengths by air basin (see excerpt below and Attachment A).[13]

**Worker Trip Length by Air Basin**

| Air Basin | Rural (miles) | Urban (miles) |
|---|---|---|
| Great Basin Valleys | 16.8 | 10.8 |
| Lake County | 16.8 | 10.8 |
| Lake Tahoe | 16.8 | 10.8 |
| Mojave Desert | 16.8 | 10.8 |
| Mountain Counties | 16.8 | 10.8 |
| North Central Coast | 17.1 | 12.3 |
| North Coast | 16.8 | 10.8 |
| Northeast Plateau | 16.8 | 10.8 |
| Sacramento Valley | 16.8 | 10.8 |
| Salton Sea | 14.6 | 11 |
| San Diego | 16.8 | 10.8 |
| San Francisco Bay Area | 10.8 | 10.8 |
| San Joaquin Valley | 16.8 | 10.8 |
| South Central Coast | 16.8 | 10.8 |
| South Coast | 19.8 | 14.7 |
| **Average** | **16.47** | **11.17** |
| **Minimum** | **10.80** | **10.80** |
| **Maximum** | **19.80** | **14.70** |
| **Range** | **9.00** | **3.90** |

04-22 Cont.

[9] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[10] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[11] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14.
[12] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 21.
[13] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-84 – D-86.

As demonstrated above, default rural worker trip lengths for air basins in California vary from 10.8- to 19.8-miles, with an average of 16.47 miles. Furthermore, default urban worker trip lengths vary from 10.8- to 14.7-miles, with an average of 11.17 miles. Thus, while default worker trip lengths vary by location, default urban worker trip lengths tend to be shorter in length. Based on these trends evident in the CalEEMod default worker trip lengths, we can reasonably assume that the efficacy of a local hire requirement is especially dependent upon the urbanization of the project site, as well as the project location.

04-22 Cont.

### Practical Application of a Local Hire Requirement and Associated Impact

To provide an example of the potential impact of a local hire provision on construction-related GHG emissions, we estimated the significance of a local hire provision for the Village South Specific Plan ("Project") located in the City of Claremont ("City"). The Project proposed to construct 1,000 residential units, 100,000-SF of retail space, 45,000-SF of office space, as well as a 50-room hotel, on the 24-acre site. The Project location is classified as Urban and lies within the Los Angeles-South Coast County. As a result, the Project has a default worker trip length of 14.7 miles.[14] In an effort to evaluate the potential for a local hire provision to reduce the Project's construction-related GHG emissions, we prepared an updated model, reducing all worker trip lengths to 10 miles (see Attachment B). Our analysis estimates that if a local hire provision with a 10-mile radius were to be implemented, the GHG emissions associated with Project construction would decrease by approximately 17% (see table below and Attachment C).

| Local Hire Provision Net Change | |
|---|---|
| **Without Local Hire Provision** | |
| Total Construction GHG Emissions (MT $CO_2e$) | 3,623 |
| Amortized Construction GHG Emissions (MT $CO_2e$/year) | 120.77 |
| **With Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,024 |
| Amortized Construction GHG Emissions (MT $CO_2e$/year) | 100.80 |
| ***% Decrease in Construction-related GHG Emissions*** | ***17%*** |

04-23

As demonstrated above, by implementing a local hire provision requiring 10 mile worker trip lengths, the Project could reduce potential GHG emissions associated with construction worker trips. More broadly, any local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

This serves as an example of the potential impacts of local hire requirements on estimated project-level GHG emissions, though it does not indicate that local hire requirements would result in reduced construction-related GHG emission for all projects. As previously described, the significance of a local hire requirement depends on the worker trip length enforced and the default worker trip length for the project's urbanization level and location.

[14] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-85.

## Disclaimer

SWAPE has received limited discovery. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

O4-24

Sincerely,

Matt Hagemann, P.G., C.Hg.

Paul E. Rosenfeld, Ph.D.

Attachment A

| Location Type | Location Name | Rural H-W (miles) | Urban H-W (miles) |
|---|---|---|---|
| Air Basin | Great Basin | 16.8 | 10.8 |
| Air Basin | Lake County | 16.8 | 10.8 |
| Air Basin | Lake Tahoe | 16.8 | 10.8 |
| Air Basin | Mojave Desert | 16.8 | 10.8 |
| Air Basin | Mountain | 16.8 | 10.8 |
| Air Basin | North Central | 17.1 | 12.3 |
| Air Basin | North Coast | 16.8 | 10.8 |
| Air Basin | Northeast | 16.8 | 10.8 |
| Air Basin | Sacramento | 16.8 | 10.8 |
| Air Basin | Salton Sea | 14.6 | 11 |
| Air Basin | San Diego | 16.8 | 10.8 |
| Air Basin | San Francisco | 10.8 | 10.8 |
| Air Basin | San Joaquin | 16.8 | 10.8 |
| Air Basin | South Central | 16.8 | 10.8 |
| Air Basin | South Coast | 19.8 | 14.7 |
| Air District | Amador County | 16.8 | 10.8 |
| Air District | Antelope Valley | 16.8 | 10.8 |
| Air District | Bay Area AQMD | 10.8 | 10.8 |
| Air District | Butte County | 12.54 | 12.54 |
| Air District | Calaveras | 16.8 | 10.8 |
| Air District | Colusa County | 16.8 | 10.8 |
| Air District | El Dorado | 16.8 | 10.8 |
| Air District | Feather River | 16.8 | 10.8 |
| Air District | Glenn County | 16.8 | 10.8 |
| Air District | Great Basin | 16.8 | 10.8 |
| Air District | Imperial County | 10.2 | 7.3 |
| Air District | Kern County | 16.8 | 10.8 |
| Air District | Lake County | 16.8 | 10.8 |
| Air District | Lassen County | 16.8 | 10.8 |
| Air District | Mariposa | 16.8 | 10.8 |
| Air District | Mendocino | 16.8 | 10.8 |
| Air District | Modoc County | 16.8 | 10.8 |
| Air District | Mojave Desert | 16.8 | 10.8 |
| Air District | Monterey Bay | 16.8 | 10.8 |
| Air District | North Coast | 16.8 | 10.8 |
| Air District | Northern Sierra | 16.8 | 10.8 |
| Air District | Northern | 16.8 | 10.8 |
| Air District | Placer County | 16.8 | 10.8 |
| Air District | Sacramento | 15 | 10 |

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| | | | |
|---|---|---|---|
| Air District | San Diego | 16.8 | 10.8 |
| Air District | San Joaquin | 16.8 | 10.8 |
| Air District | San Luis Obispo | 13 | 13 |
| Air District | Santa Barbara | 8.3 | 8.3 |
| Air District | Shasta County | 16.8 | 10.8 |
| Air District | Siskiyou County | 16.8 | 10.8 |
| Air District | South Coast | 19.8 | 14.7 |
| Air District | Tehama County | 16.8 | 10.8 |
| Air District | Tuolumne | 16.8 | 10.8 |
| Air District | Ventura County | 16.8 | 10.8 |
| Air District | Yolo/Solano | 15 | 10 |
| County | Alameda | 10.8 | 10.8 |
| County | Alpine | 16.8 | 10.8 |
| County | Amador | 16.8 | 10.8 |
| County | Butte | 12.54 | 12.54 |
| County | Calaveras | 16.8 | 10.8 |
| County | Colusa | 16.8 | 10.8 |
| County | Contra Costa | 10.8 | 10.8 |
| County | Del Norte | 16.8 | 10.8 |
| County | El Dorado-Lake | 16.8 | 10.8 |
| County | El Dorado- | 16.8 | 10.8 |
| County | Fresno | 16.8 | 10.8 |
| County | Glenn | 16.8 | 10.8 |
| County | Humboldt | 16.8 | 10.8 |
| County | Imperial | 10.2 | 7.3 |
| County | Inyo | 16.8 | 10.8 |
| County | Kern-Mojave | 16.8 | 10.8 |
| County | Kern-San | 16.8 | 10.8 |
| County | Kings | 16.8 | 10.8 |
| County | Lake | 16.8 | 10.8 |
| County | Lassen | 16.8 | 10.8 |
| County | Los Angeles- | 16.8 | 10.8 |
| County | Los Angeles- | 19.8 | 14.7 |
| County | Madera | 16.8 | 10.8 |
| County | Marin | 10.8 | 10.8 |
| County | Mariposa | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Merced | 16.8 | 10.8 |
| County | Modoc | 16.8 | 10.8 |
| County | Mono | 16.8 | 10.8 |
| County | Monterey | 16.8 | 10.8 |
| County | Napa | 10.8 | 10.8 |



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Cont.

| | | | |
|---|---|---|---|
| County | Nevada | 16.8 | 10.8 |
| County | Orange | 19.8 | 14.7 |
| County | Placer-Lake | 16.8 | 10.8 |
| County | Placer-Mountain | 16.8 | 10.8 |
| County | Placer- | 16.8 | 10.8 |
| County | Plumas | 16.8 | 10.8 |
| County | Riverside- | 16.8 | 10.8 |
| County | Riverside- | 19.8 | 14.7 |
| County | Riverside-Salton | 14.6 | 11 |
| County | Riverside-South | 19.8 | 14.7 |
| County | Sacramento | 15 | 10 |
| County | San Benito | 16.8 | 10.8 |
| County | San Bernardino- | 16.8 | 10.8 |
| County | San Bernardino- | 19.8 | 14.7 |
| County | San Diego | 16.8 | 10.8 |
| County | San Francisco | 10.8 | 10.8 |
| County | San Joaquin | 16.8 | 10.8 |
| County | San Luis Obispo | 13 | 13 |
| County | San Mateo | 10.8 | 10.8 |
| County | Santa Barbara- | 8.3 | 8.3 |
| County | Santa Barbara- | 8.3 | 8.3 |
| County | Santa Clara | 10.8 | 10.8 |
| County | Santa Cruz | 16.8 | 10.8 |
| County | Shasta | 16.8 | 10.8 |
| County | Sierra | 16.8 | 10.8 |
| County | Siskiyou | 16.8 | 10.8 |
| County | Solano- | 15 | 10 |
| County | Solano-San | 16.8 | 10.8 |
| County | Sonoma-North | 16.8 | 10.8 |
| County | Sonoma-San | 10.8 | 10.8 |
| County | Stanislaus | 16.8 | 10.8 |
| County | Sutter | 16.8 | 10.8 |
| County | Tehama | 16.8 | 10.8 |
| County | Trinity | 16.8 | 10.8 |
| County | Tulare | 16.8 | 10.8 |
| County | Tuolumne | 16.8 | 10.8 |
| County | Ventura | 16.8 | 10.8 |
| County | Yolo | 15 | 10 |
| County | Yuba | 16.8 | 10.8 |
| Statewide | Statewide | 16.8 | 10.8 |

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Cont.

| Worker Trip Length by Air Basin | | |
|---|---|---|
| **Air Basin** | **Rural (miles)** | **Urban (miles)** |
| Great Basin Valleys | 16.8 | 10.8 |
| Lake County | 16.8 | 10.8 |
| Lake Tahoe | 16.8 | 10.8 |
| Mojave Desert | 16.8 | 10.8 |
| Mountain Counties | 16.8 | 10.8 |
| North Central Coast | 17.1 | 12.3 |
| North Coast | 16.8 | 10.8 |
| Northeast Plateau | 16.8 | 10.8 |
| Sacramento Valley | 16.8 | 10.8 |
| Salton Sea | 14.6 | 11 |
| San Diego | 16.8 | 10.8 |
| San Francisco Bay Area | 10.8 | 10.8 |
| San Joaquin Valley | 16.8 | 10.8 |
| South Central Coast | 16.8 | 10.8 |
| South Coast | 19.8 | 14.7 |
| **Average** | **16.47** | **11.17** |
| **Mininum** | **10.80** | **10.80** |
| **Maximum** | **19.80** | **14.70** |
| **Range** | **9.00** | **3.90** |

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Cont.

Attachment B

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

## Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Annual**

### 1.0 Project Characteristics

#### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

#### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

#### 1.3 User Entered Comments & Non-Default Data

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.98 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.06 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

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| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 6.96 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.96 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

04-25 Cont.

## 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1713 | 1.8242 | 1.1662 | 2.4000e-003 | 0.4199 | 0.0817 | 0.4986 | 0.1795 | 0.0754 | 0.2549 | 0.0000 | 213.1969 | 213.1969 | 0.0501 | 0.0000 | 214.6993 |
| 2022 | 0.6604 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.682 6 | 1,721.682 6 | 0.1294 | 0.0000 | 1,724.918 7 |
| 2023 | 0.6148 | 3.3640 | 5.6747 | 0.0178 | 1.1993 | 0.0996 | 1.2990 | 0.3203 | 0.0936 | 0.4138 | 0.0000 | 1,627.529 5 | 1,627.529 5 | 0.1185 | 0.0000 | 1,630.492 5 |
| 2024 | 4.1619 | 0.1335 | 0.2810 | 5.9000e-004 | 0.0325 | 5.4700e-003 | 0.0380 | 8.6300e-003 | 5.0400e-003 | 0.0147 | 0.0000 | 52.9078 | 52.9078 | 8.0200e-003 | 0.0000 | 53.1082 |
| **Maximum** | **4.1619** | **4.1142** | **6.1625** | **0.0189** | **1.3058** | **0.1201** | **1.4259** | **0.3460** | **0.1128** | **0.4588** | **0.0000** | **1,721.682 6** | **1,721.682 6** | **0.1294** | **0.0000** | **1,724.918 7** |

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

## 2.1 Overall Construction

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1713 | 1.8242 | 1.1662 | 2.4000e-003 | 0.4199 | 0.0817 | 0.4986 | 0.1795 | 0.0754 | 0.2549 | 0.0000 | 213.1967 | 213.1967 | 0.0501 | 0.0000 | 214.6991 |
| 2022 | 0.6004 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.682 3 | 1,721.682 3 | 0.1294 | 0.0000 | 1,724.918 3 |
| 2023 | 0.6148 | 3.3648 | 5.6747 | 0.0178 | 1.1993 | 0.0996 | 1.2990 | 0.3203 | 0.0936 | 0.4138 | 0.0000 | 1,627.529 1 | 1,627.529 1 | 0.1185 | 0.0000 | 1,630.492 1 |
| 2024 | 4.1619 | 0.1335 | 0.2810 | 5.9000e-004 | 0.0325 | 5.4700e-003 | 0.0380 | 8.6300e-003 | 5.0400e-003 | 0.0147 | 0.0000 | 52.9077 | 52.9077 | 8.0200e-003 | 0.0000 | 53.1082 |
| Maximum | 4.1619 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.682 3 | 1,721.682 3 | 0.1294 | 0.0000 | 1,724.918 3 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| 1 | 9-1-2021 | 11-30-2021 | 1.4103 | 1.4103 |
| 2 | 12-1-2021 | 2-28-2022 | 1.3613 | 1.3613 |
| 3 | 3-1-2022 | 5-31-2022 | 1.1985 | 1.1985 |
| 4 | 6-1-2022 | 8-31-2022 | 1.1921 | 1.1921 |
| 5 | 9-1-2022 | 11-30-2022 | 1.1919 | 1.1919 |
| 6 | 12-1-2022 | 2-28-2023 | 1.0774 | 1.0774 |
| 7 | 3-1-2023 | 5-31-2023 | 1.0320 | 1.0320 |
| 8 | 6-1-2023 | 8-31-2023 | 1.0260 | 1.0260 |

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | | | | |
|---|---|---|---|---|
| 9 | 9-1-2023 | 11-30-2023 | 1.0265 | 1.0265 |
| 10 | 12-1-2023 | 2-29-2024 | 2.8857 | 2.8857 |
| 11 | 3-1-2024 | 5-31-2024 | 1.6207 | 1.6207 |
| | | Highest | 2.8857 | 2.8857 |

**2.2 Overall Operational**

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.8700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.8200e-003 | | 0.0998 | 0.0998 | | 0.0998 | 0.0998 | 0.0000 | 3,896.073 2 | 3,896.073 2 | 0.1303 | 0.0468 | 3,913.283 3 |
| Mobile | 1.5857 | 7.0982 | 19.1834 | 0.0821 | 7.7979 | 0.0680 | 7.8659 | 2.0805 | 0.0639 | 2.1454 | 0.0000 | 7,820.498 6 | 7,820.498 6 | 0.3407 | 0.0000 | 7,829.018 2 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.6079 | 0.0000 | 207.6079 | 12.2611 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 28.1632 | 556.8420 | 585.8052 | 3.0183 | 0.0755 | 883.7587 |
| Total | 6.8692 | 9.5223 | 30.3407 | 0.0914 | 7.7979 | 0.2390 | 8.0240 | 2.0805 | 0.2349 | 2.3114 | 235.9712 | 12,294.18 07 | 12,531.15 19 | 15.7904 | 0.1260 | 12,963.47 51 |

04-25 Cont.

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.5700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.073 2 | 3,896.073 2 | 0.1303 | 0.0468 | 3,913.283 3 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0695 | 0.0539 | 2.1434 | 0.0000 | 7,620.498 6 | 7,620.498 6 | 0.3407 | 0.0000 | 7,629.016 2 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8394 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 28.1032 | 566.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Total | 6.8692 | 9.5223 | 30.3407 | 0.0914 | 7.7979 | 0.2260 | 8.0240 | 2.0695 | 0.2219 | 2.3114 | 236.9712 | 12,294.18 07 | 12,531.15 19 | 15.7904 | 0.1260 | 12,963.47 51 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

04-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0012** | **51.0012** | **0.0144** | **0.0000** | **51.3601** |

04-25 Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.7000e-004 | 7.5000e-004 | 6.5100e-003 | 2.0000e-005 | 2.4700e-003 | 2.0000e-005 | 2.4900e-003 | 6.5000e-004 | 2.0000e-005 | 6.7000e-004 | 0.0000 | 2.2251 | 2.2251 | 7.0000e-005 | 0.0000 | 2.2267 |
| Total | 2.9000e-003 | 0.0641 | 0.0233 | 2.0000e-004 | 6.4100e-003 | 2.1000e-004 | 6.6200e-003 | 1.7300e-003 | 2.0000e-004 | 1.9300e-003 | 0.0000 | 19.6816 | 19.6816 | 1.2800e-003 | 0.0000 | 19.7136 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |
| Total | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | 0.0496 | 0.0233 | 0.0729 | 7.5100e-003 | 0.0216 | 0.0291 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |

04-25 Cont.

### 3.2 Demolition - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.7000e-004 | 7.5000e-004 | 8.5100e-003 | 2.0000e-005 | 2.4700e-003 | 2.0000e-005 | 2.4900e-003 | 6.5000e-004 | 2.0000e-005 | 6.7000e-004 | 0.0000 | 2.2251 | 2.2251 | 7.0000e-005 | 0.0000 | 2.2267 |
| Total | 2.9000e-003 | 0.0641 | 0.0233 | 2.0000e-004 | 6.4100e-003 | 2.1000e-004 | 6.6200e-003 | 1.7300e-003 | 2.0000e-004 | 1.9300e-003 | 0.0000 | 19.6816 | 19.6816 | 1.2800e-003 | 0.0000 | 19.7136 |

### 3.3 Site Preparation - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |
| Total | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | 0.1807 | 0.0204 | 0.2011 | 0.0993 | 0.0188 | 0.1181 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |

O4-25
Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |
| Total | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1897 | 0.0000 | 0.1897 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |
| Total | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | 0.1897 | 0.0204 | 0.2011 | 0.0993 | 0.0188 | 0.1181 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |

04-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |
| Total | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0798 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3778 |
| Total | 0.0798 | 0.8816 | 0.5867 | 1.1800e-003 | 0.1741 | 0.0377 | 0.2118 | 0.0693 | 0.0347 | 0.1040 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3778 |

04-25 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |
| Total | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0798 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |
| Total | 0.0798 | 0.8816 | 0.5867 | 1.1800e-003 | 0.1741 | 0.0377 | 0.2118 | 0.0693 | 0.0347 | 0.1040 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |

04-25 Cont.

### 3.4 Grading - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |
| Total | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |

04-25 Cont.

### 3.4 Grading - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| Total | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | 0.0807 | 5.7200e-003 | 0.0865 | 0.0180 | 5.2600e-003 | 0.0233 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |
| Total | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| Total | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | 0.0807 | 5.7200e-003 | 0.0865 | 0.0180 | 5.2600e-003 | 0.0233 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |

04-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |
| Total | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |
| Total | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |

04-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1600e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0284 | 0.0000 | 442.6435 |
| Worker | 0.4088 | 0.3066 | 3.6305 | 0.0107 | 1.1105 | 8.8700e-003 | 1.1192 | 0.2949 | 8.1700e-003 | 0.3031 | 0.0000 | 966.8117 | 966.8117 | 0.0295 | 0.0000 | 967.4773 |
| Total | 0.4616 | 2.0027 | 3.9885 | 0.0152 | 1.2243 | 0.0121 | 1.2363 | 0.3278 | 0.0112 | 0.3390 | 0.0000 | 1,408.795 2 | 1,408.795 2 | 0.0580 | 0.0000 | 1,410.120 8 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |
| Total | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |

04-25 Cont.

**3.5 Building Construction - 2022**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1600e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0284 | 0.0000 | 442.6435 |
| Worker | 0.4088 | 0.3066 | 3.6305 | 0.0107 | 1.1105 | 8.8700e-003 | 1.1192 | 0.2949 | 8.1700e-003 | 0.3031 | 0.0000 | 966.8117 | 966.8117 | 0.0295 | 0.0000 | 967.4773 |
| Total | 0.4616 | 2.0027 | 3.9885 | 0.0152 | 1.2243 | 0.0121 | 1.2363 | 0.3278 | 0.0112 | 0.3390 | 0.0000 | 1,408.795 2 | 1,408.795 2 | 0.0580 | 0.0000 | 1,410.120 8 |

**3.5 Building Construction - 2023**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |
| Total | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |

04-25 Cont.

### 3.5 Building Construction - 2023

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.5000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9830 | 417.9830 | 0.0228 | 0.0000 | 418.5524 |
| Worker | 0.3753 | 0.2708 | 3.1096 | 0.0101 | 1.0840 | 8.4100e-003 | 1.0924 | 0.2879 | 7.7400e-003 | 0.2957 | 0.0000 | 909.3439 | 909.3439 | 0.0234 | 0.0000 | 909.9291 |
| Total | 0.4135 | 1.5218 | 3.5107 | 0.0144 | 1.1953 | 9.8700e-003 | 1.2051 | 0.3200 | 9.1400e-003 | 0.3292 | 0.0000 | 1,327.3269 | 1,327.3269 | 0.0462 | 0.0000 | 1,328.4916 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |
| Total | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |

04-25 Cont.

### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.5000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9830 | 417.9830 | 0.0228 | 0.0000 | 418.5524 |
| Worker | 0.3753 | 0.2708 | 3.1096 | 0.0101 | 1.0840 | 8.4100e-003 | 1.0924 | 0.2879 | 7.7400e-003 | 0.2957 | 0.0000 | 909.3439 | 909.3439 | 0.0234 | 0.0000 | 909.9291 |
| Total | 0.4135 | 1.5218 | 3.5107 | 0.0144 | 1.1953 | 9.8700e-003 | 1.2051 | 0.3200 | 9.1400e-003 | 0.3292 | 0.0000 | 1,327.3269 | 1,327.3269 | 0.0462 | 0.0000 | 1,328.4916 |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0963 | 0.0948 | 1.6000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 6.7100e-003 | 0.0963 | 0.0948 | 1.6000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |

04-25 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |
| Total | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0963 | 0.0948 | 1.6000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 6.7100e-003 | 0.0963 | 0.0948 | 1.6000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |

04-25 Cont.

### 3.6 Paving - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |
| Total | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |

### 3.6 Paving - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.6000e-004 | | 6.1500e-003 | 6.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 0.0109 | 0.1048 | 0.1609 | 2.6000e-004 | | 6.1500e-003 | 6.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |

04-25 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |
| Total | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.6000e-004 | | 6.1500e-003 | 6.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 0.0109 | 0.1048 | 0.1609 | 2.6000e-004 | | 6.1500e-003 | 6.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |

O4-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |
| Total | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| Total | 4.1404 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |

04-25 Cont.

### 3.7 Architectural Coating - 2024

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |
| Total | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| Total | 4.1404 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |

04-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |
| Total | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |

04-25 Cont.

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.5857 | 7.9962 | 19.1834 | 0.0521 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.498 6 | 7,620.498 6 | 0.3407 | 0.0000 | 7,629.018 2 |
| Unmitigated | 1.5857 | 7.9962 | 19.1834 | 0.0521 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.498 6 | 7,620.498 6 | 0.3407 | 0.0000 | 7,629.018 2 |

04-25 Cont.

**4.2 Trip Summary Information**

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 508,227 | 508,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 82.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 628.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,184.43 | 8,057.31 | 20,552,452 | 20,552,452 |

**4.3 Trip Type Information**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.646 5 | 2,512.646 5 | 0.1037 | 0.0215 | 2,521.635 6 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.646 5 | 2,512.646 5 | 0.1037 | 0.0215 | 2,521.635 6 |
| NaturalGas Mitigated | 0.1308 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.428 7 | 1,383.428 7 | 0.0286 | 0.0254 | 1,391.647 8 |
| NaturalGas Unmitigated | 0.1308 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.428 7 | 1,383.428 7 | 0.0286 | 0.0254 | 1,391.647 8 |

04-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9969 | 696.9969 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 466400 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9083 | 24.9083 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 446.9468 |
| Hotel | 1.74666e+006 | 9.3800e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.54600e+006 | 8.3000e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| Total | | 0.1396 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.426 8 | 1,383.426 8 | 0.0265 | 0.0254 | 1,391.647 8 |

04-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9969 | 696.9969 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 466400 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9083 | 24.9083 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 446.9468 |
| Hotel | 1.74666e+006 | 9.3800e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.54600e+006 | 8.3000e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| Total | | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.426 8 | 1,383.426 8 | 0.0265 | 0.0254 | 1,391.647 8 |

04-25 Cont.

### 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 109010 | 33.7770 | 1.3900e-003 | 2.0600e-004 | 33.8078 |
| Apartments Mid Rise | 3.946697e+006 | 1,257.587 9 | 0.0510 | 0.0107 | 1,262.088 9 |
| General Office Building | 584500 | 186.2502 | 7.6900e-003 | 1.5800e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.586016e+006 | 505.3022 | 0.0209 | 4.3200e-003 | 506.1138 |
| Hotel | 550308 | 175.3389 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353126 | 112.5135 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7386 |
| Total | | 2,512.646 5 | 0.1037 | 0.0215 | 2,521.635 6 |

04-25 Cont.

### 5.3 Energy by Land Use - Electricity

Mitigated

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 109010 | 33.7770 | 1.2900e-003 | 2.0600e-004 | 33.8078 |
| Apartments Mid Rise | 3.946607e+006 | 1,257.587 9 | 0.0510 | 0.0107 | 1,262.088 9 |
| General Office Building | 584500 | 186.2502 | 7.6900e-003 | 1.5800e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.586016e+006 | 505.3022 | 0.0209 | 4.3200e-003 | 506.1138 |
| Hotel | 550308 | 175.3389 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353126 | 112.5135 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7386 |
| Total | | 2,512.646 5 | 0.1037 | 0.0215 | 2,521.635 6 |

04-25 Cont.

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Unmitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3988 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1753 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3285 |
| Landscaping | 0.3099 | 0.1197 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2549 |
| Total | 5.1437 | 0.2950 | 10.3804 | 1.6600e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

04-25 Cont.

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1768 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2940 |
| Total | 5.1437 | 0.2955 | 10.3804 | 1.6600e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

04-25 Cont.

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 585.8052 | 3.0183 | 0.0755 | 883.7567 |
| Unmitigated | 585.8052 | 3.0183 | 0.0755 | 883.7567 |

O4-25
Cont.

### 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9096 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.5719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3560 | 8.8200e-003 | 62.8462 |
| Hotel | 1.26834 / 0.140827 | 8.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42627 / 0.154998 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5280 | 0.1363 | 3.4200e-003 | 31.9466 |
| Total | | 585.6852 | 3.0163 | 0.0755 | 683.7567 |

04-25 Cont.

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9096 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.5719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3560 | 8.8200e-003 | 62.8462 |
| Hotel | 1.26834 / 0.140827 | 8.1833 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42627 / 0.154998 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5280 | 0.1363 | 3.4200e-003 | 31.9466 |
| Total | | 585.6852 | 3.0163 | 0.0755 | 683.7567 |

04-25 Cont.

### 8.0 Waste Detail

#### 8.1 Mitigation Measures Waste

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Unmitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |

04-25
Cont.

**8.2 Waste by Land Use**

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4962 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 216.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4816 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9389 | 0.7054 | 0.0000 | 29.5706 |
| Total | | 207.6879 | 12.2811 | 0.0000 | 514.8354 |

04-25 Cont.

### 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4962 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 216.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4816 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9389 | 0.7054 | 0.0000 | 29.5706 |
| Total | | 207.6879 | 12.2811 | 0.0000 | 514.8354 |

### 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

### 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

04-25
Cont.

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

O4-25
Cont.

**Village South Specific Plan (Proposed)**

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

04-25 Cont.

| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 6.96 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

04-25 Cont.

## 2.0 Emissions Summary

**2.1 Overall Construction (Maximum Daily Emission)**

Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2769 | 46.4588 | 31.6840 | 0.0643 | 18.2675 | 2.0461 | 20.3136 | 9.9640 | 1.8824 | 11.8464 | 0.0000 | 6,234.797 4 | 6,234.797 4 | 1.9486 | 0.0000 | 6,283.535 2 |
| 2022 | 5.3304 | 38.8967 | 49.5629 | 0.1517 | 9.8688 | 1.6386 | 10.7727 | 3.6658 | 1.5057 | 5.1615 | 0.0000 | 15,251.56 74 | 15,251.56 74 | 1.9503 | 0.0000 | 15,278.52 88 |
| 2023 | 4.8907 | 26.3317 | 46.7567 | 0.1472 | 9.8688 | 0.7794 | 10.6482 | 2.6361 | 0.7322 | 3.3702 | 0.0000 | 14,807.52 89 | 14,807.52 89 | 1.0250 | 0.0000 | 14,833.15 21 |
| 2024 | 237.1830 | 8.5575 | 18.1043 | 0.0244 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,361.398 9 | 2,361.398 9 | 0.7177 | 0.0000 | 2,379.342 1 |
| **Maximum** | **237.1830** | **46.4588** | **49.5629** | **0.1517** | **18.2675** | **2.0461** | **20.3136** | **9.9640** | **1.8824** | **11.8464** | **0.0000** | **15,251.56 74** | **15,251.56 74** | **1.9503** | **0.0000** | **15,278.52 88** |

04-25 Cont.

**2.1 Overall Construction (Maximum Daily Emission)**

Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2769 | 46.4588 | 31.6840 | 0.0643 | 18.2675 | 2.0461 | 20.3136 | 9.9640 | 1.8824 | 11.8464 | 0.0000 | 6,234.797 4 | 6,234.797 4 | 1.9486 | 0.0000 | 6,283.535 2 |
| 2022 | 5.3304 | 38.8967 | 49.5629 | 0.1517 | 9.8688 | 1.6386 | 10.7727 | 3.6658 | 1.5057 | 5.1615 | 0.0000 | 15,251.56 74 | 15,251.56 74 | 1.9503 | 0.0000 | 15,278.52 88 |
| 2023 | 4.8907 | 26.3317 | 46.7567 | 0.1472 | 9.8688 | 0.7794 | 10.6482 | 2.6361 | 0.7322 | 3.3702 | 0.0000 | 14,807.52 69 | 14,807.52 69 | 1.0250 | 0.0000 | 14,833.15 20 |
| 2024 | 237.1830 | 8.5575 | 18.1043 | 0.0244 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,361.398 9 | 2,361.398 9 | 0.7177 | 0.0000 | 2,379.342 1 |
| Maximum | 237.1830 | 46.4588 | 49.5629 | 0.1517 | 18.2675 | 2.0461 | 20.3136 | 9.9640 | 1.8824 | 11.8464 | 0.0000 | 15,251.56 74 | 15,251.56 74 | 1.9503 | 0.0000 | 15,278.52 88 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

04-25 Cont.

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.59 50 | 18,148.59 50 | 0.4874 | 0.3300 | 18,259.11 92 |
| Energy | 0.7660 | 6.7482 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3118 | 12.6070 | | 50,306.60 34 | 50,306.60 34 | 2.1807 | | 50,361.12 08 |
| **Total** | **41.1168** | **67.2282** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.18 16** | **76,811.18 16** | **2.8282** | **0.4832** | **77,025.87 88** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.59 50 | 18,148.59 50 | 0.4874 | 0.3300 | 18,259.11 92 |
| Energy | 0.7660 | 6.7482 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3118 | 12.6070 | | 50,306.60 34 | 50,306.60 34 | 2.1807 | | 50,361.12 08 |
| **Total** | **41.1168** | **67.2282** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.18 16** | **76,811.18 16** | **2.8282** | **0.4832** | **77,025.87 88** |

04-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |
| Total | 3.1651 | 31.4407 | 21.5650 | 0.0388 | 3.3074 | 1.5513 | 4.8588 | 0.5008 | 1.4411 | 1.9419 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |

04-25
Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9802 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0643 | 0.0442 | 0.5042 | 1.7100e-003 | 0.1677 | 1.3600e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 170.8155 | 170.8155 | 5.0300e-003 | | 170.9413 |
| Total | 0.1916 | 4.1394 | 1.5044 | 0.0136 | 0.4346 | 0.0139 | 0.4485 | 0.1176 | 0.0133 | 0.1309 | | 1,463.0568 | 1,463.0568 | 0.0927 | | 1,465.3750 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| Total | 3.1651 | 31.4407 | 21.5650 | 0.0388 | 3.3074 | 1.5513 | 4.8588 | 0.5008 | 1.4411 | 1.9419 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |

04-25 Cont.

### 3.2 Demolition - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9802 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.241 3 | 1,292.241 3 | 0.0877 | | 1,294.433 7 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0643 | 0.0442 | 0.5042 | 1.7100e-003 | 0.1677 | 1.3600e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 170.8155 | 170.8155 | 5.0300e-003 | | 170.9413 |
| Total | 0.1916 | 4.1394 | 1.5044 | 0.0136 | 0.4346 | 0.0139 | 0.4485 | 0.1176 | 0.0133 | 0.1309 | | 1,463.056 8 | 1,463.056 8 | 0.0927 | | 1,465.375 0 |

### 3.3 Site Preparation - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |

04-25 Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1298 |
| Total | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1298 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |

04-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| Total | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |

04-25 Cont.

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3988 | 30.8785 | 0.0520 | | 1.9853 | 1.9853 | | 1.8285 | 1.8285 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| Total | 4.1912 | 46.3988 | 30.8785 | 0.0520 | 8.6733 | 1.9853 | 10.6587 | 3.5965 | 1.8285 | 5.4250 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0857 | 0.0589 | 0.8056 | 2.2000e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 6.7100e-003 | | 227.9217 |
| Total | 0.0857 | 0.0589 | 0.8056 | 2.2000e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 6.7100e-003 | | 227.9217 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3988 | 30.8785 | 0.0520 | | 1.9853 | 1.9853 | | 1.8285 | 1.8285 | 0.0000 | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| Total | 4.1912 | 46.3988 | 30.8785 | 0.0520 | 3.6733 | 1.9853 | 10.6587 | 3.5965 | 1.8285 | 5.4250 | 0.0000 | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |

04-25 Cont.

### 3.4 Grading - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0857 | 0.0589 | 0.8056 | 2.2000e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 5.7100e-003 | | 227.9217 |
| Total | 0.0857 | 0.0589 | 0.8056 | 2.2000e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 5.7100e-003 | | 227.9217 |

### 3.4 Grading - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.5248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |
| Total | 3.5248 | 38.8435 | 29.0415 | 0.0521 | 3.6733 | 1.6349 | 10.3082 | 3.5965 | 1.5041 | 5.1006 | | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |

04-25 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 5.0600e-003 | | 219.8941 |
| Total | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 5.0600e-003 | | 219.8941 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.5248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| Total | 3.5248 | 38.8435 | 29.0415 | 0.0521 | 3.6733 | 1.6349 | 10.3082 | 3.5965 | 1.5041 | 5.1006 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |

04-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 6.0600e-003 | | 219.8941 |
| Total | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 6.0600e-003 | | 219.8941 |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |
| Total | 1.7062 | 15.6156 | 16.3634 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |

04-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,899.548 2 | 3,899.548 2 | 0.2236 | | 3,902.138 4 |
| Worker | 3.2162 | 2.1318 | 29.7664 | 0.0883 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,800.685 7 | 8,800.085 7 | 0.2429 | | 8,806.758 2 |
| Total | 3.6242 | 15.3350 | 33.1995 | 0.1247 | 9.8688 | 0.0949 | 9.9637 | 2.6381 | 0.0883 | 2.7263 | | 12,697.23 39 | 12,697.23 39 | 0.4665 | | 12,708.89 68 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3834 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |
| Total | 1.7062 | 15.6156 | 16.3834 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |

04-25 Cont.

**3.5 Building Construction - 2022**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2836 | 0.0237 | 0.3073 | | 3,899.548 2 | 3,899.548 2 | 0.2236 | | 3,902.138 4 |
| Worker | 3.2162 | 2.1318 | 29.7664 | 0.0883 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,800.685 7 | 8,800.685 7 | 0.2429 | | 8,806.758 2 |
| Total | 3.6242 | 15.3350 | 33.1995 | 0.1247 | 9.8688 | 0.0949 | 9.9637 | 2.6581 | 0.0883 | 2.7263 | | 12,697.23 39 | 12,697.23 39 | 0.4665 | | 12,708.89 66 |

**3.5 Building Construction - 2023**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |
| Total | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |

04-25 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.876 2 | 3,773.876 2 | 0.1962 | | 3,778.830 0 |
| Worker | 3.0203 | 1.9287 | 27.4113 | 0.0851 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 8,478.440 8 | 8,478.440 8 | 0.2190 | | 8,483.916 0 |
| Total | 3.3229 | 11.9468 | 30.5127 | 0.1203 | 9.8688 | 0.0797 | 9.9485 | 2.6381 | 0.0738 | 2.7118 | | 12,252.31 70 | 12,252.31 70 | 0.4172 | | 12,262.74 60 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.209 9 | 2,555.209 9 | 0.6979 | | 2,570.405 1 |
| Total | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.209 9 | 2,555.209 9 | 0.6979 | | 2,570.405 1 |

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**3.5 Building Construction - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.876 2 | 3,773.876 2 | 0.1962 | | 3,778.830 0 |
| Worker | 3.0203 | 1.9287 | 27.4113 | 0.0851 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 8,478.440 8 | 8,478.440 8 | 0.2190 | | 8,483.916 0 |
| Total | 3.3229 | 11.9468 | 30.5127 | 0.1203 | 9.8688 | 0.0797 | 9.9486 | 2.6381 | 0.0738 | 2.7118 | | 12,252.31 70 | 12,252.31 70 | 0.4172 | | 12,262.74 60 |

**3.6 Paving - 2023**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |

04-25 Cont.

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0566 | 0.0361 | 0.5133 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |
| Total | 0.0566 | 0.0361 | 0.5133 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |

04-25 Cont.

**3.6 Paving - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0568 | 0.0361 | 0.5133 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |
| Total | 0.0568 | 0.0361 | 0.5133 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |

**3.6 Paving - 2024**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |

04-25 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0535 | 0.0329 | 0.4785 | 1.6400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |
| Total | 0.0535 | 0.0329 | 0.4785 | 1.6400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |

04-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0635 | 0.0329 | 0.4785 | 1.6400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |
| Total | 0.0635 | 0.0329 | 0.4785 | 1.6400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| Total | 236.5923 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |

04-25 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5707 | 0.3513 | 5.1044 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.085 2 | 1,641.085 2 | 0.0491 | | 1,642.088 6 |
| Total | 0.5707 | 0.3513 | 5.1044 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.085 2 | 1,641.085 2 | 0.0491 | | 1,642.088 6 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| Total | 236.5923 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |

04-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5707 | 0.3513 | 5.1044 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.085 2 | 1,641.085 2 | 0.0491 | | 1,642.088 6 |
| Total | 0.5707 | 0.3513 | 5.1044 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.085 2 | 1,641.085 2 | 0.0491 | | 1,642.088 6 |

04-25 Cont.

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.8489 | 45.4304 | 114.8495 | 0.4017 | 45.8592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.60 34 | 50,306.60 34 | 2.1807 | | 50,361.12 08 |
| Unmitigated | 9.8489 | 45.4304 | 114.8495 | 0.4017 | 45.8592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.60 34 | 50,306.60 34 | 2.1807 | | 50,361.12 08 |

**4.2 Trip Summary Information**

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 508,227 | 508,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 82.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2617.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 628.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,184.43 | 8,057.31 | 20,562,452 | 20,562,452 |

**4.3 Trip Type Information**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

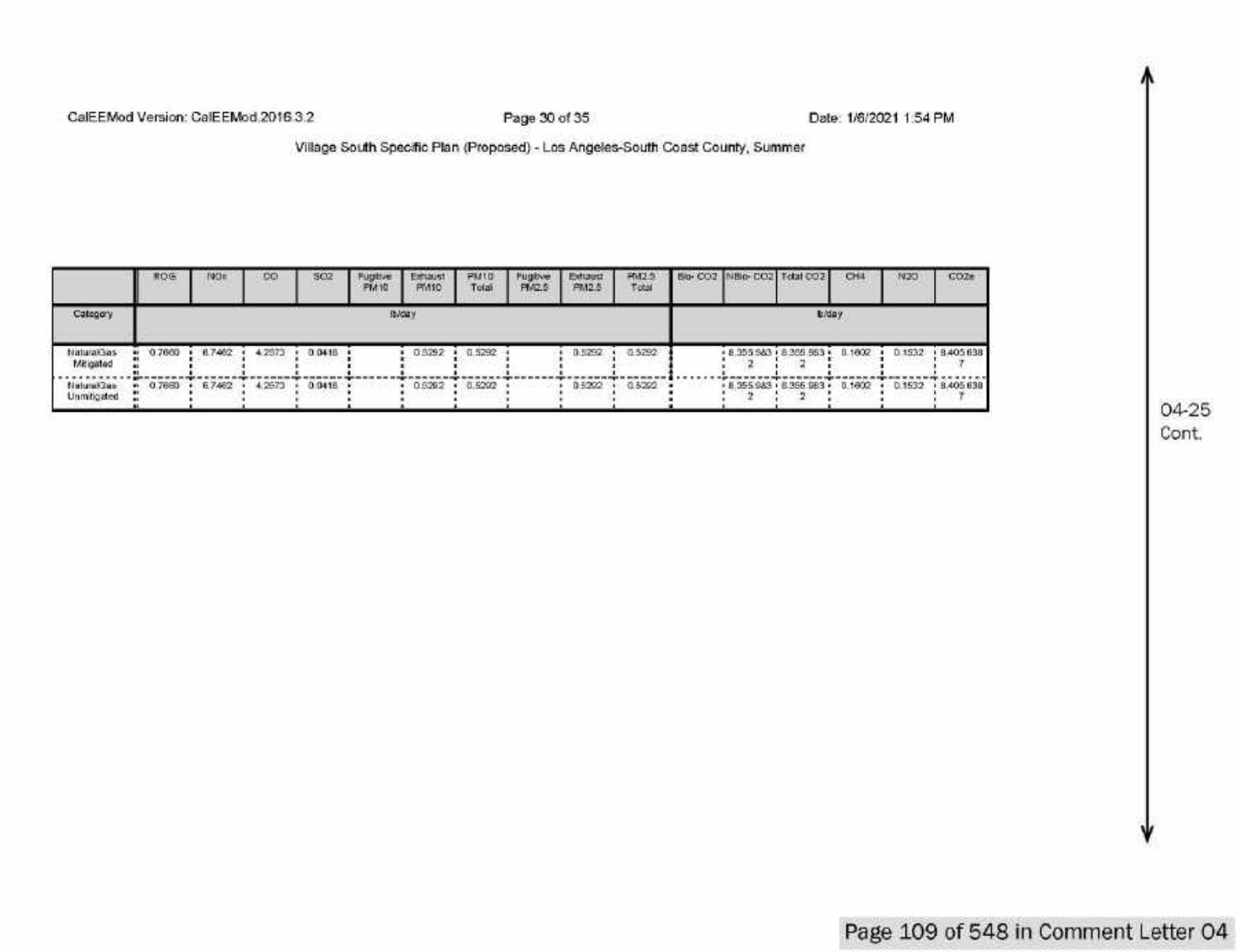
| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

04-25 Cont.



CalEEMod Version: CalEEMod.2016.3.2 Page 30 of 35 Date: 1/6/2021 1:54 PM

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7680 | 6.7462 | 4.2573 | 0.0416 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |
| NaturalGas Unmitigated | 0.7680 | 6.7462 | 4.2573 | 0.0416 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

04-25 Cont.

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**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.916 4 | 4,209.916 4 | 0.0807 | 0.0772 | 4,234.933 9 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22769.8 | 0.2458 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.834 2 | 2,677.834 2 | 0.0513 | 0.0491 | 2,693.546 0 |
| Hotel | 4769.72 | 0.0514 | 0.4675 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4958 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5656 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7776 |
| Total | | 0.7660 | 6.7463 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

04-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3959 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.916 4 | 4,209.916 4 | 0.0807 | 0.0772 | 4,234.933 9 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7696 | 0.2466 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.834 2 | 2,677.834 2 | 0.0513 | 0.0491 | 2,693.546 0 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5656 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7776 |
| Total | | 0.7660 | 6.7463 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

04-25 Cont.

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2870 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,105.9650 |
| Landscaping | 2.4788 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| Total | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |

O4-25
Cont.

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2970 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0000 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,100.0000 |
| Landscaping | 2.4788 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1642 |
| Total | 30.5620 | 15.0496 | 88.4430 | 0.0044 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,256.1192 |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

04-25 Cont.

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

O4-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

**Village South Specific Plan (Proposed)**

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.98 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

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| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 6.96 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.96 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

04-25 Cont.

**2.1 Overall Construction (Maximum Daily Emission)**

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2869 | 46.4651 | 31.6150 | 0.0642 | 18.2675 | 2.0461 | 20.3136 | 9.9849 | 1.8824 | 11.8664 | 0.0000 | 6,221.493 7 | 6,221.493 7 | 1.9491 | 0.0000 | 6,270.221 4 |
| 2022 | 5.7218 | 38.9024 | 47.3319 | 0.1455 | 9.8688 | 1.6388 | 10.7736 | 3.6658 | 1.5057 | 5.1615 | 0.0000 | 14,630.30 99 | 14,630.30 99 | 1.9499 | 0.0000 | 14,657.26 63 |
| 2023 | 5.2705 | 26.4014 | 44.5036 | 0.1413 | 9.8688 | 0.7800 | 10.6488 | 2.6361 | 0.7328 | 3.3708 | 0.0000 | 14,210.34 24 | 14,210.34 24 | 1.9230 | 0.0000 | 14,235.91 60 |
| 2024 | 237.2328 | 8.5610 | 18.0611 | 0.0243 | 1.7884 | 0.4699 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,352.417 8 | 2,352.417 8 | 0.7175 | 0.0000 | 2,370.355 0 |
| Maximum | 237.2328 | 46.4651 | 47.3319 | 0.1455 | 18.2675 | 2.0461 | 20.3136 | 9.9849 | 1.8824 | 11.8664 | 0.0000 | 14,630.30 99 | 14,630.30 99 | 1.9499 | 0.0000 | 14,657.26 63 |

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CalEEMod Version: CalEEMod.2016.3.2 Page 5 of 35 Date: 1/6/2021 1:49 PM

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

**2.1 Overall Construction (Maximum Daily Emission)**

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2869 | 46.4651 | 31.6150 | 0.0642 | 18.2675 | 2.0461 | 20.3136 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,221.493 7 | 6,221.493 7 | 1.9491 | 0.0000 | 6,270.221 4 |
| 2022 | 5.7218 | 38.9024 | 47.3319 | 0.1455 | 9.8688 | 1.6386 | 10.7736 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 14,630.30 99 | 14,630.30 99 | 1.9499 | 0.0000 | 14,657.26 63 |
| 2023 | 5.2705 | 26.4014 | 44.5036 | 0.1413 | 9.8688 | 0.7800 | 10.6488 | 2.6361 | 0.7328 | 3.3708 | 0.0000 | 14,210.34 24 | 14,210.34 24 | 1.9230 | 0.0000 | 14,235.91 60 |
| 2024 | 237.2928 | 8.5610 | 18.0611 | 0.0243 | 1.7884 | 0.4699 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,352.417 8 | 2,352.417 8 | 0.7175 | 0.0000 | 2,370.355 0 |
| Maximum | 237.2928 | 46.4651 | 47.3319 | 0.1455 | 18.2675 | 2.0461 | 20.3136 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 14,630.30 99 | 14,630.30 99 | 1.9499 | 0.0000 | 14,657.26 63 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

04-25 Cont.

CalEEMod Version: CalEEMod.2016.3.2 Page 6 of 35 Date: 1/6/2021 1:49 PM

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7482 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.6233 | 45.9914 | 110.6422 | 0.4081 | 45.9592 | 0.3373 | 46.2965 | 12.2958 | 0.3132 | 12.6089 | | 47,917.8006 | 47,917.8006 | 2.1963 | | 47,972.0839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.5043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7482 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.6233 | 45.9914 | 110.6422 | 0.4081 | 45.9592 | 0.3373 | 46.2965 | 12.2958 | 0.3132 | 12.6089 | | 47,917.8006 | 47,917.8006 | 2.1963 | | 47,972.0839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.5043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

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| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 4/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

04-25
Cont.

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |
| Total | 3.1651 | 31.4407 | 21.5650 | 0.0388 | 3.3074 | 1.5513 | 4.8588 | 0.5008 | 1.4411 | 1.9419 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |

04-25 Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1464 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8665 | 1,269.8665 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0715 | 0.0489 | 0.0824 | 1.6100e-003 | 0.1677 | 1.3600e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 160.8377 | 160.8377 | 4.7300e-003 | | 160.9560 |
| Total | 0.2019 | 4.1953 | 1.1006 | 0.0133 | 0.4346 | 0.0141 | 0.4487 | 0.1176 | 0.0135 | 0.1311 | | 1,430.6932 | 1,430.6932 | 0.0955 | | 1,433.0812 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| Total | 3.1651 | 31.4407 | 21.5650 | 0.0388 | 3.3074 | 1.5513 | 4.8588 | 0.5008 | 1.4411 | 1.9419 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |

04-25 Cont.

**3.2 Demolition - 2021**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1464 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8665 | 1,269.8665 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0715 | 0.0489 | 0.0824 | 1.6100e-003 | 0.1677 | 1.3600e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 160.8377 | 160.8377 | 4.7300e-003 | | 160.9560 |
| Total | 0.2019 | 4.1953 | 1.1006 | 0.0133 | 0.4346 | 0.0141 | 0.4487 | 0.1176 | 0.0135 | 0.1311 | | 1,430.6932 | 1,430.6932 | 0.0955 | | 1,433.0812 |

**3.3 Site Preparation - 2021**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

**3.3 Site Preparation - 2021**

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| Total | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |

04-25 Cont.

**3.3 Site Preparation - 2021**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| Total | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |

**3.4 Grading - 2021**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3988 | 30.8785 | 0.0520 | | 1.9853 | 1.9853 | | 1.8285 | 1.8285 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| Total | 4.1912 | 46.3988 | 30.8785 | 0.0520 | 3.6733 | 1.9853 | 10.6587 | 3.5965 | 1.8285 | 5.4230 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

**3.4 Grading - 2021**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |
| Total | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3988 | 30.8785 | 0.0520 | | 1.9853 | 1.9853 | | 1.8285 | 1.8285 | 0.0000 | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| Total | 4.1912 | 46.3988 | 30.8785 | 0.0520 | 3.6733 | 1.9853 | 10.6587 | 3.5965 | 1.8285 | 5.4230 | 0.0000 | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |

04-25 Cont.

### 3.4 Grading - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |
| Total | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |

### 3.4 Grading - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5955 | 0.0000 | 3.5955 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.5248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |
| Total | 3.5248 | 38.8435 | 29.0415 | 0.0521 | 3.6733 | 1.6349 | 10.3082 | 3.5955 | 1.5041 | 5.1006 | | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |

04-25 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0806 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |
| Total | 0.0806 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.5248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |
| Total | 3.5248 | 38.8435 | 29.0415 | 0.0521 | 3.6733 | 1.6349 | 10.3082 | 3.5965 | 1.5041 | 5.1006 | 0.0000 | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |

04-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0806 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |
| Total | 0.0806 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3834 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |
| Total | 1.7062 | 15.6156 | 16.3834 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |

04-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1873 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,769.075 0 | 3,769.075 0 | 0.2351 | | 3,795.029 3 |
| Worker | 3.5872 | 2.3593 | 27.1680 | 0.0832 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,286.901 3 | 8,286.901 3 | 0.2282 | | 8,292.605 8 |
| Total | 4.0156 | 15.5466 | 30.9685 | 0.1186 | 9.8688 | 0.0957 | 9.9645 | 2.6381 | 0.0891 | 2.7271 | | 12,075.97 63 | 12,075.97 63 | 0.4633 | | 12,087.63 41 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3834 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |
| Total | 1.7062 | 15.6156 | 16.3834 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |

04-25 Cont.

**3.5 Building Construction - 2022**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1873 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.075 0 | 3,789.075 0 | 0.2351 | | 3,795.028 3 |
| Worker | 3.5872 | 2.3593 | 27.1680 | 0.0832 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,286.901 3 | 8,286.901 3 | 0.2282 | | 8,292.605 8 |
| Total | 4.0156 | 15.5466 | 30.9685 | 0.1186 | 9.8688 | 0.0957 | 9.9645 | 2.6381 | 0.0891 | 2.7271 | | 12,075.97 63 | 12,075.97 63 | 0.4633 | | 12,087.63 41 |

**3.5 Building Construction - 2023**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |
| Total | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |

04-25 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.400 7 | 3,671.400 7 | 0.2096 | | 3,676.641 7 |
| Worker | 3.3795 | 2.1338 | 24.9725 | 0.0801 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 7,983.731 8 | 7,983.731 8 | 0.2056 | | 7,988.868 3 |
| Total | 3.6978 | 12.1065 | 28.3496 | 0.1144 | 9.8689 | 0.0803 | 9.9491 | 2.6381 | 0.0743 | 2.7124 | | 11,655.13 25 | 11,655.13 25 | 0.4151 | | 11,665.50 88 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |
| Total | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |

04-25 Cont.

### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.400 7 | 3,671.400 7 | 0.2096 | | 3,676.641 7 |
| Worker | 3.3795 | 2.1338 | 24.9725 | 0.0801 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 7,983.731 8 | 7,983.731 8 | 0.2056 | | 7,988.868 3 |
| Total | 3.6978 | 12.1065 | 28.3496 | 0.1144 | 9.8689 | 0.0803 | 9.9491 | 2.6381 | 0.0743 | 2.7124 | | 11,655.13 25 | 11,655.13 25 | 0.4151 | | 11,665.50 98 |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |

04-25 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |
| Total | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |

04-25 Cont.

**3.6 Paving - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |
| Total | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |

**3.6 Paving - 2024**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |

04-25 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0601 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |
| Total | 0.0601 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |

04-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0601 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |
| Total | 0.0601 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| Total | 236.5923 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |

04-25 Cont.

### 3.7 Architectural Coating - 2024

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2252 |
| Total | 0.0406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2252 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| Total | 236.5923 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |

04-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2252 |
| Total | 0.0406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2252 |

04-25 Cont.

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.5233 | 45.9914 | 110.0422 | 0.4881 | 45.8992 | 0.3373 | 46.2365 | 12.2950 | 0.3132 | 12.6083 | | 47,917.80 05 | 47,917.80 05 | 2.1953 | | 47,972.68 39 |
| Unmitigated | 9.5233 | 45.9914 | 110.0422 | 0.4881 | 45.8992 | 0.3373 | 46.2365 | 12.2950 | 0.3132 | 12.6083 | | 47,917.80 05 | 47,917.80 05 | 2.1953 | | 47,972.68 39 |

**4.2 Trip Summary Information**

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 508,227 | 508,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 82.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 628.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,184.43 | 8,057.31 | 20,562,452 | 20,562,452 |

**4.3 Trip Type Information**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

O4-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7680 | 6.7462 | 4.2573 | 0.0416 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |
| NaturalGas Unmitigated | 0.7680 | 6.7462 | 4.2573 | 0.0416 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

04-25
Cont.

**5.2 Energy by Land Use - NaturalGas**

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.916 4 | 4,209.916 4 | 0.0807 | 0.0772 | 4,234.933 9 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22769.9 | 0.2458 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.834 2 | 2,677.834 2 | 0.0513 | 0.0491 | 2,693.546 0 |
| Hotel | 4769.72 | 0.0514 | 0.4675 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4958 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5656 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7776 |
| Total | | 0.7660 | 6.7463 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

04-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3959 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.916 4 | 4,209.916 4 | 0.0807 | 0.0772 | 4,234.933 9 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7696 | 0.2466 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.834 2 | 2,677.834 2 | 0.0513 | 0.0491 | 2,693.546 0 |
| Hotel | 4.76972 | 0.0514 | 0.4675 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5656 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7776 |
| Total | | 0.7660 | 6.7463 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

04-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |

04-25 Cont.

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2870 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4788 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| Total | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |

**6.2 Area by SubCategory**

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2970 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0000 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,100.0000 |
| Landscaping | 2.4788 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1642 |
| Total | 30.5620 | 15.0496 | 88.4430 | 0.0044 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,256.1192 |

04-25 Cont.

## 7.0 Water Detail

**7.1 Mitigation Measures Water**

## 8.0 Waste Detail

**8.1 Mitigation Measures Waste**

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

O4-25
Cont.

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 168.37 | 79.82 |

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Cont.

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.06 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 6.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 6.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

**2.0 Emissions Summary**

04-25 Cont.

**2.1 Overall Construction**

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1704 | 1.8234 | 1.1577 | 2.3800e-003 | 0.4141 | 0.0817 | 0.4958 | 0.1788 | 0.0754 | 0.2542 | 0.0000 | 210.7664 | 210.7664 | 0.0900 | 0.0000 | 212.2661 |
| 2022 | 0.5865 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.655 4 | 1,418.655 4 | 0.1215 | 0.0000 | 1,421.692 5 |
| 2023 | 0.5190 | 3.2850 | 4.7678 | 0.0147 | 0.8497 | 0.0971 | 0.9468 | 0.2283 | 0.0912 | 0.3195 | 0.0000 | 1,342.441 2 | 1,342.441 2 | 0.1115 | 0.0000 | 1,345.229 1 |
| 2024 | 4.1592 | 0.1313 | 0.2697 | 5.0000e-004 | 0.0221 | 6.3900e-003 | 0.0285 | 5.8700e-003 | 5.9700e-003 | 0.0118 | 0.0000 | 44.6358 | 44.6358 | 7.8300e-003 | 0.0000 | 44.8311 |
| **Maximum** | **4.1592** | **4.0240** | **5.1546** | **0.0155** | **0.9509** | **0.1175** | **1.0683** | **0.2518** | **0.1103** | **0.3621** | **0.0000** | **1,418.655 4** | **1,418.655 4** | **0.1215** | **0.0000** | **1,421.692 5** |

04-25 Cont.

## 2.1 Overall Construction

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1704 | 1.8234 | 1.1577 | 2.3800e-003 | 0.4141 | 0.0817 | 0.4958 | 0.1788 | 0.0754 | 0.2542 | 0.0000 | 210.7661 | 210.7661 | 0.0900 | 0.0000 | 212.2658 |
| 2022 | 0.5865 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.655 0 | 1,418.655 0 | 0.1215 | 0.0000 | 1,421.692 1 |
| 2023 | 0.5190 | 3.2850 | 4.7678 | 0.0147 | 0.8497 | 0.0971 | 0.9468 | 0.2283 | 0.0912 | 0.3195 | 0.0000 | 1,342.440 9 | 1,342.440 9 | 0.1115 | 0.0000 | 1,345.228 7 |
| 2024 | 4.1592 | 0.1313 | 0.2697 | 5.0000e-004 | 0.0221 | 5.3900e-003 | 0.0285 | 5.9700e-003 | 5.9700e-003 | 0.0118 | 0.0000 | 44.6354 | 44.6354 | 7.8300e-003 | 0.0000 | 44.8311 |
| Maximum | 4.1592 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.655 0 | 1,418.655 0 | 0.1215 | 0.0000 | 1,421.692 1 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| 1 | 9-1-2021 | 11-30-2021 | 1.4081 | 1.4081 |
| 2 | 12-1-2021 | 2-28-2022 | 1.3329 | 1.3329 |
| 3 | 3-1-2022 | 5-31-2022 | 1.1469 | 1.1469 |
| 4 | 6-1-2022 | 8-31-2022 | 1.1457 | 1.1457 |
| 5 | 9-1-2022 | 11-30-2022 | 1.1415 | 1.1415 |
| 6 | 12-1-2022 | 2-28-2023 | 1.0278 | 1.0278 |
| 7 | 3-1-2023 | 5-31-2023 | 0.9868 | 0.9868 |
| 8 | 6-1-2023 | 8-31-2023 | 0.9831 | 0.9831 |

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| | | | | |
|---|---|---|---|---|
| 9 | 9-1-2023 | 11-30-2023 | 0.9798 | 0.9798 |
| 10 | 12-1-2023 | 2-29-2024 | 2.8757 | 2.8757 |
| 11 | 3-1-2024 | 5-31-2024 | 1.6188 | 1.6188 |
| | | Highest | 2.8757 | 2.8757 |

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.8700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.8200e-003 | | 0.0998 | 0.0998 | | 0.0998 | 0.0998 | 0.0000 | 3,896.073 2 | 3,896.073 2 | 0.1303 | 0.0468 | 3,913.283 3 |
| Mobile | 1.5857 | 7.0982 | 19.1834 | 0.0821 | 7.7979 | 0.0680 | 7.8659 | 2.0805 | 0.0638 | 2.1454 | 0.0000 | 7,820.498 6 | 7,820.498 6 | 0.3407 | 0.0000 | 7,829.018 2 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.6079 | 0.0000 | 207.6079 | 12.2611 | 0.0000 | 514.6354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 28.1632 | 556.8420 | 585.8052 | 3.0183 | 0.0755 | 883.7587 |
| Total | 6.8692 | 8.5223 | 30.3407 | 0.0914 | 7.7979 | 0.2390 | 8.0240 | 2.0805 | 0.2349 | 2.3114 | 235.9712 | 12,294.18 07 | 12,531.15 19 | 15.7994 | 0.1260 | 12,963.47 51 |

04-25 Cont.

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.5700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.073 2 | 3,896.073 2 | 0.1303 | 0.0468 | 3,913.283 3 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.498 6 | 7,620.498 6 | 0.3407 | 0.0000 | 7,629.016 2 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 28.1032 | 556.6420 | 585.6052 | 3.0183 | 0.0755 | 683.7567 |
| Total | 6.8692 | 9.5223 | 30.3407 | 0.0914 | 7.7979 | 0.2260 | 8.0240 | 2.0895 | 0.2219 | 2.3114 | 236.9712 | 12,294.18 07 | 12,531.15 19 | 15.7904 | 0.1260 | 12,963.47 51 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

04-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

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Cont.

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |
| Total | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | 0.0496 | 0.0233 | 0.0729 | 7.5100e-003 | 0.0216 | 0.0291 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |

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### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4866 | 17.4866 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 5.3000e-004 | 6.0000e-003 | 2.0000e-005 | 1.6800e-003 | 1.0000e-005 | 1.6900e-003 | 4.5000e-004 | 1.0000e-005 | 4.6000e-004 | 0.0000 | 1.5281 | 1.5281 | 5.0000e-005 | 0.0000 | 1.5293 |
| Total | 2.6500e-003 | 0.0639 | 0.0209 | 2.0000e-004 | 5.6200e-003 | 2.0000e-004 | 5.8200e-003 | 1.5300e-003 | 1.9000e-004 | 1.7200e-003 | 0.0000 | 18.9847 | 18.9847 | 1.2600e-003 | 0.0000 | 19.0161 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |
| Total | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | 0.0496 | 0.0233 | 0.0729 | 7.5100e-003 | 0.0216 | 0.0291 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |

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### 3.2 Demolition - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4969 | 17.4969 | 1.2100e-003 | 0.0000 | 17.4969 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 5.3000e-004 | 6.0000e-003 | 2.0000e-005 | 1.6800e-003 | 1.0000e-005 | 1.6900e-003 | 4.5000e-004 | 1.0000e-005 | 4.6000e-004 | 0.0000 | 1.5281 | 1.5281 | 5.0000e-005 | 0.0000 | 1.5293 |
| Total | 2.6500e-003 | 0.0639 | 0.0209 | 2.0000e-004 | 5.6200e-003 | 2.0000e-004 | 5.8200e-003 | 1.5300e-003 | 1.9000e-004 | 1.7200e-003 | 0.0000 | 18.9847 | 18.9847 | 1.2600e-003 | 0.0000 | 19.0161 |

### 3.3 Site Preparation - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |
| Total | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | 0.1807 | 0.0204 | 0.2011 | 0.0993 | 0.0188 | 0.1181 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |

04-25 Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3500e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |
| Total | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3500e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |
| Total | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | 0.1807 | 0.0204 | 0.2011 | 0.0993 | 0.0188 | 0.1181 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |

04-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3560e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |
| Total | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3560e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0798 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3770 |
| Total | 0.0798 | 0.8816 | 0.5867 | 1.1800e-003 | 0.1741 | 0.0377 | 0.2118 | 0.0693 | 0.0347 | 0.1040 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3770 |

04-25 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8500e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |
| Total | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8500e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0798 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |
| Total | 0.0798 | 0.8816 | 0.5867 | 1.1800e-003 | 0.1741 | 0.0377 | 0.2118 | 0.0693 | 0.0347 | 0.1040 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |

O4-25 Cont.

### 3.4 Grading - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8500e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |
| Total | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8500e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |

### 3.4 Grading - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| Total | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | 0.0807 | 5.7200e-003 | 0.0865 | 0.0180 | 5.2600e-003 | 0.0233 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |

04-25 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |
| Total | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| Total | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | 0.0807 | 5.7200e-003 | 0.0865 | 0.0180 | 5.2600e-003 | 0.0233 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |

04-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |
| Total | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |
| Total | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |

04-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1600e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0284 | 0.0000 | 442.6435 |
| Worker | 0.3051 | 0.2164 | 2.5233 | 7.3500e-003 | 0.7557 | 6.2300e-003 | 0.7619 | 0.2007 | 5.7400e-003 | 0.2066 | 0.0000 | 663.9036 | 663.9036 | 0.0167 | 0.0000 | 664.4604 |
| Total | 0.3578 | 1.9125 | 2.9812 | 0.0119 | 0.8696 | 9.4100e-003 | 0.8790 | 0.2336 | 8.7800e-003 | 0.2424 | 0.0000 | 1,105.977 1 | 1,105.977 1 | 0.0451 | 0.0000 | 1,107.103 9 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |
| Total | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |

04-25 Cont.

### 3.5 Building Construction - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1600e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0284 | 0.0000 | 442.6435 |
| Worker | 0.3051 | 0.2164 | 2.5233 | 7.3500e-003 | 0.7557 | 6.2300e-003 | 0.7619 | 0.2007 | 5.7400e-003 | 0.2066 | 0.0000 | 663.9036 | 663.9036 | 0.0167 | 0.0000 | 664.4604 |
| Total | 0.3578 | 1.9125 | 2.9812 | 0.0119 | 0.8696 | 9.4100e-003 | 0.8790 | 0.2336 | 8.7800e-003 | 0.2424 | 0.0000 | 1,105.977 1 | 1,105.977 1 | 0.0451 | 0.0000 | 1,107.103 9 |

### 3.5 Building Construction - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |
| Total | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |

04-25 Cont.

### 3.5 Building Construction - 2023

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.5000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9830 | 417.9830 | 0.0228 | 0.0000 | 418.5524 |
| Worker | 0.2795 | 0.1910 | 2.2635 | 6.9100e-003 | 0.7377 | 5.0100e-003 | 0.7426 | 0.1960 | 4.6000e-003 | 0.2014 | 0.0000 | 624.5303 | 624.5303 | 0.0164 | 0.0000 | 624.9466 |
| Total | 0.3177 | 1.4420 | 2.6646 | 0.0112 | 0.8490 | 7.2700e-003 | 0.8554 | 0.2281 | 6.0600e-003 | 0.2349 | 0.0000 | 1,042.513 4 | 1,042.513 4 | 0.0392 | 0.0000 | 1,043.499 0 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |
| Total | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |

04-25 Cont.

### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.5000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9830 | 417.9830 | 0.0228 | 0.0000 | 418.5524 |
| Worker | 0.2795 | 0.1910 | 2.2935 | 6.9100e-003 | 0.7377 | 5.9100e-003 | 0.7436 | 0.1960 | 5.4500e-003 | 0.2014 | 0.0000 | 624.5303 | 624.5303 | 0.0164 | 0.0000 | 624.9466 |
| Total | 0.2177 | 1.4420 | 2.6946 | 0.0112 | 0.8490 | 7.2700e-003 | 0.8564 | 0.2281 | 6.8500e-003 | 0.2349 | 0.0000 | 1,042.529 4 | 1,042.529 4 | 0.0392 | 0.0000 | 1,043.509 0 |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0963 | 0.0948 | 1.6000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 6.7100e-003 | 0.0963 | 0.0948 | 1.6000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |

04-25 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |
| Total | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0963 | 0.0948 | 1.6000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 6.7100e-003 | 0.0963 | 0.0948 | 1.6000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |

04-25 Cont.

**3.6 Paving - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |
| Total | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |

**3.6 Paving - 2024**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.6000e-004 | | 6.1500e-003 | 6.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 0.0109 | 0.1048 | 0.1609 | 2.6000e-004 | | 6.1500e-003 | 6.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |

04-25 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |
| Total | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.6000e-004 | | 6.1500e-003 | 6.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 0.0109 | 0.1048 | 0.1609 | 2.6000e-004 | | 6.1500e-003 | 6.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |

04-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |
| Total | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| Total | 4.1404 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |

04-25 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |
| Total | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| Total | 4.1404 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |

O4-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.8000e-004 | 0.0211 | 5.5500e-003 | 1.6000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |
| Total | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.8000e-004 | 0.0211 | 5.5500e-003 | 1.6000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

04-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.5857 | 7.9962 | 19.1834 | 0.0521 | 7.7979 | 0.0580 | 7.8559 | 2.0805 | 0.0539 | 2.1434 | 0.0000 | 7,620.498 6 | 7,620.498 6 | 0.3407 | 0.0000 | 7,629.018 2 |
| Unmitigated | 1.5857 | 7.9962 | 19.1834 | 0.0521 | 7.7979 | 0.0580 | 7.8559 | 2.0805 | 0.0539 | 2.1434 | 0.0000 | 7,620.498 6 | 7,620.498 6 | 0.3407 | 0.0000 | 7,629.018 2 |

04-25 Cont.

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 508,227 | 508,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 82.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 628.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,184.43 | 8,057.31 | 20,552,452 | 20,552,452 |

### 4.3 Trip Type Information

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

04-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.648 5 | 2,512.648 5 | 0.1037 | 0.0215 | 2,521.635 6 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.648 5 | 2,512.648 5 | 0.1037 | 0.0215 | 2,521.635 6 |
| NaturalGas Mitigated | 0.1308 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.428 7 | 1,383.428 7 | 0.0286 | 0.0254 | 1,391.647 8 |
| NaturalGas Unmitigated | 0.1308 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.428 7 | 1,383.428 7 | 0.0286 | 0.0254 | 1,391.647 8 |

04-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9969 | 696.9969 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 466400 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 446.9468 |
| Hotel | 1.74666e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.54600e+006 | 8.3100e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| Total | | 0.1396 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.426 8 | 1,383.426 8 | 0.0265 | 0.0254 | 1,391.647 8 |

04-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9969 | 696.9969 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 466400 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9083 | 24.9083 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 446.9468 |
| Hotel | 1.74666e+006 | 9.3800e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.54600e+006 | 8.3000e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| Total | | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.426 8 | 1,383.426 8 | 0.0265 | 0.0254 | 1,391.647 8 |

04-25 Cont.

**5.3 Energy by Land Use - Electricity**

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 109010 | 33.7770 | 1.3900e-003 | 2.0600e-004 | 33.8078 |
| Apartments Mid Rise | 3.946607e+006 | 1,257.587 9 | 0.0510 | 0.0107 | 1,262.088 9 |
| General Office Building | 584500 | 186.2502 | 7.6900e-003 | 1.5800e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.586016e+006 | 505.3022 | 0.0209 | 4.3200e-003 | 506.1138 |
| Hotel | 550308 | 175.3389 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353126 | 112.5135 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7386 |
| Total | | 2,512.646 5 | 0.1037 | 0.0215 | 2,521.635 6 |

04-25 Cont.

### 5.3 Energy by Land Use - Electricity

Mitigated

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 109010 | 33.7770 | 1.3900e-003 | 2.0600e-004 | 33.8078 |
| Apartments Mid Rise | 3.946607e+006 | 1,257.587 9 | 0.0510 | 0.0107 | 1,262.088 9 |
| General Office Building | 584500 | 186.2502 | 7.6900e-003 | 1.5800e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.586016e+006 | 505.3022 | 0.0209 | 4.3200e-003 | 506.1138 |
| Hotel | 550308 | 175.3389 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353126 | 112.5135 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7386 |
| Total | | 2,512.646 5 | 0.1037 | 0.0215 | 2,521.635 6 |

04-25 Cont.

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Unmitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3988 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1753 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3285 |
| Landscaping | 0.3099 | 0.1197 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2549 |
| Total | 5.1437 | 0.2950 | 10.3804 | 1.6600e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

04-25 Cont.

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1768 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| Total | 5.1437 | 0.2955 | 10.3804 | 1.6600e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

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Cont.

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 585.8052 | 3.0183 | 0.0755 | 883.7567 |
| Unmitigated | 585.8052 | 3.0183 | 0.0755 | 883.7567 |

O4-25
Cont.

### 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9096 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.6719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697462 | 51.2702 | 0.3560 | 8.8200e-003 | 62.8462 |
| Hotel | 1.26834 / 0.140827 | 8.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42627 / 0.154998 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5280 | 0.1363 | 3.4200e-003 | 31.9466 |
| Total | | 585.6852 | 3.0163 | 0.0755 | 683.7567 |

04-25 Cont.

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9096 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.6719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3560 | 8.8200e-003 | 62.8462 |
| Hotel | 1.26834 / 0.140827 | 8.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42627 / 0.154998 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5280 | 0.1363 | 3.4200e-003 | 31.9466 |
| Total | | 585.6852 | 3.0163 | 0.0755 | 683.7567 |

### 8.0 Waste Detail

#### 8.1 Mitigation Measures Waste

04-25 Cont.

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Unmitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |

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Cont.

**8.2 Waste by Land Use**

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4962 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 216.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4816 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9389 | 0.7054 | 0.0000 | 29.5706 |
| Total | | 207.6879 | 12.2811 | 0.0000 | 514.8354 |

04-25 Cont.

**8.2 Waste by Land Use**

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4962 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 216.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4816 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9389 | 0.7054 | 0.0000 | 29.5706 |
| Total | | 207.6879 | 12.2811 | 0.0000 | 514.8354 |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**10.0 Stationary Equipment**

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

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Cont.

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

04-25
Cont.

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

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Cont.

Page 194 of 548 in Comment Letter O4

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 168.37 | 79.82 |

O4-25
Cont.

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.06 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 6.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 6.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

**2.0 Emissions Summary**

04-25
Cont.

**2.1 Overall Construction (Maximum Daily Emission)**

Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2561 | 46.4416 | 31.4494 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.8670 | 1.8820 | 11.8490 | 0.0000 | 6,163.416 6 | 6,163.416 6 | 1.9475 | 0.0000 | 6,212.103 9 |
| 2022 | 4.5441 | 38.8811 | 40.8776 | 0.1240 | 8.8255 | 1.6381 | 10.4816 | 3.6969 | 1.5052 | 5.1421 | 0.0000 | 12,493.44 03 | 12,493.44 03 | 1.9485 | 0.0000 | 12,518.57 07 |
| 2023 | 4.1534 | 25.7008 | 38.7457 | 0.1206 | 7.0088 | 0.7592 | 7.7679 | 1.8799 | 0.7136 | 2.5935 | 0.0000 | 12,150.48 90 | 12,150.48 90 | 0.9589 | 0.0000 | 12,174.46 15 |
| 2024 | 237.0219 | 8.5478 | 14.9642 | 0.0239 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4316 | 0.4521 | 0.0000 | 2,313.180 8 | 2,313.180 8 | 0.7186 | 0.0000 | 2331.085 6 |
| Maximum | 237.0219 | 46.4416 | 40.8776 | 0.1240 | 18.2032 | 2.0456 | 20.2488 | 9.8670 | 1.8820 | 11.8490 | 0.0000 | 12,493.44 03 | 12,493.44 03 | 1.9485 | 0.0000 | 12,518.57 07 |

04-25 Cont.

**2.1 Overall Construction (Maximum Daily Emission)**

Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2561 | 46.4416 | 31.4494 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.8670 | 1.8820 | 11.8490 | 0.0000 | 6,163.416 6 | 6,163.416 6 | 1.9475 | 0.0000 | 6,212.103 9 |
| 2022 | 4.5441 | 38.8811 | 40.8776 | 0.1240 | 8.8255 | 1.6381 | 10.4816 | 3.6969 | 1.5052 | 5.1421 | 0.0000 | 12,493.44 03 | 12,493.44 03 | 1.9485 | 0.0000 | 12,518.57 07 |
| 2023 | 4.1534 | 25.7008 | 38.7457 | 0.1206 | 7.0088 | 0.7592 | 7.7679 | 1.8799 | 0.7136 | 2.5935 | 0.0000 | 12,150.48 90 | 12,150.48 90 | 0.9589 | 0.0000 | 12,174.46 15 |
| 2024 | 237.0219 | 8.5478 | 14.9642 | 0.0239 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4316 | 0.4521 | 0.0000 | 2,313.180 8 | 2,313.180 8 | 0.7186 | 0.0000 | 2331.085 5 |
| Maximum | 237.0219 | 46.4416 | 40.8776 | 0.1240 | 18.2032 | 2.0456 | 20.2488 | 9.8670 | 1.8820 | 11.8490 | 0.0000 | 12,493.44 03 | 12,493.44 03 | 1.9485 | 0.0000 | 12,518.57 07 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

04-25 Cont.

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.59 50 | 18,148.59 50 | 0.4874 | 0.3300 | 18,259.11 92 |
| Energy | 0.7660 | 6.7482 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3118 | 12.6070 | | 50,306.60 34 | 50,306.60 34 | 2.1807 | | 50,361.12 08 |
| **Total** | **41.1168** | **67.2282** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.18 16** | **76,811.18 16** | **2.8282** | **0.4832** | **77,025.87 88** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.59 50 | 18,148.59 50 | 0.4874 | 0.3300 | 18,259.11 92 |
| Energy | 0.7660 | 6.7482 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3118 | 12.6070 | | 50,306.60 34 | 50,306.60 34 | 2.1807 | | 50,361.12 08 |
| **Total** | **41.1168** | **67.2282** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.18 16** | **76,811.18 16** | **2.8282** | **0.4832** | **77,025.87 88** |

04-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 4/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

04-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |
| Total | 3.1651 | 31.4407 | 21.5650 | 0.0388 | 3.3074 | 1.5513 | 4.8588 | 0.5008 | 1.4411 | 1.9419 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |

04-25 Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9802 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,202.2413 | 1,202.2413 | 0.0877 | | 1,204.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0487 | 0.0313 | 0.4282 | 1.1800e-003 | 0.1141 | 9.0000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 117.2799 | 117.2799 | 3.5200e-003 | | 117.3678 |
| Total | 0.1760 | 4.1265 | 1.3884 | 0.0131 | 0.3810 | 0.0135 | 0.3946 | 0.1034 | 0.0129 | 0.1163 | | 1,409.5212 | 1,409.5212 | 0.0912 | | 1,411.8015 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| Total | 3.1651 | 31.4407 | 21.5650 | 0.0388 | 3.3074 | 1.5513 | 4.8588 | 0.5008 | 1.4411 | 1.9419 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |

04-25 Cont.

**3.2 Demolition - 2021**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9802 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.241 3 | 1,292.241 3 | 0.0877 | | 1,294.433 7 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0487 | 0.0313 | 0.4282 | 1.1800e-003 | 0.1141 | 9.0000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 117.2799 | 117.2799 | 3.5200e-003 | | 117.3678 |
| Total | 0.1760 | 4.1265 | 1.3884 | 0.0131 | 0.3810 | 0.0135 | 0.3946 | 0.1034 | 0.0129 | 0.1163 | | 1,409.521 2 | 1,409.521 2 | 0.0912 | | 1,411.801 5 |

**3.3 Site Preparation - 2021**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |

04-25 Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |
| Total | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |

04-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |
| Total | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3988 | 30.8785 | 0.0520 | | 1.9853 | 1.9853 | | 1.8285 | 1.8285 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| Total | 4.1912 | 46.3988 | 30.8785 | 0.0520 | 3.6733 | 1.9853 | 10.6587 | 3.5965 | 1.8285 | 5.4230 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |

04-25 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0416 | | 156.3732 | 156.3732 | 4.0900e-003 | | 156.4804 |
| Total | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0416 | | 156.3732 | 156.3732 | 4.0900e-003 | | 156.4804 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3988 | 30.8785 | 0.0520 | | 1.9853 | 1.9853 | | 1.8285 | 1.8285 | 0.0000 | 5,007.043 4 | 5,007.043 4 | 1.9428 | | 5,055.613 4 |
| Total | 4.1912 | 46.3988 | 30.8785 | 0.0520 | 3.6733 | 1.9853 | 10.6587 | 3.5965 | 1.8285 | 5.4250 | 0.0000 | 5,007.043 4 | 5,007.043 4 | 1.9428 | | 5,055.613 4 |

04-25 Cont.

### 3.4 Grading - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0416 | | 156.3732 | 156.3732 | 4.0900e-003 | | 156.4804 |
| Total | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0416 | | 156.3732 | 156.3732 | 4.0900e-003 | | 156.4804 |

### 3.4 Grading - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.5248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |
| Total | 3.5248 | 38.8435 | 29.0415 | 0.0521 | 3.6733 | 1.6349 | 10.3082 | 3.5965 | 1.5041 | 5.1006 | | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |

04-25 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0607 | 0.0376 | 0.0263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0416 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |
| Total | 0.0607 | 0.0376 | 0.0263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0416 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.5248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |
| Total | 3.5248 | 38.8435 | 29.0415 | 0.0521 | 3.6733 | 1.6349 | 10.3082 | 3.5965 | 1.5041 | 5.1006 | 0.0000 | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |

04-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0607 | 0.0376 | 0.0263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0416 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |
| Total | 0.0607 | 0.0376 | 0.0263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0416 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3834 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |
| Total | 1.7062 | 15.6156 | 16.3834 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |

04-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2836 | 0.0237 | 0.3073 | | 3,899.548 2 | 3,899.548 2 | 0.2236 | | 3,902.138 4 |
| Worker | 2.4209 | 1.5074 | 21.0801 | 0.0607 | 6.0992 | 0.0493 | 6.1426 | 1.6163 | 0.0454 | 1.6617 | | 6,042.558 5 | 6,042.558 5 | 0.1697 | | 6,046.800 0 |
| Total | 2.8379 | 14.7106 | 24.5142 | 0.0971 | 7.0067 | 0.0741 | 7.0828 | 1.8799 | 0.0691 | 1.9490 | | 9,939.106 7 | 9,939.106 7 | 0.3933 | | 9,948.938 4 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3834 | 0.0289 | | 0.8090 | 0.8090 | | 0.7812 | 0.7812 | 0.0000 | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |
| Total | 1.7062 | 15.6156 | 16.3834 | 0.0289 | | 0.8090 | 0.8090 | | 0.7812 | 0.7812 | 0.0000 | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |

04-25 Cont.

**3.5 Building Construction - 2022**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,899.548 2 | 3,899.548 2 | 0.2236 | | 3,902.138 4 |
| Worker | 2.4209 | 1.5074 | 21.0801 | 0.0607 | 6.0992 | 0.0493 | 6.1426 | 1.6163 | 0.0454 | 1.6617 | | 6,042.558 5 | 6,042.558 5 | 0.1697 | | 6,046.800 0 |
| Total | 2.8379 | 14.7106 | 24.5142 | 0.0971 | 7.0067 | 0.0741 | 7.0828 | 1.8799 | 0.0691 | 1.9490 | | 9,939.106 7 | 9,939.106 7 | 0.3933 | | 9,948.938 4 |

**3.5 Building Construction - 2023**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |
| Total | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |

04-25 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.876 2 | 3,773.876 2 | 0.1962 | | 3,778.830 0 |
| Worker | 2.2789 | 1.3628 | 19.4002 | 0.0584 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,821.402 8 | 5,821.402 8 | 0.1529 | | 5,825.225 4 |
| Total | 2.5817 | 11.3809 | 22.5017 | 0.0936 | 7.0088 | 0.0595 | 7.0682 | 1.8799 | 0.0552 | 1.9350 | | 9,595.279 0 | 9,595.279 0 | 0.3511 | | 9,604.055 4 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.209 9 | 2,555.209 9 | 0.6979 | | 2,570.405 1 |
| Total | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.209 9 | 2,555.209 9 | 0.6979 | | 2,570.405 1 |

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### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1962 | | 3,778.8300 |
| Worker | 2.2780 | 1.3928 | 19.4002 | 0.0584 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,821.4028 | 5,821.4028 | 0.1529 | | 5,825.2254 |
| Total | 2.5807 | 11.3809 | 22.5017 | 0.0936 | 7.0088 | 0.0595 | 7.0682 | 1.8799 | 0.0552 | 1.9350 | | 9,595.2790 | 9,595.2790 | 0.3511 | | 9,604.0554 |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |

04-25 Cont.

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

**3.6 Paving - 2023**

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0427 | 0.0255 | 0.3633 | 1.0000e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |
| Total | 0.0427 | 0.0255 | 0.3633 | 1.0000e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |

04-25 Cont.

**3.6 Paving - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0427 | 0.0255 | 0.3633 | 1.0000e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |
| Total | 0.0427 | 0.0255 | 0.3633 | 1.0000e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |

**3.6 Paving - 2024**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |

04-25 Cont.

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0403 | 0.0233 | 0.3384 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |
| Total | 0.0403 | 0.0233 | 0.3384 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |

04-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0403 | 0.0233 | 0.3384 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |
| Total | 0.0403 | 0.0233 | 0.3384 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| Total | 236.5923 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |

04-25
Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3316 | | 1,126.758 3 | 1,126.758 3 | 0.0280 | | 1,127.458 3 |
| Total | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3316 | | 1,126.758 3 | 1,126.758 3 | 0.0280 | | 1,127.458 3 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| Total | 236.5923 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |

04-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3316 | | 1,126.758 3 | 1,126.758 3 | 0.0280 | | 1,127.458 3 |
| Total | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3316 | | 1,126.758 3 | 1,126.758 3 | 0.0280 | | 1,127.458 3 |

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

O4-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.8489 | 45.4304 | 114.8495 | 0.4017 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.60 34 | 50,306.60 34 | 2.1807 | | 50,361.12 08 |
| Unmitigated | 9.8489 | 45.4304 | 114.8495 | 0.4017 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.60 34 | 50,306.60 34 | 2.1807 | | 50,361.12 08 |

04-25 Cont.

**4.2 Trip Summary Information**

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 508,227 | 508,227 |
| Apartments Mid Rise | 4,028.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 82.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 628.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,184.43 | 8,057.31 | 20,562,452 | 20,562,452 |

**4.3 Trip Type Information**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

04-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7680 | 6.7462 | 4.2573 | 0.0416 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |
| NaturalGas Unmitigated | 0.7680 | 6.7462 | 4.2573 | 0.0416 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

04-25
Cont.

### 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.916 4 | 4,209.916 4 | 0.0807 | 0.0772 | 4,234.933 9 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22769.9 | 0.2458 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.634 2 | 2,677.634 2 | 0.0513 | 0.0491 | 2,693.546 0 |
| Hotel | 4769.72 | 0.0514 | 0.4675 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4958 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5656 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7776 |
| Total | | 0.7660 | 6.7463 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

04-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3959 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.916 4 | 4,209.916 4 | 0.0807 | 0.0772 | 4,234.933 9 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7696 | 0.2466 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.834 2 | 2,677.834 2 | 0.0513 | 0.0491 | 2,693.546 0 |
| Hotel | 4.76972 | 0.0514 | 0.4675 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0286 | 595.0286 | 0.0114 | 0.0109 | 598.5656 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7776 |
| Total | | 0.7660 | 6.7463 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

04-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4768 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| Total | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |

04-25
Cont.

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2970 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0000 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,100.0000 |
| Landscaping | 2.4788 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1642 |
| Total | 30.5620 | 15.0496 | 88.4430 | 0.0044 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,256.1192 |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

04-25
Cont.

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

O4-25
Cont.

**Village South Specific Plan (Proposed)**

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 168.37 | 79.82 |

04-25
Cont.

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.06 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 6.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 6.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

**2.0 Emissions Summary**

04-25 Cont.

Page 231 of 548 in Comment Letter 04

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

**2.1 Overall Construction (Maximum Daily Emission)**

Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2621 | 46.4460 | 31.4068 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,154.337 7 | 6,154.337 7 | 1.9472 | 0.0000 | 6,203.018 6 |
| 2022 | 4.7566 | 38.8851 | 39.8338 | 0.1195 | 8.8255 | 1.6381 | 10.4816 | 3.6969 | 1.5052 | 5.1421 | 0.0000 | 12,035.34 40 | 12,035.34 40 | 1.9482 | 0.0000 | 12,060.80 13 |
| 2023 | 4.3089 | 25.8048 | 37.5031 | 0.1162 | 7.0088 | 0.7598 | 7.7685 | 1.8799 | 0.7142 | 2.5940 | 0.0000 | 11,710.40 90 | 11,710.40 90 | 0.9517 | 0.0000 | 11,734.44 97 |
| 2024 | 237.0656 | 8.5503 | 14.9372 | 0.0236 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4316 | 0.4521 | 0.0000 | 2,307.051 7 | 2,307.051 7 | 0.7164 | 0.0000 | 2324.962 7 |
| Maximum | 237.0656 | 46.4460 | 39.8338 | 0.1195 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 12,035.34 40 | 12,035.34 40 | 1.9482 | 0.0000 | 12,060.80 13 |

04-25 Cont.

**2.1 Overall Construction (Maximum Daily Emission)**

Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2621 | 46.4460 | 31.4068 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,154.337 7 | 6,154.337 7 | 1.9472 | 0.0000 | 6,203.018 6 |
| 2022 | 4.7566 | 38.8851 | 39.8338 | 0.1195 | 8.8255 | 1.6381 | 10.4816 | 3.6969 | 1.5052 | 5.1421 | 0.0000 | 12,035.34 40 | 12,035.34 40 | 1.9482 | 0.0000 | 12,060.80 13 |
| 2023 | 4.3039 | 25.8048 | 37.5031 | 0.1162 | 7.0088 | 0.7598 | 7.7685 | 1.8799 | 0.7142 | 2.5940 | 0.0000 | 11,710.40 80 | 11,710.40 80 | 0.9517 | 0.0000 | 11,734.44 97 |
| 2024 | 237.0656 | 0.5503 | 14.9372 | 0.0236 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4316 | 0.4521 | 0.0000 | 2,307.051 7 | 2,307.051 7 | 0.7164 | 0.0000 | 2324.962 7 |
| Maximum | 237.0656 | 46.4460 | 39.8338 | 0.1195 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 12,035.34 40 | 12,035.34 40 | 1.9482 | 0.0000 | 12,060.80 13 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

04-25 Cont.

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7482 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.6233 | 45.9914 | 110.6422 | 0.4081 | 45.9592 | 0.3373 | 46.2965 | 12.2958 | 0.3132 | 12.6089 | | 47,917.8006 | 47,917.8006 | 2.1263 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.5043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7482 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.6233 | 45.9914 | 110.6422 | 0.4081 | 45.9592 | 0.3373 | 46.2965 | 12.2958 | 0.3132 | 12.6089 | | 47,917.8006 | 47,917.8006 | 2.1263 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.5043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

04-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 9/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

04-25 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 2021**

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |
| Total | 3.1651 | 31.4407 | 21.5650 | 0.0388 | 3.3074 | 1.5513 | 4.8588 | 0.5008 | 1.4411 | 1.9419 | | 3,747.944 9 | 3,747.944 9 | 1.0549 | | 3,774.317 4 |

04-25 Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1464 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8665 | 1,269.8665 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0532 | 0.0346 | 0.3963 | 1.1100e-003 | 0.1141 | 9.0000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 110.4707 | 110.4707 | 3.3300e-003 | | 110.5539 |
| Total | 0.1835 | 4.1809 | 1.4144 | 0.0128 | 0.3810 | 0.0137 | 0.3948 | 0.1034 | 0.0131 | 0.1166 | | 1,380.3372 | 1,380.3372 | 0.0941 | | 1,382.6791 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| Total | 3.1651 | 31.4407 | 21.5650 | 0.0388 | 3.3074 | 1.5513 | 4.8588 | 0.5008 | 1.4411 | 1.9419 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |

04-25 Cont.

**3.2 Demolition - 2021**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1464 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.6665 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0532 | 0.0346 | 0.3963 | 1.1100e-003 | 0.1141 | 9.0000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 110.4707 | 110.4707 | 3.3300e-003 | | 110.5539 |
| Total | 0.1835 | 4.1809 | 1.4144 | 0.0128 | 0.3810 | 0.0137 | 0.3948 | 0.1034 | 0.0131 | 0.1165 | | 1,380.3282 | 1,380.3262 | 0.0941 | | 1,382.6791 |

**3.3 Site Preparation - 2021**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |

04-25 Cont.

### 3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0638 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |
| Total | 0.0638 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |
| Total | 3.8882 | 40.4971 | 21.1543 | 0.0380 | 18.0663 | 2.0445 | 20.1107 | 9.9307 | 1.8809 | 11.8116 | 0.0000 | 3,685.656 9 | 3,685.656 9 | 1.1920 | | 3,715.457 3 |

04-25 Cont.

### 3.3 Site Preparation - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0638 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |
| Total | 0.0638 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |

### 3.4 Grading - 2021

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3988 | 30.8785 | 0.0520 | | 1.9853 | 1.9853 | | 1.8285 | 1.8285 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| Total | 4.1912 | 46.3988 | 30.8785 | 0.0520 | 3.6733 | 1.9853 | 10.6587 | 3.5965 | 1.8285 | 5.4230 | | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |

04-25 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0416 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |
| Total | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0416 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3988 | 30.8785 | 0.0520 | | 1.9853 | 1.9853 | | 1.8285 | 1.8285 | 0.0000 | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |
| Total | 4.1912 | 46.3988 | 30.8785 | 0.0520 | 3.6733 | 1.9853 | 10.6587 | 3.5965 | 1.8285 | 5.4230 | 0.0000 | 6,007.043 4 | 6,007.043 4 | 1.9428 | | 6,055.613 4 |

04-25 Cont.

### 3.4 Grading - 2021

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0416 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |
| Total | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0416 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |

### 3.4 Grading - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.5248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |
| Total | 3.5248 | 38.8435 | 29.0415 | 0.0521 | 3.6733 | 1.6349 | 10.3082 | 3.5965 | 1.5041 | 5.1006 | | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |

04-25 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0416 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |
| Total | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0416 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.6733 | 0.0000 | 3.6733 | 3.5965 | 0.0000 | 3.5966 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.5248 | 38.8435 | 29.0415 | 0.0521 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |
| Total | 3.5248 | 38.8435 | 29.0415 | 0.0521 | 3.6733 | 1.6349 | 10.3082 | 3.5965 | 1.5041 | 5.1006 | 0.0000 | 6,011.410 5 | 6,011.410 5 | 1.9442 | | 6,060.015 8 |

04-25 Cont.

### 3.4 Grading - 2022

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0416 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |
| Total | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0416 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |

### 3.5 Building Construction - 2022

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |
| Total | 1.7062 | 15.6156 | 16.3634 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |

04-25 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1873 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2836 | 0.0245 | 0.2881 | | 3,789.075 0 | 3,789.075 0 | 0.2351 | | 3,795.029 3 |
| Worker | 2.0620 | 1.6677 | 19.4600 | 0.0571 | 6.0992 | 0.0493 | 6.1426 | 1.6163 | 0.0454 | 1.6617 | | 5,691.935 4 | 5,691.935 4 | 0.1602 | | 5,695.940 8 |
| Total | 3.0904 | 14.8550 | 23.2704 | 0.0926 | 7.0067 | 0.0749 | 7.0826 | 1.8799 | 0.0699 | 1.9498 | | 9,481.010 4 | 9,481.010 4 | 0.3954 | | 9,490.969 1 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3834 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |
| Total | 1.7062 | 15.6156 | 16.3834 | 0.0289 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.333 6 | 2,554.333 6 | 0.6120 | | 2,569.632 2 |

04-25 Cont.

**3.5 Building Construction - 2022**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1873 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.075 0 | 3,789.075 0 | 0.2351 | | 3,795.029 3 |
| Worker | 2.0620 | 1.6977 | 19.4600 | 0.0571 | 0.0932 | 0.0493 | 0.1426 | 0.0163 | 0.0454 | 0.0617 | | 5,691.935 4 | 5,691.935 4 | 0.1602 | | 5,695.940 8 |
| Total | 3.0904 | 14.8850 | 23.2704 | 0.0926 | 1.0087 | 0.0749 | 1.0836 | 0.2799 | 0.0699 | 0.3498 | | 9,481.010 4 | 9,481.010 4 | 0.3954 | | 9,490.969 1 |

**3.5 Building Construction - 2023**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |
| Total | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |

04-25 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.400 7 | 3,671.400 7 | 0.2096 | | 3,676.641 7 |
| Worker | 2.5029 | 1.5073 | 17.8820 | 0.0550 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,483.797 4 | 5,483.797 4 | 0.1442 | | 5,487.402 0 |
| Total | 2.8211 | 11.4799 | 21.2591 | 0.0893 | 7.0088 | 0.0601 | 7.0688 | 1.8799 | 0.0557 | 1.9356 | | 9,155.198 1 | 9,155.198 1 | 0.3538 | | 9,164.043 7 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |
| Total | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.209 9 | 2,555.209 9 | 0.6079 | | 2,570.405 1 |

04-25 Cont.

### 3.5 Building Construction - 2023

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.400 7 | 3,671.400 7 | 0.2096 | | 3,676.641 7 |
| Worker | 2.5029 | 1.5073 | 17.8820 | 0.0550 | 6.0992 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,483.797 4 | 5,483.797 4 | 0.1442 | | 5,487.402 0 |
| Total | 2.8211 | 11.4799 | 21.2591 | 0.0893 | 7.0088 | 0.0601 | 7.0688 | 1.8799 | 0.0557 | 1.9356 | | 9,155.198 1 | 9,155.198 1 | 0.3538 | | 9,164.043 7 |

### 3.6 Paving - 2023

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |

04-25 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |
| Total | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.584 1 | 2,207.584 1 | 0.7140 | | 2,225.433 6 |

04-25 Cont.

**3.6 Paving - 2023**

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |
| Total | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |

**3.6 Paving - 2024**

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |

04-25 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0444 | 0.0287 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |
| Total | 0.0444 | 0.0287 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Total | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.547 2 | 2,207.547 2 | 0.7140 | | 2,225.396 3 |

04-25 Cont.

### 3.6 Paving - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0444 | 0.0287 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |
| Total | 0.0444 | 0.0287 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |

### 3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| Total | 236.5923 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |

04-25 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3316 | | 1,061.381 8 | 1,061.381 8 | 0.0264 | | 1,062.041 0 |
| Total | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3316 | | 1,061.381 8 | 1,061.381 8 | 0.0264 | | 1,062.041 0 |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| Total | 236.5923 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |

04-25 Cont.

### 3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3316 | | 1,061.381 8 | 1,061.381 8 | 0.0264 | | 1,062.041 0 |
| Total | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3316 | | 1,061.381 8 | 1,061.381 8 | 0.0264 | | 1,062.041 0 |

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

04-25 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.5233 | 45.9914 | 110.0422 | 0.4881 | 45.8592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.80 05 | 47,917.80 05 | 2.1953 | | 47,972.68 39 |
| Unmitigated | 9.5233 | 45.9914 | 110.0422 | 0.4881 | 45.8592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.80 05 | 47,917.80 05 | 2.1953 | | 47,972.68 39 |

04-25 Cont.

**4.2 Trip Summary Information**

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 508,227 | 508,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 82.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 628.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,184.43 | 8,057.31 | 20,562,452 | 20,562,452 |

**4.3 Trip Type Information**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.80 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

**4.4 Fleet Mix**

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

04-25
Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7680 | 6.7462 | 4.2573 | 0.0416 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |
| NaturalGas Unmitigated | 0.7680 | 6.7462 | 4.2573 | 0.0416 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

04-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.916 4 | 4,209.916 4 | 0.0807 | 0.0772 | 4,234.933 9 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22769.8 | 0.2458 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.834 2 | 2,677.834 2 | 0.0513 | 0.0491 | 2,693.546 0 |
| Hotel | 4769.72 | 0.0514 | 0.4675 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5656 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7776 |
| Total | | 0.7660 | 6.7463 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

04-25 Cont.

### 5.2 Energy by Land Use - NaturalGas

Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.916 4 | 4,209.916 4 | 0.0807 | 0.0772 | 4,234.933 9 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7696 | 0.2458 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.834 2 | 2,677.834 2 | 0.0513 | 0.0491 | 2,693.546 0 |
| Hotel | 4.76972 | 0.0514 | 0.4675 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5656 |
| Regional Shopping Center | 0.251618 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7776 |
| Total | | 0.7660 | 6.7463 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.983 2 | 8,355.983 2 | 0.1602 | 0.1532 | 8,405.638 7 |

04-25 Cont.

### 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |

**6.2 Area by SubCategory**

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2870 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1065 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4788 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| Total | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3500 | 18,259.1192 |

04-25 Cont.

**6.2 Area by SubCategory**

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2970 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0000 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,100.0060 |
| Landscaping | 2.4788 | 0.9496 | 82.4430 | 4.3800e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1642 |
| Total | 30.5620 | 15.0496 | 88.4430 | 0.0044 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,256.1192 |

**7.0 Water Detail**

**7.1 Mitigation Measures Water**

**8.0 Waste Detail**

**8.1 Mitigation Measures Waste**

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**10.0 Stationary Equipment**

04-25 Cont.

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

**11.0 Vegetation**

04-25
Cont.

Attachment C

| Local Hire Provision Net Change | |
|---|---|
| **Without Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,623 |
| Amortized (MT CO2e/year) | 120.77 |
| **With Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,024 |
| Amortized (MT CO2e/year) | 100.80 |
| ***% Decrease in Construction-related GHG Emissions*** | ***17%*** |

O4-25
Cont.

**EXHIBIT B**

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

SOIL WATER AIR PROTECTION ENTERPRISE
2656 29th Street, Suite 201
Santa Monica, California 90405
Attn: Paul Rosenfeld, Ph.D.
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# *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**Risk Assessment & Remediation Specialist**

## Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

## Professional Experience

Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from unconventional oil drilling operations, oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, and many other industrial and agricultural sources. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at dozens of sites and has testified as an expert witness on more than ten cases involving exposure to air contaminants from industrial sources.



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## Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex $H_2O$ Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

## Publications:

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P.**, (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

**Rosenfeld, P.E.** & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences.* 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health.* 73(6), 34-46.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry.* Amsterdam: Elsevier Publishing.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P.** (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution,* 123 (17), 319-327.

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Tam L. K., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

**Rosenfeld, P.E.,** J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

**Rosenfeld, P. E.,** M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities*. Boston Massachusetts: Elsevier Publishing.

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

**Rosenfeld P. E.,** J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004*. New Orleans, October 2-6, 2004.

**Rosenfeld, P.E.,** and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49( 9), 171-178.

**Rosenfeld, P. E.**, Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

**Rosenfeld, P.E.,** Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

**Rosenfeld, P.E.**, and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

**Rosenfeld, P.E.,** and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality*. 29, 1662-1668.

**Rosenfeld, P.E.,** C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

**Rosenfeld, P.E.,** and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

**Rosenfeld, P.E.,** and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

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Cont.

Chollack, T. and **P. Rosenfeld. (**1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

**Rosenfeld, P. E.** (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

**Rosenfeld, P. E.** (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

**Rosenfeld, P. E. (**1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

**Rosenfeld, P. E.** (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

**Rosenfeld, P. E. (**1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

## Presentations:

**Rosenfeld, P.E.,** Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society*. Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

**Rosenfeld, P.E**. (April 19-23, 2009). Perfluorooctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

**Rosenfeld, P.E.** (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

**Rosenfeld, P. E.** (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

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**Rosenfeld, P. E.** (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld P. E.** (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

**Rosenfeld P. E.** (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting*. Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition*. Lecture conducted from Boston Massachusetts.

**Paul Rosenfeld Ph.D**. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference*. Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel in Irvine, California.

**Paul Rosenfeld Ph.D**. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference*. Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

**Paul Rosenfeld Ph.D**. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

**Paul Rosenfeld, Ph.D.** (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

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**Paul Rosenfeld, Ph.D.** (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association.* Lecture conducted from Radison Hotel, Sacramento, California.

**Rosenfeld, P. E.**, Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

**Paul Rosenfeld, Ph.D.** (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum.* Lecture conducted from Marriott Hotel, Anaheim California.

**Paul Rosenfeld, Ph.D**. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E.** and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost. *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association.* Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association.* Lecture conducted from Vancouver Washington..

**Rosenfeld, P.E.** and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conference.* Lecture conducted from Indianapolis, Maryland.

**Rosenfeld. P.E.** (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

**Rosenfeld. P.E.** (October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

**Rosenfeld, P.E.** (2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association.* Lecture conducted from Sacramento California.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings.* Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America.* Lecture conducted from Salt Lake City Utah.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

**Rosenfeld, P.E.**, C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

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**Rosenfeld, P.E.,** C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

## Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

## Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993



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**Deposition and/or Trial Testimony:**

In the United States District Court For The District of New Jersey
Duarte et al, *Plaintiffs*, vs. United States Metals Refining Company et. al. *Defendant.*
Case No.: 2:17-cv-01624-ES-SCM
Rosenfeld Deposition. 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk, *Plaintiffs*, vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" *Defendant.*
Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No.: No. BC615636
Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No.: No. BC646857
Rosenfeld Deposition, 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiff vs. The 3M Company et al., Defendants
Case: No 1:16-cv-02531-RBJ
Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No 1923
Rosenfeld Deposition, 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No C12-01481
Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 8-23-2017

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No.: LC102019 (c/w BC582154)
Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., *Plaintiffs*, vs. Meritor Inc., et al., *Defendants*
Case Number: 4:16-cv-52-DMB-JVM
Rosenfeld Deposition: July 2017

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In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No.: No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial, March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No.: RG14711115
Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No.: LALA002187
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Jerry Dovico, et al., Plaintiffs vs. Valley View Sine LLC, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Doug Pauls, et al.,, et al., Plaintiffs vs. Richard Warren, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al
Civil Action N0. 14-C-30000
Rosenfeld Deposition, June 2015

In The Third Judicial District County of Dona Ana, New Mexico
Betty Gonzalez, et al. Plaintiffs vs. Del Oro Dairy, Del Oro Real Estate LLC, Jerry Settles and Deward DeRuyter, Defendants
Rosenfeld Deposition: July 2015

In The Iowa District Court For Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No 4980
Rosenfeld Deposition: May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case Number CACE07030358 (26)
Rosenfeld Deposition: December 2014

In the United States District Court Western District of Oklahoma
Tommy McCarty, et al., Plaintiffs, v. Oklahoma City Landfill, LLC d/b/a Southeast Oklahoma City Landfill, et al. Defendants.
Case No. 5:12-cv-01152-C
Rosenfeld Deposition: July 2014

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In the County Court of Dallas County Texas
Lisa Parr et al, *Plaintiff*, vs. Aruba et al, *Defendant*.
Case Number cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial: April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., *Plaintiffs*, vs. Republic Services, Inc., et al., *Defendants*
Case Number: 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition: October 2012

In the United States District Court of Southern District of Texas Galveston Division
Kyle Cannon, Eugene Donovan, Genaro Ramirez, Carol Sassler, and Harvey Walton, each Individually and on behalf of those similarly situated, *Plaintiffs*, vs. BP Products North America, Inc., *Defendant*.
Case 3:10-cv-00622
Rosenfeld Deposition: February 2012
Rosenfeld Trial: April 2013

In the Circuit Court of Baltimore County Maryland
Philip E. Cvach, II et al., *Plaintiffs* vs. Two Farms, Inc. d/b/a Royal Farms, Defendants
Case Number: 03-C-12-012487 OT
Rosenfeld Deposition: September 2013

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**EXHIBIT C**

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

1640 5th St., Suite 204 Santa
Santa Monica, California 90401
Tel: (949) 887-9013
Email: mhagemann@swape.com

**Matthew F. Hagemann, P.G., C.Hg., QSD, QSP**

**Geologic and Hydrogeologic Characterization**
**Industrial Stormwater Compliance**
**Investigation and Remediation Strategies**
**Litigation Support and Testifying Expert**
**CEQA Review**

**Education:**

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

**Professional Certifications:**

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

**Professional Experience:**

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2014;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

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- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

**Senior Regulatory and Litigation Support Analyst:**

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 100 environmental impact reports since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, Valley Fever, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Manager of a project to provide technical assistance to a community adjacent to a former Naval shipyard under a grant from the U.S. EPA.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.



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- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.

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- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

**Executive Director:**

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

**Hydrogeology:**

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.



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- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

**Policy:**

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

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**Geology:**

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

**Teaching:**

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt taught physical geology (lecture and lab and introductory geology at Golden West College in Huntington Beach, California from 2010 to 2014.

**Invited Testimony, Reports, Papers and Presentations:**

**Hagemann, M.F.**, 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

**Hagemann, M.F.**, 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

**Hagemann, M.F.**, 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

**Hagemann, M.F.**, 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

**Hagemann, M.F.**, 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

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Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

**Hagemann, M.F.**, 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

**Hagemann, M.F.**, 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

**Hagemann, M.F.**, 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

**Hagemann, M.F.**, 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

**Hagemann, M.F.**, 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

**Hagemann, M.F.**, 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

**Hagemann, M.F.**, 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.



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**Hagemann, M.F.**, 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

**Hagemann, M.F.**, 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

**Hagemann, M.F.**, and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F.** 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

**Hagemann, M.F.**, 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

**Hagemann, M.F.**, 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

**Hagemann, M.F.**, and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

**Hagemann, M.F.**, Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

**Hagemann, M. F.**, Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

**Hagemann, M.F.**, 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

**Hagemann, M.F.** and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

**Hagemann, M.F.**, 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

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**Hagemann, M.F.**, 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

**Other Experience:**

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.

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**EXHIBIT D**

FTA

FEDERAL TRANSIT ADMINISTRATION

# Transit Noise and Vibration Impact Assessment Manual

SEPTEMBER 2018

FTA Report No. 0123
Federal Transit Administration

PREPARED BY
John A. Volpe National Transportation Systems Center



U.S. Department of Transportation
Federal Transit Administration

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# Transit Noise and Vibration Impact Assessment Manual

SEPTEMBER 2018
FTA Report No. 0123

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U.S. Department of Transportation
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## Metric Conversion Table

| SYMBOL | WHEN YOU KNOW | MULTIPLY BY | TO FIND | SYMBOL |
|---|---|---|---|---|
| | | **LENGTH** | | |
| in | inches | 25.4 | millimeters | mm |
| ft | feet | 0.305 | meters | m |
| yd | yards | 0.914 | meters | m |
| mi | miles | 1.61 | kilometers | km |
| | | **VOLUME** | | |
| fl oz | fluid ounces | 29.57 | milliliters | mL |
| gal | gallons | 3.785 | liters | L |
| $ft^3$ | cubic feet | 0.028 | cubic meters | $m^3$ |
| $yd^3$ | cubic yards | 0.765 | cubic meters | $m^3$ |
| | | NOTE: volumes greater than 1000 L shall be shown in $m^3$ | | |
| | | **MASS** | | |
| oz | ounces | 28.35 | grams | g |
| lb | pounds | 0.454 | kilograms | kg |
| T | short tons (2000 lb) | 0.907 | megagrams (or "metric ton") | Mg (or "t") |
| | | **TEMPERATURE (exact degrees)** | | |
| °F | Fahrenheit | 5 (F-32)/9 or (F-32)/1.8 | Celsius | °C |

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**14. ABSTRACT**
This report is the third edition of a guidance manual originally issued in 1995. It includes clarifications to existing policy and updates to outdated references where applicable. Topics presented in this manual include procedures for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. Additional topics include descriptions of noise and vibration mitigation measures, construction noise and vibration, and how to present these analyses in the Federal Transit Administration's environmental documents. This guidance is for technical specialists who conduct the analyses, as well as project sponsor staff, Federal agency reviewers, and members of the general public who may be affected by the projects.

**15. SUBJECT TERMS**
Transit noise and vibration analysis, noise and vibration impact criteria, noise and vibration mitigation measures, environmental impact assessment, Nation Environmental Policy Act compliance.

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## Abstract

This report is the third edition of a guidance manual originally issued in 1995. It includes clarifications to existing policy and updates to outdated references where applicable. Topics presented in this manual include procedures for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. Additional topics include descriptions of noise and vibration mitigation measures, construction noise and vibration, and how to present these analyses in the Federal Transit Administration's environmental documents. This guidance is for technical specialists who conduct the analyses, as well as project sponsor staff, Federal agency reviewers, and members of the general public who may be affected by the projects.

## Acknowledgments

The original 1995 version of this manual was developed by the firm Harris Miller Miller & Hanson Inc. (HMMH) and peer-reviewed by a group of specialists in the fields of acoustics and environmental planning and analysis. HMMH updated the original manual in 2006.

The updates for this current version were provided by the John A. Volpe National Transportation Systems Center, Cross Spectrum Acoustics, and FTA, and it was peer-reviewed by a panel of experts.

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SECTION 1

# Introduction

## 1.1 Purpose

The Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of the National Environmental Policy Act of 1969 (NEPA)[1,2] require that a federally-funded project be assessed for its impact on the human and natural environment prior to implementation. The Federal Transit Administration (FTA), in conjunction with the Federal Highway Administration (FHWA), has issued detailed regulations implementing NEPA for transit and highway projects. The regulations are codified in part 771 of title 23, Code of Federal Regulations, and are titled "Environmental Impact and Related Procedures." (23 CFR part 771).[3]

The Federal Transit Administration (FTA) provides financial assistance for a range of public transportation projects from new rail rapid transit (RRT) systems to bus maintenance facilities and vehicle purchases. As required by NEPA and its implementing regulations, each project must undergo environmental review.

Noise and vibration are sometimes among the major concerns regarding the effects of a transit project on the surrounding community and are key elements of the environmental impact assessment process for public transportation projects. A transit system is often placed near population centers by necessity and may cause noise and vibration at nearby residences and other sensitive types of land use.

This manual provides technical guidance for conducting noise and vibration analyses for transit projects, as well as direction regarding preparation of the information for FTA's environmental documents. Some situations may not be explicitly covered in this manual; the exercise of professional judgment may be required to extend the basic methods in these cases and frequent consultation with FTA staff is important to ensure the methods used meet the requirements for environmental reviews. See Appendix G for information on using non-standard modeling procedures.

In general, the noise and vibration impact assessment process for projects includes the following steps:

1. Determine appropriate impact criteria (Section 4.1).
2. Conduct screening and determine appropriate level of noise analysis, analyze project noise impacts, and evaluate mitigation options if appropriate (Sections 4.2–4.5).
3. Determine appropriate level of vibration analysis, analyze project vibration impacts, and evaluate mitigation options if appropriate (Sections 6.1–6.5).
4. Analyze construction noise and vibration impacts (Section 7).
5. Document findings (Section 8).

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## 1.2 Organization of the Manual

This guidance manual is organized by the following recommended analysis workflow. A glossary of terms used throughout this manual is available in Appendix A. Detailed information on the fundamentals of noise, noise impact criteria, clustering receivers, determining existing noise, computing source levels from measurements, and using non-standard methodology is available in the appendices.

**Section 2: Project Class of Action and Planning** – This section describes the first step in the analysis process that is applicable to both noise and vibration analyses.

**Section 3: Transit Noise** – This section provides the reader with background information specific to transit noise.

**Section 4: Noise Impact Analysis** – This section provides a general outline of the entire noise impact analysis process: guidelines on determining noise impact criteria, methods for choosing the appropriate level of noise analysis ("Screening," "General," or "Detailed"), steps for evaluating noise impacts with the Noise Screening Procedure (a simplified method of evaluating the potential for noise impact from transit projects), steps for evaluating noise impact with the General Noise Assessment procedure (a simplified assessment method to estimate noise impact and compare alternatives for transit projects), and steps for evaluating noise impact with the Detailed Noise Analysis procedure (a comprehensive assessment method to produce the most accurate estimates of noise impact intended for certain major public transportation projects).

**Section 5: Transit Vibration** – This section contains background information specific to transit vibration.

**Section 6: Vibration Impact Analysis –** This section provides a general outline of the entire vibration impact analysis process: guidelines on determining vibration impact criteria, methods for choosing the appropriate level of vibration analysis ("Screening," "General," or "Detailed"), steps for evaluating vibration impact with the vibration screening procedure (a simplified method of evaluating the potential for vibration impact from transit projects), steps for evaluating vibration impact with the general vibration assessment procedure (a simplified assessment method to estimate vibration impact and compare alternatives for transit projects), and steps for evaluating vibration impact with the detailed vibration analysis procedure (a comprehensive assessment method to produce the most accurate estimates of vibration impact intended for certain major public transportation projects).

**Section 7: Noise and Vibration During Construction** – This section presents the process of assessing noise and vibration impact during construction, including determination of level of assessment, source levels, impact criteria, and mitigation.

**Section 8: Documentation of Noise and Vibration Assessment** – This section includes guidance for documenting the noise and vibration assessment in technical reports and environmental documents.



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SECTION 2

# Project Class of Action and Planning

The level of environmental analysis and review depends on the significance of any potential associated environmental impacts, which in turn depends in part on the scope and complexity of the proposed project. The goals of a transit noise and vibration impact assessment are to:

1. Determine existing noise and vibration levels.
2. Assess project noise and vibration for potential impact.
3. Evaluate the effect of mitigation options on impacts.

The class of action determination will inform the required level of analysis. The FTA Regional office[1] determines the class of action based on project information provided by the project sponsor. The following types of information can assist the FTA Regional office in an initial class of action determination for a project:

- Project description
- Project-specific graphics, including:
  - Project location/sizes
  - Known land use and environmental features
- Additional information, as appropriate:
  - Summary of prior planning
  - Draft purpose and need statement

Project classes of action are described in Section 2.1. Project planning and development guidelines are presented in Section 2.2.

## 2.1 Project Class of Action

FTA's environmental regulations classify projects by level of environmental analysis. The class of action will determine the appropriate level of analysis and documentation for a project. Details of each class are described in the following sections. For more information, review FTA's environmental impact and related procedures at 23 CFR part 771.

**Environmental Impact Statements**
Environmental impact statements (EISs) apply to projects that are expected to cause significant environmental effects in the NEPA context. Typical examples include new or extensions of fixed-guideway projects, such as heavy rail, light rail, commuter rail, and automated guideway transit (AGT) systems that are not located within existing transportation right-of-way (ROW). It is likely that for major infrastructure projects requiring an EIS, the most detailed treatment of noise and vibration impacts will often be required.

**Categorical Exclusions**
Categorical exclusions (CEs) cover actions that are excluded from requiring an EIS or environmental assessment (EA) because FTA has determined that they do

[1] http://www.fta.dot.gov/12926.html.



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not routinely cause significant environmental impacts. FTA's CEs are located at 23 CFR §§ 771.118(c) and (d), commonly referred to as the c-list and d-list, respectively. Examples of projects that would normally be CEs include vehicle purchases, maintenance of equipment, vehicles, or facilities, and ROW acquisition.
In general, CEs for transit capital construction projects often require at least a screening of noise impacts.

**Environmental Assessments**
When a proposed project is presented to FTA and it is uncertain whether the project requires an EIS or qualifies for a CE, FTA will normally direct the project sponsor to prepare an environmental assessment (EA) to assist in making the determination. An EA may be prepared for any type of project if uncertainty exists about the magnitude or extent of the impacts. Generally, an EA is selected over a CE if FTA determines that several types of potential impacts require further investigation, for example, air quality, noise, wetlands, historic sites, and/or traffic, but FTA's environmental regulation does not list typical projects that require EAs.
Experience shows that most of the EAs prepared for transit projects require at least a general assessment of noise impacts.

## 2.2 Project Planning and Development

Capital transit projects are ordinarily developed initially from a comprehensive transportation planning process conducted in metropolitan areas (see 23 CFR § 450.300).[4] The metropolitan planning process often includes some early consideration of social, economic, and environmental effects of proposed major infrastructure improvements. At this stage, environmental effects are usually considered on a broad scale—for example, overall development patterns, impacts on green space, and regional air quality. Noise and vibration assessments are not typically performed at this stage because the proposed infrastructure improvements lack the necessary detail.

Once the need for a capital transit project in a corridor is established in the metropolitan transportation plan, the transit mode and general alignment best suited for the corridor are identified. The Screening and General noise assessment procedures and the vibration screening procedure described in this manual may be used to compare noise and vibration effects among different transit modes and alignments at an early stage of the project planning. The analysis that results is documented through the environmental review process.

NEPA establishes a broad policy regarding mitigation as a means of accomplishing its environmental objectives. Other Federal laws, such as Section 4(f) (49 U.S.C. 303) and Section 404 (33 U.S.C. 1344), have explicit mitigation requirements for certain resources. The decision to include noise or vibration mitigation for a project is made by FTA and the project sponsor after public review of the environmental document, as appropriate. If mitigation measures are deemed necessary to protect the environment or to satisfy statutory requirements, they will be incorporated as an integral part of the project and subsequent grant documents will reference these measures as contractual obligations on the part of the project sponsor. Through that process, FTA



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ensures that the project sponsor complies with all design and mitigation commitments contained in the environmental record.

Once the project enters construction, noise or vibration may need to be reassessed in some circumstances. Some large construction projects in densely populated residential areas may require noise monitoring to ensure agreed-upon noise limits are not exceeded. Vibration testing may be needed in the final stages of construction to determine whether vibration control measures have the predicted effect.

Considering that transit projects must be located amid or very close to concentrations of people, noise and vibration impacts can be a concern throughout the environmental review process, design, and construction phases. This manual offers the flexibility to address noise and vibration at different stages in the development of a project and in different levels of detail.

## 2.3 Mitigation Policy Considerations

Because noise is frequently among the greatest environmental concerns of planned transit projects, FTA and the project sponsor should make reasonable efforts to reduce predicted noise to levels considered acceptable for affected noise-sensitive land uses. The need for noise mitigation is determined based on the magnitude of impact and consideration of factors specifically related to the proposed project and affected land uses.

The goal of providing noise mitigation is to gain substantial noise reduction, not simply to reduce the predicted levels to just below the "severe" impact threshold. For FTA to determine whether the mitigation is reasonable, the evaluation of specific mitigation measures should include the noise reduction potential, the cost, the effect on transit operations and maintenance, and any other relevant factors, such as any new environmental impacts that may be caused by the implementation of a noise reduction measure. A thorough evaluation enables FTA to make the findings required by NEPA and other statutes, such as Section 4(f) or Section 106 requirements and their implementing regulations.

Severe impacts have the greatest adverse impact on the community, and mitigation should be strongly considered. Areas with "moderate" impacts also have potential for effects on the community and therefore should also include consideration and possible adoption of mitigation measures when considered reasonable.

Since reasonableness is not strictly defined, FTA recommends that project sponsors work with the affected public and FTA staff during the environmental review process to decide appropriate mitigation strategies. A project sponsor may also consider developing and formally adopting a mitigation policy to aid in the determination of appropriate and applicable mitigation measures for current and proposed projects and anticipated impacts. Having such a policy in place can aid in the project planning up front and help to expedite mitigation decisions.



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The following considerations can assist in determining circumstances that trigger the need for mitigation and include examples of how they can be applied in a noise mitigation policy:

- **Number of Noise-Sensitive Sites Affected**
  A row or cluster of residences adjacent to a rail transit line establishes a greater need for mitigation than one or several isolated residences in a mixed-use area. Single residences may not be able to meet a cost-effectiveness criterion for mitigation.

  ***Example Mitigation Policy Consideration:*** Set a minimum number of noise-sensitive sites as a threshold, combined with a reference to a cost-effectiveness criterion.

- **Increase over Existing Noise Levels**
  Since the noise impact criteria are delineated as bands or ranges, project noise can vary 5 to 7 decibels (dB) within the band of moderate impact at any specific ambient noise level. If the project and ambient noise plot falls just below the severe range, the need for mitigation is strongest for a moderate impact. Similarly, if the plot falls within the moderate range just above the no impact threshold, the impacts are expected to be less, so the justification for mitigation would not be as strong.

  ***Example Mitigation Policy Consideration:*** Set a strong need for mitigation when a moderate impact is 2 dB (for example) over the no impact threshold.

- **Noise Sensitivity of the Property**
  Section 4.1 includes a comprehensive list of noise-sensitive land uses, yet there can be differences in noise sensitivity depending on individual circumstances. For example, parks and recreational areas vary in their sensitivity depending on the type of use they experience (active vs. passive recreation) and the settings in which they are located.

  ***Example Mitigation Policy Consideration:*** Cite the use of the property as a determination of sensitivity for parks and recreational areas.

- **Effectiveness of the Mitigation Measure(s)**
  Determine the magnitude of the noise reduction that can be achieved, and consider whether there are conditions that limit effectiveness, such as noise barrier effectiveness for a multi-story apartment building.

  ***Example Mitigation Policy Consideration:*** Set a minimum reduction in noise level to be considered effective. A 5-dB reduction is typically considered an effective reduction from mitigation.

- **Feasibility of the Mitigation Measure(s)**
  Determine if the mitigation measure is feasible from an engineering, operations or safety perspective. In some cases, it may not be possible to construct mitigation (noise barriers) due to physical or structural limitations



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or because of safety concerns, especially related to sight lines for pedestrians and vehicles.

***Example Mitigation Policy Consideration:*** State that the engineering design of the mitigation must be feasible, that it must be implementable in light of operations, and that mitigation must not compromise safety.

- **Fairness and Equity of the Mitigation Measure(s)**
  Ensure that mitigation measures are applied in a fair and equitable manner. In many cases, small differences in distances or operations can result in small differences in projected noise levels. For example, all the residences in a row could have a projected moderate impact except for one residence at the end of the row that falls just under the moderate criteria due to being set slightly further back from the alignment. In a case like this, mitigation should be applied for the entire row of residences if possible.

  ***Example Mitigation Policy Consideration:*** State that mitigation should be applied equitably.

- **Existing Transportation Noise**
  Neighborhoods with ambient noise levels already heavily influenced by transportation noise, especially the same type of noise source as the project, should be considered. Often adding a new similar noise source will not add to the ambient noise levels or only slightly increase it to within acceptable levels. Whereas, impacts would be more likely, if the new noise was added to a neighborhood with minimal transportation noise. However, it is important to note that per (Section 4.1, Step 3) the higher the existing noise, the lower the allowable noise increase from new sources. A new cumulative noise environment may be very objectionable because people will not be compartmentalizing the existing noise versus the new noise and reacting only to the new noise. In this circumstance, impacts predicted in the moderate range could be treated as if they were severe.

  ***Example Mitigation Policy Consideration:*** Set a policy that moderate impacts under these circumstances be treated as severe and cite the potential for reducing noise from existing transportation noise, as well as from project noise.

- **Community Views**
  This manual provides the methodology to make an objective assessment of the need for noise mitigation. However, the views of the community should be considered where there are potential noise impacts predicted through this manual. The NEPA compliance process provides the framework for hearing the community's concerns about a proposed project and then making a good-faith effort to address those concerns. Many projects can be expected to have projected noise levels within the moderate impact range and, where possible, decisions regarding mitigation should be made after considering input from the affected public, relevant government agencies, and community organizations. There have been cases where the solution to the noise problem, a noise barrier, was not preferable to community members because of perceived adverse visual effects.



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***Example Mitigation Policy Consideration:*** State that community input in determining the need for mitigation will be included whenever possible.

- **Implementation Cost**
  Cost is an important consideration in reaching decisions about noise mitigation measures. One guideline for gauging the reasonableness of the cost of mitigation is the state DOT's procedures on the subject. Many states have established their own cost threshold per benefited residence for determining whether installation of noise barriers for noise reduction is a reasonable expenditure. Several airport authorities have placed limits on the costs they will incur for sound insulation per residence for homes, and FTA assesses cost in a similar manner by benefited residence. Higher costs may be justified depending on the specific set of circumstances of a project.

  ***Example Mitigation Policy Consideration:*** State the adopted cost threshold per benefited receiver for typical circumstances.

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SECTION 3

# Transit Noise

This section presents the basic concepts of transit noise as background for computation methods and transit noise assessment procedures presented in Section 4. An overview of fundamental noise topics, including amplitude, frequency, time pattern, and decibel addition, is presented in Appendix B.

The Source-Path-Receiver framework for noise illustrated in Figure 3-1 is central to all environmental noise studies. Each transit source generates noise that depends upon the type of source and its operating characteristics. Along the propagation path, between all sources and receivers, noise levels can be reduced (attenuated) by distance depending on ground type, intervening obstacles, and other factors. Finally, noise combines from multiple sources at each receiver and potentially interferes with activities at that location.

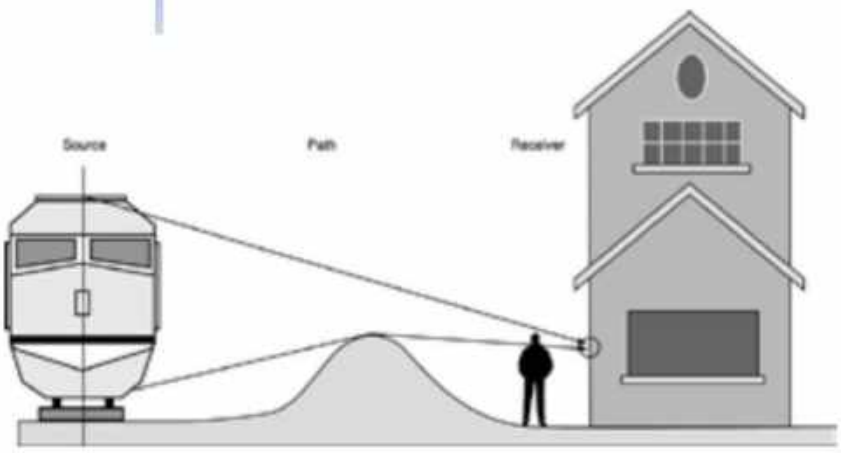


**Figure 3-1 Source-Path-Receiver Framework**

This section contains the following:

- Section 3.1 presents the noise metrics used in this manual.
- Section 3.2 provides an overview of transit noise sources, including a listing of major sources and a discussion of noise-generation mechanisms.
- Section 3.3 provides an overview of noise paths, including a discussion of the various attenuating mechanisms on the path between source and receiver.
- Section 3.4 provides an overview of receiver response to transit noise, including a discussion of the technical background for transit noise criteria and the distinction between absolute and relative noise impact.



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## 3.1 Noise Metrics

This manual uses the noise metrics outlined in Table 3-1 for transit noise measurements, computations, and assessment. The terminology is consistent with common usage in the United States. All of these noise metrics are expressed in units of A-weighted decibels (dBA). A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This is the basic noise unit for transit noise analyses.

**Table 3-1 Noise Metrics**

| Metric | Abbreviation | Definition |
|---|---|---|
| A-weighted Sound Level | dBA | A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This is expressed as A-weighted decibels (dBA), the basic noise unit for transit noise analyses. |
| Sound Exposure Level | SEL | SEL is the cumulative noise exposure from a single noise event, normalized to one second. SEL contains the same overall sound energy as the actual varying sound energy during the event. It is the primary metric for the measurement of transit vehicle noise emissions, and is an intermediate metric in the measurement and calculation of both $L_{eq(t)}$ and $L_{dn}$. |
| Equivalent Sound Level | $L_{eq(t)}$ | The equivalent sound level $L_{eq(t)}$ describes a receiver's cumulative noise exposure from all events normalized to a specified period of time "t". $L_{eq(t)}$ represents a hypothetical, constant sound level and contains the same overall sound energy as the actual varying sound energy during the time period "t". For transit noise impact assessments, the equivalent sound level metric is A-weighted and all events are normalized over a one-hour time period, $L_{eq(1hr)}$. For transit noise assessments, this metric is appropriate for non-residential land uses and is computed for the loudest hour of project related activity during hours of noise sensitivity. |
| Day-Night Sound Level | $L_{dn}$ | $L_{dn}$ describes a receiver's cumulative noise exposure from all events over 24 hours. Events between 10 p.m. and 7 a.m. are increased by 10 dB to account for humans' greater nighttime sensitivity to noise. $L_{dn}$ is used to assess transit noise for residential land uses. |
| Maximum Sound Level | $L_{max}$ | The maximum level describes the maximum noise level reached during a single noise event. For transit noise impact assessments, it is appropriate to consider the A-weighted maximum level ($L_{max}$) to understand the full context of the scenario. It is not appropriate to use this metric for transit noise impact assessments. This metric is commonly used in vehicle noise specifications and commonly measured for individual vehicles. |

The noise metrics, including their application to transit noise and vibration impact assessment, are described in more detail in Appendix B.1.4. Mathematical definitions and graphic illustrations are presented to facilitate understanding and the interrelationships among metrics.

## 3.2 Sources of Transit Vehicle Noise

This section discusses major characteristics of the sources of transit noise. Transit noise can be generated by transit vehicles in motion, stationary transit



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vehicles, and fixed-transit facilities. Procedures for computing nearby noise levels for major sources as a function of operating parameters such as vehicle speed are given in Sections 4.4 and 4.5.

**Transit Vehicles in Motion**

Transit vehicles most noticeably create noise when in motion. Noise from transit vehicles in motion can come from multiple sources, including the propulsion unit (i.e., the engine and engine components), the interaction of the wheels and/or tires and the running surface, and warning bells and horns.

Vehicle propulsion units generate:

- Whine from electric control systems and traction motors that propel rapid transit cars
- Diesel-engine exhaust noise from both diesel-electric locomotives and transit buses
- Air-turbulence noise generated by cooling fans
- Gear noise

Noise is also generated by the interaction of wheels and/or tires with their running surfaces. Tire noise from rubber-tired vehicles is generated at normal operating speeds. The interaction of steel wheels and rails generates:

- Rolling noise due to continuous rolling contact
- Impact noise when a wheel encounters a discontinuity in the running surface such as a rail joint, turnout or crossover (where the train or rail vehicle switches off one track and onto another)
- Impact noise from the wheel and running surface if the wheel is not completely round (wheel flat) or if the running surface is not completely flat
- Squeal generated by friction between wheels and rail on tight curves

Transit vehicles are equipped with horns and bells for use in emergency situations and as a general audible warning to track workers and trespassers within the ROW, pedestrians, and motor vehicles at highway grade crossings. Horns and bells on the moving transit vehicle combined with stationary bells at-grade crossings can generate high noise levels for nearby residents and are often sources of complaints.

For many noise sources, such as transit vehicles, the sound level is dependent on the speed of the noise source. In other cases, such as for stationary sources or horns mounted on vehicles, the sound level is not dependent on speed. Figure 3-2 illustrates sound level dependence on speed for a diesel-powered commuter rail train and an electric-powered transit train assuming all other parameters, such as weight, are equal. Plotted vertically in this figure is a notional indication of the maximum sound level during a passby. Speed dependence is strong for electric-powered transit trains because wheel/rail noise is the dominant noise source and noise from this type of source increases strongly with speed. Diesel-powered commuter rail train noise is dominated by the locomotive exhaust noise at slower speeds. As speed increases, wheel-rail



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Cont.

noise becomes the dominant noise source and diesel- and electric-powered trains generate similar noise levels. Similarly, speed dependence is also strong for automobiles, city buses (two-axle), and non-accelerating highway buses (three-axle), because tire/pavement noise is the dominant noise source for these vehicles. Accelerating highway bus noise is dominated by exhaust noise.

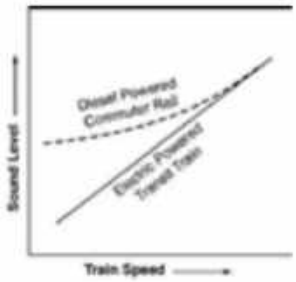


**Figure 3-2 Sound Level Dependence on Speed**

Sound levels close to the source are also dependent on vehicle acceleration, vehicle length, running surface type, and running surface condition. For high-speed rail vehicles (vehicles with an operating speed of 90–250 mph are typically beyond the scope of this manual), air turbulence can also be a source of noise. In addition, for an elevated structure, the guideway can radiate noise as it vibrates in response to the dynamic loading of the moving vehicle.

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**Stationary Transit Vehicles**

Noise can be generated by transit vehicles even when they are stationary. For example, auxiliary equipment such as cooling fans on motors, radiator fans, plus hydraulic, pneumatic, and air-conditioning pumps, often continue to run when vehicles are stationary. Transit buses are also often left idling in stations or storage yards.

**Fixed-transit Facilities**

Noise can also be generated by sources at fixed-transit facilities. Such sources include ventilation fans in transit stations, subway tunnels, and electric power substations, as well as equipment in chiller plants, and many activities within maintenance facilities and shops.

**Common Noise Sources**

Table 3-2 summarizes common sources of transit noise by vehicle and facility type.

**Table 3-2 Sources of Transit Noise**

| Vehicle or Facility* | Dominant Components | Comments |
|---|---|---|
| RRT or Light Rail Transit (LRT) on exclusive ROW | Wheel/rail interaction and guideway amplification | Depends on condition of wheels and rails |
| | Propulsion system | When accelerating and at higher speeds |
| | Brakes | When stopping |
| | Auxiliary equipment | When stopped |
| | Wheel squeal | On tight curves |
| | *In general* | Noise increases with speed and train length |
| LRT in Mixed Traffic | Wheel squeal | On tight curves |
| | Auxiliary equipment | When stopped |
| | Horns and crossing bells | At-grade crossings and stations |
| | *In general* | Traveling at lower speeds in mixed traffic produces less noise than when traveling at higher speeds in exclusive ROW |
| Commuter Rail | Diesel exhaust | On diesel-hauled trains |
| | Cooling fans | On both diesel and electric-powered trains |
| | Wheel/rail interaction | Depends on condition of wheels and rails |
| | Horns and crossing gate bells | At-grade crossings and stations |
| | *In general* | Noise is usually dominated by locomotives and horns/bells at-grade crossings |
| Low and Intermediate Capacity Transit | Propulsion systems, including speed controllers | At low speeds |
| | Ventilation systems | At low speeds |
| | Tire/guideway interaction | For rubber-tired vehicles, including monorails |
| | Wheel/rail interaction | Depends on condition of wheels and rails |
| | *In general* | Wide range of vehicles: monorail, rubber-tired, steel-wheeled, linear induction. Noise characteristics depend upon type |
| Diesel Buses | Cooling fans | While idling |
| | Engine casing | While idling |
| | Diesel exhaust | At low speeds and while accelerating |
| | Tire/roadway interaction | At moderate and high speeds |
| | *In general* | Includes city buses (generally two-axle) and commuter buses (generally three-axle) |
| Electric Buses and Trackless Trolleys | Tire/roadway interaction | At moderate speeds |
| | Electric traction motors | At moderate speeds |
| | *In general* | Much quieter than diesel buses |
| Bus Storage Yards | Buses starting up | Usually most disruptive in the early morning |
| | Buses accelerating | Usually near entrances/exits and/or locations that require buses to accelerate (tight turns) |
| | Buses idling | Warm-up areas |
| | *In general* | Site specific: often peak periods with considerable noise |
| Rail Transit Storage Yards | Wheel squeal | On tight curves |
| | Wheel impacts | On joints and switches |
| | Wheel rolling noise | On tangent track |
| | Auxiliary equipment | Throughout day and night; includes air-break release noise |
| | Coupling/uncoupling | On storage tracks |
| | Signal horns | Throughout yard site |
| | *In general* | Site specific: often early morning and peak periods with considerable noise |



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Cont.

| | | |
|---|---|---|
| Maintenance Facilities | Signal horns | Throughout facility |
| | Intercoms | Throughout facility |
| | Impact tools | Shop buildings |
| | Car/bus washers/driers | Wash facility |
| | Vehicle activity | Throughout facility |
| | *In general* | Site specific: considerable activity throughout day and night, some outside. |
| Stations | Automobiles | Patron arrival/departure, especially in early morning |
| | Buses idling | Bus loading zone |
| | Intercoms | Platform area |
| | Locomotive idling | At commuter rail terminal stations |
| | Auxiliary systems | At terminal stations and layover facilities |
| | Horns | At stations, if applicable |
| | *In general* | Site specific, with peak activity periods |
| Subways | Fans | Noise through vent shafts/structures |
| | Buses/trains in tunnels | Noise through vent shafts/structures |
| | *In general* | Noise is not a problem, except in the immediate vicinity of vent shafts/structures. |

[‡] Refer to Appendix A for additional information.

## 3.3 Paths of Transit Noise from Source to Receiver

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Cont.

This section contains a qualitative overview of noise-path characteristics from source to receiver, including attenuation along these paths. Equations for specific noise-level attenuations along source-receiver paths are included in Sections 4.4 and 4.5.

Sound paths from source to receiver are predominantly through the air. Along these paths, sound reduces with distance due to divergence, absorption/diffusion, and shielding. These mechanisms of sound attenuation are discussed below.

**Divergence**

Sound levels naturally attenuate with distance, as shown in Figure 3-3. The plot shows attenuation at the receiver relative to the sound level 50 ft from the source. This type of attenuation is called divergence and is dependent upon source configuration (line or point source) or other source-emission characteristics. Localized sources (point sources) grouped closely together attenuate greatly with distance at a rate of approximately 6 dB per doubling of distance. Examples of point sources include highway grade-crossing signals along rail corridors, intercoms in maintenance yards and other closely grouped sources of noise. Vehicles passing along a track or roadway forming a line are called line sources. Line sources attenuate less than point sources with distance. Rate of attenuation for line sources varies depending on the noise metric. $L_{eq(1hr)}$ and $L_{dn}$ noise levels attenuate at a rate of 3 dB per doubling of distance and $L_{max}$ noise levels attenuate at a rate of 3 to 6 dBs per doubling of distance.

Figure 3-3 illustrates approximate attenuation with distance between the source and receiver for point and line sources. The line source curve for the $L_{max}$ noise

metric separates into three curves because it is dependent on the length of the line source. Equations for the curves in Figure 3-3 are included in Section 4.5.

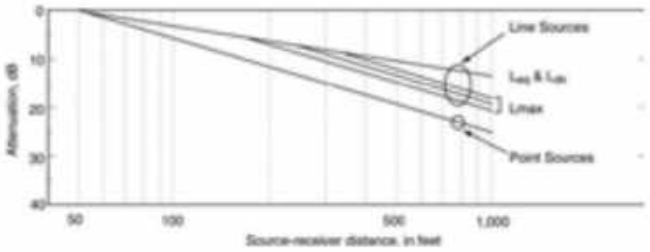


**Figure 3-3 Attenuation Due to Distance (Divergence)**

**Absorption/Diffusion**

In addition to distance, sound levels can be attenuated depending on the type of ground between the source and receiver. A portion of the sound energy is absorbed by the ground and only the remaining energy travels to the source. How much energy the ground absorbs is dependent on the ground type (characterized as acoustically "hard" or "soft") and geometry. Example absorptive ground types include freshly-plowed or vegetation-covered ground. Figure 3-4 illustrates approximate attenuation due to ground type by source to receiver path distance and height. Ground attenuation can be as large as 5 dB over a path distance of several hundred ft. At very large distances, wind and temperature gradients could modify the expected ground attenuation. However, these variable atmospheric effects are not included in this manual because they generally occur beyond the range of typical transit-noise impact. Equations for the curves in this figure are included in Section 4.5.

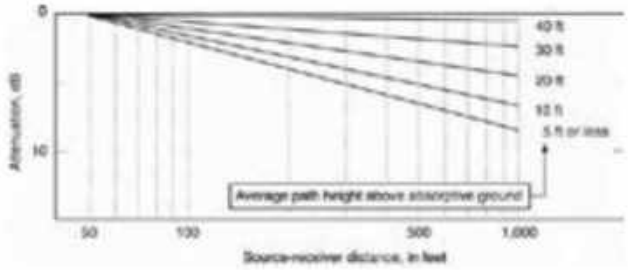


**Figure 3-4 Attenuation due to Soft Ground**

**Shielding**

Sound paths are sometimes interrupted by terrain, human-constructed noise barriers, rows of buildings, or other objects. Noise barriers are one of the most effective means of mitigating noise (Section 4.5, Step 7). A noise barrier reduces sound levels at a receiver by breaking the direct line-of-sight between source and receiver with a solid wall (in contrast to vegetation which hides the source from view but does not reduce sound levels substantially over short distances). Sound energy reaches the receiver only by bending (diffracting) over the top of



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the barrier, as shown in Figure 3-5. This diffraction over the barrier reduces the sound level that reaches the receiver. One important consideration in using noise barriers to mitigate noise impacts is safety. Noise barriers, if not designed and sited carefully, can reduce visibility of trains for pedestrians and motorists, leading to less safe conditions. It is important to consult with safety experts when choosing and siting a noise barrier.

Noise barriers for transportation systems are typically used to attenuate noise at the receiver, potentially reducing received sound levels by 5 to 15 dB, depending upon barrier height, length, and distance from both source and receiver. Barriers on structures close to the transportation noise source may provide less attenuation than barriers located farther from the source due to reverberation (multiple reflections) between the barrier and the body of the vehicle or noise source. This reverberation can be offset by increased barrier height and/or acoustical absorption on the source side of the barrier. Further discussion and equations on acoustical absorption and barrier attenuation is provided in Section 4.5.

Source-to-receiver sound paths may not always travel through the air, but rather through the ground or through structural components of the receiver's building. Discussion of such ground-borne and structure-borne propagation is included in Section 5.

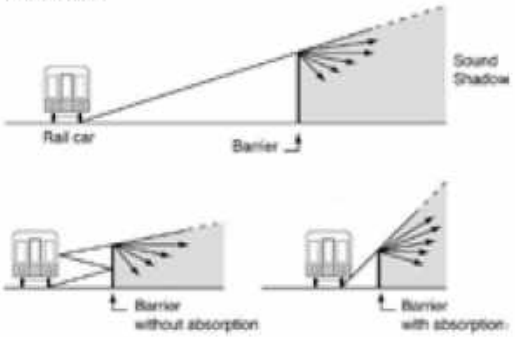


**Figure 3-5 Noise Barrier Geometry**

## 3.4 Receiver Response to Transit Noise

This section contains an overview of human receiver response to noise. It serves as background information for the noise impact criteria in Section 4.1.

Noise can interrupt ongoing activities causing community annoyance, especially in residential areas. In general, most residents become highly annoyed when noise interferes considerably with activities such as sleeping, talking, noise-sensitive work, and audio entertainment. In addition, some land uses, such as outdoor concert pavilions, are inherently incompatible with high noise levels.



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Annoyance from noise has been investigated and approximate dose-response relationships have been quantified by the U.S. Environmental Protection Agency (EPA).[5] The selection of noise metrics in this manual is largely based upon this EPA work. Beginning in the 1970s, the EPA undertook a number of research and synthesis studies relating to community noise of all types. Results of these studies have been widely published, discussed, and refereed by many professionals in acoustics. Basic conclusions of these studies have been adopted by the Federal Interagency Committee on Noise (FICON),[10] the U.S. Department of Housing and Urban Development (HUD), the American National Standards Institute, and even internationally[6][7][8][9]. Conclusions from this seminal EPA work remain scientifically relevant today.

Figure 3-6 contains a synthesis of actual case studies of community reaction to newly introduced sources of noise in a residential urban neighborhood.[10] Plotted horizontally in the figure is the increase in noise from new sources above existing noise levels expressed as Day-Night Sound Levels, $L_{dn}$, discussed in Appendix B.1.4.5. Plotted vertically is the community reaction to this newly introduced noise. As shown in the figure, community reaction varies from no reaction to vigorous action for newly introduced noises averaging from 10 dB below existing to 25 dB above existing. Note the assumptions included in the graphic are associated with the specific data points from the study. These assumptions are generally appropriate to give context to most transit projects, but community reaction may differ for conditions specific to each project.

In many community attitudinal surveys, transportation noise has been ranked among the greatest causes of community dissatisfaction. A synthesis of many such surveys on annoyance is shown in Figure 3-7.[11][12] Noise exposure levels are plotted against the percentage of people who are highly annoyed by the particular level of neighborhood noise. As shown in the figure, the percentage of high annoyance is approximately 0 percent at 45 dB, 10 percent around 60 dB, and increases quite rapidly to approximately 70 percent around 85 dB. The scatter about the synthesis line is due to community variation and wording differences in the surveys. An update of the original research containing additional railroad, transit and street traffic noise surveys generally follows the shape of the original response curve shown in Figure 3-7.[12][13]

As indicated by Figure 3-6 and Figure 3-7, introduction of certain levels of transit noise into a community may have two undesirable effects. First, it may substantially increase noise levels above existing noise levels in a community. This effect is called a relative noise impact. Evaluation of this effect compares new noise levels to the existing levels. Criteria for a relative noise impact evaluation are based upon noise increases above existing levels. Second, newly introduced transit noise may interfere with community activities independent of existing noise levels. For example, it may be too loud to converse or sleep. This effect is called absolute noise impact and is expressed as a fixed level threshold that is not to be exceeded. The fixed level threshold is determined independently of existing noise levels. Relative and absolute noise impacts are discussed in terms of transit noise criteria in Section 4.1, Step 3.

[a] The Federal Interagency Committee on Aviation Noise (FICAN) is the current version of this group.



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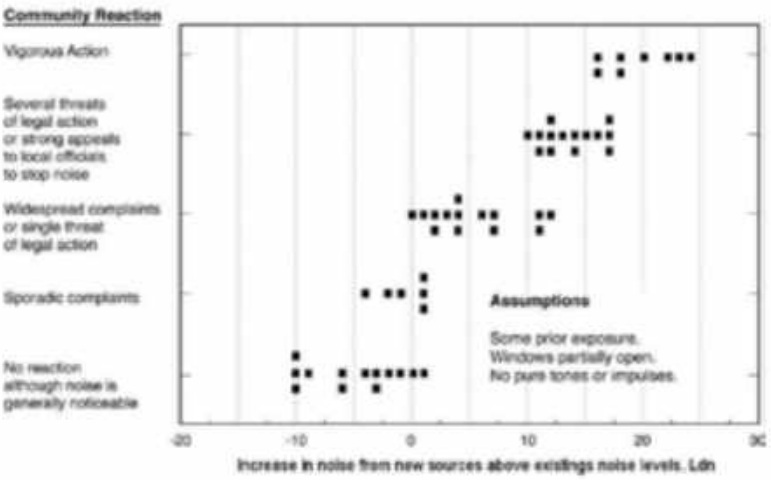


**Figure 3-6 Community Reaction to New Noise, Relative to Existing Noise in a Residential Urban Environment**

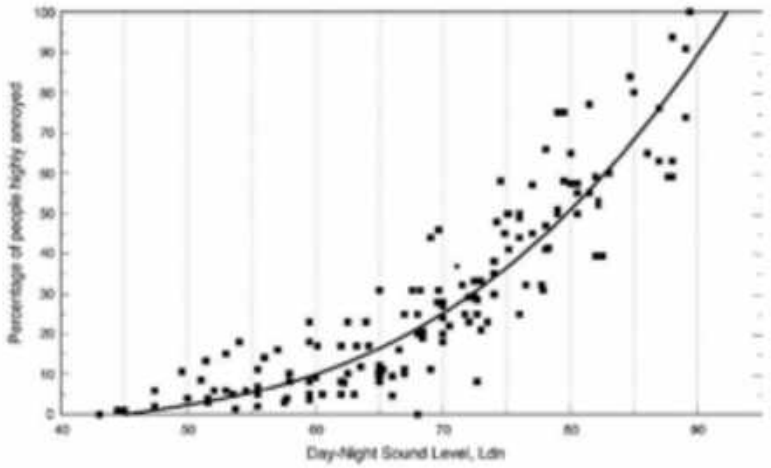


**Figure 3-7 Community Annoyance Due to Noise**

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SECTION 4

# Noise Impact Analysis

The FTA noise impact analysis process is a multi-step process used to evaluate the project for potential noise impacts for FTA NEPA approvals. If impact is determined, measures necessary to mitigate adverse impacts must be considered for incorporation into the project.[4] It is recommended that project sponsors develop and formally adopt a policy for determining the need for mitigation for situations that are loosely covered by the impact criteria. Considerations for mitigation policies are included in Section 2.3. The FTA noise impact analysis steps are summarized as follows and are described in the subsequent subsections:

**4.1:** Determine noise impact criteria.
- **Step 1:** Identify the type of project/dominant noise source (transit or multimodal).
- **Step 2:** Choose land use category for FTA criteria.

**4.2:** Determine the highest appropriate level of noise analysis for the current stage of project planning or development.

**4.3:** Evaluate for the potential of impact according to the Noise Screening Procedure.
- **Step 1:** Identify project type.
- **Step 2:** Determine the screening distance.
- **Step 3:** Identify the study area.
- **Step 4:** Locate noise-sensitive land uses.

**4.4:** Evaluate impact according to the General Noise Assessment and evaluate preliminary mitigation options if impact is found.
- **Step 1:** Identify noise-sensitive receivers.
- **Step 2:** Determine the project noise source reference levels.
- **Step 3:** Estimate project noise exposure by distance.
- **Step 4:** Combine noise exposure from all sources.
- **Step 5:** Measure existing noise exposure.
- **Step 6:** Inventory noise impacts.
- **Step 7:** Determine noise mitigation needs.

**4.5:** Evaluate for impact according to the Detailed Noise Analysis and evaluate mitigation options if impact is found.
- **Step 1:** Identify noise-sensitive receivers.
- **Step 2:** Determine noise source levels for detailed analysis.
- **Step 3:** Calculate project noise exposure by distance.
- **Step 4:** Combine noise exposure from all sources.
- **Step 5:** Determine existing noise exposure.
- **Step 6:** Assess noise impact.
- **Step 7:** Determine noise mitigation measures.

In addition to analyzing for potential noise impacts, analyze the project for potential vibration impacts according to the process presented in Section 6. After both the noise and vibration analyses have been completed, assess



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construction noise and vibration according to Section 7 and document findings according to Section 8.

## 4.1 Determine Noise Impact Criteria

This section describes the procedure for determining the appropriate criteria for assessing project noise impact based on the type of project and project noise source. Project noise is the new noise or change in noise introduced by the project. Noise impact criteria may vary for different segments of the project. Project segments can be portions of a project with similar characteristics.

The procedure to determine the appropriate impact criteria is described in this section and shown more simply as a flow chart in Figure 4-1. If there is uncertainty in how to determine the appropriate criteria, contact the FTA Regional office.

The selected criteria are used in the analysis procedures discussed in Sections 4.3, 4.4, and 4.5 to identify potential impacts and the level of impact.

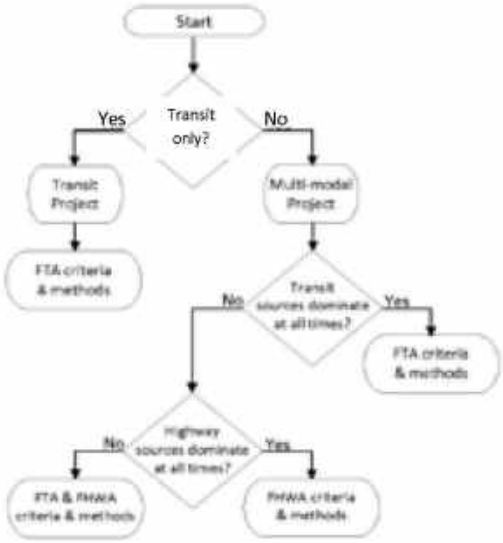


**Figure 4-1 Noise Impact Criteria Flow Chart by Project Segment**



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## Step 1: Identify Project Type

*Identify the type of project as transit, multimodal (transit and highway), or other multimodal according to the dominant noise source.*

**Option A: Transit Project (Transit Noise Only) –** The transit project category includes all transit projects where the project noise is exclusively due to new transit sources, no changes are made to the highway or to existing highway noise barriers, and the existing noise levels generated by roadway sources will not change because of the project. For these transit projects, FTA is the lead agency conducting the environmental review in cooperation with the transit agency.

Typical examples of transit projects include:

- RRT, LRT, commuter rail, and AGT
- Rail projects built within an existing highway or railroad corridor that do not alter the existing noise levels generated by roadway sources
- Bus facility projects with operations on local streets and highways used to access the facility, where the project does not include roadway construction or modification that changes roadway capacity substantially
- Fixed facilities including storage and maintenance yards, passenger stations and terminals, parking facilities, and substations
- Portions of transit projects not adjacent to highway corridors

*FTA impact criteria are appropriate for transit projects, proceed to Step 2.*

**Option B: Multimodal Project (Transit and Highway Noise) –** In this manual, "multimodal" refers to projects that include changes to both transit and highway components, resulting in project noise comprised of both highway and transit noise sources.

Typical examples of multimodal projects include:

- New highway construction providing general-purpose lanes as well as dedicated bus and high occupancy vehicle (HOV) lanes
- Rail transit projects that involve changes to the highway travel lanes or existing highway noise barriers

Evaluate multimodal projects for impact according to the project noise source by project segment. FHWA's noise assessment methods are used to inform FTA's NEPA evaluation only for segments where highway noise levels change due to the transit project. These projects are not necessarily subject to FHWA's procedures at 23 CFR part 772 *(see call out box below)*. For segments of the project outside the highway corridor, use FTA's criteria and methods. Use Table 4-1 to determine multimodal project noise.

Once the project noise source(s) is identified, determine the appropriate assessment method according to Table 4-2.



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Note that a separate noise analysis may be required for FHWA approval of a multimodal project pursuant to 23 CFR part 772. For these projects, it is important to work with FHWA early in the environmental review process to determine how a noise assessment will be completed where FHWA approval is needed for the project.

The determination of whether a project is subject to FHWA procedures at 23 CFR part 772 depends upon the specific circumstances of a project. A proposed transit project that would share an existing highway ROW is not necessarily a FHWA-defined multimodal project. A transit project that meets all three of the following criteria is not considered a multimodal project subject to 23 CFR part 772:

- FTA is the lead agency in the NEPA process and FHWA's limited participation is as a cooperating agency.
- The main transportation purpose of the project, as stated in the purpose and need statement of the environmental document, is transit-related and not highway-related.
- No Federal-aid highway funds are being used to fund the project.

**Table 4-1 Multimodal Project Noise Factors**

| Factor | Description |
|---|---|
| Volume of Traffic | Major freeways and interstate highways often carry large volumes of traffic throughout the day and night such that the highway noise dominates at all times. Transit noise in this case may be unimportant by comparison, but must still be evaluated using FTA's noise criteria for a potential impact. |
| Traffic Patterns | Some highways and arterials serve primarily as commuter routes such that nighttime traffic diminishes considerably, while transit systems continue to operate well into the late hours. Here the dominant noise source at times of maximum sensitivity may be transit. |
| Type of Traffic | Some highways and arterials may serve commuters during the daytime hours, but provide access to business centers by trucks at night. In this case, the roadway noise would likely continue to dominate. |
| Alignment Configuration | Elevation of the transit mode in the median or beside a busy highway may result in transit noise contributing more noise to nearby neighborhoods than a highway that may be partially shielded by rows of buildings adjacent to the ROW. In this case, both transit and highway noise may be considered dominant. |

**Table 4-2 Multimodal Project Assessment Methods**

| Dominant Noise Source | Assessment Method |
|---|---|
| Transit, at All Times | Use FTA criteria and methods. *Proceed to Step 2.* |
| Highway, at All Times | Use FHWA criteria and methods to inform FTA's NEPA evaluation. *Contact FHWA directly for assistance using FHWA noise analysis methods and FHWA noise impact criteria.* |
| Transit and Highway at Different Times | Use both the FHWA and FTA methods to determine if one, both, or neither method determines impact due to the project noise for these segments. Note that the project noise includes both highway and transit sources associated with the project. Both methods are used because the FTA methods consider nighttime sensitivity while the FHWA methods consider the peak traffic hour. *Proceed to Step 2 for FTA criteria. Contact FHWA directly for assistance using FHWA noise analysis methods and FHWA noise impact criteria.* |



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**Option C: Other Multimodal Projects –** For projects with components from other modes, contact the FTA Regional office. Additional information on high-speed rail vibration and noise can be found in the Federal Railroad Administration (FRA) "High-Speed Ground Transportation Noise and Vibration Impact Assessment" guidance manual.[14]

## Step 2: Choose Land Use Category for FTA Criteria

*Determine the appropriate noise-sensitive land use category for the project segment using Table 4-3 and the descriptions below then, proceed to Step 3. FTA criteria are presented by land use.*

**Table 4-3 Land Use Categories and Metrics for Transit Noise Impact Criteria**

| Land Use Category | Land Use Type | Noise Metric, dBA | Description of Land Use Category |
|---|---|---|---|
| 1 | High Sensitivity | Outdoor $L_{eq(1hr)}$* | Land where quiet is an essential element of its intended purpose. Example land uses include preserved land for serenity and quiet, outdoor amphitheaters and concert pavilions, and national historic landmarks with considerable outdoor use. Recording studios and concert halls are also included in this category. |
| 2 | Residential | Outdoor $L_{dn}$ | This category is applicable all residential land use and buildings where people normally sleep, such as hotels and hospitals. |
| 3 | Institutional | Outdoor $L_{eq(1hr)}$* | This category is applicable to institutional land uses with primarily daytime and evening use. Example land uses include schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities are also included in this category. |

* $L_{eq(1hr)}$ for the loudest hour of project-related activity during hours of noise sensitivity.

Noise-sensitive land use categories are described in in order of sensitivity. Most commercial or industrial uses are not considered noise-sensitive because activities within these buildings are generally compatible with higher noise levels. Business can be considered noise-sensitive if low noise levels are an important part of operations, such as sound and motion picture recording studios.

For residential land use (category 2), apply the noise criteria at the nearest façade of the occupied portion of the building, e.g., not at a garage or porch. The residential criteria should be applied at locations with nighttime sensitivity. For major noise-sensitive outdoor use at non-residential locations, apply the noise criteria at the point of noise-sensitive use nearest the noise source.

Land use categories are evaluated using noise metrics that reflect the noise-sensitive time of day:

- **Categories 1 and 3** – The noise metric, $L_{eq(1hr)}$ is used for all category 1 and 3 land uses where nighttime sensitivity is not a factor. Category 3 land uses are considered less noise-sensitive than category 1 land uses. For transit analyses, $L_{eq(1hr)}$ is computed for the noisiest hour of transit-



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related activity during which human activities occur at the noise-sensitive location. See Appendix B.1.4.4 for more information on this metric.

- **Category 2** – The noise metric $L_{dn}$ is a used for all category 2 land uses where nighttime sensitivity is a factor. This noise metric includes a 10-dB penalty for nighttime noise. See Appendix B.1.4.5 for more information on this metric.

**Land Use Categories: Special Cases**

Historic sites, parks, indoor-only land use, and undeveloped land require special consideration. In addition to NEPA, noise impacts may need to be considered under other environmental laws such as Section 106[15] or Section 4(f).[16] Indoor-only use and undeveloped land should be evaluated on a case-by-case basis to determine noise sensitivity based on how each facility is used or the reason it is protected under the applicable requirement.

**Historic Sites** – Section 106 requires Federal agencies to evaluate potential effects from projects on historic properties. Per the regulations at 36 CFR part 800,[17] historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for the National Register of Historic Places (NRHP). An adverse effect determination under Section 106 is made when a project may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Under FTA environmental reviews, some structures may be evaluated as noise-sensitive resources per this noise manual and evaluated as historic properties under Section 106. However, because this manual and Section 106 regulations have different criteria for effect, identifying a severe noise impact for a structure under this manual does not necessarily mean there would be an adverse effect under Section 106. It is important to thoroughly document the characteristics of historic properties that qualify for inclusion in the NRHP for evaluation of effect under Section 106.

If a property, for example, is listed on the NRHP under criterion C because the structure possesses high artistic values, but lacks integrity of setting, feeling, or association, it is unlikely that a change in the noise environment would affect the features that qualify the property for listing or eligibility for inclusion in the NRHP.

In the assessment of effects on historic properties, consideration should be given to not just the proposed transit project, but any associated mitigation measures with the transit project. For example, if a transit project would involve noise walls or berms as mitigation, the effect of those structures on the visual setting may need to be considered in a Section 106 analysis.

**Parks** – Most parks used primarily for active recreation such as sports complexes and bike or running paths are not considered noise-sensitive.



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However, some parks (even some in dense urban areas) are primarily used for passive recreation such as reading, conversation, or meditation. These places, which may be valued as havens from the noise and rapid pace of everyday city life, are treated as noise-sensitive, and are included in land use category 3. Consult the state or local agency with jurisdiction over the park on questions about how the park is used, and visit the park to observe its use, if possible.

**Indoor-Only Use** – The land use categories described in this section correspond with noise impact criteria that provide protection for both outdoor and indoor land uses. For locations where noise impact will be evaluated but there is no outdoor land use such as apartment buildings, hotels or upper levels of multi-story buildings, indoor criteria can be used. In these cases, the criterion for indoor noise levels from project sources is a $L_{dn}$ of 45 dBA.[18] This criterion is consistent with the Federal Aviation Administration (FAA). See Section 4.5 for more information on how indoor criteria apply to noise mitigation consideration.

**Undeveloped Land –** Undeveloped land may also need to be considered for noise impact assessment and mitigation if plans are under way to develop the land for noise-sensitive use. The policy for considering such land for assessment and mitigation should be determined on a project-specific basis by the project sponsor in consultation with the FTA Regional office.

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Cont.

## Step 3: Determine Appropriate FTA Criteria Presentation

FTA criteria for noise impact were developed specifically for transit noise sources operating on fixed-guideways or at fixed facilities in urban areas. These criteria are based on well-documented research on human response to community noise and represent a reasonable balance between community benefit and project costs. These criteria do not reflect specific community attitudinal factors. See Appendix C for additional background information on the development of FTA noise criteria.

The criteria specify a comparison of future project noise with existing noise. Note that projections of future noise exposure without the project (no-build scenario) are not included in this analysis. The criteria also consider land use which is an important factor that reflects noise sensitivity based on activity and time period of concern. The criteria are defined with the expectation that communities already exposed to high levels of noise can only tolerate a small increase. In contrast, if the existing noise levels are low, it is reasonable to allow a greater change in the community noise.

The levels of impact are described in Table 4-4. The criteria at which the levels of impact occur are presented in two ways depending on the relationship of project and existing noise sources.

*If the project noise source is a new source of transit noise in the community, such as a new project in an area currently without transit, use the criteria as presented in Option A. If the project noise adds to or changes existing transit noise in the community, use the criteria as presented in Option B.*

**Table 4-4 Levels of Impact**

| Level of Impact | Description |
|---|---|
| No Impact | Project-generated noise is not likely to cause community annoyance. Noise projections in this range are considered acceptable by FTA and mitigation is not required. |
| Moderate Impact | Project-generated noise in this range is considered to cause impact at the threshold of measurable annoyance. Moderate impacts serve as an alert to project planners for potential adverse impacts and complaints from the community. Mitigation should be considered at this level of impact based on project specifics and details concerning the affected properties. |
| Severe Impact | Project-generated noise in this range is likely to cause a high level of community annoyance. The project sponsor should first evaluate alternative locations/alignments to determine whether it is feasible to avoid severe impacts altogether. In densely populated urban areas, evaluation of alternative locations may reveal a trade-off of affected groups, particularly for surface rail alignments. Projects that are characterized as point sources rather than line sources often present greater opportunity for selecting alternative sites. This guidance manual and FTA's environmental impact regulations both encourage project sites which are compatible with surrounding development when possible. If it is not practical to avoid severe impacts by changing the location of the project, mitigation measures must be considered. |

**Option A: Project Noise Impact Criteria Presentation –** The impact criteria presentation for evaluating existing noise independently to project noise is presented in this option.

The noise levels at which impacts occur are presented in Figure 4-2 and Table 4-5. Equations for the impact criteria are presented in Appendix C. If impact is determined, measures necessary to mitigate impacts are to be considered for incorporation into the project.[3]

Figure 4-2 presents the existing noise exposure on the horizontal axis and project noise on the vertical axis. Category 1 and 2 land uses have the same criteria for project noise and are on the primary vertical axis. Category 3 land use criteria are presented on the secondary vertical axis. Note that project noise for category 1 and 3 land uses is expressed as $L_{eq(1hr)}$, whereas project noise for category 2 land use is expressed as $L_{dn}$. Also, note that project noise criteria are 5 dB higher for category 3 land uses in Figure 4-2 since these types of land use are less noise-sensitive than those in categories 1 and 2.

Note that for projects in locations with existing noise levels below 55 dBA, the project noise exposure is allowed some increase over the existing noise exposure before it is considered to cause impact. For category 1 and 2 land uses, the maximum project noise level to be considered to cause no impact is 65 dBA ($L_{eq(1hr)}$ or $L_{dn}$) regardless of the existing noise. Note that no impact at 65 dBA aligns with other Federal agencies in that a $L_{dn}$ of 65 dBA is a standard limit for an acceptable living environment among some Federal agencies.[19] [20] Project noise levels above the top curve are considered to cause severe impact. The upper limit of the severe impact range is 75 dBA for category 1 and 2 land uses. The upper limit of 75 dBA is associated with an unacceptable living environment. Project noise between the two curves is considered to have moderate impact on the community.



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Cont.

The criteria are also tabulated in Table 4-5. Figure 4-2 and the equations that correspond with this figure in Appendix C are the precise definition of the criteria. The values in Table 4-5 can be used for illustrative purposes and should only be used if all numbers are rounded up to the nearest decibel.

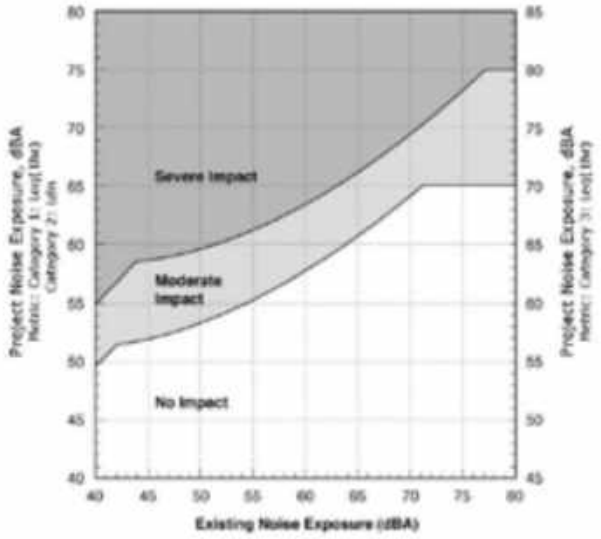


**Figure 4-2 Noise Impact Criteria for Transit Projects**

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**Table 4-5 Noise Levels Defining Impact for Transit Projects**

| Existing Noise Exposure, dBA | Project Noise Impact Exposure, dBA | | | | | |
|---|---|---|---|---|---|---|
| | Category 1 ($L_{eq(1hr)}$) or 2 ($L_{dn}$) Sites | | | Category 3 Sites ($L_{eq(1hr)}$) | | |
| $L_{eq(1hr)}$ or $L_{dn}$ | No Impact | Moderate Impact | Severe Impact | No Impact | Moderate Impact | Severe Impact |
| <43 | < Ambient+10 | Ambient +10 to 15 | > Ambient+15 | < Ambient+15 | Ambient +15 to 20 | > Ambient+20 |
| 43 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 44 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 45 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 46 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 47 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 48 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 49 | <54 | 54-59 | >59 | <59 | 59-64 | >64 |
| 50 | <54 | 54-59 | >59 | <59 | 59-64 | >64 |
| 51 | <54 | 54-60 | >60 | <59 | 59-65 | >65 |
| 52 | <55 | 55-60 | >60 | <60 | 60-65 | >65 |
| 53 | <55 | 55-60 | >60 | <60 | 60-65 | >65 |
| 54 | <55 | 55-61 | >61 | <60 | 60-66 | >66 |
| 55 | <56 | 56-61 | >61 | <61 | 61-66 | >66 |
| 56 | <56 | 56-62 | >62 | <61 | 61-67 | >67 |
| 57 | <57 | 57-62 | >62 | <62 | 62-67 | >67 |
| 58 | <57 | 57-62 | >62 | <62 | 62-67 | >67 |
| 59 | <58 | 58-63 | >63 | <63 | 63-68 | >68 |
| 60 | <58 | 58-63 | >63 | <63 | 63-68 | >68 |
| 61 | <59 | 59-64 | >64 | <64 | 64-69 | >69 |
| 62 | <59 | 59-64 | >64 | <64 | 64-69 | >69 |
| 63 | <60 | 60-65 | >65 | <65 | 65-70 | >70 |
| 64 | <61 | 61-65 | >65 | <66 | 66-70 | >70 |
| 65 | <61 | 61-66 | >66 | <66 | 66-71 | >71 |
| 66 | <62 | 62-67 | >67 | <67 | 67-72 | >72 |
| 67 | <63 | 63-67 | >67 | <68 | 68-72 | >72 |
| 68 | <63 | 63-68 | >68 | <68 | 68-73 | >73 |
| 69 | <64 | 64-69 | >69 | <69 | 69-74 | >74 |
| 70 | <65 | 65-69 | >69 | <70 | 70-74 | >74 |
| 71 | <66 | 66-70 | >70 | <71 | 71-75 | >75 |
| 72 | <66 | 66-71 | >71 | <71 | 71-76 | >76 |
| 73 | <66 | 66-71 | >71 | <71 | 71-76 | >76 |
| 74 | <66 | 66-72 | >72 | <71 | 71-77 | >77 |
| 75 | <66 | 66-73 | >73 | <71 | 71-78 | >78 |
| 76 | <66 | 66-74 | >74 | <71 | 71-79 | >79 |
| 77 | <66 | 66-74 | >74 | <71 | 71-79 | >79 |
| >77 | <66 | 66-75 | >75 | <71 | 71-80 | >80 |

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Cont.

**Option B: Cumulative Noise Impact Criteria Presentation**

*The impact criteria presentation for evaluating existing noise to project noise cumulatively is presented in this option.*

In certain cases, the cumulative form of the noise criteria shown in Figure 4-3 can be used. These cases involve projects where changes are proposed to an existing transit system, as opposed to a new project in an area previously without transit. Such changes might include operations of a new type of vehicle, modifications of track alignments within existing transit corridors, or changes in facilities that dominate existing noise levels. In these cases, the existing noise

sources change because of the project, and so it is not possible to define project noise separately from existing noise. An example would be a commuter rail corridor where the existing noise along the alignment is dominated by diesel locomotive-hauled trains, and where the project involves electrification with the resulting replacement of some of the diesel-powered locomotives with electric trains operating at increased frequency of service and higher speeds on the same tracks. In this case, the existing noise can be determined and a new future noise can be calculated, but it is not possible to describe what constitutes the "project noise." For example, if the existing noise dominated by trains was measured to be an $L_{dn}$ of 63 dBA at a particular location, and the new combination of diesel and electric trains is projected to be an $L_{dn}$ of 65 dBA, the change in the noise exposure due to the project would be 2 dB. Referring to Figure 4-3, a 2-dB increase with an existing noise exposure of 63 dBA would be rated as a moderate impact. Normally the project noise is added to the existing noise to come up with a new cumulative noise, but in this case, the existing noise was dominated by a source that changed due to the project, so it would be incorrect to add the project noise to the existing noise. Consequently, the existing noise determined by measurement is compared with a new calculated future noise, but a description of what constitutes the actual project is complex.

Another example would be a rail corridor where a track is added and grade crossings are closed, potentially resulting in a change in train location and horn operation. Here the "project noise" results from moving some trains closer to some receivers, away from others, and elimination of horns. In this case, the change in noise level is more readily determined than the noise from the actual project elements. In all cases, Figures 4-3 and 4-4 for changes in a transit system results in the same assessment of impact as Figure 4-2 for development of transit facilities in a new area.

The noise impact criteria in Figure 4-3 and Figure 4-4 are presented as an increase in cumulative noise level between the existing and project conditions. The horizontal axis represents the existing noise exposure and the vertical axis is the increase in cumulative noise level due to the transit project. Note that noise exposure is expressed as $L_{eq(1\,hr)}$ for category 1 and 3 land uses and $L_{dn}$ for category 2 land use. Since $L_{eq(1\,hr)}$ and $L_{dn}$ are measures of total acoustic energy, any new noise sources in a community will cause an increase, even if the new source level is the same or less than the existing noise level (refer to decibel addition in Appendix B). As shown in Figure 4-3, the criterion for moderate impact is a noise exposure increase of 10 dB for an existing noise exposure level of 42 dBA or less, but only a 1-dB increase when the existing noise exposure is 70 dBA.

As the existing level of ambient noise increases, the allowable level of transit noise increases, but the total amount that community noise exposure is allowed to increase is reduced. This accounts for the unexpected result that a project exposure which is less than the existing noise exposure can still cause impact. This is clearer from the examples listed in Table 4-6 which indicate the level of transit noise allowed for different existing levels of exposure. Any increase greater than shown in the table will cause moderate impact.

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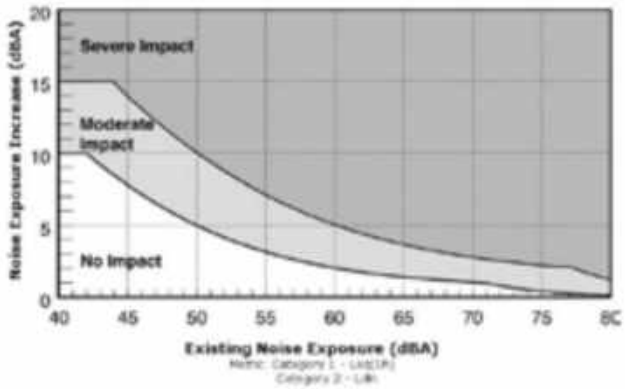


**Figure 4-3 Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 1 & 2)**

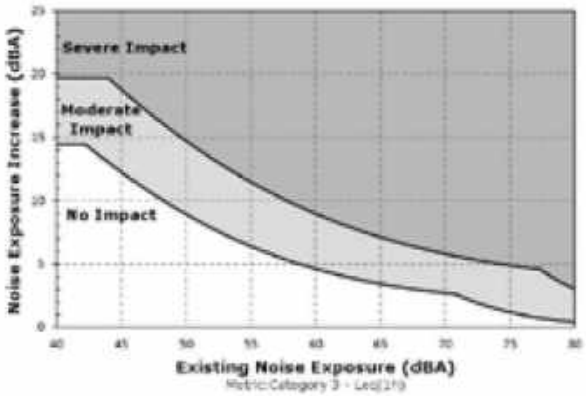


**Figure 4-4 Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 3)**

This table shows that as the existing noise exposure increases from 45 dBA to 75 dBA, the allowed project noise exposure increases from 51 dBA to 65 dBA. However, the allowed increase in the cumulative noise level decreases from 7 dB to 0 dB (rounded to the nearest whole decibel). The justification for this is that people already exposed to high levels of noise should be expected to tolerate only a small increase in the amount of noise in their community. In contrast, if the existing noise levels are quite low, it is reasonable to allow a greater change in the community noise for the equivalent difference in annoyance.



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Note that Table 4-6 was developed for illustrative purposes and the official criteria are included in Figure 4-3 and Figure 4-4 and the associated equations.

**Table 4-6 Noise Impact Criteria: Effect on Cumulative Noise Exposure**

| $L_{dn}$ or $L_{eq(1hr)}$ in dBA (rounded to nearest whole decibel) | | | |
|---|---|---|---|
| **Existing Noise Exposure** | **Allowable Project Noise Exposure Before Moderate Impact** | **Allowable Combined Total Noise Exposure** | **Allowable Noise Exposure Increase Before Moderate Impact** |
| 45 | 51 | 52 | 7 |
| 50 | 53 | 55 | 5 |
| 55 | 55 | 58 | 3 |
| 60 | 57 | 62 | 2 |
| 65 | 60 | 66 | 1 |
| 70 | 64 | 71 | 1 |
| 75 | 65 | 75 | 0 |

## 4.2 Determine Noise Analysis Level

There are three levels of analysis to evaluate noise on a transit project based on the type and scale of the project, stage of project development, and environmental setting. These levels, described below, are the Noise Screening Procedure, the General Noise Assessment and the Detailed Noise Analysis.

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The Noise Screening Procedure, conducted first, defines the study area of any subsequent noise impact assessment. Where there is potential for noise impact, the General Noise Assessment and Detailed Noise Analysis procedures are used to determine the extent and severity of impact. In some cases, a General Noise Assessment may be all that is needed. However, if the proposed project is near noise-sensitive land uses, and it appears at the outset that the impact would be substantial, it is prudent to conduct a Detailed Noise Analysis.

*Conduct the noise screening procedure and then determine the appropriate noise analysis option.*

**Noise Screening Procedure** – The Noise Screening Procedure is a simplified method of identifying study area receivers or locations where a project may have the potential for noise impacts from transit projects. This procedure accounts for impact criteria, the type of project, and noise-sensitive land uses. If no noise-sensitive land uses or receivers are present in the analysis area, then no further noise assessment is needed. If noise-sensitive receivers are identified, then proceed to conduct a General Assessment and/or a Detailed Assessment.

The Noise Screening Procedure steps are provided in Section 4.3.

**General Noise Assessment** – The General Noise Assessment is used to examine potentially impacted areas identified in the screening step by examining the location and estimated severity of noise impacts. This procedure considers noise source and land use information likely to be available at an early stage in the project development process. Estimates are made of project noise levels and of existing noise conditions to model the location of a noise impact contour

that defines the outer limit of an impact corridor or area. This modeling method uses transit-specific noise and adjustment data (in tabular and graphical form) for the noise computations.

For many smaller projects, this assessment may be sufficient to define impacts and determine whether noise mitigation is necessary. The procedure can be used in conjunction with established highway noise prediction procedures to compare highway, transit, and multimodal alternatives. If an assessment is needed to inform the decision on transit mode and general alignment in a corridor, the General Noise Assessment procedures should be used, and not the Detailed Noise Analysis, which requires more detailed information.

The General Noise Assessment procedure is provided in Section 4.4. FTA has also developed an Excel spreadsheet to more simply conduct the General Noise Assessment. It is on FTA's website at http://www.fta.dot.gov/12347_2233.html.

**Detailed Noise Analysis** – The Detailed Noise Analysis procedure is a comprehensive assessment method that produces the most accurate estimates of noise impacts for a proposed project. It is important to recognize that use of the Detailed Noise Analysis methods will not provide more accurate results than the General Noise Assessment unless more detailed and case-specific input data are used.

The project must be defined to the extent that location, alignment, transit mode, hourly operational schedules during day and night, speed profiles, plan and profiles of guideways, locations of access roads, and landform topography (including terrain and building features) are determined. A detailed Noise Analysis is often accomplished at the development of the final environmental impact statement (FEIS), record of decision (ROD), or combined FEIS/ROD in the NEPA process, when the preferred alternative is undergoing refinements to mitigate its adverse impacts. However, these project details may not be available until the final design phase, requiring that the detail noise analysis be conducted after the NEPA process is complete. However, it is recommended that the detailed analysis be conducted earlier for controversial projects or projects with highly noise-sensitive sites close to tracks.

A Detailed Noise Analysis may be warranted as part of the development of an environmental assessment (EA) if there are potentially severe impacts due to the proximity of noise-sensitive land uses.

In some cases, decisions on appropriate noise mitigation measures can be made based on the results of the General Noise Assessment. But if costly measures may be needed, it is generally recommended that a Detailed Noise Analysis be conducted to verify the need and design of the noise mitigation. The Detailed Noise Analysis is always appropriate under two sets of circumstances:

- For a major transit project with likely noise impacts after the preferred alternative has been selected.
- For any other transit project where potentially severe impacts are identified at an early stage.



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Cont.

Noise impacts may occur for relatively minor transit projects when the project is near noise-sensitive sites, particularly residences. In this case, completing a Detailed Noise Analysis is recommended. Some examples include:

- A terminal or station sited adjacent to a residential neighborhood
- A maintenance facility located near a school
- A storage yard adjacent to residences
- An electric substation located adjacent to a hospital

The Detailed Noise Analysis procedure is provided in Section 4.5.

## 4.3 Evaluate Impact: Noise Screening Procedure

*Identify the potential for impact using the Noise Screening Procedure described below.*

### Step 1: Identify Project Type

*Identify the project type using Table 4-7 and confirm the assumptions in Table 4-8 are appropriate for the project.*

The noise screening procedure is intended to be conservative to broadly capture the potential for impact with minimal effort. To make the procedure conservative, the project system must be assumed to be operating under relatively high-capacity conditions, which would produce more noise than normal operating conditions. In addition, the assumptions in Table 4-8 were made using the lowest threshold of impact (50 dBA) from the criteria curves in Figure 4-2. Clarification can be obtained from FTA on special cases that are not represented in this section.

If the assumptions in Table 4-8 are not appropriate for the project, make adjustments to the screening distances in Table 4-8 according to the methodology in Section 4.4 or the FTA spreadsheet model.

### Step 2: Determine the Screening Distance

*Determine the appropriate screening distance considering the type of project and shielding from intervening buildings.*

**2a.** Determine the appropriate screening distance column in Table 4-7.

**Option A: Buildings in the Sound Paths –** Use the screening distances in the "Intervening Buildings" column.

**Option B: Buildings Not in the Sound Paths –** Use the distances in the "Unobstructed" column.

**2b.** Adjust these distances according to the methodology in Section 4.4, or the FTA spreadsheet model, if the assumptions in Table 4-8 are not appropriate for the project. The appropriate screening distance is where the project noise reaches 50 dBA for the appropriate metric. If the assumptions in Table 4-8 are not appropriate for a commuter rail grade crossing project where horns and



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warning bells are used, use the FRA horn noise model available from the FRA website to develop the screening distance distance (49 CFR § 222).[23]

### Step 3: Identify Study Area

*Apply the screening distances as follows to identify the study area. The study area is intended to be sufficiently large to encompass all potentially impacted locations.*

**Option A: Fixed Guideway Transit Sources –** Apply the screening distance from the guideway centerline.

**Option B: Highway/Transit Sources (e.g., Bus) –** Apply the screening distance from the nearest ROW line on both sides of a highway or access road.

**Option C: Small Stationary Facilities –** Apply the screening distance from the center of the noise-generating activity.

**Option D: Stationary Facility Spread Over a Large Area –** Apply the screening distance from the outer boundary of the proposed project site.

### Step 4: Locate Noise-Sensitive Land Uses

*Locate all noise-sensitive land uses within the study area using Table 4-3.*

See Section 4.1 for more information on noise-sensitive land uses. Include all categories of noise-sensitive land uses in this step.

***If no noise-sensitive land uses are identified, no further noise analysis is needed. If one or more of the noise-sensitive land uses are in the study area, proceed to Section 4.4 and complete a General Noise Assessment.***

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Cont.

**Table 4-7 Screening Distance for Noise Assessments**

| Project Systems | | Screening Distance, ft* | |
|---|---|---|---|
| | | Unobstructed | Intervening Buildings |
| ***Fixed-Guideway Systems*** | | | |
| Commuter Rail Mainline | | 750 | 375 |
| Commuter Rail Station | With Horn Blowing | 1,600 | 1,200 |
| | Without Horn Blowing | 250 | 200 |
| Commuter Rail Road Crossing with Horns and Bells | | 1,600 | 1,200 |
| RRT | | 700 | 350 |
| RRT Station | | 200 | 100 |
| LRT | | 350 | 175 |
| Streetcar | | 200 | 100 |
| Access Roads to Stations | | 100 | 50 |
| Low and Intermediate Capacity Transit | Steel Wheel | 125 | 50 |
| | Rubber Tire | 90 | 40 |
| | Monorail | 175 | 70 |
| Yards and Shops | | 1000 | 650 |
| Parking Facilities | | 125 | 75 |
| Access Roads to Parking | | 100 | 50 |
| Ancillary Facilities: Ventilation Shafts | | 200 | 100 |
| Ancillary Facilities: Power Substations | | 250 | 125 |
| ***Bus Systems*** | | | |
| Busway | | 500 | 250 |
| Bus Rapid Transit (BRT) on exclusive roadway | | 200 | 100 |
| Bus Facilities | Access Roads | 100 | 50 |
| | Transit Mall | 225 | 150 |
| | Transit Center | 225 | 150 |
| | Storage & Maintenance | 350 | 225 |
| | Park & Ride Lots w/Buses | 225 | 150 |
| ***Ferry Boat Terminals*** | | 300 | 150 |

*Measured from centerline of guideway for fixed-guideway sources, from the ROW on both sides of the roadway for highway/transit sources, from the center of noise-generating activity for stationary sources, or from the outer boundary of the proposed project site for fixed facilities spread out over a large area.

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Cont.

**Table 4-8 Assumptions for Screening Distances for Noise Assessments**

| Type of Project | | Operations | Speeds* | Metric** |
|---|---|---|---|---|
| ***Fixed-Guideway Systems*** | | | | |
| Commuter Rail Mainline | | 66 day /12 night; 1 loco, 6 cars | 55 mph | $L_{dn}$ |
| Commuter Rail Station | With Horn Blowing | 22 day / 4 night | N/A | $L_{dn}$ |
| | Without Horn Blowing | 22 day / 4 night | N/A | $L_{dn}$ |
| Commuter Rail-Highway Crossing with Horns and Bells | | 22 day / 4 night | 55 mph | $L_{dn}$ |
| RRT | | 220 day / 24 night; 6-car trains | 50 mph | $L_{dn}$ |
| RRT Station | | 220 day / 24 night | 20 mph | $L_{dn}$ |
| LRT | | 150 day / 18 night; 2 artic veh. | 35 mph | $L_{dn}$ |
| Streetcar | | 150 day / 18 night | 25 mph | $L_{dn}$ |
| Access Roads to Stations | | 1000 cars, 12 buses | 35 mph | $L_{eq(1hr)}$ |
| Low and Intermediate Capacity Transit | Steel Wheel | 220 day / 24 night | 30 mph | $L_{dn}$ |
| | Rubber Tire | 220 day / 24 night | 30 mph | $L_{dn}$ |
| | Monorail | 220 day / 24 night | 30 mph | $L_{dn}$ |
| Yards and Shops | | 20 train movements | N/A | $L_{eq(1hr)}$ |
| Parking Facilities | | 1000 cars | N/A | $L_{eq(1hr)}$ |
| Access Roads to Parking | | 1000 cars | 35 mph | $L_{eq(1hr)}$ |
| Ancillary Facilities: Ventilation Shafts | | Rapid Transit in Subway | 50 mph | $L_{dn}$ |
| Ancillary Facilities: Power Substations | | Sealed shed, air conditioned | N / A | $L_{dn}$ |
| | | ***Bus Systems*** | | |
| Busway | | 30 buses, 120 automobiles | 50 mph | $L_{eq(1hr)}$ |
| BRT on exclusive roadway | | 30 buses | 35 mph | $L_{eq(1hr)}$ |
| Bus Facilities | Access Roads | 1000 cars | 35 mph | $L_{eq(1hr)}$ |
| | Transit Mall | 20 buses | N/A | $L_{eq(1hr)}$ |
| | Transit Center | 20 buses | N/A | $L_{eq(1hr)}$ |
| | Storage & Maintenance | 30 buses | N/A | $L_{eq(1hr)}$ |
| | Park & Ride Lots w/Buses | 1000 cars, 12 buses | N/A | $L_{eq(1hr)}$ |
| ***Ferry Boat Terminals*** | | 8 boats with horns used in normal docking cycle | N/A | $L_{eq(1hr)}$ |

*N/A = not applicable
**$L_{eq(1hr)}$ = the loudest hour of project related activity during hours of noise sensitivity.

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Cont.

## 4.4 Evaluate Impact: General Noise Assessment

The General Noise Assessment should be completed after the Noise Screening Procedure (Section 4.3), through which noise-sensitive receivers have been identified. This can be completed either by using the General Noise Assessment Procedure described below or using the FTA General Noise Assessment Spreadsheet found on the following FTA website: http://www.fta.dot.gov/12347_2233.html.

Assumptions are used throughout the General Noise Assessment. If the listed assumptions are not appropriate for the project and good engineering judgement cannot be used by following the General Noise Assessment procedure, proceed to a Detailed Noise Analysis or consult with the FTA Regional office.

Major steps in the General Noise Assessment procedure and recommended workflow are shown in Figure 4-5 and listed below. Four examples of General Noise Assessments are given at the end of this section. Many of these concepts are explained in greater detail in the context of a Detailed Noise Analysis in Section 4.5.

**Step 1: Identify Noise-Sensitive Receivers –** Identify noise-sensitive receivers (Section 4.3) and their proximity to the project and major noise sources.

**Step 2: Determine Project Noise Source Reference Levels –** Determine the project noise sources and reference levels. Then, estimate the project noise exposure at the reference distance of 50 ft considering operational characteristics with preliminary estimations of the effect of mitigation.

**Step 3: Estimate Project Noise Exposure by Distance –** Estimate project noise exposure at distances beyond 50 ft considering propagation characteristics using a simplified procedure.

**Step 4: Combine Noise Exposure from All Sources –** Combine all sources associated with the project to predict the total project noise at the receivers.

**Step 5: Measure Existing Noise Exposure –** Measure the existing noise or estimate the existing noise exposure using a simplified procedure.

**Step 6: Inventory Impacts**

**Option A:** Tabulate the change in noise (existing vs. estimated project noise) at each noise-sensitive receiver or cluster, identifying all moderate and severe impacts.

**Option B:** Take inventory of noise-sensitive receivers that fall within the moderate and severe noise contours.



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**Step 7: Determine Noise Mitigation Needs –** Evaluate the need for mitigation and repeat the General Noise Assessment with proposed mitigation.

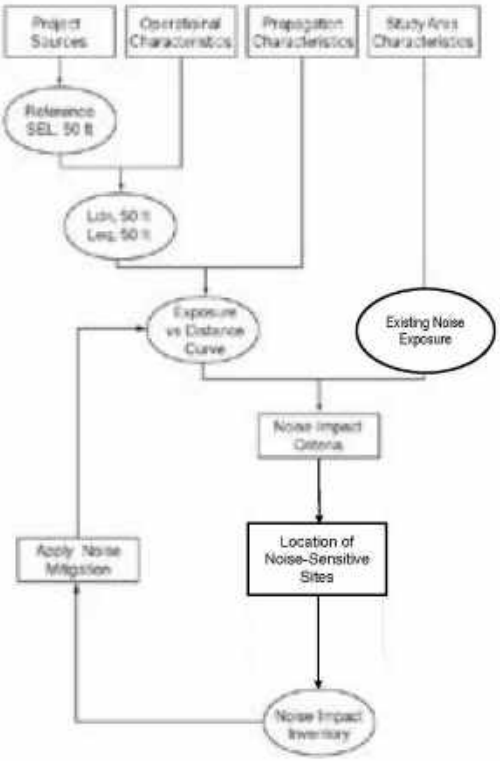


**Figure 4-5 Procedure for General Noise Assessment**

## Step 1: Identify Noise-Sensitive Receivers

*Determine the proximity of noise-sensitive land uses identified in Section 4.3 to the project and to the nearest major roadways and railroad lines.*

**1a.** When necessary, use windshield surveys or detailed land use maps to confirm the location of noise-sensitive land uses.

**1b.** For land uses more than 1,000 ft from major roadways or railroad mainlines, obtain an estimate of the population density in the immediate area, expressed in people per square mile. Distances to roadways or railroads, or population density, will be used later to estimate the existing



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noise level. Coordinate with the Metropolitan Planning Organization (MPO) for population densities at an appropriate level of detail.

### Step 2: Determine Project Noise Source Reference Levels

*Determine the general source reference level for each project noise source.*

Classify all project noise sources as fixed-guideway transit, highway/transit, or stationary facility and determine the source reference levels. Note that a major fixed-guideway system will have stationary facilities associated with it and that a stationary facility may have highway/transit elements associated with it.

**Option A: Fixed-guideway Transit Sources –** For this manual, fixed-guideway transit sources include commuter rail, RRT, LRT, streetcar, AGT, monorail, and magnetically levitated vehicles (maglev). For commuter railroads and LRT systems, the crossing of streets and highways at-grade is likely, and in that case, warning devices should be included in the assessment. At an early project stage, the information available for a General Noise Assessment includes:

- Candidate transit mode
- Guideway options
- Time of operation
- Operational headways
- Design speed
- Alternative alignments

This information is not sufficient to predict noise levels at all locations along the ROW. Therefore, use conservative estimates (e.g., maximum (expected) design speeds and operations at design capacities) to estimate worst-case noise levels.

First choose the appropriate fixed-guideway transit source reference level and then predict the noise exposure at 50 ft in terms of $L_{eq(1hr)}$ and $L_{dn}$.

**A.i.** Choose the reference source noise levels 50 ft from the track for one vehicle in terms of Sound Exposure Level (SEL) using Table 4-9. See Appendix B for a detailed explanation of SEL. Note that the SEL reference speed is 50 mph, unless otherwise noted.

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**Table 4-9 Reference SEL's 50 ft from Track and at 50 mph, One Vehicle**

| Source | Type | Reference Conditions | Reference SEL ($SEL_{ref}$), dBA |
|---|---|---|---|
| Commuter Rail, At-Grade | *Locomotives* | Diesel-electric, 3000 hp, throttle 5 | 92 |
| | | Electric | 90 |
| | *Diesel Multiple Unit (DMU)* | Diesel-powered, 1200 hp | 85 |
| | *Horns* | Within ¼ mile of grade crossing | 110 |
| | *Cars* | Ballast, welded rail | 82 |
| Rail Transit and Streetcars at 50 mph | | At-grade, ballast, welded rail | 82 |
| Rail Transit and Streetcars at 25 mph | | At-grade, ballast, welded rail | 76 |
| Transit whistles / warning devices | | Within 1/8 mile of grade crossing | 93 |
| AGT | *Steel Wheel* | Aerial, concrete, welded rail | 80 |
| | *Rubber Tire* | Aerial, concrete guideway | 78 |
| Monorail | | Aerial straddle beam | 82 |
| Maglev | | Aerial, open guideway | 72 |

**A.ii.** Collect the following data:

- Number of train passbys during the day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) for category 2 land uses
- Maximum number of train passbys during hours that category 1 or category 3 land uses are normally in use (typically the peak hour train volume)
- Number of vehicles per train for each time period for category 2 land uses (if this number varies during the day or night, take the average)
- Maximum number of vehicles per train during hours that category 1 or category 3 land uses are normally in use (typically the peak hour train volume)
- Train speed in mph (maximum expected)
- Guideway configuration
- Location of highway and street grade crossings, if any
- If this process is repeated to estimate the effect of proposed noise mitigation, include the noise barrier location

**A.iii.** Calculate the noise exposure at 50 ft in terms of $L_{eq(1hr)}$:

- Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-10.
- Compute $L_{eq(1hr),Combo}$ using Eq. 4-6. It may be necessary to compute the combined totals with and without warning horns. Some neighborhoods along the corridor may be exposed to horn noise, but some may not.

**A.iv.** Calculate the noise exposure at 50 ft in terms of $L_{dn}$:

- If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-10.
- It may be necessary to calculate $L_{dn}$ with and without warning horns, as in the previous step.

Note that the equations in Table 4-10 include terms to account for a difference in speed from the 50 mph reference speed and a numerical adjustment to account for the one-hour time period for this metric. For



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more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

Table 4-10 presents an estimate of the noise reduction potentially provided by wayside noise barriers that can be used when assessing mitigation options in a General Noise Assessment. If impact is determined during the General Noise Assessment, repeat the procedure and include proposed mitigation according to Section 4.4, Step 7. See Section 4.5, Step 7 for a complete description of the benefits resulting from various noise mitigation measures that can be evaluated with a Detailed Noise Analysis.

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**Table 4-10 Computation of Noise Exposure at 50 ft for Fixed-Guideway General Noise Assessment**

| | | |
|---|---|---|
| **Locomotives*** $L_{eq\,(1hr)}$ at 50 ft | $L_{eq\,Loco(1hr)} = SEL_{ref} + 10\,log(N_{Loco}) + K log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-1** |
| **Locomotive Warning Horns**** $L_{eq\,(1hr)}$ at 50 ft | $L_{eq\,LHorns(1hr)} = SEL_{ref} + 10\,log(V) - 35.6$ | **Eq. 4-2** |
| **Rail Vehicles**† $L_{eq\,(1hr)}$ at 50 ft | $L_{eq\,RCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-3** |
| **Streetcars (25 mph or slower)** $L_{eq\,(1hr)}$ at 50 ft | $L_{eq\,SCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 2\log(\frac{S}{25}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-4** |
| **Transit Warning Horns** $L_{eq\,(1hr)}$ at 50 ft | $L_{eq\,THorns(1hr)} = SEL_{ref} - 10\,log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-5** |
| **Combined Locomotive and transit**†† $L_{eq\,(1hr)}$ at 50 ft | $L_{eq\,Combo(1hr)} = 10\log(10^{(L_{eq\,Loco(1hr)}/10)} + 10^{(L_{eq\,RCars(1hr)}/10)} + 10^{(L_{eq\,SCars(1hr)}/10)} + 10^{(L_{eq\,LHorns(1hr)}/10)} + 10^{(L_{eq\,THorns(1hr)}/10)})$ | **Eq. 4-6** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$, $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-7** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$, $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-8** |
| **Day/Night** $L_{dn}$ at 50 ft | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-9** |

$N_{Loco}$ = average number of locomotives per train

K = constant
- -10 for passenger diesel
- 0 for DMUs
- +10 for electric

S = train speed, mph

$V$ = average hourly volume of train traffic, trains per hour

$N_{Cars}$ = average number of cars per train

$Adj_{track}$ = constant
- +5 for jointed track or for a crossover within 300 ft
- +4 for aerial structure with slab track (except AGT and monorail)
- +3 for embedded track on grade
- -5 if a noise barrier blocks the line of sight

$V_d$ = average hourly daytime volume of train traffic, trains per hour

$= \frac{number\ of\ trains, 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of train traffic, trains per hour

$= \frac{number\ of\ trains, 10\ p.m.\ to\ 7a.m.}{9}$

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)

$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)

$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

* Assumes a diesel locomotive power rating at approximately 3000 hp.
** Based on FRA's horn noise model (http://www.fra.dot.gov/eLib/Details/L04091).
† Includes all commuter rail cars, transit cars, streetcars above 25 mph, AGT and monorail.
†† Only include appropriate terms.

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**Option B: Highway/Transit Sources –** The highway/transit type sources include most transit modes that do not require a fixed-guideway. Examples are high-occupancy vehicles, such as buses, commuter vanpools and carpools. Use the instructions below to estimate source noise levels for projects that involve these types of vehicles and are using FTA's environmental review procedures. At an early project stage, the information available for a General Noise Assessment includes:

- Vehicle type
- Transitway design options
- Time of operation
- Typical headways
- Design speed
- Alternative alignments

This information is not sufficient to predict noise levels at all locations along the ROW; therefore, use of conservative estimates (e.g., maximum (expected) design speeds and operations at design capacities) to estimate worst-case noise impact levels is recommended. The procedure is consistent with FHWA's highway noise prediction method. The reference SEL levels in Table 4-11 correspond to FHWA's source emission levels and speed coefficients for buses and automobiles.[22]

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**B.i.** Using Table 4-11, choose the appropriate reference source noise levels 50 ft from the roadway in terms of SEL. Note that the SEL reference speed is 50 mph, unless otherwise noted.

**Table 4-11 Source Reference Levels at 50 ft from Roadway, 50 mph**

| Source* | Reference SEL, dBA |
|---|---|
| Automobiles and Vans | 74 |
| Buses (diesel-powered) | 82 |
| Buses (electric) | 80 |
| Buses (hybrid) | 83** |

* Assumes normal roadway surface conditions.
** For hybrid buses, determine Reference SEL on a case-by-case basis because they vary, and data are scarce.

**B.ii.** Collect the following data:

- Number of vehicle passbys during the day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) for each vehicle type in Table 4-11, if a category 2 land use is present
- Number of vehicle passbys during hours that category 1 or category 3 land uses are normally in use, each vehicle type in Table 4-11
- Speed (maximum expected)
- Transitway configuration (with or without noise barrier)

**B.iii.** Calculate the noise exposure at 50 ft in terms of $L_{eq(1hr)}$. Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-12.

**B.iv.** Calculate the noise exposure at 50 ft in terms of $L_{dn}$. If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-12.

Note that the equations in Table 4-12 include terms to account for a speed other than the 50 mph reference speed and a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

Table 4-12 presents an estimate of noise reduction potentially provided by wayside noise barriers. This is considered illustrative given that barriers are the most common noise mitigation measure. See Section 4.5, Step 7 for a complete description of the benefits resulting from noise mitigation. If impact is determined during the General Noise Assessment without mitigation, repeat the procedure and include proposed mitigation.

**Table 4-12 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Highway/Transit General Noise Assessment**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(V) + C_S log(\frac{S}{50}) - 35.6$ | **Eq. 4-10** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{Aeq(1hr)}$ where V = $V_d$ | **Eq. 4-11** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{Aeq(1hr)}$ where V = $V_n$ | **Eq. 4-12** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-13** |
| **Barrier Adjustment** | = -5 for noise barriers | |
| $V$ | = hourly volume of vehicles, vehicles per hour | |
| $C_s$ | = Speed constant<br>15 for diesel buses<br>28 for electric buses<br>21 for hybrid buses[23]<br>30 for automobile and van pools | |
| S | = average vehicle speed, mph | |
| $V_d$ | = average hourly daytime volume of vehicles, vehicles per hour<br>$= \frac{total\ number\ of\ vehicles, 7\ a.m.\ to\ 10\ p.m.}{15}$ | |
| $V_n$ | = average hourly nighttime volume of vehicles, vehicles per hour<br>$= \frac{total\ number\ of\ vehicles, 10\ p.m.\ to\ 7\ a.m.}{9}$ | |

**Option C: Stationary Sources** – Stationary sources include fixed transit system facilities. New transit facilities undergo a site review for best location that considers the noise sensitivity of surrounding land uses. Although many facilities such as bus maintenance garages are usually located in industrial and commercial areas, some facilities such as bus terminals, ferry terminals, train stations, and park-and-ride lots may be placed near residential neighborhoods where noise impact may occur. Access roads to some of these facilities may also



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pass through noise-sensitive areas. Noise from access roads is treated according to the procedures described in the Highway/Transit Sources category. In a General Noise Assessment, only the prominent features of each fixed facility are considered in the noise analysis.

**C.i.** For small facilities, using Table 4-13, determine the reference source noise levels 50 ft from the center of the site in terms of SEL. The source reference levels given in the table are based on measurements for the peak hour of operation of a typical stationary source of the noted type and size.

A large facility, such as a rail yard, is spread out over considerable area with various noise sources with different noise levels depending on the layout of the facility. Specifying a single reference SEL for the facility at 50 ft from the center of the site could be misleading if all of these different noise sources are not represented. Therefore, the reference distance should be the equivalent distance of 50 ft, which is determined by estimating the noise levels from the center of the site at a distance far enough to capture all noise sources and projecting back to 50 ft from the center of the site. This approach allows for a conservative estimate of noise for all surrounding areas and the equivalent noise can be considered as concentrated at the center of the site. If the location of noise sources is known, then the distance should be taken from the point of the noisiest activity on the site (e.g., the dock in the case of ferry boat operations) instead of the center of the site.

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**Table 4-13 Source Reference Levels at 50 ft from Center of Site, Stationary Sources**

| Source | Reference SEL, dBA | Reference Conditions |
|---|---|---|
| ***Rail System*** | | |
| Yards and shops | 118 | 20 train movements in peak activity hour |
| Layover tracks (commuter rail) | 109 | 1 train with diesel locomotive idling for 1 hour |
| Crossing signals | 109 | 3600 second duration |
| ***Bus System*** | | |
| Storage yard | 111 | 100 buses accessing facility in peak activity hour |
| Operating facility | 114 | 100 buses accessing facility, 30 buses serviced and cleaned in peak activity hour |
| Transit center | 101 | 20 buses in peak activity hour |
| ***Ferry Terminal*** | | |
| Ferry boat (no fog horn sounded) | 97 | 4 ferry boat landings in 1 hour |
| Ferry boat (fog horn sounded) | 100 | |
| ***Parking Garage*** | 92 | 1000-car capacity in peak activity hour |
| ***Park & Ride Lot*** | 101 | 12 buses, 1000 cars in peak activity hour |

**C.ii.** Collect the following data:

- Number of layover tracks and hours of use
- Number of buses, if different from assumed reference conditions (if this number varies during the day or night, take the average)
- Number of ferry boat landings, if different from assumed reference conditions (if this number varies during the day or night, take the average)
- Actual capacity of parking garage or lot

**C.iii.** Calculate $L_{eq(1hr)}$ at 50 ft. Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-14.

**C.iv.** Calculate $L_{dn}$ at 50 ft. If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-14.

The equations in Table 4-14 include a numerical adjustment to account for the one-hour time period for this metric. See Appendix B.1.4.4 for more information on the numerical adjustment.

Table 4-14 presents an estimate of noise reduction potentially provided by noise barriers at the property line. Only approximate locations and lengths for barrier or other noise mitigation measures are developed during a General Noise Assessment to provide a preliminary indication of the costs and benefits of mitigation. A Detailed Noise Analysis of the preferred alternative is usually warranted following the General Noise Assessment (if it predicts any impacts) to verify impacts and design the mitigation.

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**Table 4-14 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Stationary Source General Noise Assessment***

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + C_N - 35.6$ | **Eq. 4-14** |
| **Daytime** $L_d$ at 50 ft | $L_d = 10\log((\frac{1}{15}) \sum_{7am-10pm} 10^{(L_{Aeq(1hr)}/10)})$ | **Eq. 4-15** |
| **Nighttime** $L_n$ at 50 ft | $L_n = 10\log((\frac{1}{9}) \sum_{10pm-7am} 10^{(L_{Aeq(1hr)}/10)})$ | **Eq. 4-16** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-17** |
| **Barrier Adjustment** | = -5 for noise barrier at property line | |
| **Volume Adjustment** | $= C_N$ | |
| | $= 10\log(\frac{N_T}{20})$ Rail yards and shops | |
| | $= 10\log(N_T)$ Layover tracks | |
| | $= 10\log(\frac{N_B}{100})$ Bus storage yard | |
| | $= 10\log(\frac{N_B}{200} + \frac{N_S}{60})$ Bus operating facility | |
| | $= 10\log(\frac{N_B}{20})$ Bus transit center | |
| | $= 10\log(\frac{N_V}{4})$ Ferry terminal | |
| | $= 10\log(\frac{N_A}{1000})$ Parking garage | |
| | $= 10\log(\frac{N_A}{2000} + \frac{N_B}{24})$ Park & ride lot | |
| | $= 10\log(\frac{E}{3600})$ Crossing signals | |
| | $N_T$ = average number of trains per hour during the day (7AM to 10PM) or night (10PM to 7AM)<br>$N_B$ = average number of buses per hour during the day or night<br>$N_V$ = average number of ferry boat landings per hour during the day or night<br>$N_S$ = average number of buses serviced and cleaned per hour during the day or night<br>$N_A$ = average number of automobiles per hour during the day or night<br>E = average hourly duration of events, sec during the day or night | |

* If any of these numbers is zero, omit that term.



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## Step 3: Estimate Project Noise Exposure by Distance

*Estimate the project noise exposure for locations beyond the reference distance, such as for noise-sensitive land uses.*

In the previous step, noise exposure at the reference distance of 50 ft was calculated for the various noise sources. This step describes how to estimate the project noise exposure beyond (or, if needed, closer than) the reference distance, such as at noise-sensitive land uses locations. This procedure estimates the source's noise exposure as a function of distance. Adjustments are provided to account for shielding attenuation from rows of buildings.

**3a.** Select the appropriate distance correction curve (Fixed-Guideway & Highway or Stationary) from Figure 4-6. The Fixed-Guideway & Highway curve refers to line sources while the Stationary curve is refers to point sources. The distance correction factor ($C_{distance}$) is 0 dB at 50 ft.

**3b.** Choose a distance other than 50 ft, such as the distance to a receiver. Determine the correction factor using Figure 4-6 or calculate using the equations in Table 4-15.[18] For distances beyond 1,000 ft, the equations in Table 4-15 can be used; however, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. More detailed calculation methods may be required to account for those effects beyond 1,000 ft.

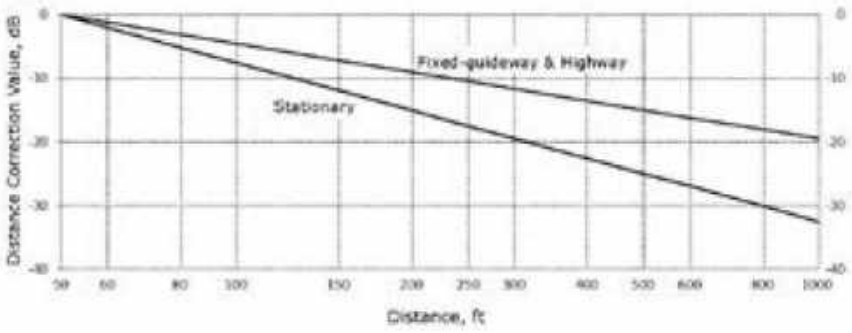


**Figure 4-6 Curves for Estimating Exposure vs. Distance in General Noise Assessment**

[18] Note that the curves and equations assume acoustically soft ground beyond a distance of 50 ft. See Table 4-27 for more detailed calculation of ground attenuation.



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**Table 4-15 Distance Correction Factor Equations for General Noise Assessment**

| Source | Equation | |
|---|---|---|
| Stationary Sources | $C_{distance} = -25\log(\frac{D}{50})$ | Eq. 4-18 |
| Fixed-guideway and Highway | $C_{distance} = -15\log(\frac{D}{50})$ | Eq. 4-19 |
| $D$ = distance, ft | | |

**3c.** Apply the distance correction ($C_{distance}$) to the project noise exposure at 50 ft (Section 4.4, Step 2) using the following equation:

$$L_{distance} = L_{50} + C_{distance} \quad \text{Eq. 4-20}$$

where:

$L_{distance}$ = $L_{dn}$ or $L_{eq(1hr)}$ at the new distance in feet
$L_{50}$ = $L_{dn}$ or $L_{eq(1hr)}$ at 50 ft

**3d.** Repeat Step 3c for each source-receiver distance from the project. A noise exposure vs. distance curve can be created, if desired, by calculating the noise exposure for all distances of interest and plotting a curve. This curve can be used to assist in determining the noise impact contour for the first row of unobstructed buildings. This plot can be used to display noise from both unmitigated and mitigated conditions to assess the potential benefits from mitigation measures.

For second row receivers and beyond, it is necessary to account for shielding attenuation from rows of intervening buildings. Without accounting for shielding, impacts may be substantially overestimated. Use the following general rules to account for the effect of shielding from intervening rows of buildings:

- Assign 4.5 dB of shielding attenuation for the first row of intervening buildings only.
- Assign 1.5 dB of shielding attenuation for each subsequent row, up to a maximum total attenuation of 10 dB.

## Step 4: Combine Noise Exposure from All Sources

*Combine all sources to predict the total project noise at the receivers using the equations in Table 4-16, once propagation adjustments have been made for the noise exposure from each source separately (fixed-guideway, highway/transit, and stationary).*

**Table 4-16 Computing Total Noise Exposure**

| | | |
|---|---|---|
| Total $L_{eq(h}$ from all sources for the hour of interest: | $L_{eq\,total(1hr)} = 10\log(\sum_{all\ sources} 10^{L_{eq}/_{10}})$ | Eq. 4-21 |
| Total $L_{dn}$ from all sources | $L_{dn,total} = 10\log(\sum_{all\ sources} 10^{L_{dn}/_{10}})$ | Eq. 4-22 |



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## Step 5: Estimate Existing Noise Exposure

*Measure the existing noise or estimate the existing noise exposure using a simplified procedure.*

Existing noise in the project vicinity must be quantified and compared to the project noise to determine the potential noise impact. It is generally recommended to measure existing noise, especially at locations known to be noise-sensitive, but if measurement results are not available then they must be estimated. In the Detailed Noise Analysis, the existing noise exposure is usually based on noise measurements at representative locations in the community.

It is not necessary or recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for "clusters" of sites based on measurements or estimates at representative locations in the community. Because of the sensitivity of the noise criteria to the existing noise exposure, careful characterization of pre-project ambient noise is important. Guidelines for selecting representative receiver locations and determining ambient noise are provided in Appendix D and Appendix E, respectively.

**Changes to Existing Transit**
For projects that propose changes to an existing transit system, such as a rehabilitation project, the project noise can include changes to the existing noise because of the project, and so it is not possible to define project noise separately. For these projects, refer to Section 4.1, Step 3 – Option B, on using the cumulative noise criteria.

This section describes how to estimate the existing noise in the project study area from general data available early in project planning. The procedure uses Table 4-17, where a neighborhood's existing noise exposure is based on proximity to nearby major roadways or railroads, or on population density. For areas near major airports, published aircraft noise contours can also be used to estimate the existing noise exposure. The process is as follows:

**5a.** Obtain scaled mapping and aerial photographs showing the project location and alternatives. A scale of 1 inch = 200 or 400 ft is convenient for the accuracy needed in the noise assessment. The size of the base map should be sufficient to show distances of at least 1000 ft from the center of the alignment or property center, depending on whether the project is a line source (fixed guideway/ roadway) or a stationary facility. These data are commonly available from local transit agencies and a number of publicly available online tools.

**5b.** Estimate the existing noise exposure by estimating the noise from major roads and railroad lines or by population density. First, evaluate the site's proximity to major roads and railroad lines including those that are included in the project. If these noise sources are far enough away that ambient noise is dominated by local streets and community activities, estimate the existing noise based on population density. To choose the appropriate existing noise exposure, compare noise levels from each of the three categories—Roadways, Railroads, and Population Density—and select the lowest level. In case of a



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lightly used railroad (one train per day or less) select the Population Density category. Existing noise levels are presented in Table 4-17. Refer to Section 4.1, Step 3 – Option B, on using the cumulative noise criteria for projects that propose changes to an existing transit system, such as a rehabilitation project.

**Option A: Roadways –** Major roadways are separated into two categories for a general noise assessment. Roadways that cannot be described by these two categories are not considered major roadways and would use the Population Density method described below. The roadway categories are as follows:

- Interstate highway—roadways with 4 or more lanes that allow trucks
- Other roadway—parkways without trucks and city streets with the equivalent of 75 or more heavy trucks per hour or 300 or more medium trucks per hour

The estimated roadway noise levels in Table 4-17 are based on data for light to moderate traffic on typical highways and parkways using FHWA highway noise prediction procedures. Where a range of distances is given, the noise exposure estimates are given at the larger distance (note that the traffic noise at the smaller distance is underestimated). For highway noise, distances are measured from the centerline of the near lane for roadways with two lanes, while for roadways with more than two lanes the distance is measured from the geometric mean of the roadway. This distance is computed as follows:

$$D_{GM} = \sqrt{(D_N)(D_F)} \qquad \textbf{Eq. 4-23}$$

where:

$D_{GM}$ = distance to the geometric mean in feet
$D_N$ = distance to the nearest lane centerline in feet
$D_F$ = distance to the farthest lane centerline in feet

**Option B: Railroad Lines –** For railroads, the estimated noise levels are based on an average train traffic volume of 5–10 trains per day at 30–40 mph for main line railroad corridors and the noise levels are provided in terms of $L_{dn}$ only. Distances are referenced to the track centerline, or in the case of multiple tracks, to the centerline of the rail corridor. Because of the intermittent nature of train operations, train noise will affect the $L_{eq(1hr)}$ only during certain hours of the day, and these hours may vary from day to day. Therefore, to avoid underestimating noise impact when using $L_{eq(1hr)}$, it is recommended that sites near rail lines are estimated based on nearby roadways or population density unless very specific train information is available.

**Option C: Population Density –** In areas away from major roadways, noise from local streets or in neighborhoods is estimated using a relationship determined during a research program by EPA.[24] EPA determined that ambient noise can be related to population density in locations away from transportation corridors, such as airports, major roads and railroad tracks, according to the following relation:

$$L_{dn} = 22 + 10\log(p) \qquad \textbf{Eq. 4-24}$$



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where:

$L_{dn}$ = in dBA
$p$ = population density in people per square mile

In areas near major airports, published noise contours can be used to estimate the existing noise exposure. The $L_{dn}$ from such contours should be applied if greater than the estimates of existing noise from other sources at a given location.

**Table 4-17 Estimating Existing Noise Exposure for General Noise Assessment**

| Dominant Existing Noise Source | Distance from Major Noise Source, ft* | Population Density, people per sq. mi. | *Noise Exposure Estimates* | | | |
|---|---|---|---|---|---|---|
| | | | $L_{eq}$ Day | $L_{eq}$ Evening | $L_{eq}$ Night | $L_{dn}$ |
| Interstate Highway** | 10–50 | | 75 | 70 | 65 | 75 |
| | 50–100 | | 70 | 65 | 60 | 70 |
| | 100–200 | | 65 | 60 | 55 | 65 |
| | 200–400 | | 60 | 55 | 50 | 60 |
| | 400–800 | | 55 | 50 | 45 | 55 |
| | 800 and up | | 50 | 45 | 40 | 50 |
| Other Roadway† | 10–50 | | 70 | 65 | 60 | 70 |
| | 50–100 | | 65 | 60 | 55 | 65 |
| | 100–200 | | 60 | 55 | 50 | 60 |
| | 200–400 | | 55 | 50 | 45 | 55 |
| | 400 and up | | 50 | 45 | 40 | 50 |
| Railway†† | 10–30 | | -- | -- | -- | 75 |
| | 30–60 | | -- | -- | -- | 70 |
| | 60–120 | | -- | -- | -- | 65 |
| | 120–240 | | -- | -- | -- | 60 |
| | 240–500 | | -- | -- | -- | 55 |
| | 500–800 | | -- | -- | -- | 50 |
| | 800 and up | | -- | -- | -- | 45 |
| Population | | 1–100 | 35 | 30 | 25 | 35 |
| | | 100–300 | 40 | 35 | 30 | 40 |
| | | 300–1000 | 45 | 40 | 35 | 45 |
| | | 1000–3000 | 50 | 45 | 40 | 50 |
| | | 3000–10000 | 55 | 50 | 45 | 55 |
| | | 10000–30000 | 60 | 55 | 50 | 60 |
| | | 30000 and up | 65 | 60 | 55 | 65 |

*Distances do not include shielding from intervening rows of buildings. Generally, for estimating shielding attenuation in populated areas, assume 1 row of buildings every 100 ft, 4.5 dB for the first row, and 1.5 dB for every subsequent row up to a maximum of 10 dB attenuation.
** Roadways with 4 or more lanes that permit trucks, with traffic at 60 mph.
† Parkways with traffic at 55 mph, but without trucks, and city streets with the equivalent of 75 or more heavy trucks per hour and 300 or more medium trucks per hour at 30 mph.
†† Main line railroad corridors typically carrying 5-10 trains per day at speeds of 30-40 mph.

## Step 6: Inventory Noise Impacts

*Inventory the potential noise impacts either by comparing the project and existing noise at each noise-sensitive land use or by developing noise impact contours.*

Use land use information and assumptions for shielding attenuation from rows of buildings. In some cases, it may be necessary to supplement the land use information or determine the number of dwelling units within a multi-family building with a visual survey. If the objective is to compare major alignment options, it may not be necessary to identify every different type of noise-



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sensitive land use. The inventory may include a subset of land uses, including residential and public institutional uses.

Option A is the preferred method as it quantifies the noise impact at each noise-sensitive land use indicating the severity of the impact. Option B may be useful for comparing and narrowing down major alignment options with numerous noise-sensitive land uses.

**Option A: Compare existing noise to project noise at each noise-sensitive land use.**

**A1.** Tabulate each individual noise-sensitive land use building and site within the identified screening distance (Section 4.3).

**A2.** Determine for each noise-sensitive land use the existing noise (Section 4.4, Step 5), the project noise (Section 4.4, Step 3) and the resulting change in noise.

**A3.** Designate each noise-sensitive land use with either a no, moderate, or severe noise impact based on the criteria in Section 4.1.

**A4.** Identify all moderate and severe impacts on a project map.

**Option B: Develop noise impact contours.**

**B1.** Determine the noise level thresholds at which the project noise would cause moderate and severe impacts using the estimated existing noise exposure from Section 4.4, Step 5 and the noise impact criteria in Figure 4-2.

**B2.** Determine the distances from the project boundary to the two impact levels using the noise exposure vs. distance curves or equations in Section 4.4, Step 3.

**B3.** Plot points on a project land use map that correspond to the distances determined in Section 4.4, Step 3. Continue this process for all areas surrounding the project. Connect the plotted points to represent the noise impact contours.

**B4.** Tabulate all noise-sensitive land use buildings and sites that lie between the impact contours and the project boundary. For residential buildings, an estimate of the number of dwelling units is satisfactory.

**B5.** Prepare summary tables showing the number of buildings (and estimated dwelling units, if available) within both impact categories.

Specific decibel level noise contours, for example, 65 dBA, can also be plotted if desired. The distances can be determined using the procedure in Section 4.4, Step 3 by substituting the desired decibel level for the impact threshold.

Locations of points will change with respect to the project boundary as the existing ambient exposure changes, the project source levels change, and as shielding effects change. It is recommended to plot points close together to



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Cont.

draw a smooth curve. For a General Noise Assessment, the contours may be drawn through buildings and terrain features as if they were not present. This practice is acceptable considering the level of detail associated with a project in its early stages of development. Example 4-1 and Example 4-4 describe the development of noise contours with illustrations.

### Step 7: Determine Noise Mitigation Needs

*Apply estimates of the noise reduction from proposed mitigation measures (Section 4.4, Step 2), where the assessment shows either severe or moderate impact, and repeat the tabulation of noise impacts.*

Note that noise barriers are the only form of mitigation available in a General Noise Assessment. The other mitigation measures are available for a Detailed Noise Analysis. The approximate noise barrier lengths and locations developed in a General Noise Assessment provide a preliminary basis for evaluating the costs and benefits of impact mitigation. This evaluation will provide a conservative estimate of the effect of the mitigation on the identified impacts.

In general, it is recommended to complete a Detailed Noise Analysis for final mitigation measures. However, if impact is identified through a General Noise Assessment and can be mitigated to a level of no impact using the noise reduction estimates included in the General Noise Assessment, a Detailed Noise Analysis may not be needed. Mitigation assumed in the assessment used for the NEPA evaluation must be included in the project as a commitment. Consult with the FTA Regional office to determine if a Detailed Noise Analysis is required for final mitigation measures.

The following examples illustrate how to complete general noise assessments for varying project types including commuter rail, highway/transit, BRT system, and a transit center.

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Cont.

### Example 4-1 General Noise Assessment – Commuter Rail

**General Noise Assessment for a Commuter Rail System in an Existing Abandoned Railroad Right-of-Way**

The following example illustrates the General Noise Assessment procedure for a new fixed-guideway project. The hypothetical project is a commuter rail system to be built within the abandoned ROW of a railroad. The example covers a segment of the corridor that passes through a densely developed area with population density of 25,000 people per square mile in mixed single- and multi-family residential land uses as shown in Figure 4-7. The example is presented in two parts: first, a segment where the rail line is grade-separated and a horn is not sounded; and second, an at-grade street-rail crossing where the horn is sounded.

**Assumptions**

- **Project Corridor**
  Existing population density is 25,000 people per square mile.
- **Commuter Rail System**
  Commuter train with one locomotive and a three-car consist on a double-track at-grade system with welded rail. Trains operate with 20-minute headways during peak hours and 1-hour headways during off-peak. Speeds are approximately 40 mph along the corridor.

**Operating Schedule**

| | Period | Headway (minutes) Inbound | Headway (minutes) Outbound | Trains per hour Inbound | Trains per hour Outbound | Trains per hour Total | Period Total |
|---|---|---|---|---|---|---|---|
| Daytime | 7 a.m. – 8 a.m. | 20 | 20 | 3 | 3 | 6 | 6 |
| | 8 a.m. – 4 p.m. | 60 | 60 | 1 | 1 | 2 | 16 |
| | 4 p.m. – 6 p.m. | 20 | 20 | 3 | 3 | 6 | 12 |
| | 6 p.m. – 10 p.m. | 60 | 60 | 1 | 1 | 2 | 8 |
| Nighttime | 10 p.m. – 11 p.m. | 60 | 60 | 1 | 1 | 2 | 2 |
| | 11 p.m. – 5 a.m. | -- | -- | -- | -- | -- | -- |
| | 5 a.m. – 6 a.m. | 60 | 60 | 1 | 1 | 2 | 2 |
| | 6 a.m. – 7 a.m. | 20 | 20 | 1 | 1 | 2 | 2 |

***Part 1: Grade-Separated Street Crossing***

**Determine Project Source Reference Levels at 50 ft**

Classify the noise source: Fixed-Guideway Transit
Determine noise source reference level from Table 4-9:
Locomotive: 92 dBA
Cars: 82 dBA

**Estimate Project Noise Exposure at 50 ft**

Determine average hourly daytime and nighttime volumes of train traffic.

Daytime (7 a.m. – 10 p.m.)

$$V_d = \frac{42\ trains}{15\ hours} = 2.8\ trains/hour$$

Nighttime (10 p.m. – 7 a.m.)

$$V_n = \frac{6\ trains}{9\ hours} = 0.7\ trains/hour$$

Use Eq. 4-1 and Eq. 4-3 to calculate the daytime $L_{eq(hr)}$ at 50 ft for the locomotives and rail cars.

$$\begin{aligned} L_{d,Locos} &= SEL_{ref} + 10log(N_{Locos}) + Klog(\frac{S}{50}) + 10log(V_d) - 35.6 \\ &= 92 + 10log(1) - 10log(\frac{40}{50}) + 10log(2.8) - 35.6 \\ &= 61.8\ dBA \text{ at 50 ft} \end{aligned}$$

$$\begin{aligned} L_{d,RCars} &= SEL_{ref} + 10log(N_{Cars}) + 20log(\frac{S}{50}) + 10log(V_d) - 35.6 \\ &= 82 + 10log(3) + 20log(\frac{40}{50}) + 10log(2.8) - 35.6 \\ &= 53.7\ dBA \text{ at 50 ft} \end{aligned}$$

Calculate the total daytime $L_d$ for the locomotive and rail cars using Eq. 4-7.

$$\begin{aligned} L_{d,Combo} &= 10log(10^{L_{d,Loco}/10} + 10^{L_{d,RCars}/10}) \\ &= 10log(10^{61.8/10} + 10^{53.7/10}) \\ &= 62.4\ dBA \text{ at 50 ft} \end{aligned}$$



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Calculate the nighttime $L_{eq(1hr)}$ at 50 ft for the locomotives and rail cars.

$$L_{n,Locos} = SEL_{ref} + 10\log(N_{Locos}) + K\log(\frac{S}{50}) + 10\log(V_n) - 35.6$$
$$= 92 + 10\log(1) - 10\log(\frac{40}{50}) + 10\log(0.7) - 35.6$$
$$= 55.8\ dBA \text{ at 50 ft}$$

$$L_{n,RCars} = SEL_{ref} + 10\log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\log(V_n) - 35.6$$
$$= 82 + 10\log(3) + 20\log(\frac{40}{50}) + 10\log(0.7) - 35.6$$
$$= 47.7\ dBA \text{ at 50 ft}$$

Calculate the total nighttime $L_n$ for the locomotive and rail cars using Eq. 4-8.

$$L_{n,Combo} = 10log(10^{L_{n,Locos}/10} + 10^{L_{n,RCars}/10})$$
$$= 10log(10^{55.8/10} + 10^{47.7/10})$$
$$= 56.4\ dBA \text{ at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-9.

$$L_{dn,Combo} = 10log\ (15 \times 10^{(L_{d,Combo}/10)} + 9 \times 10^{((L_{n,Combo}+10)/10)}) - 13.8$$

**Estimate Existing Noise Exposure**

Estimate existing noise at noise-sensitive sites. Since the existing alignment is on an abandoned railroad, the dominant existing noise source can be described by a generalized noise level to characterize a large area. Use Table 4-17 and population density of 25,000 people per square mile to determine the existing noise level. Unobstructed residences range from 100 to 200 ft from the rail line.

According to Table 4-17: $L_{dn}$ = 60 dBA

**Determine Noise Level and Distance for the Onset Of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 60 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{dn}$.

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 60 dBA | 58 dBA | 64 Dba |

Determine the distance from the project noise sources to the noise impact contours using the fixed-guideway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise level at 50 ft is approximately 64 dBA.

Moderate impact (58 dBA)

$$58 - 64 = -6\ dB$$

According to Figure 4-6, the distance correction is approximately -6 dB at 120 ft.

Severe Impact (64 dBA)

$$64 - 64 = 0\ dB$$



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Cont.

According to Figure 4-6, the distance correction is less than 0 dB at approximately 51 ft.

| Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 64 dBA | 120 ft | 51 ft |

**Develop Noise Impact Contours**

Draw contours for each affected land use, based on the above table and its distance from the rail line (Figure 4-7). Note that the impact distances listed are in terms of distance to the centerline of the Commuter Rail corridor.

**Inventory of Noise Impact**

There are six residential buildings within the contours defining moderate impact (shaded in Figure 4-7).

**Noise Mitigation**

The procedure is repeated assuming a noise barrier to be placed at the railroad ROW line. The barrier serves to reduce project noise from the commuter rail by at least 5 dB. Note that the barrier does not affect the project criteria to be used in determining impact, and the same existing noise levels (as the case without a barrier) are used to determine these thresholds.

In this example, the noise barrier decreases the distance to moderate impact from 120 to 60 ft and eliminates all residential noise impact for this segment of the project area.

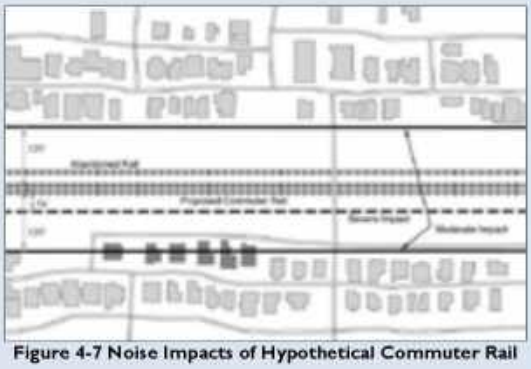

**Figure 4-7 Noise Impacts of Hypothetical Commuter Rail**

***Part 2: At-Grade Crossing with Horn Blowing***

Now consider the case of an active street crossing of the commuter railroad tracks. The General Noise Assessment method includes source reference levels for horns on moving trains and warning bells (crossing signals) at the street crossing. According to Table 4-9, the horn noise applies to track segments within ¼ mile of the grade crossing.

**Estimate Project Noise Exposure at 50 ft**

Using the train volumes from Part 1 and the information in Table 4-9 and Table 4-10, determine the day and nighttime $L_{eq(1hr)}$ from sounding the horns at 50 ft.

$$L_{d,Horns} = SEL_{ref} + 10\log(V_d) - 35.6$$
$$= 110 + 10\log(2.8) - 35.6$$
$$= 78.9\ dBA$$



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Cont.

$$L_{n,LHorns} = SEL_{ref} + 10\log(V_n) - 35.6$$
$$= 110 + 10\log(0.7) - 35.6$$
$$= 72.9\ dBA$$

Calculate the $L_{dn}$ at 50 ft from train horns using Eq. 4-9 :

$$L_{dn,LHorns} = 10\log(15 \times 10^{(L_{d,LHorns}/10)} + 9 \times 10^{((L_{n,LHorns}+10)/10)}) - 13.8$$
$$= 81\ dBA$$

At-grade street crossings will have warning bells, typically sounding for 20 seconds for every train passby. The total daytime and nighttime durations are as follows:

$E_d$ = average daytime hourly duration
=20 seconds X 2.8 trains/hour = 56 seconds/hour

$E_n$ = average nighttime hourly duration
=20 seconds X 0.7 trains/hour = 14 seconds/hour

From Table 4-14:

$$L_{d,WBell} = SEL_{ref} + 10\log(\frac{E_d}{3600}) - 35.6$$
$$= 109 + 10\log(\frac{56}{3600}) - 35.6$$
$$= 55.3\ dBA$$

$$L_{n,WBell} = SEL_{ref} + 10\log(\frac{E_n}{3600}) - 35.6$$
$$= 109 + 10\log(\frac{14}{3600}) - 35.6$$
$$= 49.3\ dBA$$

Calculate $L_{dn}$ at 50 ft. from the warning bells using Eq. 4-17:

$$L_{dn,WBell} = 10\log(15 \times 10^{(L_{d,WBell}/10)} + 9 \times 10^{((L_{n,WBell}+10)/10)}) - 13.8$$
$$= 57.3\ dBA$$

Compared to horn blowing, the crossing signal warning bell noise is negligible, but still must be included in the evaluation.

**Estimate Existing Noise Exposure**

From Part 1, the existing noise level is 60 dBA.

**Determine Noise Level and Distance for the Onset Of Impact**

As in Part 1, the existing noise level (60 dBA) is used to determine the onset of moderate and severe impacts:

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 60 dBA | 58 dBA | 64 dBA |



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Cont.

Determine the distance from the project noise sources to the impact contours using the fixed-guideway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise at 50 ft is approximately 81 dBA. However, there are at least two intervening rows of buildings, which will provide 6 dB (4.5 dB for the first row and 1.5 dB for the second row) of shielding.

Moderate impact (58 dBA)

$$58 - (81 - 6) = -17\ dB$$

According to Figure 4-6, the distance correction is approximately -17 dB at 715 ft.

Severe Impact (64 dBA)

$$64 - (81 - 6) = -11\ dB$$

According to Figure 4-6, the distance correction is approximately -11 dB at 265 ft.

| Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 81 dBA | 715 ft | 265 ft |

**Draw Noise Impact Contours**

Contours can be drawn as in Part 1 for ¼ mile on either side of the grade crossing.

## Example 4-2 General Noise Assessment – Highway/Transit

**General Noise Assessment Example of Highway/Transit Corridor Projects**

This example illustrates a highway/transit project where the highway noise dominates and the FHWA assessment methods should be used to inform the FTA process according to the impact criteria in Section 4.1.

**Case 1: Highway Dominates**

A new LRT system is planned for the median of a major highway that carries heavy traffic both day and night. The noise levels at the first row of houses along the highway were measured during peak hour, mid-day and nighttime with hourly $L_{eq(1hr)}$ readings of 65 dBA, 63 dBA, and 60 dBA, respectively. The LRT tracks will be 125 ft from the first row of houses. The LRT operations during peak hour will be 4-car trains at 45 mph, with 5-minute headways in both directions. Nighttime service decreases to 2-car trains and 20 minute headways.

FTA is providing a share of the funding for the LRT project, but the State DOT and the FHWA are co-lead agencies because the median requires considerable preparation for the tracks, including replacing bridge piers of street crossings and moving some highway lanes.

**Assumptions**

$SEL_{ref}$ = 82 dBA
$Nd$ = 4 cars per train
$Nn$ = 2 cars per train
$S$ = 45 mph
$V_d$ = 24 trains per hour
$V_n$ = 6 trains per hour

**Estimate Project Noise Exposure at 50 ft**

Use Table 4-9 and Table 4-10 to determine the peak hour $L_{eq(1hr)}$ for the rail vehicles.

Use Eq. 4-3 to calculate the LRT peak-hour noise level.

$$L_{d,RCars}(h) = SEL_{ref} + 10\,log(N_{cars}) + 20\log(\tfrac{S}{50}) + 10\,log(V) - 35.6$$
$$= 82 + 10\,log(4) + 20\log(\tfrac{45}{50}) + 10\,log(24) - 35.6$$
$$= 65 \text{ dBA at 50 ft}$$



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Cont.

Use Eq. 4-3 to calculate the LRT late evening hourly noise level.

$$L_{n,RCars}(h) = SEL_{ref} + 10\,log(N_{cars}) + 20\log(\tfrac{S}{50}) + 10\,log(V) - 35.6$$
$$= 82 + 10\,log(2) + 20\log(\tfrac{45}{50}) + 10\,log(6) - 35.6$$
$$= 56 \text{ dBA at 50 ft}$$

**Estimate Project Noise Exposure at 125 ft**

Since the LRT tracks will be 125 ft from the first row of houses, use Figure 4-6 to determine the level at 125 ft.

At 125 ft, the distance correction is 5 dB.
Peak hour:

$$65 - 5 = 60\ dBA\ at\ 125\ ft$$

Night hourly:

$$56 - 5 = 51\ dBA\ at\ 125\ ft$$

In this case, the highway dominates the noise environment in the area both day and night, by 5 dB during peak hour and 9 dB at night. According to Section 4.1 and Table 4-2, use the FHWA assessment methods.

## Example 4-3 General Noise Assessment – BRT System

**General Noise Assessment for a BRT System in an Existing Railroad Right-of-Way**

This example for a simple BRT project illustrates using the FTA procedures for a new BRT corridor planned in an existing abandoned railroad ROW.

**Assumptions**

| | |
|---|---|
| $SEL_{ref}$ | = 82 for buses |
| $S$ | = 25 mph |
| $V_d$ | = (344 buses) / (15 hours) = 22.9 buses per hour |
| $V_n$ | = (116 buses) / (9 hours) = 12.9 buses per hour |

**Estimate Project Noise Exposure**

Use the information and equations in Table 4-12 to calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$C_S$ = 15 for buses

$$L_{d,Bus} = SEL_{ref} + 10\,log(V_d) + C_S\log(\tfrac{S}{50}) - 35.6$$
$$= 82 + 10\,log(22.9) + 15log(\tfrac{25}{50}) - 35.6$$
$$= 55 \text{ dBA at 50 ft}$$

$$L_{n,Bus} = SEL_{ref} + 10\,log(V_n) + C_S\log(\tfrac{S}{50}) - 35.6$$
$$= 82 + 10\,log(12.9) + 15log(\tfrac{25}{50}) - 35.6$$
$$= 53 \text{ dBA at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-13.

$$L_{dn,Bus} = 10\log(15 \times 10^{(L_{d,Bus}/10)} + 9 \times 10^{((L_{n,Bus}+10)/10)}) - 13.8$$
$$= 60 \text{ dBA at 50 ft}$$



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Cont.

**Estimate Existing Noise Exposure**

The surrounding area is residential with 2,500 people per square mile starting approximately 100 ft away from the proposed alignment. Determine the existing noise using Table 4-17.

$L_{eq}$ = 50 dBA

**Determine Noise Level and distance for the Onset of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 50 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{eq}$.

| Existing Noise $L_{eq}$ | Onset of Moderate Impact $L_{eq}$ | Onset of Severe Impact $L_{eq}$ |
|---|---|---|
| 50 dBA | 54 dBA | 59 dBA |

Determine the distance to the noise impact contours using the fixed-guideway & highway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise level at 50 ft is approximately 60 dBA.

Moderate impact (54 dBA)

$$54 - 60 = -6\,dB$$

According to Figure 4-6, the distance correction is approximately -6 dB at 125 ft.

Severe Impact (59 dBA)

$$59 - 60 = -1\,dB$$

According to Figure 4-6, the distance correction is less than -1 dB at approximately 60 ft.

| Project Level $L_{eq}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 60 dBA | 125 ft | 60 ft |

**Inventory of Noise Impact**

Since there are residential land uses approximately 100 ft away from the proposed alignment and the onset of moderate impact is at 125 ft, there are possible moderate impacts to the residences.

**Noise Mitigation**

A barrier is proposed for mitigation between the BRT system and the residences. The analysis is repeated and results in a predicted new project level of 55 dBA and the following impact distances:

| Mitigated Project Level $L_{eq}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 55 dBA | 60 ft | N/A |

With a noise barrier in place between the BRT system and the residences, it is predicted that the onset of moderate impact would occur approximately 60 ft away from the BRT system. Since the residential area begins approximately 100 ft away from the BRT system, which is beyond the distance of moderate impact (60 ft), a noise barrier would provide the appropriate noise mitigation for the predicted moderate impact. The onset of severe impact is listed as N/A because with a noise barrier, the severe impact criterion is not exceeded by the project.



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## Example 4-4 General Noise Assessment – Transit Center

### General Noise Assessment for a Transit Center

The following example illustrates the procedure for performing a General Noise Assessment for a stationary source. The example represents a typical FTA-assisted project in an urban area, the siting of a busy transit center in a mixed commercial and residential area, as shown in Figure 4-8.

Assume that the Noise Screening Procedure has already been done for this project and the nearest residence has been identified approximately 140 ft from the center of the proposed transit center. Recall that if any residential or other noise-sensitive land use is identified within 150 ft of a transit center during the Noise Screening Procedure, additional analysis is required.

**Assumptions**

- **Main Street Traffic**
  Peak hour traffic of 1200 autos, 20 heavy trucks, 300 medium trucks.
- **Population Density**
  12 houses per block, single family homes, 3 people per family.
  - Block area 78,750 square ft.
  - Population density = 9,750 people/square mile.
- **Bus Traffic**

| Period | Hours | Buses per Hour |
|---|---|---|
| Peak, Morning | 7 a.m.–9 a.m. | 30 |
| Peak, Afternoon | 4 p.m.–6 p.m. | 30 |
| Mid-day | 9 a.m.–4 p.m. | 15 |
| Evening | 6 p.m.–10 p.m. | 12 |
| Early Morning (Night) | 6 a.m.–7 a.m. | 15 |
| Late Night | 10 p.m.–1 a.m. | 4 |

**Estimate Project Noise Exposure at 50 ft**

Determine the hourly volume of buses during day and night.

Daytime (7 a.m. – 10 p.m.)

$$V_d = \frac{273\ buses}{15\ hours} = 18.2\ buses/hour$$

Nighttime (10 p.m. – 7 a.m.)

$$V_n = \frac{27\ buses}{9\ hours} = 3\ buses/hour$$

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft for the bus transit center using the reference levels in Table 4-13 and the equations in Table 4-14.

$$L_{d,BTCenter} = SEL_{ref} + C_N - 35.6$$
$$= 101 + 10\log\left(\frac{18.2}{20}\right) - 35.6$$
$$= 65\ dBA \text{ at } 50 \text{ ft}$$

$$L_{n,BTCenter} = SEL_{ref} + C_N - 35.6$$



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Cont.

$$= 101 + 10\log(\frac{3}{20}) - 35.6$$
$$= 57\ dB\text{A at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-17.

$$L_{dn,BTCenter} = 10\log(15 \times 10^{(L_{d,BTCenter}/10)} + 9 \times 10^{((L_{n,BTCenter}+10)/10)}) - 13.8$$
$$= 66\ dBA \text{ at 50 ft}$$

**Estimate Existing Noise Exposure**

Estimate existing noise at noise-sensitive sites from the dominant noise source, and either major roadways or local streets (population density).

**Roadway Noise Estimate –** The traffic on Main Street qualifies this street for the Other Roadway category in Table 4-17. According to the map, the nearest residence is 275 ft from the edge of Main Street. The table shows existing $L_{dn}$ = 55 dBA at this distance for representative busy city street traffic.
**Population Density Noise Estimate –** Noise from local streets is estimated from the population density of 9,750 people/square mile. Table 4-17 confirms that the $L_{dn}$ is approximately 55 dBA.

In this example, the existing noise level by both the roadway and population density estimates are the same, but that is not always the case. If the levels are different, use the lower noise level. The existing noise level associated with the residential neighborhood in this example is $L_{dn}$ = 55 dBA.

**Determine Noise Level and Distance for the Onset of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 55 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{dn}$.

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 55 dBA | 56 dBA | 62 dBA |

Determine the distances from the center of the property to the noise impact contours using the stationary curve in Figure 4-6. The project noise level at 50 ft is 66 dBA.

Moderate impact (56 dBA)

$$56 - 66 = -10\ dB$$

According to Figure 4-6, the distance correction is approximately -10 dB at 125 ft.

Severe impact (62 dBA)

$$62 - 66 = -4\ dB$$

According to Figure 4-6, the distance correction is -4 dB at approximately 70 ft.

| Project Noise $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 66 dBA | 125 ft | 70 ft |

**Draw Noise Impact Contours**

Draw lines at 70 ft and 125 ft from the center of the property of the proposed transit center. These lines represent the noise impact contours. (Note that in Figure 4-8 the severe impact contour is not drawn for clarity. The contour is just within the dashed line representing the moderate impact contour after mitigation).

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Cont.

**Inventory of Noise Impact**

Within, or touching, the contour defining moderate impact are three residential buildings (shaded in Figure 4-8). No residences are within the severe impact contour.

**Noise Mitigation**

The process is repeated with a hypothetical noise barrier at the property line on the residential side of the transit center. This would consist of a wall approximately 15 ft high partially enclosing the transit center, sufficient to screen the residences but not the commercial block facing Main Street. According to Table 4-14, the approximate noise barrier effect is -5 dB. Repeating the procedure above, the noise barrier will reduce the moderate impact contour to 80 ft and the severe impact contour to 45 ft (note that at 50 ft the distance correction is 0), which in this example eliminates all potential impacts on the residences.

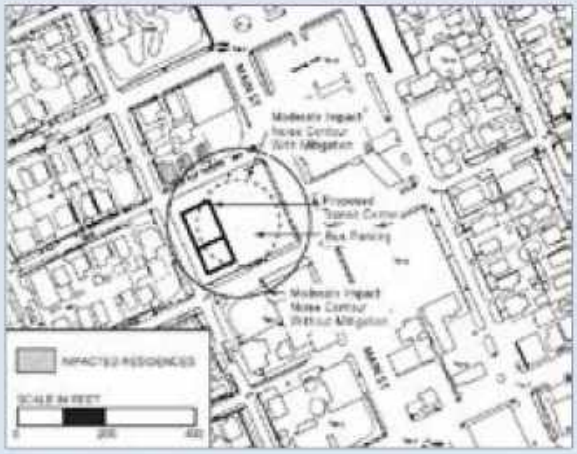

**Figure 4-8 Example of Project for General Noise Assessment: Siting of Transit Center in Mixed Commercial/Residential Area**

## 4.5 Evaluate Impact: Detailed Noise Analysis

**Evaluate for impact using the Detailed Noise Analysis procedure in this section, if appropriate.** For guidelines on when the Detailed Noise Analysis is appropriate, review Section 4.2.

The steps in the Detailed Noise Analysis (Figure 4-9) parallel the steps in the General Noise Assessment, though the Detailed Noise Analysis employs equations for computations rather than graphs or tables. Each step in the Detailed Noise Analysis is more refined in the prediction of project noise and subsequent evaluation of mitigation measures. Noise projections from the project must be determined for each receiver.

- **Step 1: Identify Noise-Sensitive Receivers**
  Identify the noise-sensitive receivers of interest in the impact analysis study, including clustering noise-sensitive areas. This identification is usually based



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on the Screening Procedure and General Noise Assessment previously conducted.

- **Step 2: Determine Project Noise Source Reference Levels**
  Determine the project noise sources and reference levels. Then, estimate the project noise exposure at the reference distance of 50 ft, considering operational characteristics. When appropriate, measurements may be used to determine noise source reference levels.

- **Step 3: Determine Propagation Characteristics**
  Estimate project noise exposure as a function of distance, accounting for shielding and propagation along the path.

- **Step 4: Combine Noise Exposure from All Sources**
  Combine all sources to predict the total project noise at receivers.

- **Step 5: Determine Existing Noise Exposure**
  Determine the existing noise exposure. Measurements are used to determine the existing noise exposure. When measurements are unavailable, a simplified procedure to estimate existing noise exposure may be used with a clear justification to and approval by the FTA Regional office.

- **Step 6: Assess Noise Impact**
  Assess the noise impact at each receiver of interest using separate procedures for transit only and multimodal transportation projects.

- **Step 7: Determine Noise Mitigation Measures**
  Evaluate the need for mitigation and repeat the Detailed Noise Analysis with proposed mitigation.

When situations arise that are not explicitly covered in the Detailed Noise Analysis, professional judgment, in consultation with the FTA Regional office, may be used to extend these methods to cover these unique cases, when appropriate. Appendix G provides information on developing and using non-standard modeling procedures.

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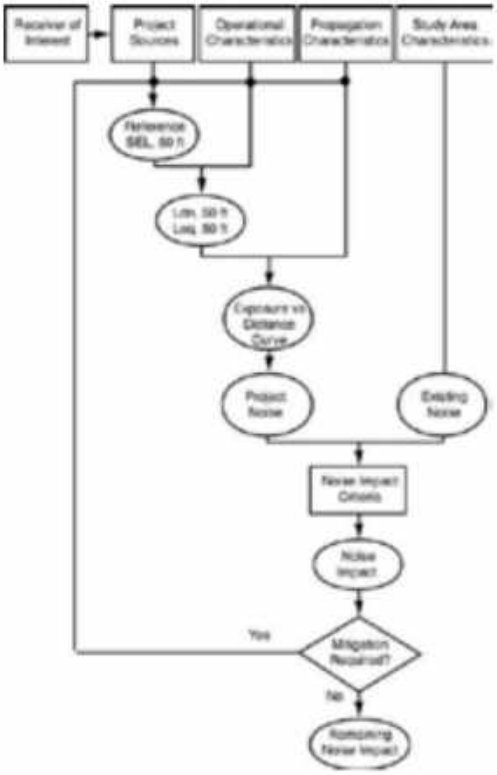


**Figure 4-9 Procedure for Detailed Noise Analysis**

## Step 1: Identify Noise-Sensitive Receivers

*Select the noise-sensitive receivers of interest, the number of which will depend upon the land use in the vicinity of the proposed project and the extent of the study area defined by the Noise Screening Procedure in Section 4.3 and the results of the General Noise Assessment in Section 4.4.*

The steps in identifying the noise-sensitive receivers of interest, both the number of receivers needed and their locations, shown in Figure 4-10, include:

**1a.** Identify all noise-sensitive land uses.
**1b.** Select individual receivers of interest.
**1c.** Cluster residential neighborhoods and other large noise-sensitive areas.



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Cont.




**Figure 4-10 Guide to Selecting Noise-Sensitive Receivers of Interest**

**1a.** Identify all noise-sensitive land uses where impact is identified by the General Noise Assessment in Section 4.4. If a General Noise Assessment has not been done, include all noise-sensitive sites according to the Noise Screening Procedure in Section 4.3. In areas where ambient noise is low, include land uses that are farther from the proposed project than for areas with higher ambient levels.

Recommended materials and methods that can assist in locating noise-sensitive land uses near the proposed project include:

- **Land use maps** prepared by regional or local planning agencies or by the project staff. Area-wide maps often do not have sufficient detail to be of much use. But they can provide broad guidance and may suggest residential pockets hidden within otherwise commercial zones. Of more use are project-specific maps that provide building-by-building detail on the land near the proposed project.

- **Road and town maps** can supplement other maps, are generally more up-to-date, and may be of larger scale.

- **Aerial photographs,** when current, especially those of 400-ft scale or better, are valuable in locating all potential noise-sensitive land uses close to the proposed project. In addition, they can be useful in determining the distances between receivers and the project.

- **Windshield survey,** in which the corridor is driven and land uses are annotated on base maps, may be used for definitive identification of noise-sensitive sites. The windshield survey, supplemented by footwork where needed, is especially useful in identifying newly-constructed sites and in confirming land uses very close to the proposed project. In addition, maps and aerial photos typically reveal only horizontal distances, not vertical distances. Houses on a hill overlooking the project may need a barrier of unacceptable height for its attenuation to be effective, and the greater vertical distance between source and receiver may eliminate the impact entirely. The windshield survey would reveal where vertical contour maps



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or other means may be needed so that vertical distances can be determined.

- **Geographic Information Systems (GIS)** provides electronic mapping needed for identifying noise-sensitive land uses. GIS data may include land parcels, building structures, aerial photography, and project-specific information. These data may be obtained during the project study or from local or regional agencies that store and maintain GIS data. Using electronic GIS data has advantages over paper mapping with respect to automating the process of identifying noise-sensitive land uses and accurately being able to determine their distances to the project alignment

Table 4-18 contains three types of *land uses of interest* and provides guidelines as to when receivers should be analyzed individually and when they can be clustered.

**Table 4-18 Land Uses of Interest**

| Land Uses | Specific Use | Selecting Receivers |
|---|---|---|
| Residences | Isolated single family residences<br><br>Neighborhoods (single and multi-family residences, apartment buildings, duplexes, etc.) | Select each isolated residence as a receiver of interest.<br>For residential areas, cluster by proximity to project sources, proximity to ambient-noise sources, and location along project line. Choose one receiver of interest (closest to the project noise source and at an intermediate distance from the predominant sources of existing noise) in each cluster (i.e., Balance the distance between the receiver and the new noise source and the receiver and the existing noise source). Multiple clusters in one location may be needed to fully characterize the area. |
| Indoor noise-sensitive sites | Places of worship<br>Schools Hospitals/nursing homes Libraries<br>Public meeting halls<br>Concert halls/auditoriums/theaters<br>Recording/broadcast studios<br>Museums and certain historic buildings<br>Hotels and motels<br>Other public buildings with noise- sensitive indoor use | Select noise-sensitive buildings as separate receivers of interest. |
| Outdoor noise-sensitive areas | Certain parks<br>Historic sites used for interpretation<br>Amphitheaters<br>Passive recreation areas<br>Cemeteries<br>Other outdoor noise-sensitive areas | For relatively small noise-sensitive areas, select noise-sensitive sites as separate receivers of interest.<br>For relatively large areas (e.g. a cemetery, etc.), cluster by proximity to project noise sources, proximity to ambient-noise sources, and location along project line. Choose one receiver of interest (closest to the project noise source and at an intermediate distance from the predominant sources of existing noise) in each cluster. |



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**1b.** Select the following types of noise-sensitive receivers within the noise study area, per Table 4-18, to be evaluated as individual receivers:

- Every major noise-sensitive public building
- Every isolated residence
- Every relatively small outdoor noise-sensitive area

Use judgment to avoid analyzing noise where such analysis is obviously not needed. Areas that are considered particularly noise-sensitive by the community, but do not meet the criteria in Table 4-3, should be considered on a case-by-case basis as discussed in Section 4.1.

**1c.** Residential neighborhoods and relatively large outdoor noise-sensitive areas can often be clustered, simplifying the analysis that is required without compromising the accuracy of the analysis. Subdivide all such neighborhoods/areas into clusters of approximately uniform noise, each containing a collection of noise-sensitive sites. Strive to obtain uniformity of both project noise and ambient noise using the following guidelines:

- In general, project noise reduces (drops off) with distance from the project. For this reason, project noise uniformity requires nearly equal distances between the project noise source and all sites within the cluster. Clusters are typically shaped as long narrow strips parallel to the transit corridor and/or circling project point sources such as maintenance facilities. It is suggested to cluster sites where the project noise varies over a range of 5 dB or less.

- Note that noise drops off approximately 3 dB per doubling of distance for line sources and approximately 6 dB per doubling of distance for point sources over open terrain. This reduction in noise will occur over a shorter distance in areas containing obstacles blocking the path of sound propagation, such as rows of buildings.

- Ambient noise usually drops off from non-project sources in the same manner as noise from project sources. For this reason, clustering for uniform ambient noise will usually result in long narrow strips parallel to major roadways or circling major point sources of ambient noise, such as manufacturing facilities. It is suggested to cluster sites where the ambient noise varies over a range of 5 dB or less. Ambient noise levels may be difficult to judge without measurements. In areas without predominant sources of noise, like highways, ambient noise can be considered to vary with population density, which is often uniform along the corridor. In situations where ambient noise tends to be uniform, the clusters can encompass relatively large areas.

After defining clusters, select one representative receiver in each cluster. It is recommended to choose the receiver closest to the project noise source and at an intermediate distance from the predominant sources of existing noise. See Appendix D for additional guidance and examples on clustering receivers, as well as an example.



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Assess each identified cluster representative and individual noise-sensitive receiver of interest using the Detailed Noise Analysis as presented in the following steps.

### Step 2: Determine Project Noise Source Reference Levels

*Identify the major project noise sources near the noise-sensitive receivers of interest, group them by source type, and determine reference levels to compute project noise at 50 ft, as shown in Figure 4-11.*




**Figure 4-11 Flow Diagram for Determining Project Noise at 50 ft**

**2a.** Identify the major project noise sources near receivers of interest according to Table 4-19. The right-hand column of the table indicates if each source is considered as a major contributor to the overall noise impact. Note that some noise sources can create high noise levels but are not indicated as major contributors. Although such sources are loud, they rarely stay in a neighborhood for more than a day or two; therefore, the overall noise exposure is relatively minor. Computations are required for all major noise sources in this table.



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**Table 4-19 Sources of Transit Noise**

| Project Type | Source Type | Actual Source | Major? |
|---|---|---|---|
| Commuter Rail<br>Light Rail Streetcars<br>RRT | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Horns and whistles | Yes |
| | | Crossing signals | Yes |
| | | Crossovers/switches | Yes |
| | | Squeal on tight curves | Yes |
| | | Track-maintenance equipment | No |
| | Stationary | Substations | Yes |
| | | Chiller plants | No |
| Busways<br>Bus Transit Malls | Highway/Transit | Bus passbys | Yes |
| | | Buses parking | No |
| | Stationary | Buses idling | Yes |
| AGT | Fixed-Guideway | Vehicle passbys | Yes |
| Monorail | Miscellaneous | Line equipment | No |
| Terminals<br>Stations<br>Transit Centers | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Crossovers/switches | Yes |
| | | Squeal on tight curves | Yes |
| | Highway/Transit | Bus passbys | Yes |
| | | Buses parking | No |
| | | Automobile passbys | No |
| | Stationary | Locomotives idling | Yes |
| | | Buses idling | Yes |
| | | Ferry boats landing, idling, and departing at dock | Yes |
| | | HVAC equipment | No |
| | | Cooling towers | No |
| | | P/A systems | No |
| Park-and-Ride Lots | Highway/Transit | Bus passbys | Yes |
| | | Buses idling | Yes |
| | | Automobile passbys | No |
| | Stationary | P/A systems | No |
| Traffic Diversion Projects | Highway/Transit | Highway vehicle passbys | Yes |
| Storage Facilities<br>Maintenance Facilities | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Locomotives idling | Yes |
| | | Squeal on tight curves | Yes |
| | | Horns, warning signals, coupling/ uncoupling, auxiliary equipment, crossovers/ switches, brake squeal, and air release | Yes |
| | Highway/Transit | Bus passbys | Yes |
| | Stationary | Buses idling | Yes |
| | | Yard/shop activities | No |
| | | Car washes | No |
| | | HVAC Equipment | No |
| | | P/A Systems | No |



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Cont.

**2b.** Separate the major noise sources by source type: fixed-guideway transit, highway/transit or stationary facility. Note that a major fixed-guideway system will usually have stationary facilities associated with it, and that a stationary facility may have highway/transit elements associated with it. Then use the instructions in the following source type options below to:

**2c.** Determine the source reference levels for the all project noise sources. Each source reference level pertains to reference operating conditions for stationary sources or one vehicle passby under reference operating conditions.

These reference levels should incorporate source-noise mitigation only if such mitigation will be considered for incorporation into the system specifications. The source levels used in this manual are typical of systems designed according to current engineering practice, but they do not include special noise control features that could be incorporated in the specifications at extra cost. If special features that result in noise reductions are included in any of the predictions, the Federal environmental documents must include a commitment by the project sponsor to adopt such treatments before the project is approved for construction. For example, if the specifications include vehicle noise limits that may not be exceeded, these limits should be used to determine the reference level, and this level should be used in the analysis rather than the standard, tabulated reference level.

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**2d.** Convert the source reference level to noise exposure in terms of $L_{eq(1hr)}$ or $L_{dn}$ under project operating conditions using the appropriate equations depending upon the type of source. The noise exposure is determined at the reference distance of 50 ft.

**Option A. Fixed-guideway Sources –** Compute project noise at 50 ft for fixed-guideway sources as identified in the second column of Table 4-19.

**A.i. Reference SEL Levels**
Determine the reference SEL at 50 ft for each major fixed-guideway noise source, either by measurement according to Appendix F or by referencing Table 4-20. The table provides guidance on which method is preferred for each source type. The "NO" designation implies that the source levels given in the table are appropriate to use in the analysis, and the "YES" designation implies that measurements are preferred over the data given in the table. In general, measurements are preferred for source types that vary considerably from project to project, including any emerging technology sources. The data in the table are adequate for source types that do not vary considerably from project to project.

For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of these measurements to the reference conditions of Table 4-20. For projects where source-noise specifications have been defined (e.g., noise limits are usually included in the specifications for purchase of new transit vehicles), these specifications may be used instead of measurements after conversion to reference conditions using the equations in Appendix F. This is only appropriate when there is a firm commitment to adopt the noise specifications in the vehicle

procurement documents during the engineering phase and to adhere to the specifications throughout the procurement, delivery, and testing of the vehicles.

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

**Table 4-20 Source Reference SELs at 50 ft: Fixed-Guideway Sources at 50 mph**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements? * |
|---|---|---|---|
| Rail cars | 82 | 80 | No |
| Streetcars** | 76 | 74 | No |
| Locomotives – diesel | 92 | 88 | No |
| Locomotives – electric | 90 | 86 | No |
| Diesel multiple unit (DMU) | 85 | 81 | Yes |
| Agt – steel wheel | 80 | 78 | Yes |
| Agt – rubber tire | 78 | 75 | Yes |
| Monorail | 82 | 80 | Yes |
| Maglev | 72 | 70 | Yes |
| Transit car horns (emergency) | 93 | 90 | No |
| Transit car whistles | 81 | 78 | No |
| Locomotive horns | | | |
| At-grade crossing | 113 | 110 | No |
| From crossing to 1/8 mile | † | 110 | |
| From 1/8 mile to 1/4 mile | 110 | 110 | |

* "No" implies that the source levels given in the table are appropriate to use in the analysis and "Yes" implies that measurements are preferred over the data given in the table.
** The reference speed for streetcars is 25 mph. For streetcar speeds above 25 mph, use the "Rail Cars" reference level and 50 mph for the reference speed.
† Use the following equation for locomotive horns from crossing to 1/8 mile:

$$SEL_{Ref} = 113 - 3 \times \left(\frac{D_P}{660}\right)$$

where:
$D_P$ = distance from grade crossing parallel to tracks

**A.ii. Estimate Noise Exposure at 50 ft** – Use the reference SELs in Table 4-20, operating conditions, and the equations in Table 4-21 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Trains with different numbers of cars or operating conditions produce different noise exposure levels and should be converted from SEL to $L_{dn}$ separately. Use the following guidelines to determine if sources should be converted separately. These differences in operating conditions will produce an approximate 2-decibel change in noise exposure:
   - 40 percent change in number of locomotives or cars per train.
   - 40 percent change in number of trains per hour.
   - 40 percent change in number of trains per day, or per night (for computation of $L_{dn}$).
   - 15 percent change in train speed.
   - Change of one notch in diesel locomotive throttle setting (e.g., from notch 5 to notch 6).

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Cont.

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project-related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for locomotives, rail cars, and warning horns.
   - Number of rail cars in the train (if this number varies during the day, take the average for the daytime and nighttime periods separately for category 2 land uses, and use the maximum number during the period of interest for category 1 or 3 land uses).
   - Number of locomotives in the train, if any.
   - Train speed, in miles per hour (maximum expected).
   - Average throttle setting of the train's locomotive(s) for diesel-powered locomotives and DMU's only.[*] If this input is not available, assume a throttle setting of 8 for locations where the vehicle would accelerate and 5 for all other locations.[25]
   - For residential receivers of interest:
     - Average hourly train volume during daytime hours (the total number of train passbys between 7 a.m. and 10 p.m., divided by 15 hours);
     - Average hourly train volume during nighttime hours (the total number of train passbys between 10 p.m. and 7 a.m., divided by 9 hours);
   - For non-residential receivers of interest, number of events that occur during each hour of interest in trains per hour; and
   - Track type (continuously welded or jointed) and profile (at-grade or elevated).

4. **Calculate $L_{eq(1hr)}$ at 50 ft**
   - Calculate $L_{eq(1hr)}$ using the appropriate equations in Table 4-21 for each hour of interest.
   - Compute the combined $L_{eq(1hr)}$. It may be necessary to compute the combined totals with and without the warning horns; some neighborhoods along the corridor may be exposed to the horn noise and some may not.

5. **Calculate $L_{dn}$ at 50 ft**
   - If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined day $L_{eq(1hr)}$ and the combined night $L_{eq(1hr)}$.
   - It may be necessary to calculate $L_{dn}$ with and without the warning horns, as above.

[*] Omit this term if not applicable from the equation in Table 4-21 for other vehicle types.



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Note that the equations in Table 4-21 include terms to account for a difference in speed from the reference speed of 50 mph and a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

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**Table 4-21 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Fixed-Guideway Sources**

| | | |
|---|---|---|
| **Locomotives*** $L_{eq(1hr)}$ at 50 ft | $L_{eq,Loco(1hr)} = SEL_{ref} + 10\,log(N_{Loco}) + C_T + K log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-25** |
| **Locomotive Warning Horns**** $L_{eq(1hr)}$ at 50 ft | $L_{eq,LHorns(1hr)} = SEL_{ref} + 10\,log(V) - 35.6$ | **Eq. 4-26** |
| **Rail Vehicles†** $L_{eq(1hr)}$ at 50 ft | $L_{eq,RCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-27** |
| **Streetcar (25 mph or slower)** $L_{eq(1hr)}$ at 50 ft | $L_{eq,SCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 2\log(\frac{S}{25}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-28** |
| **Transit Warning Horns**** $L_{eq(1hr)}$ at 50 ft | $L_{eq,THorns(1hr)} = SEL_{ref} - 10\,log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-29** |
| **Combined Locomotive and transit††** $L_{eq(1hr)}$ at 50 ft | $L_{eq,Combo(1hr)} = 10\log(10^{(L_{eq,Loco(1hr)}/10)} + 10^{(L_{eq,RCars(1hr)}/10)} + 10^{(L_{eq,SCars(1hr)}/10)} + 10^{(L_{eq,LHorns(1hr)}/10)} + 10^{(L_{eq,THorns(1hr)}/10)})$ | **Eq. 4-30** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$, $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-31** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$, and $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-32** |
| **Day/Night** $L_{dn}$ at 50 ft | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-33** |

$N_{Loco}$ = average number of locomotives per train

$C_T$ = $0\ for\ T < 6$; $2(T-5)\ for\ T \geq 6$
where
T = average throttle setting for diesel-powered locomotives and DMUs only

K = -10 for passenger diesel
0 for DMUs‡
+10 for electric

$N_{Cars}$ = average number of cars per train

$V$ = average hourly volume of train traffic, trains per hour

S = train speed, mph

$Adj_{track}$ = constant
+5 for jointed track or for a crossover within 300 ft
+4 for aerial structure with slab track (except AGT and monorail)
+3 for embedded track on grade

$V_d$ = average hourly daytime volume of train traffic, trains per hour
$= \frac{number\ of\ trains,\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of train traffic, trains per hour
$= \frac{number\ of\ trains,\ 10\ p.m.\ to\ 7a.m.}{9}$

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)
$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)
$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

* Assumes a diesel locomotive power rating at approximately 3000 hp ** Based on FRA's horn noise model (www.fra.dot.gov/Elib/Document/2681)
† Includes all commuter rail cars, transit cars, streetcars above 25 mph, AGT and monorail. †† Only include appropriate terms.
‡ Because of the wide range of vehicle types that qualify as a DMU, measurements are preferred for the reference level and speed coefficient. If no measurements are conducted, use the reference level in Table 4-20 and a speed coefficient of 0.

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## Example 4-5 Detailed Noise Analysis – Fixed Guideway Noise Sources

### Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Fixed-Guideway Source

A commuter train with 1 diesel locomotive and 6 cars will pass close to a residential area at a grade crossing. The track is jointed.

**Assumptions**

$SEL_{ref}$ = 92 for diesel locomotives
= 82 for rail cars
= 113 for locomotive warning horns at-grade crossing
$N_{Cars}$ = 6
$N_{Loco}$ = 1
$S$ = 43 mph
$T$ = 8
$V_d$ = $40\ trains/15\ hours = 2.667\ trains\ per\ hour$
$V_n$ = $2\ trains/9\ hours = 0.222\ trains\ per\ hour$

Use the equations in Table 4-21 to determine the daytime $L_{eq(1hr)}$ for each source and the combined daytime $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Locs(1hr)} = SEL_{ref} + 10\log(N_{Loco}) + C_T + K\log(\frac{S}{50}) + 10\log(V_d) - 35.6$$
$$= 92 + 10\log(1) + 6 + (-10)\log(\frac{43}{50}) + 10\log(2.667) - 35.6$$
$$= 67.3\ dBA \text{ at 50 ft}$$

$$L_{d.RCars(1hr)} = SEL_{ref} + 10\log(N_{Cars}) + 20\log\left(\frac{S}{50}\right) + 10\log(V_d) - 35.6 + Adj_{track}$$
$$= 82 + 10\log(6) + 20\log\left(\frac{43}{50}\right) + 10\log(2.667) - 35.6 + 5$$
$$= 62.1\ dBA \text{ at 50 ft}$$

$$L_{d.LHorn(1hr)} = SEL_{ref} + 10\log(V_d) - 35.6$$
$$= 113 + 10\log(2.667) - 35.6$$
$$= 81.7\ dBA \text{ at 50 ft}$$

$L_{d.Combo(1hr)}$ With horn:
$$= 10\log\left[10^{(L_{d.Locos(1hr)}/10)} + 10^{(L_{d.RCars(1hr)}/10)} + 10^{(L_{d.LHorn(1hr)}/10)}\right]$$
$$= 81.9\ dBA \text{ in neighborhoods where the horn is sounded}$$

Without horn:
$$= 10\log\left[10^{(L_{d.Locos(1hr)}/10)} + 10^{(L_{d.RCars(1hr)}/10)}\right]$$
$$= 68.4\ dBA \text{ in neighborhoods where the horn is not sounded}$$

Use the same equations as above to determine the nighttime $L_{eq(1hr)}$ at 50 ft. Use $V_n$ instead of $V_d$.

$L_{n.Locos(1hr)}$ = 56.5 for locomotives
$L_{n.RCars(1hr)}$ = 51.3 for cars
$L_{n.LHorn(1hr)}$ = 70.9 for horns
$L_{n.Combo(1hr)}$ = 71.1 in neighborhoods where the horn is sounded
= 57.6 in neighborhoods where the horn is not sounded

Calculate the $L_{dn}$ with and without horns.

$$L_{dn.Combo} = 10\log\left[15 \times 10^{(L_{d.Combo}/10)} + 9 \times 10^{((L_{n.Combo}+10)/10)}\right] - 13.8$$

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With horn: = 81.6 at 50 ft in neighborhoods where horns are sounded
Without horn: = 68.1 at 50 ft in neighborhoods where horns are not sounded

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

**Option B. Highway/Transit Sources** – Compute project noise at 50 ft for highway/transit noise sources as identified in the second column of Table 4-19. Use the instructions below to estimate source noise levels for projects following FTA's procedures that involve highway vehicles.

This method is based on the original FHWA highway noise prediction model, with updated noise emission levels.[26] The vehicle equations are applicable to speeds typical of freely-flowing traffic on city streets and access roads.

**B.i. Reference SEL Levels** – Determine the reference SEL at 50 ft for each major highway/transit source, either by measurement according to Appendix F or by using Table 4-22.[v] The table provides guidance on which method is preferred for each source type. "NO" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table. For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of measurement data to the reference conditions in Table 4-20.

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

**Table 4-22 Source Reference SELs at 50 ft: Highway/Transit Sources at 50 mph**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements?* |
|---|---|---|---|
| Automobiles | 74 | 70 | No |
| Buses (diesel) | 82 | 79 | No |
| Buses (electric trolleybus) | 80 | 77 | No |
| Buses (hybrid)** | 83 | 80 | Yes |

* "No" implies that the source levels given in the table are appropriate to use in the analysis and "Yes" implies that measurements are preferred over the data given in the table.
** Hybrid bus with full-time diesel engine and electric drive motors.

[v] Idling buses are considered stationary sources.



O4-28 Cont.

**B.ii. Noise Exposure at 50 ft** – Use the reference SELs in Table 4-22, operating conditions, and the equations in Table 4-23 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Noise emission from most transit buses is not dependent upon whether the buses are accelerating or cruising. However, accelerating suburban buses are substantially louder than cruising suburban buses. For this reason, suburban buses require separate calculation along roadway stretches where they are accelerating. Separate calculation is also needed for all highway/transit vehicles at different speeds, since speed affects noise emissions. Use the following guidelines to determine if sources should be calculated separately. These differences in operating conditions will produce an approximate 2-decibel change in noise exposure:
   - 40 percent change in number of vehicles per hour;
   - 40 percent change in number of vehicles per day, or per night (for computation of $L_{dn}$); or
   - 15 percent change in vehicle speed.

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for the vehicle types of concern
   - Average running speed in miles per hour
   - For residential receivers of interest:
     - Average hourly vehicle volume during daytime hours (total number of vehicle passbys between 7 a.m. and 10 p.m., divided by 15).
     - Average hourly vehicle volume during nighttime hours (total number of vehicle passbys between 10 p.m. and 7 a.m., divided by 9).
   - For non-residential receivers of interest, number of events that occur during each hour of interest, in vehicles per hour

4. **Calculate $L_{eq(1hr)}$ at 50 ft – Calculate $L_{eq(1hr)}$ using the appropriate** equations in Table 4-23 for each hour of interest.

5. **Calculate $L_{dn}$ at 50 ft –** If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the day $L_{eq(1hr)}$ and night $L_{eq(1hr)}$.

Note that the equations in Table 4-23 include terms to account for a difference in speed from the reference speed of 50 mph and a numerical adjustment to

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Cont.

account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

**Table 4-23 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Highway/Transit Sources**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(V) + C_{emissions} - 10\log(\frac{S}{50}) - 35.6$ | **Eq. 4-34** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$ | **Eq. 4-35** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$ | **Eq. 4-36** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-37** |
| **Adjustments** | = -3 for automobiles, open-graded asphalt<br>= +3 for automobiles, grooved pavement | |

$V$ = average hourly volume of vehicles, vehicles per hour

$C_{emissions}$ = $25\log(\frac{S}{50})$ for buses
$31\log(\frac{S}{50})$ for hybrid buses [23]
1.6 for accelerating 3-axle commuter buses
$40\log(\frac{S}{50})$ for automobiles

$S$ = average vehicle speed, mph (distance divided by time, excluding stop time at red lights)

$V_d$ = average hourly daytime volume of vehicles of this type, vehicles per hour
$= \frac{total\ vehicle\ volume, 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of vehicles, vehicles per hour
$= \frac{total\ vehicle\ volume, 10\ p.m.\ to\ 7\ a.m.}{9}$

## Example 4-6 Detailed Noise Analysis – Highway Transit Noise Sources

**Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Highway/Transit Source**

A bus route with city buses will pass close to a school that is in session from 8 a.m. to 4 p.m. on weekdays. Within this time period, the hour of greatest activity for this bus route is 8 a.m. to 9 a.m.

**Assumptions**

$SEL_{ref}$ = 82 dBA
$S$ = 40 mph
$V$ = 30 buses per hour

Use the equations in Table 4-23 to determine the hourly $L_{eq(1hr)}$ at 50 ft.

$$L_{d,Bus} = SEL_{ref} + 10\,log(V) + C_{emissions} - 10\log(\frac{S}{50}) - 35.6$$
$$= 82 + 10\,log(30) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 59.7\ dBA \text{ at 50 ft}$$

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Cont.

This same bus also passes close to a residential area with the following operating conditions:

$V_d$ = 200 *buses*/15 *hours* = 13.33 *buses per hour*
$V_n$ = 20 *buses*/9 *hours* = 2.22 *buses per hour*

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Bus} = 82 + 10\,log(13.33) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 56.2\,dBA \text{ at 50 ft}$$

$$L_{n.Bus} = 82 + 10\,log(2.22) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 48.4\,dBA \text{ at 50 ft}$$

Calculate $L_{dn}$ at 50 ft.

$$L_{dn.Bus} = 10log(15 \times 10^{(L_{d.Bus}/10)} + 9 \times 10^{((L_{n.Bus}+10)/10)}) - 13.8$$
$$= 57.2\,dBA \text{ at 50 ft}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

**Option C. Stationary Sources** – Compute project noise at 50 ft for stationary sources as identified in the second column of Table 4-19.

**C.i. Determine Reference SEL Levels** – Determine the reference SEL at 50 ft for each major stationary source, either by measurement according to Appendix F or by using Table 4-24. The table provides guidance on which method is preferred for each source type. "NO" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table. In general, measurements are preferred for source types that vary considerably from project to project. For example, curve squeal is highly variable depending on weather conditions, curve radius, and train speed. The data in the table are adequate for source types that do not vary considerably from project to project (crossing signals, for example). For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of these measurements to the reference conditions of Table 4-24.

Layover facilities and transit centers can be the sources of low-frequency noise from idling diesel engines. Sounds with considerable low-frequency components can cause greater annoyance than would be expected based on their A-weighted levels. Low-frequency sounds often cause windows and walls to vibrate resulting in secondary effects in buildings such as rattling of dishes in cupboards and wall-mounted pictures. The reference levels in Table 4-24 are adjusted to take increased annoyance into account. For a Detailed Noise Analysis at locations where such idling takes place for an extended period, use the method described in ANSI Standard S12.9-Part 4, Annex D.[27]

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.



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**Table 4-24 Source Reference SELs at 50 ft: Stationary Sources**

| Source | Reference SEL, dBA | Approximate $L_{max}$ dBA | Prefer Measurements?* |
|---|---|---|---|
| Auxiliary Equipment | 101 | 65 | Yes |
| Locomotive Idling | 109 | 73 | No |
| Rail Transit Idling | 106 | 70 | No |
| Buses Idling | 111 | 75 | No |
| Ferry Boat Landing**, Idling, and Departing | 91 | 78 | No |
| Ferry Boat Fog Horn | 90 | 84 | No |
| Track Curve Squeal | 136 | 100 | Yes |
| Car Washes | 111 | 75 | Yes |
| Crossing Signals | 109 | 73 | No |
| Substations | 99 | 63 | No |

*"No" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table.

**Ferry boat landings are included in the stationary source category because the noise from the landing remains in one area even though the boats move in and out.

**C.ii. Estimate Noise Exposure at 50 ft** – Use the reference SELs in Table 4-24, operating conditions, and the equations in Table 4-25 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Identify actual source durations and numbers of events. Sources with different operating conditions should be converted from SEL to $L_{dn}$ separately. Use the following guidelines to determine if sources should be converted separately. These differences in operating conditions will produce an approximate 2-dB change in noise exposure:
   - 40 percent change in event duration (e.g., from 30 to 42 minutes), or
   - 40 percent change in number of events per hour (e.g., from 10 to 14 events per hour).

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for each relevant source
   - Average duration of one event, in seconds
   - For residential receivers of interest:
     - Average number of events per hour that occur during the daytime (the total number of events between 7 a.m. and 10 p.m., divided by 15).



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Cont.

- Average number of events per hour that occur during the nighttime (the total number of events between 10 p.m. and 7 a.m., divided by 9).
- For non-residential receivers of interest, number of events that occur during each hour of interest in events per hour

4. **Calculate $L_{eq(1hr)}$ at 50 ft** – Calculate $L_{eq(1hr)}$ using the appropriate equations in Table 4-25 for each hour of interest.

5. **Calculate $L_{dn}$ at 50 ft** – If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the day $L_{eq(1hr)}$ and night $L_{eq(1hr)}$.

Note that the equations in Table 4-25 include a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

**Table 4-25 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Stationary Sources**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(N) + 10\log(\frac{E}{3600}) - 35.6$ | **Eq. 4-38** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where N = $N_d$ | **Eq. 4-39** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where N = $N_n$ | **Eq. 4-40** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-41** |

$N$ = number of events of this type that occur during one-hour

E* = duration of one event, sec

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)

$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)

$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

*Omit the term containing E for ferry boat, and fog horn noise sources.

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## Example 4-7 Detailed Noise Analysis – Stationary Noise Sources

**Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Stationary Sources**

A signal crossing lies close to a school that is in session from 8 a.m. to 4 p.m. on weekdays. Within this time period, the hour of greatest activity for the signal crossing is 8 a.m. to 9 a.m.

**Assumptions**

$SEL_{ref}$ = 109 dBA
$E$ = 25 seconds (counting both cycles of the signal)
$N$ = 22

Use the equations in Table 4-25 to determine the hourly $L_{eq(1hr)}$ at 50 ft.

$$L_{d,Cross} = SEL_{ref} + 10log(N) + 10log\left(\frac{E}{3600}\right) - 35.6$$
$$= 109 + 10log(22) + 10log(\frac{25}{3600}) - 35.6$$
$$= 65.2\,dBA \text{ at 50 ft}$$

This same signal crossing lies close to a residential area with the following operating conditions:

$N_d$ = 200 /15 $hours$ = 13.3 $events\ per\ hour$
$N_n$ =12 /9 $hours$ = 1.33 $events\ per\ hour$

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$$L_{d,Cross} = 109 + 10log(13.3) + 10log(\frac{25}{3600}) - 35.6$$
$$= 63.1\,dBA \text{ at 50 ft}$$
$$L_{n,Cross} = 109 + 10log(1.33) + 10log(\frac{25}{3600}) - 35.6$$
$$= 53.1\,dBA \text{ at 50 ft}$$

Calculate $L_{dn}$ at 50 ft.

$$L_{dn} = 10log(15 \times 10^{(L_{d,Cross}/10)} + 9 \times 10^{((L_{n,Cross}+10)/10)}) - 13.8$$
$$= 63.1\,dBA \text{ at 50 ft}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

### Step 3: Determine Propagation Characteristics

*Determine the combined propagation characteristics between each source and receiver of interest.*

**3a.** Calculate project noise exposure as a function of distance. *Calculate the project noise exposure at distances other than 50 ft, such as at receiver locations, as a function of distance accounting for shielding and ground effects along the path.* See Example 4-8 below.



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Cont.

1. Determine the topography of the ground within the transit corridor using the figures in Table 4-26 as a guide. It is not necessary to represent the transit corridor with an extreme number of changes in topography. Often, several typical sections will suffice throughout the transit corridor.

2. Use the equations in Table 4-26 to determine ground factor (G) based on the effective path height (Heff) for each identified terrain feature. Standard source heights are included at the bottom of the table. Assume receiver heights of 5 ft for both outdoor receivers and first-floor receivers. Note that larger ground factors correspond to larger amounts of ground attenuation with increasing distance from the source. For acoustically "hard" (e.g., non-absorptive) ground conditions, G should be taken to be zero.

3. Determine the distance correction factor using the ground factor and another distance, such as the distance to a receiver, and the equations in Table 4-27.

4. Apply the distance correction ($C_{distance}$) to the project noise exposure at 50 ft (Section 4.5, Step 2) using the following equation:

$$L_{distance} = L_{50ft} + C_{distance} \quad \text{Eq. 4-42}$$

where:

$L_{distance}$ = $L_{dn}$ or $L_{Aeq(1hr)}$ at the new distance, ft
$L_{50ft}$ = $L_{dn}$ or $L_{Aeq(1hr)}$ at 50 ft

5. Plot noise exposure as a function of distance if desired.

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Cont.

**Table 4-26 Ground Factor G, for Ground Attenuation**

**Ground Factor**

**Soft Ground:**

$$G = \begin{cases} 0.66, & H_{eff} \le 5 \\ 0.75(1-\frac{H_{eff}}{42}), & 5 < H_{eff} < 42 \\ 0, & H_{eff} \ge 42 \end{cases}$$ **Eq. 4-43**

$H_{eff}$ = sum of average path heights on either side of the barrier, see below.

**Hard Ground:** $G = 0$

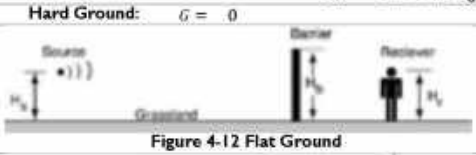


**Figure 4-12 Flat Ground**

$$H_{eff} = \frac{H_s + 2H_b + H_r}{2}$$ **Eq. 4-44**

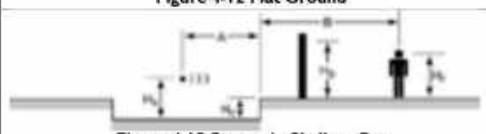

**Figure 4-13 Source in Shallow Cut**

$$H_{eff} = \frac{H_s + 2H_b + H_c + H_r}{2} \quad for\ B \le \frac{A}{2}$$

Use Eq. 4-44 $\quad for\ B > \frac{A}{2}$

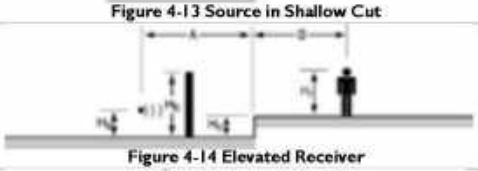

**Figure 4-14 Elevated Receiver**

$$H_{eff} = \frac{H_s + H_c + H_r}{2} \quad for\ H_b \le H_c$$

$$H_{eff} = \frac{H_s + 2H_b - H_c + H_r}{2} \quad for\ H_b > H_c$$

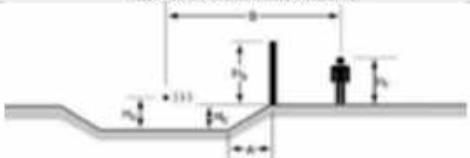

**Figure 4-15 Source in Sloped Cut**

Use Eq. 4-44 $\quad for\ A \le \frac{B}{2}$

$$H_{eff} = \frac{H_s + 2H_b + H_c + H_r}{2} \quad for\ A > \frac{B}{2}$$

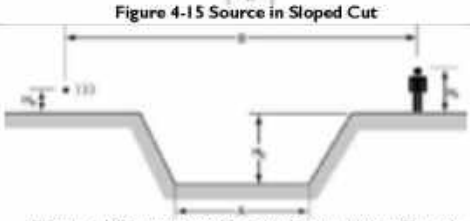

**Figure 4-16 Source and Receiver Separated by Trench**

$$H_{eff} = \frac{H_s + H_r}{2} \quad for\ A \le \frac{B}{2}$$

$$H_{eff} = \frac{H_s + 2H_c + H_r}{2} \quad for\ A > \frac{B}{2}$$

$H_r$ = 8 ft for trains with diesel-electric locomotives
= 2 ft for trains without diesel-electric locomotives
= 0 ft for automobiles
= 3 ft for 2-axle city buses
= 8 ft for 3-axle commuter buses

Note: Equations for $H_{eff}$ remain valid when $H_b = 0$

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Cont.

**Table 4-27 Distance Correction Factor Equations for Detailed Noise Analysis**

| Source | Equation* | |
|---|---|---|
| Stationary Sources | $C_{distance} = -20\log(\frac{D}{50}) - 10G\log(\frac{D}{50})$ | Eq. 4-45 |
| Fixed-guideway rail car passbys | $C_{distance} = -10\log(\frac{D}{50}) - 10G\log(\frac{D}{42})$ | Eq. 4-46 |
| Fixed-guideway locomotive and rubber-tired vehicle passbys, highway vehicle passbys and horns | $C_{distance} = -10\log(\frac{D}{50}) - 10G\log(\frac{D}{29})$ | Eq. 4-47 |
| $D$ = distance, ft<br>$G$ = ground factor, see Table 4-26 | | |

*These equations assume the distance between the source and receiver is approximately 300 ft or less. At longer distances, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. Therefore, more detailed calculation methods may be required to account for those effects.

## Example 4-8: Detailed Noise Analysis – Exposure vs. Distance Curve

**Exposure vs. Distance Curve for Fixed-Guideway Source**

Plot an exposure vs. distance curve for a diesel-electric commuter train that does not sound the horn in this area.

**Assumptions**

The terrain is flat grassland without a noise barrier.

$L_{eq\,Loco}\,(8-9cm)$ = 72 dBA at 50 ft
$L_{dn\,Loco}$ = 68 dBA at 50 ft
$H_r$ = 5 ft
$H_b$ = 0 ft (for a "no noise barrier" case)
$H_s$ = 8 ft (for a diesel-electric commuter train)

Calculate $H_{eff}$ using the equations in Table 4-26.

$$H_{eff} = \frac{H_s + 2H_b + H_r}{2} = \frac{8+0+5}{2} = 6.5 \text{ ft}$$

Determine the ground factor using Eq. 4-43.

$$G = 0.75(1 - \frac{H_{eff}}{42}) = 0.63$$

Use Eq. 4-45 to determine noise vs. exposure equations for $L_{eq\,Loco}$ and $L_{dn\,Loco}$.

$$L_{eq\,Loco} = 72 - 10\log(\frac{D}{50}) - 6.3\log(\frac{D}{42})$$

$$L_{dn\,Loco} = 68 - 10\log(\frac{D}{50}) - 6.3\log(\frac{D}{42})$$

Plot the two equations (see example in Figure 4-17). From these curves, the noise levels due to this train operation can be determined for a receiver of interest at any distance without shielding.



04-28
Cont.

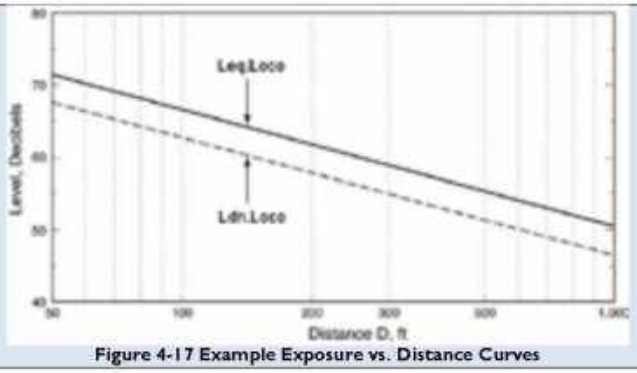


**Figure 4-17 Example Exposure vs. Distance Curves**

**3b.** Calculate the attenuation due to shielding for each distance of interest from Step 3a, using the following equation and Tables 4-26 through 4-30 and as illustrated in Example 4-9. If the conditions described in the tables are not met, the attenuation due to shielding is considered zero. Shielding can be due to intervening noise barriers, terrain features, rows of buildings, and dense tree zones.

$$A_{shielding} = \max\{IL_{barrier} \text{ or } A_{buildings} \text{ or } A_{trees}\} \qquad \text{Eq. 4-48}$$

where:

$IL_{barrier}$ = barrier insertion loss, see Table 4-28

$A_{buildings}$ = attenuation due to buildings, see Table 4-29

$A_{trees}$ = attenuation due to trees, see Table 4-30

**Table 4-28 Barrier Insertion Loss**

| **Barrier Insertion Loss** | $IL_{barrier} = \max\{0 \text{ or } (A_{barrier} - 10(G_{NB} - G_B)\log(\frac{D}{50}))\}$ | **Eq. 4-49** |
|---|---|---|
| $A_{barrier}$ | $= \min\{12 \text{ or } [5.3\log(P) + 6.7]\}$ | For non-absorptive transit barriers within 5 ft of the rail |
| | $= \min\{15 \text{ or } (5.3\log(P) + 9.7)\}$ | For absorptive transit barriers within 5 ft of the rail |
| | $= \min\{15 \text{or}(20\log(\frac{2.51\sqrt{P}}{\tanh(4.46\sqrt{P})}) + 5)\}$ | For all other barriers, and for protrusion of terrain above the line of sight |
| P | = path length difference, ft (see figure 4-18)* | |
| $D$ | = closest distance between the receiver and the source, ft | |
| $G_{NB}$ | = ground factor G computed without barrier (see Table 4-26) | |
| $G_B$ | = ground factor G computed with barrier (see Table 4-26) | |

* If the source height (exhaust outlet) for diesel-electric locomotives is not available, assume 15 ft.



04-28 Cont.

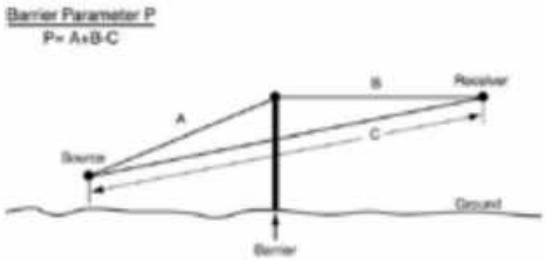


**Figure 4-18 Noise Barrier Parameter "P"**

**Table 4-29 Attenuation due to Buildings**

| Condition | Equation | |
|---|---|---|
| Gaps in the row of buildings constitute less than 35% of the length of the row | $A_{buildings} = \min\{10 \text{ or } [1.5\ (R-1)+5]\}$ | Eq. 4-50 |
| Gaps in the row of buildings constitute 35 to 65% of the length of the row | $A_{buildings} = \min\{10 \text{ or } [1.5\ (R-1)+3]\}$ | Eq. 4-51 |
| Gaps in the row of buildings constitute more than 65% of the length of the row | $A_{buildings} = 0$ | |
| $R$ = number of rows of houses that intervene between the source and receiver | | |

**Table 4-30 Attenuation due to Trees**

| Condition | Equation | |
|---|---|---|
| At least 100 ft of trees intervene between the source and receiver with no clear line-of-sight between source and receiver, and the trees extend 15 ft or more above the line-of-sight | $A_{trees} = \min\left\{10 \text{ or } \frac{W}{20}\right\}$ where $W \geq 100ft$<br>$= 0$ where $W < 100ft$ | Eq. 4-52 |
| W = width of tree zone along the line-of-site between the source and receiver in feet | | |

## Example 4-9: Detailed Noise Analysis – Shielding

**Computation of Shielding**

The following features are between the rail corridor and a receiver of interest. Calculate the attenuation due to shielding.

1. A 15-foot high noise barrier is 40 ft from the closest track and 130 ft from the receiver
2. A dense tree zone 100 ft thick that extends 15 ft above the line-of-sight

**Assumptions**

$H_s$ = 8 ft
$H_r$ = 5 ft

Barrier dimensions

A = 40.61 ft
B = 130.38 ft
C = 170.03 ft

**Barrier**

Calculate $H_{eff}$ with and without the barrier using the equations in Table 4-26.

$$H_{eff,NoBarrier} = \frac{H_s + 2H_b + H_r}{2}$$

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Cont.

$$= \frac{8+0+5}{2}$$
$$= 6.5 \text{ ft}$$

$$H_{eff\,Barrier} = \frac{H_s + 2H_b + H_r}{2}$$
$$= \frac{8+15+5}{2}$$
$$= 21.5 \text{ ft}$$

Determine the ground factor with and without the barrier using Eq. 4-43.

$$G_{NoBarrier} = 0.75\left(1 - \frac{H_{eff}}{42}\right)$$
$$= 0.63$$

$$G_{Barrier} = 0.75\left(1 - \frac{H_{eff}}{42}\right)$$
$$= 0.37$$

Calculate the barrier insertion loss using Table 4-28 and Figure 4-18.

$$P = A + B - C$$
$$= 0.96 \text{ ft}$$

$$A_{barrier} = \min\left\{15 \text{ or } \left(20 \log\left(\frac{2.51\sqrt{P}}{\tanh\left(4.46\sqrt{P}\right)}\right) + 5\right)\right\}$$
$$= 12.8 \text{ dB}$$
$$= \min\{15 \text{ or } 12.8\}$$
$$= 12.8 \text{ dB}$$

$$IL_{barrier} = \max\left\{0 \text{ or } \left(A_{barrier} - 10\left(G_{NoBarrier} - G_{Barrier}\right)\log\left(\frac{D}{50}\right)\right)\right\}$$
$$= 12.8 - 10(0.63 - 0.37)\log\left(\frac{170}{50}\right)$$
$$= 11.4 \text{ dB}$$

**Trees**

Determine the attenuation due to trees using Table 4-30.

$$A_{trees} = \min\left\{10 \text{ or } \frac{W}{20}\right\}$$
$$= 5 \text{ dB}$$

**Total Shielding**

The total shielding is the maximum of the barrier and tree zone shielding, 11.4 dB.

$$A_{shielding} = \max\left\{IL_{barrier} \text{ or } A_{buildings} \text{ or } A_{trees}\right\}$$
$$= \max\{11.4 \text{ or } 0 \text{ or } 5\}$$
$$= 11.4 \text{ dB}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.



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**3c.** Combine the two propagation characteristics.
Combine the results from Steps 3a and 3b to determine the noise at the receiver considering the propagation characteristics of distance and shielding by applying the distance correction and attenuation due to shielding to the project noise exposure level at 50 ft.

The equations in Table 4-31 combine the equations in Steps 3a and 3b.

**Table 4-31 Calculate $L_{dn}$ or $L_{eq(1hr)}$**

| Source | Equation* | |
|---|---|---|
| Stationary Sources | $L_{DistShield} = L - 20\log(\frac{D}{50}) - 10Glog(\frac{D}{50}) - A_{shielding}$ | Eq. 4-53 |
| Fixed-guideway rail car passbys | $L_{DistShield} = L - 10\log(\frac{D}{50}) - 10Glog(\frac{D}{42}) - A_{shielding}$ | Eq. 4-54 |
| Fixed-guideway locomotive and rubber-tired vehicle passbys, highway vehicle passbys and horns | $L_{DistShield} = L - 10\log(\frac{D}{50}) - 10Glog(\frac{D}{29}) - A_{shielding}$ | Eq. 4-55 |
| $L$ = $L_{dn}$ or $L_{eq}$<br>$D$ = distance, ft<br>$G$ = ground factor, see Section 4.5, Step 3a<br>$A_{shielding}$ = attenuation due to shielding, see Section 4.5, Step 3b. | | |

*These equations assume the distance between the source and receiver is approximately 300 ft or less. At longer distances, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. Therefore, more detailed calculation methods may be required to account for those effects.[28, 29]

## Step 4: Combine Noise Exposure from All Sources

*Combine all sources to predict the total project noise at the receivers using the equations in Table 4-32 after propagation adjustments have been made for the noise exposure from each source separately.*

**Table 4-32 Computing Total Noise Exposure**

| | | |
|---|---|---|
| Total $L_{eq(1hr)}$ from all sources for the hour of interest: | $L_{eq,total(1hr)} = 10\log(\sum_{all\ sources} 10^{L_{Aeq(1hr)}/10})$ | Eq. 4-56 |
| Total $L_{dn}$ from all sources | $L_{dn,total} = 10\log(\sum_{all\ sources} 10^{L_{dn}/10})$ | Eq. 4-57 |

### Example 4-10 Detailed Noise Analysis – Combine Sources

**Computation of Total Exposure from Combined Sources**

Combine the noise exposure from the commuter train and light rail system to estimate the total noise exposure at the receiver.

**Assumptions**
A commuter train operation produces the following levels at a receiver of interest:
$L_{eq,Commuter}$ = 72 dBA
$L_{dn,Commuter}$ = 68 dBA

A light rail system produces the following levels at the same receiver:
$L_{eq,LightRail}$ = 69 dBA



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Cont.

$L_{dn,LightRail}$ = 70 dBA

No other project sources affect this receiver.

Calculate the total noise exposure at the receiver using the equations in Table 4-32.

$$L_{eq,total} = 10\log(10^{(72/10)} + 10^{(69/10)}) = 73.8 \text{ dBA}$$

$$L_{dn,total} = 10\log(10^{(68/10)} + 10^{(70/10)}) = 72.1 \text{ dBA}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

## Step 5: Determine Existing Noise Exposure

*Choose the appropriate method for characterizing noise and then determine the existing noise at each identified noise-sensitive receiver.* The existing noise is needed to determine the noise impact according to the criteria described in Section 4.1, Step 2. Recall that impact is assessed based on a comparison of the existing ambient noise exposure and the additional noise exposure that will be caused by the project. The existing noise exposure must be estimated for all receivers of interest identified in Section 4.5, Step 1.

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For a Detailed Noise Analysis, it is recommended to measure existing noise at each receiver of interest identified in Section 4.5, Step 1, for the most precise assessment of existing noise and conclusions concerning noise impact. However, measurements are expensive, often thwarted by weather, and take considerable time in the field. If taking measurements at each identified receiver is not possible, other less precise methods are available. Different methods may be used at different receivers along the project. However, it is important to recognize the correlation between the precision of measurements and the confidence in the impact assessment. Especially in a Detailed Noise Analysis, avoid using less precise methods of measuring existing noise just for the sake of convenience or expediency. The use of less precise methods must be clearly justified.

**Option A. Noise Exposure Measurements** – Full one-hour measurements are the most appropriate way to determine ambient noise exposure for non-residential receivers with the level of precision expected in a Detailed Noise Analysis. For residential receivers, full 24-hour measurements are more appropriate. These full-duration measurements are preferred over other methods of characterizing existing noise where time and study funds allow.

Follow the procedures below for these full-duration ambient noise exposure measurements:

**Ai. Non-residential land uses** – Measure a full hour $L_{eq(1hr)}$ at the receiver of interest on at least two non-successive weekdays (generally between noon on Monday and noon on Friday). Select the hour of the day when the maximum project activity is expected to occur.

**A.ii. Residential land uses** – Measure a full 24-hour $L_{dn}$ at the receiver of interest for a single weekday (generally between noon on Monday and noon on Friday).

**A.iii. Microphone position** – The location of the microphone at the receiver depends upon the proposed location of the transit noise source, so use good technical judgment in positioning the measurement microphone. If, for example, a new rail line will be in front of the house, do not locate the microphone in the backyard behind the house where the line of sight between the noise source and receiver is obstructed. Figure 4-19 illustrates recommended measurement positions for various locations of the project, with respect to the house and the existing source of ambient noise.

**A.iv. Measurement guidelines** – Undertake all measurements in accordance with good engineering practice following guidelines given in ASTM and ANSI standards.[30][31]

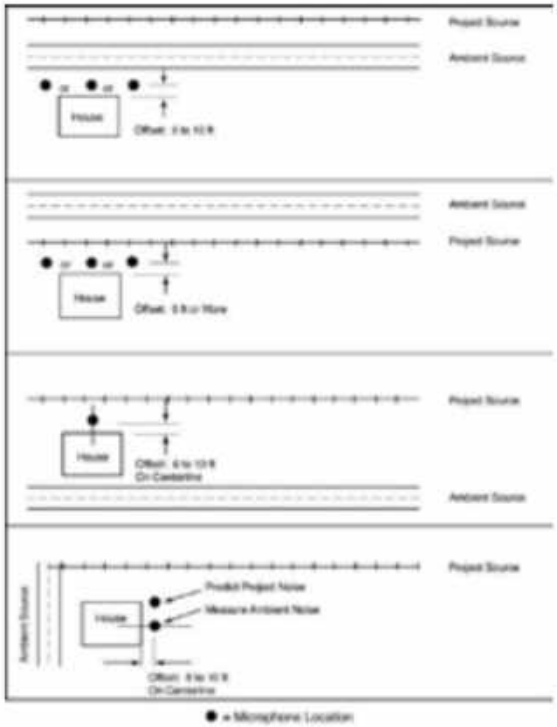


**Figure 4-19 Recommended Microphone Locations for Existing Noise Measurements**

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**Option B. Noise Exposure Computations from Partial Measurements** – Often, measurements can be made at some of the receivers of interest and used to estimate noise exposure at nearby receivers. In other situations, several $L_{eq(1hr)}$ measurements can be taken at a receiver and then the $L_{dn}$ computed from these. Both options require experience and knowledge of acoustics to select representative measurement sites. If using this method to compute an Ldn, a minimum time period of one hour should be used for each measurement period. It is unacceptable to extrapolate a one hour measurement from a shorter measurement period.

Measurements at one receiver can be used to represent the noise environment at other sites, but only when proximity to major noise sources is similar among the sites. Residential neighborhoods with otherwise similar homes may have greatly varying noise environments. For example, one area of the neighborhood may be located where the ambient noise is clearly due to highway traffic. A second area toward the interior of the neighborhood may have highway noise as a factor, but also include other noise sources from the community. A third area located deep into the residential area could have local street traffic and other community activities dominate the ambient noise. In this example, three or more measurement sites would be required to represent the varying ambient noise conditions in a single neighborhood.

Typical situations where representative measurement sites can be used to estimate noise levels at other sites occur when both share the following characteristics:

- Proximity to the same major transportation noise sources, such as highways, rail lines and aircraft flight patterns
- Proximity to the same major stationary noise sources, such as power plants, industrial facilities, rail yards and airports
- Similar type and density of housing, such as single-family homes on quarter-acre lots and multi-family housing in apartment complexes

Acoustical professionals are often adept at such computations from partial data and are encouraged to use their experience and judgment in fully utilizing the measurements in their computations. This does necessitate a conservative estimate (underestimate) of existing noise to account for reduced precision from partial data as compared to full noise measurements.

Those without a background in acoustics are encouraged to use the procedures in Appendix E to compute existing noise from partial measurements. These methods include a factor to conservatively estimate (underestimate) existing noise to account for reduced precision from partial data as compared to full noise measurements.

**Option C. Estimating Existing Noise Exposure** – The least precise way to determine noise exposure is to estimate it from a table. This method is often used for the General Noise Assessment, but it is not recommended for a Detailed Noise Analysis. It can be used, however, in the absence of better data for locations where roadways or railroads are the predominant ambient noise source. Table 4-17 presents these existing levels. The levels in Table 4-17 are



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conservative and underestimate existing noise to account for reduced precision compared to full noise measurements. If a simplified procedure to estimate existing noise exposure is chosen it must be clearly justified and receive approval by the FTA Regional office.

While measurements are considered the most precise method, there is one situation where it may be more accurate to estimate rather than measure the existing noise exposure, which is in areas near major airports where aircraft noise is dominant. Because airport noise is highly variable based on weather conditions and corresponding runway usage, it is preferable in such cases to base the existing noise exposure on published aircraft noise contours in terms of Annual Average $L_{dn}$.

### Step 6: Assess Noise Impact

Assess noise impact at each receiver of interest identified in Section 4.5, Step 1 using the noise impact criteria in Section 4.1 and the procedures in this step. Choose the appropriate noise impact assessment procedure for a transit project or multimodal project.

**Option A. Transit Projects** – For transit projects, noise impact is assessed at each receiver of interest using the criteria for transit projects described in Section 4.1. The noise impact assessment procedure is as follows:

**A.i.** Tabulate existing ambient noise exposure (rounded to the nearest whole decibel) at all receivers identified Section 4.5, Step 1. In cases where large residential buildings are exposed to noise on one side only, the receivers on that side are included in the analysis.

**A.ii.** Tabulate project noise exposure at these receivers from Section 4.5, Step 4.

**A.iii.** Determine the level of noise impact (no impact, moderate impact, or severe impact) according to Section 4.1.

**A.iv.** Document the results in noise-assessment inventory tables. Include the following information:

- Receiver identification and location
- Land use description
- Number of noise-sensitive sites represented (number of dwelling units in residences or acres of outdoor noise-sensitive land)
- Closest distance to the project
- Existing noise exposure
- Project noise exposure
- Level of noise impact (no impact, moderate impact, or severe impact)
- A sum of the total number of receivers and numbers of dwelling units predicted to experience moderate impact or severe impact

**A.v.** Illustrate the areas of moderate impact and severe impact. Two methods of displaying impact are labeling and contouring.



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- In a Detailed Noise Analysis, the most accurate indication of impact is to label each impacted building or cluster identified in the inventory table.
- A less precise illustration of impacted areas is a plot of project noise contours on the maps or aerial photographs, along with shaded impact areas. Use the procedures in Section 4.4, Step 6 and the levels from Section 4.5, Step 2 to develop these contours.

Note that it is difficult to position noise contours in urban areas due to shielding, terrain features, and other propagation anomalies. If noise contours are used, they should be considered illustrative rather than definitive. If desired to conform to the practices of another agency, the contouring may perhaps include several contour lines of constant project noise, such as $L_{dn}$ 65, $L_{dn}$ 70, and $L_{dn}$ 75 dBA.

**A.vi.** Including information on the magnitude of the impacts is an essential part of the assessment. The magnitude of noise impact is defined by the two threshold curves delineating onset of moderate impact and severe impact.

**Option B. Multimodal Projects** – For multimodal projects, project noise comprised of both highway and transit noise sources that are assessed according to the FTA noise impact criteria (see Table 4-2), use the procedure in Option A above. For multimodal projects that require FHWA's noise assessment methods to inform FTA's evaluation (see Section 4.1, Step 1 - Option B), follow the FHWA guidance.[37] In general, the appropriate calculation method is to use the current version of FHWA's Traffic Noise Model (TNM).[22] TNM is a state-of-the-art computer program used for predicting noise impacts near highways.

TNM allows for a detailed assessment at each receiver of interest by separately calculating the noise contribution of each roadway segment. For each roadway segment, the noise from each vehicle type is computed from reference noise levels, adjusted for:

- Vehicle volume
- Vehicle speed
- Grade
- Roadway segment length
- Source-to-receiver distance

Further adjustments needed to accurately model the sound propagation from source to receiver include:

- Shielding provided by rows of buildings,
- Effects of different ground types,
- Source and receiver elevations, and
- Effect of any intervening noise barriers.

TNM sums the noise contributions of each vehicle type for a given roadway segment at the receiver. TNM then repeats this process for all roadway segments, summing their contributions to generate the predicted noise level at each receiver.



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## Step 7: Determine Noise Mitigation Measures

Evaluate alternative mitigation measures where the Detailed Noise Analysis shows either severe or moderate impact, and it is not feasible to change the alignment or location of the project to avoid impact. Project noise that is found to cause no impact does not generally require any mitigation.

Mitigation of noise impact from transit projects may involve treatments at the three fundamental components of the noise problem: at the noise source, along the source-to-receiver propagation path, or at the receiver. Generally, the transit property has authority to treat the source and some elements of the propagation path, but may have little or no authority to modify anything at the receiver. After mitigation options have been determined, repeat the project noise computations including the adopted mitigation and reassess the remaining noise impact.

Approximate costs for noise control measures are documented in a report from the Transit Cooperative Research Program (TCRP)[33] and are also presented in this section. These costs reflect the noise mitigation costs available in 1997 (unless otherwise noted), which are the most recent data available as of this publication, and should only be used as representative estimates when considering noise mitigation options. Current noise mitigation costs should be researched before decisions on noise mitigation options are finalized, and then they should be documented according to Section 8.

**7a. Evaluate Source Treatments** – The most effective noise mitigation treatments are applied at the noise source. This is the preferred approach to mitigation when possible. Common source treatments and their estimated acoustical effectiveness are included in Table 4-33 and described below. It is important to note that the values below are estimates and should be applied with good engineering judgement. It also important to note that these mitigation measures should not be applied as a reduction in the reference SEL values for a vehicle that already incorporates that measure as a feature, such as vehicle skirts. Measurements to determine the reference SEL source level are required in those instances.

**Table 4-33 Transit Noise Mitigation Measures – Source Treatments**

| Mitigation Measure | | Effectiveness |
|---|---|---|
| Stringent Vehicle & Equipment Noise Specifications | | Varied |
| Operational Restrictions† | | Varied |
| Resilient or Damped Wheels* | For rolling noise on tangent track: | 2 dB |
| | For wheel squeal on curved track: | 10-20 dB |
| Vehicle Skirts* | | 6-10 dB |
| Undercar Absorption* | | 5 dB |
| Quiet Fan Design and Fan Placement* | | Varied |
| Preventative Maintenance on Rail Systems* | | Varied |
| Resurfacing Roads** | | 10 dB |
| Guideway Support for Buses†** | | 10 dB |
| Turn Radii Greater than 1000 ft* | | Avoids Squeal |
| Rail Lubrication on Sharp Curves* | | Reduces Squeal |
| Movable-Point Frogs (reduce rail gaps at crossovers)* | | Reduces Impact Noise |
| Engine Compartment Treatments | | 6-10 dB |
| Quiet Zones* | | Reduces occurrence of horn noise |

†FTA does not normally accept operational restrictions as a noise mitigation measure – see below.
* Applies to rail projects only.
** Applies to bus projects only.



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- **Stringent Vehicle and Equipment Noise Specifications**
  - **Vehicles** – Among the most effective noise mitigation treatments is noise control during the specification and design of the transit vehicle. Such source treatments apply to all transit modes. By developing and enforcing stringent but achievable noise specifications, the transit property takes a major step in controlling noise everywhere on the system. It is important to ensure that the noise levels quoted in the specifications are achievable with the application of best available technology during the development of the vehicle and reasonable considering the noise reduction benefits and costs.

    Effective enforcement includes penalties for non-compliance with the specifications. The noise mitigation achieved by source treatment is dependent on the quality of installation and maintenance. Vehicles failing to meet the noise specification could result in complaints from the public and require additional noise mitigation measures applied along the path or at receivers.

  - **Stationary sources** – Stringent but achievable noise specifications for stationary sources are also an effective approach for mitigating noise impacts. Typical equipment includes fixed plant equipment such as transformers and mechanical equipment, as well as grade-crossing signals. For example, it may be possible to reduce noise impact from grade-crossing signals in some areas by specifying equipment that sets the level of the warning signal lower in locations where ambient noise is lower to minimize the signal noise in the direction of noise-sensitive receivers.

- **Operational Restrictions** – Changes in operations that can mitigate noise include the lowering of speed, the reduction of nighttime (10 p.m. to 7 a.m.) operations, and reduction of warning horns and signals.

  - **Speed reduction** – Because noise from most transit vehicles is dependent on speed, a reduction of speed results in lower noise levels. The effect can be considerable. For example, the speed dependency of steel-wheel/steel-rail systems for $L_{eq(1hr)}$ and $L_{dn}$ (Table 4-21) results in a 6-dB reduction when reducing the speed to half of the original speed.

    Although there are tangible benefits from speed reductions during the most noise-sensitive time periods, FTA does not ordinarily accept speed reduction as a noise mitigation measure for two important reasons: speed reduction is unenforceable and negated if vehicle operators do not adhere to established policies, and it is contrary to the purpose of the transit investment by FTA, which is to move as many people as possible as efficiently and safely as possible.

  - **Reduction of nighttime operations** – Complete elimination of nighttime operations has a strong effect on reducing the $L_{dn}$, because nighttime noise is increased by 10 dB when calculating $L_{dn}$. But restrictions on operations are usually not feasible because of service demands. FTA generally does not pursue restrictions on operations as a



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noise reduction measure. However, if early morning idling can be curtailed to the minimum necessary, however, this can have a measurable effect on $L_{dn}$.

While there are tangible benefits from limits on operations during the most noise-sensitive time periods, FTA does not recommend limits on operations as a way to reduce noise impacts because it is contrary to the purpose of the transit investment by FTA which is to move as many people as possible as efficiently and safely as possible.

- **Reduction of warning horns and signals** – Minimizing or eliminating horns and other warning signals at gate crossings can reduce noise impact for light rail and commuter rail systems. Although these mitigation options are limited by safety considerations, they can be effective in the right circumstances. For examples, see quiet zones below and wayside horns in Step 7b.

- **Wheel Treatments (Rail)** – A major source of noise from steel-wheel and steel-rail systems is the wheel/rail interaction that can produce three distinctive sounds: roar, impact, and squeal (as discussed in Section 3.2). Roar is the rolling noise caused by small-scale roughness on the wheel tread and rail running surface. Impacts are caused by discontinuities in the running surface of the rail or by a flat spot on the wheels. Squeal occurs when a steel-wheel tread or its flange rubs across the rail, resulting in resonant vibrations in the wheel that creates a screeching sound. Various wheel designs and other mitigation measures exist to reduce the noise from each of these three mechanisms.

  - **Resilient wheels** – Resilient wheels are effective in eliminating wheel squeal on tight turns with reductions of 10 to 20 dB in the high-frequency range where squeal noise occurs. Rolling noise is also slightly reduced with resilient wheels and typically achieves a 2-dB reduction on tangent track. The costs for resilient wheels are approximately $2000 to $3000 per wheel, as compared to about $400 to $700 for standard steel wheels.[M]

  - **Damped wheels** – Damped wheels, like resilient wheels, are effective in eliminating wheel squeal on tight turns with reductions of 5 to 15 dB in the high-frequency range where squeal occurs. Rolling noise is also slightly reduced by approximately 2 dB on tangent track. This treatment involves attaching vibration absorbers to standard steel wheels. The costs for damped wheels add approximately $500 to $1000 to the normal $700 for each steel wheel.

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[M] Assumes 8 wheels per vehicle.

- **Vehicle Treatments** – Vehicle noise mitigation measures are applied to the various mechanical systems associated with propulsion, ventilation, and passenger comfort. Propulsion systems of transit vehicles include diesel engines, electric motors, and diesel-electric combinations. Noise from the propulsion system depends on the type of unit and how much noise mitigation is built into the design. Mufflers on diesel engines are generally required to meet noise specifications; however, mufflers are generally practical only on buses, not on locomotives. Control of noise from engine casings may require shielding the engine by body panels without louvers, dictating other means of cooling, and ventilation.

  Ventilation requirements for vehicle systems are related to the noise generated by a vehicle. Fan noise often remains a major noise source after other mitigation measures have been instituted because of the need to have direct access to cooling air. This applies to heat exchangers for electric traction motors, diesel engines, and air-conditioning systems. The mitigation options for these systems include:

  - **Quiet fan design and placement** – Fan noise can be reduced by installation of quiet, efficient fans. Forced-air cooling on electric traction motors can be quieter than self-cooled motors at operating speeds. Placement of fans on the vehicle can make a considerable difference in the noise radiated to the wayside or to patrons on the station platforms.

  - **Vehicle skirts and undercar absorption** – The vehicle body design can provide shielding and absorption of the noise generated by the vehicle components. Acoustical absorption under the car has been demonstrated to provide up to 5 dB of mitigation for wheel/rail noise and propulsion-system noise on rapid transit trains. Similarly, vehicle skirts over the wheels can provide more than 5 dB of mitigation. By carrying their own noise barriers, vehicles with these features can provide cost-effective noise reduction. The cost for vehicle skirts will add approximately $5000 to $10000 per vehicle. Undercar absorption will add approximately $3500 per vehicle, assuming that 50% of the underside of the floor is treated.

- **Preventative Maintenance (Rail)** – Preventative maintenance is the best strategy to minimize rail and wheel deterioration. While these are not mitigation measures in the traditional sense and should not be included as mitigation in an environmental document, they can help to keep both noise and vibration levels at a "like-new" level or reduce both noise and vibration in systems with deferred maintenance. This can be accompanied by considerable life cost benefits for the transit system.

  - **Spin-slide control systems** – Similar to anti-locking brake systems (ABS) on automobiles, spin-slide control systems reduce the incidence of wheel flats, a major contributor of impact noise. Trains with smooth wheel treads can be up to 20 dB quieter than those with wheel flats. To be effective, the anti-locking feature should be in operation during all braking phases, including emergency braking. Wheel flats are more likely



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to occur during emergency braking than during dynamic braking. The cost of slip-slide control may be incorporated in the new vehicle costs, but may be between $5,000 and $10,000 per vehicle with a maintenance cost of $200 per year.

- **Wheel truing** – Maintenance of wheels by truing eliminates wheel flats from the treads and restores the wheel profile. As discussed above, wheel flats are a major source of impact noise. As a guideline, it is recommended that wheel sets match within approximately ±0.01 inch and all wheels on the same truck should match within ±0.02 inches to minimize damage and wear to wheels and rails.[34] A wheel truing machine costs approximately $1 million, including associated maintenance materials and labor costs. The TCRP report estimates a system with 700 vehicles would incur a yearly cost of $300,000 to $400,000 for a wheel truing program.

  It is recommended to install wheel-flat detector systems to identify vehicles that are most in need of wheel truing. These systems are becoming more common on railroads and intercity passenger systems, but are relatively rare on transit systems.

- **Rail grinding** – The smoothness of the running surface is critical in the mitigation of noise from a moving vehicle. Mill scale grinding before commencement of pre-revenue service train operations is critical. Experience shows that grinding new rails after approximately 3 months of train operations and scheduling routine grinding at approximate intervals of 2 years in the problem areas would minimize noise problems related to corrugation in most cases. Grinding with small machines when the corrugation depth is still small is a reasonable approach. As a guideline, it is recommended to spot-grind at locations where corrugation occurs before corrugation grows to 0.02 inches (32).

  Periodic rail grinding can result in a net savings per year on wheel and rail wear. Most transit systems contract out rail grinding, although some of the larger systems make the investment of approximately $1 million for the equipment and do their own grinding. Contractors typically charge a fixed amount per day for the equipment on site, plus an amount per pass-mile (one pass of the grinding machine for one mile). Typical rail grinding cost would be approximately $7,000 to $10,000 per pass-mile.

- **Wheel and rail profile matching** – It is important to consider the wheel and rail profile compatibility when truing wheels and grinding rails. If the profiles do not match, the benefits of this kind of preventative maintenance will not be achieved.

  It is equally important to consider initial wheel and rail profile compatibility. Work with track designers and vehicle suppliers early in the design process to ensure wheel and rail profile compatibility. Profiles should be defined during the design phase and should be in

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place when system opens.[32] The cost of wheel and rail profile matching may be incorporated in the new vehicle and new rail costs.

Profile grinding of the rail head in combination with a wheel truing program may be the most practical approach to controlling and reducing noise and vibration where such practices are not normally conducted.

- **Maintenance program** – Clearly defined maintenance specifications should be developed during design phase of the project. The specifications should define rail and wheel profiles, include detailed guidance for pre-revenue mill scale grinding, address issues related to healthy rail-wheel interface, and include a mechanism for periodic monitoring of wheel and rail condition and verification for compliance.[32] A diligent maintenance program can often resolve or reduce rail noise issues before they occur. Vehicle reconditioning programs should also be developed particularly for components such as suspension system, brakes, wheels, and slip-slide detectors.

- **Guideway Support (Bus)** – The smoothness of the running surface is critical in the mitigation of noise from a moving vehicle.
  - **Resurfacing roads** – Roughness on the guideway can be eliminated by resurfacing roads, thereby reducing noise levels by up to 10 dB.
  - **Bridge expansion joint angles and design** – Bridge expansion joints are also a source of noise for rubber-tire vehicles. This source of noise can be reduced by placing expansion joints on an angle or by specifying the serrated type rather than joints with right-angle edges.

- **Turn Radii and Rail Lubrication** – For steel-wheel/steel-rail systems with non-steerable trucks and sharp turns, squeal can typically be eliminated by designing all turn radii to be greater than 1000 ft, or 100 times the truck wheelbase, whichever is less. If this is not possible, squeal can be mitigated by installation of lubricators (though the potential environmental impacts of lubricant application should be factored into this decision).Rail lubricators cost approximately $10,000 - $40,000 per curve.

- **Movable-point and Spring-rail Frogs** – Frogs with spring-loaded mechanisms and frogs with movable points can reduce impact noise near crossovers. According to the TCRP report, a spring frog costs approximately $12,000, twice the cost of a standard frog. A movable point frog involves elaborate signal and control circuitry resulting in higher costs of approximately $200,000.

- **Use of Locomotive Horns at-grade Crossings and Quiet Zones** – In cases where commuter rail operations share tracks or ROW with freight or intercity passenger trains that are part of the general railroad system, the safety rules of the FRA, including the Train Horn Rule, apply.[35] The Train Horn Rule requires that locomotive horns be sounded at public highway grade crossings, although some exceptions are allowed in carefully defined circumstances. Locomotive horns are often a major contributor in



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projections of adverse noise impact, in the community from proposed commuter rail projects. Since noise barriers are not feasible at highway-rail grade crossings, the establishment of quiet zones could be considered.

Quiet zones can be established in which supplemental safety measures (SSMs) are used in place of the locomotive horn to provide an equivalent level of safety at-grade crossings.[vii] By adopting an approved SSM at each public grade crossing, a quiet zone of at least a half-mile long can be established. These measures are in addition to the standard safety devices required at most public grade crossings (e.g., stop signs, reflectorized crossbucks, flashing lights with gates that do not completely block travel over the tracks). Below are four SSMs that have been predetermined by the FRA to fully compensate for the lack of a locomotive horn:

- **Temporary closure of a public highway-rail grade crossing** – This measure requires closure of the grade crossing for one period each 24 hours, and the closure must occur at the same time each day.
- **Four-quadrant gate system** – This measure involves the installation of at least one gate for each direction of traffic to fully block vehicles from entering the crossing.
- **Gates with medians or channelization devices** – This measure keeps traffic in the proper travel lanes as it approaches the crossing. This denies the driver the option of circumventing the gates by traveling in the opposing lane.
- **One-way street with gates** – This measure consists of one-way streets with gates installed, so that all approaching travel lanes are completely blocked.

In addition to the pre-approved SSMs, the FRA rule also identifies a range of other measures that may be used in establishing a quiet zone. These could include modified SSMs or non-engineering types of measures, such as increased monitoring by law enforcement for grade crossing violations or instituting public education and awareness programs that emphasize the risks associated with grade crossings and applicable requirements. These alternative safety measures (ASMs) require approval by FRA based on a demonstration that public safety would not be compromised by eliminating horn usage.

The lead agency for designating a quiet zone is the local public authority responsible for traffic control and law enforcement on the roads crossing the tracks. To satisfy the FRA regulatory requirements, the public transit agency must work closely with this agency while also coordinating with any freight or passenger railroad operator sharing the ROW. The final environmental document should discuss the main considerations in adopting the quiet zone including: the engineering feasibility, receptiveness of the local public authority, consultation with the railroad, preliminary cost estimates, and evidence of the planning and interagency coordination that has occurred to date. If a quiet zone will be relied on as a mitigation measure, the final environmental document should provide reasonable

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[vii] For more information on quiet zones, visit: https://www.fra.dot.gov/Page/P0889.

assurance that any remaining issues can and will be resolved. For more information on documentation requirements see Section 8.

The cost of establishing a quiet zone varies considerably, depending on the number of intersections that must be treated and the specific SSMs, ASMs, or combination of measures that are used. The FRA gives a cost estimate of $15,000 per crossing for installing two 100-foot-long, non-traversable medians that prevent motorists from driving around closed gates. A typical installation of a four-quadrant gate system is in the range of $175,000–$300,000 per crossing.[36] Who pays for the installation of modifications can become a major consideration in a decision to pursue a quiet zone designation, especially in cases where noise from preexisting railroad operations is controversial in the community. In many cases where a quiet zone would mitigate a severe impact caused by the proposed transit project, the costs are covered by the project sponsor and FTA in the same proportion as the overall cost-sharing for the project.

**7b. Evaluate Path Treatments** – When noise mitigation treatments cannot be applied at the noise source or additional mitigation is required after treating the source, the next preferred placement of noise mitigation is along the noise propagation path between the source and receiver. Common path treatments and their estimated acoustical effectiveness are included in Table 4-34 and described below.

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**Table 4-34 Transit Noise Mitigation Measures – Path Treatments**

| Mitigation Measure | Effectiveness |
|---|---|
| Noise barriers close to vehicles | 6-15 dB |
| Noise barriers at row line | 3-15 dB[07] |
| Alteration of horizontal & vertical alignments | Varied |
| Wayside horns | Varied |
| Acquisition of buffer zones | Varied |
| Ballast on at-grade guideway* | 3 dB |
| Ballast on aerial guideway* | 5 dB |
| Resilient track support on aerial guideway | Varied |
| Vegetation and trees | Varied, see Table 4-30 |

* Applies to rail projects only.

- **Noise Barriers** – Noise barriers are effective in mitigating noise when they break the line-of-sight between source and receiver. The mechanism of sound shielding is described in Section 3.3. The necessary height of a barrier depends on the source height and the distance from the source to the barrier, see Table 4-28 and Figure 4-18.
  - **Noise barriers close to vehicles** – Barriers located very close to a rapid transit train, for example, may only need to be approximately 3 to 4 ft above the top of rail to be effective. Standard barriers close to vehicles can provide noise reductions of 6 to 10 dB.
  - **Noise barriers at ROW line –** Barriers on the ROW line or for trains on the far track, the height must be increased to provide equivalent effectiveness to barriers located close to the vehicles. Otherwise, the effectiveness can drop to 3 dB or less, even if the barrier breaks the line-of-sight.

All barrier effectiveness can be increased by as much as 5 dB by applying sound-absorbing material to the inner surface of the barrier. The length of the barrier wall is also important to its effectiveness. The barrier must be long enough to block noise from a moving train along most of its visible path. This is necessary so that train noise from beyond the ends of the barrier will not severely compromise noise-barrier performance at noise-sensitive locations. The barrier length can be refined in the engineering phase, closely examining the predicted sound level exceedances at specific receivers, site geometries, and the contribution of barrier flanking noise, then adjusting the length as appropriate.

Noise barriers can be made of any outdoor weather-resistant solid material that meets the minimum sound transmission loss required by the project. Materials that are commonly used for noise barriers include 16-gauge steel, 1-inch thick plywood, and any reasonable thickness of concrete. Typically, a surface density of 4 pounds per square foot is required. Areas with strong winds may require more stringent structural requirements. It is critical to seal any gaps between barrier panels and between the barrier and the ground or elevated guideway deck for maximum performance.

Costs for noise barriers (based on highway installations) range from $20 to $25 per square foot of installed noise barrier at-grade with additional cost for design and inspection.[38] Installation on aerial structures could be twice the amount of installation at-grade, especially if the structure has to be strengthened to accommodate the added weight and wind load.

As described in Section 3.3, noise barriers, if not designed and sited carefully, can reduce visibility of trains for pedestrians and motorists, which causes safety concerns. It is important to consult with safety experts in choosing and siting a noise barrier.

- **Alteration of Horizontal and Vertical Alignments** – Transit alignment in a cut as part of grade separation can accomplish the same result as installation of a noise barrier at-grade or on aerial structure. The walls of the cut serve the same function as barrier walls in breaking the line-of-sight between source and receiver.

- **Wayside Horns** – The sounding of a locomotive horn as the train approaches an at-grade intersection produces a very wide noise footprint in the community. Using wayside horns at these intersections instead of the locomotive horn can substantially reduce the noise footprint without compromising safety at the grade crossing.

  A wayside horn does not need to be as loud as a locomotive horn, and the warning sound is focused only on the area where it is needed. These are pole-mounted horns used in conjunction with flashing lights and gates at the intersection, with a separate horn oriented toward each direction of oncoming vehicle traffic. Noise levels in nearby residential and business areas can be reduced substantially with wayside horns, depending on the location with respect to the grade crossing.



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A plan to use wayside horns in place of the locomotive horn at public grade crossings must be coordinated with several public and private entities, notably the local agency having responsibility for traffic control and law enforcement on the road crossings, the state agency responsible for railroad safety, any railroads that share the ROW, and FRA. Public notification must also be given. Preliminary cost information from testing programs indicates a wayside horn system at a railroad/highway grade crossing costs approximately $50,000.

- **Buffer Zones** – Because noise levels attenuate with distance, one noise mitigation option is to increase the distance between noise sources and the closest noise-sensitive receivers. This can be accomplished by locating alignments away from noise-sensitive sites. Acquisition of land or purchasing easements for noise buffer zones is an option that may be considered if appropriate for the project.

- **Ground Absorption – Ballast on Guideways** – Propagation of noise over ground is affected by whether the ground surface is absorptive or reflective. Noise from vehicles on the surface is strongly affected by the character of the ground in the immediate vicinity of the vehicle. Roads and streets for buses are hard and reflective, but the ground at the side of a road has a substantial effect on the propagation of noise to greater distance. Guideways for rail systems can be either reflective or absorptive, depending on whether they are concrete or ballast. Ballast on a guideway can reduce train noise 3 dB at-grade and up to 5 dB on an aerial structure.

- **Vegetation and Trees** – In almost all cases, vegetation and trees are ineffective at providing noise mitigation. Vegetation and Trees can provide some mitigation if at least 100 ft of trees intervene between the source and receiver, if no clear line-of-sight exists between the source and receiver, and if the trees extend 15 ft or more above the line-of-sight as described in Section 4.5, Step 3b. This is generally not a recommended form of mitigation to pursue.

**7c. Evaluate Receiver Treatments –** Consider treatments to the receivers when noise mitigation treatments cannot be applied at the source or along the propagation path, or if combinations of treatments are required. Common receiver treatments and their estimated acoustical effectiveness are included in Table 4-35 and are described in this section.

**Table 4-35 Transit Noise Mitigation Measures – Receiver Treatments**

| Mitigation Measure | Effectiveness |
|---|---|
| Acquisition of Property Rights for Construction of Noise Barriers | 5-10 dB |
| Building Noise Insulation | 5-20 dB |

- **Noise Barriers** – In certain cases, it may be possible to acquire limited property rights for the construction of noise barriers at the receiver. As discussed above, barriers need to break the line-of-sight between the noise source and the receiver to be effective and are most effective when they are



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closest to either the source or the receiver. See Section 3.3 for more information on noise barriers.

- **Building Insulation** – In cases where noise barriers are not feasible—such as multi-story buildings, buildings very close to the ROW, or grade crossings—the only practical noise mitigation measure may be to provide sound insulation for the buildings. In these cases, the need for mitigation at locations where impact has been identified will depend on the use (outdoor vs. indoor), any existing outdoor to indoor reduction in noise levels, and the feasibility of constructing effective noise barriers for second stories and above.

  Depending on the quality of the original building façade, especially windows and doors, sound insulation treatments can improve the noise reductions from transit noise by 5 to 20 dB. To be considered cost-effective, a treatment should provide a minimum reduction of 5 dB in the interior of the building and meet the $L_{dn}$ 45 dBA interior criterion. For more information, see Section 4.1.

  In many cases, especially in locations with high ambient noise levels, the existing sound insulation of a building may already meet the 45 dBA $L_{dn}$ interior noise criterion. It is recommended that sound insulation testing be conducted to determine if the existing sound insulation is sufficient or what additional measures would be required to meet the interior criterion. Effective treatments include:
  - Caulking and sealing gaps in the building façade; and
  - Installation of new doors and windows that are specially designed to meet acoustical transmission-loss requirements:
    - Exterior doors facing the noise source should be replaced with well-gasketed, solid-core wood doors and well-gasketed storm doors.
    - Acoustical windows are typically made of multiple layers of glass with air spaces between to provide noise reduction. Acoustical performance ratings are published in terms of Sound Transmission Class (STC) for these windows. It is recommended to use a minimum STC rating of 39 on any window exposed to the noise source.

  These treatments are beneficial for heat insulation as well as for sound insulation, but acoustical windows are typically non-operable and central ventilation or air conditioning is needed. Residents' preferences should be considered.

  If needed, additional building sound insulation can be provided by sealing vents and ventilation openings and relocating them to a side of the building away from the noise source. In cases where the noise sources is low-frequency noise from diesel locomotives, it may be necessary to increase the mass of the building façade for wood-frame houses by adding a layer of sheathing to the exterior walls.

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Examples of residential sound insulation for rail or highway projects are limited. However, much practical experience with sound insulation of buildings has been gained through grants for noise mitigation to local airport authorities by FAA.

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SECTION 5

# Transit Vibration

This section presents the basic concepts of transit ground-borne vibration, also referred throughout this manual as simple "vibration," and low-frequency groundborne-noise that sometimes results from vibration. The steps for the screening and assessing of potential vibration impacts of transit projects for FTA NEPA approval are described in the following sections.

The Source-Path-Receiver framework for ground-borne vibration for a rail system illustrated in Figure 5-1 is central to all environmental vibration studies. The train wheels rolling on the rails create vibration energy that is transmitted through the track support system into the transit structure. The vibration of the transit structure excites the adjacent ground, creating vibration waves that propagate through the ground and into nearby buildings creating ground-borne vibration effects that potentially interfere with activities. The vibrating building components may radiate sound, which this manual refers to as ground-borne noise. Airborne noise from transit sources is covered in Sections 2.3–4.5 of this manual. Ground-borne noise refers to the noise generated by ground-borne vibration.

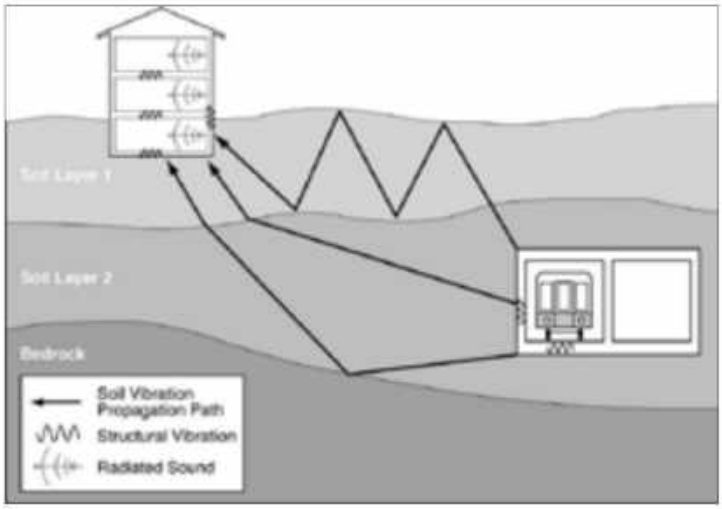


**Figure 5-1 Propagation of Ground-Borne Vibration into Buildings**

This section contains the following:

- Section 5.1 The ground-borne vibration and noise metrics used in this manual
- Section 5.2 An overview of transit vibration sources



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- Section 5.3 An overview of transit vibration paths
- Section 5.4 An overview of receiver factors of transit vibration and a discussion of the technical background for ground-borne noise criteria

## 5.1 Ground-Borne Vibration and Noise Metrics

Vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration. Because the motion is oscillatory, there is no net movement of the vibration element and the average of any of the motion metrics is zero. Displacement is the most intuitive metric. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement and acceleration is the rate of change of the speed.

Although displacement is easier to understand than velocity or acceleration, it is rarely used for describing ground-borne vibration. Most transducers used for measuring ground-borne vibration use either velocity or acceleration. Furthermore, the response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.

This manual uses the metrics outlined in Table 5-1 for transit ground-borne vibration and noise measurements, computations, and assessment. These metrics are consistent with common usage in the United States.

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**Table 5-1 Ground-borne Vibration and Noise Metrics**

| Metric | Abbreviation | Definition |
|---|---|---|
| Vibration Decibels | VdB | The vibration velocity level in decibel scale. |
| Peak Particle Velocity | PPV | The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States. |
| Root Mean Square | rms | The square root of the arithmetic average of the squared amplitude of the signal. |
| A-weighted Sound Level | dBA | A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This unit is used to characterize ground-borne noise. |

The metrics in the table above are illustrated in Figure 5-2. The components in the figure include:

- **Raw signal** – This curve shows the instantaneous vibration velocity, which fluctuates positively and negatively about the zero point.
- **Peak particle velocity (PPV)** – PPV is the maximum instantaneous positive or negative peak of the vibration signal. PPV is often used in monitoring of construction vibration (such as blasting) since it is related to the stresses that are experienced by buildings and is not used to evaluate human response.
- **Root mean square (rms) velocity** – Because the net average of a vibration signal is zero, the rms amplitude is used to describe smoothed vibration amplitude. The rms of a signal is the square root of the

average of the squared amplitude of the signal. The average is typically calculated over a one-second period. The rms amplitude is always less than the PPV[VII] and is always positive. The rms amplitude is used to convey the magnitude of the vibration signal felt by the human body, in inches/second.

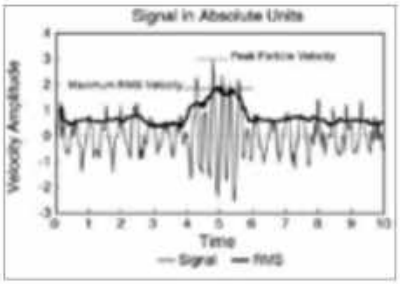


**Figure 5-2 Vibration Signal in Absolute Units**

The PPV and rms velocity are described in inches per second in the United States and meters per second internationally (with several different reference values). Although it is not universally accepted, vibration is commonly expressed in decibel notation. The decibel scale compresses the range of numbers required to describe vibration.

The graph in Figure 5-3 shows the rms curve from Figure 5-2 expressed in decibels.

Vibration velocity level in decibels is defined as:

$$L_v = 20 \log\left(\frac{v}{v_{ref}}\right) \qquad \text{Eq. 5-1}$$

where:

$L_v$ = velocity level, VdB
$v$ = rms velocity amplitude
$v_{ref}$ = $1 \times 10^{-6}$ in/sec in the USA
= $1 \times 10^{-8}$ m/sec internationally*

*Because of the variations in the reference quantities, it is important to be clear about what reference quantity is being used when specifying velocity levels. All vibration levels in this manual are referenced to $1 \times 10^{-6}$ inches/second.

[VII] The ratio of PPV to maximum rms amplitude is defined as the crest factor for the signal. The crest factor is typically greater than 1.41, although a crest factor of 8 or more is not unusual for impulsive signals. For ground-borne vibration from trains, the crest factor is usually 4 to 5.



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**Figure 5-3 Vibration Signal in RMS Velocity Decibels**

Ground-borne noise occurs when vibration radiates through a building interior and creates a low-frequency sound, often described as a rumble, as a train passes by. The annoyance potential of ground-borne noise is typically characterized with the A-weighted sound level. Although the A-weighted sound level is typically used to characterize community noise, characterizing low-frequency noise using A-weighting can be challenging because the non-linearity of human hearing causes sounds dominated by low-frequency components to seem louder than broadband sounds (sounds consisting of many frequency components, with no dominant frequencies) that have the same A-weighted level. The result is that ground-borne noise with a level of 40 dBA sounds louder than 40 dBA broadband noise. Because ground-borne noise sounds louder than broadband noise at the same noise level, the limits for ground-borne noise are lower (i.e., stricter) than would be the case for broadband noise.

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## 5.2 Sources of Transit Ground-borne Vibration and Noise

Ground-borne vibration can be a concern for nearby neighbors of a transit system route or maintenance facility. However, in contrast to airborne noise, ground-borne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. This section discusses common sources of ground-borne vibration and noise.

Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of vibration waves that propagate through the ground and create perceptible ground-borne vibration in nearby buildings include construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is fairly smooth, the vibration from rubber-tired traffic is rarely perceptible. Building damage due to vibration is also rare for typical transportation projects; but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings.

Figure 5-4 illustrates common vibration sources and the human and structural response to ground-borne vibration ranging from approximately 50 VdB (below

perceptibility) to 100 VdB (the threshold of potential damage). The background vibration velocity level in residential areas is usually 50 VdB or lower,[ix] and the threshold of perception for humans is approximately 65 VdB. A vibration level of 85 VdB in a residence can result in strong annoyance.




*Root Mean Square Vibration Velocity Level in VdB relative to $10^{-6}$ inches/second

**Figure 5-4 Typical Levels of Ground-Borne Vibration**

Rapid transit or light rail systems typically generate vibration levels of 70 VdB or more near their tracks, while buses and trucks rarely create vibration that exceeds 70 VdB unless there are bumps due to frequent potholes in the road. Heavy locomotives on diesel commuter rail systems create vibration levels approximately 5 to 10 dB higher than rail transit vehicles.

Vibration from trains is strongly dependent on factors such as how smooth the wheels and rails are, as well as the resonance frequencies of the vehicle suspension system and the track support system. These systems, like all mechanical systems, have resonances that result in increased vibration response at certain frequencies, called natural frequencies. Unusually rough road or track, steel-wheel flats, geologic conditions that promote efficient propagation of vibration, or vehicles with very stiff suspension systems could increase typical

[ix] Background vibration is typically well below the threshold of human perception and is of concern only when the vibration affects very sensitive manufacturing or research equipment. Electron microscopes and high-resolution lithography equipment are examples of equipment that is highly sensitive to vibration.



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vibration levels by approximately 10 VdB. Common factors that contribute to ground-borne vibration and noise at the source are presented in Table 5-2. These factors are discussed in more detail throughout this Section.

**Table 5-2 Factors that Influence Levels of Ground-Borne Vibration and Noise at the Source**

| Category | Factors | Influence |
|---|---|---|
| Operations and Vehicles | Speed | Higher speeds result in higher vibration levels. Doubling speed results in a vibration level increase of approximately 4 to 6 dB. |
| | Vehicle Suspension | Stiff suspension in the vertical direction can increase the effective vibration forces. On transit cars, the primary suspension has the largest effect on vibration levels. |
| | Wheel Condition and Type | Wheel flats and general wheel roughness are major sources of vibration from steel wheel/steel rail systems. Resilient wheels on rail transit systems can provide some vibration reduction over solid steel wheels, but are usually too stiff to provide substantial reduction. For more information, see Section 6.4, Step 2. |
| Guideway | Track/Roadway Surface | Rough track or rough roads are often sources of excessive vibration. Maintaining a smooth surface will reduce vibration levels. |
| | Track Support System | On rail systems, the track support system is one of the major components in determining the levels of vibration. The highest vibration levels are created by track that is rigidly attached to a concrete trackbed (e.g., track on wood half-ties embedded in the concrete). The vibration levels are much lower when special vibration control track systems such as resilient fasteners, ballast mats, and floating slabs are used. |
| | Transit Structure | Heavier transit structures typically result in the lower vibration levels. The vibration levels from a lightweight bored tunnel will usually be higher than from a poured concrete box subway. |
| | Transit System Elevation | A rail system guideway will be either underground (subway), at-grade, or elevated, with substantial differences in the vibration characteristics at each elevation.<br>▪ Underground: vibration is typically the most important environmental factor of interest.<br>▪ At-grade: airborne noise is typically the dominant factor, although vibration and noise can be a problem, particularly at interior locations well isolated from exterior noise.<br>▪ Elevated: it is rare for vibration to be an issue with elevated railways except when guideway supports are located within 50 ft of buildings. |

Brief discussions of ground-borne vibration and noise sources for different modes of transit are provided below.

**At-Grade Heavy Rail and Light Rail**

Ground-borne vibration and noise from urban heavy rail and LRT is common when there is less than 50 ft between the track and building foundations. Local geology and structural details of the building determine if the source of complaints is due to perceptible vibration or audible ground-borne noise. Complaints about ground-borne vibration from surface track are more common than ground-borne noise complaints. A substantial percentage of complaints about both ground-borne vibration and noise correlate with proximity of special track work, rough or corrugated track, or wheel flats. Light rail systems tend to generate fewer complaints than heavy rail due to lower operating speeds.

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**Commuter and Intercity Passenger Trains**
There is the potential for vibration-related issues when new commuter or intercity rail passenger service (including electric multiple units (EMUs) and diesel multiple units (DMUs)) powered by either diesel or electric locomotives is introduced in an urban or suburban area. Commuter and intercity passenger trains have similar characteristics, but commuter trains typically operate on a more frequent schedule. These passenger trains often share track with freight trains, which have different vibration characteristics as discussed below.

**Freight Trains**
Local and long-distance freight trains are similar in that they both are diesel-powered and have the same types of cars. They differ in their overall length, number and size of locomotives, and number of heavily loaded cars. However, because locomotive suspensions are similar, the maximum vibration levels of local and long-distance freights are similar. Locomotives and rail cars with wheel flats are the sources of the highest vibration levels.

If the transit project does not in any way change the freight service, tracks, etc., then vibration from the freight line would be part of the existing conditions and need to be considered in terms of cumulative impacts (see Section 6.2, Step 3 on how to consider cumulative impacts). If the project results in changes to the freight path, operations, frequency, etc. (e.g., relocating freight tracks within the ROW to make room for the transit tracks) then those potential impacts and mitigation should be evaluated as part of the proposed project. However, note that vibration mitigation is very difficult to implement on tracks where freight trains with heavy axle loads operate.

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**High-Speed Passenger Trains**
Passenger trains travelling at high speeds, 90 to 250 miles per hour, have the potential for creating high levels of ground-borne vibration. Ground-borne vibration should be anticipated as one of the major environmental impacts of any trains travelling at high speeds located in an urban or suburban area.[x] For projects that are specifically high-speed transportation refer to the FRA "High-Speed Ground Transportation Noise and Vibration Impact Assessment" guidance manual.[39]

**AGT Systems**
AGT systems include a wide range of transportation vehicles that provide local circulation in downtown areas, airports, and theme parks. Because AGT systems normally operate at low speeds, have lightweight vehicles, run on elevated structures, and rarely operate in vibration-sensitive areas, ground-borne vibration problems are very rare.

**Subway and At-grade Track**
While ground-borne vibration produced from trains operating subway and at-grade track have very different characteristics, they have comparable overall vibration velocity levels. Complaints about ground-borne vibration are often more common near subways than near at-grade track. This is not because

[x] Amtrak trains (branded Acela at the time of publication) on the Northeast Corridor between Boston and Washington, DC, which attain moderate to high speeds in some sections with improved track, fit into this category.

subways create higher vibration levels than at-grade systems, rather because subways are usually located in more densely developed areas in closer proximity to building foundations, and the airborne noise is usually a more serious problem for at-grade systems than the ground-borne vibration. Another difference between subway and at-grade track is that the ground-borne vibration from subways tends to be higher frequency than the vibration from at-grade track, which makes the ground-borne noise more noticeable.

**Streetcars**
Complaints about ground-borne vibration from street cars are uncommon given that streetcars typically operate at very low speeds (less than 25 mph).

**Buses**
Because the rubber tires and suspension systems of buses provide vibration isolation, it is unusual for buses to cause ground-borne vibration or noise problems. For most issues with bus-related vibration, such as rattling of windows, the cause is almost always airborne noise and directly related to running surface conditions such as potholes, bumps, expansion joints, or other discontinuities in the road surface (usually resolved by smoothing the discontinuities).

Buses operating inside buildings will likely cause vibration concerns for other building inhabitants. An example of this situation is a bus transfer station in the same building as commercial office space. Sudden loading of a building slab by a heavy moving vehicle or by vehicles running over lane divider bumps can cause intrusive building vibration.

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## 5.3 Paths of Transit Ground-Borne Vibration and Noise

Vibration travels from the source through the transit structure and excites the adjacent ground, creating vibration waves that propagate through soil layers and rock strata to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the building structure. The vibration of the building structure and room surfaces can radiate a low-frequency rumble called ground-borne noise (Figure 5-1).

Soil and subsurface conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils. Shallow rock may concentrate the vibration energy close to the surface, resulting in ground-borne vibration problems at large distances from the track. Factors such as soil layers and depth to water table can have substantial effects on the propagation of ground-borne vibration. These factors are summarized in Table 5-3.

**Table 5-3 Factors that Influence Levels of Ground-borne Vibration and Noise along Path**

| Geology Factors | Influence |
|---|---|
| Soil type | Vibration levels are generally higher in stiff clay-type soil than in loose sandy soil. |
| Rock layers | Vibration levels are usually high near at-grade track when the depth to bedrock is 30 ft or less. Subways founded in rock will result in lower vibration amplitudes close to the subway. Vibration levels do not attenuate as rapidly in rock as in soil. |
| Soil layering | Soil layering can have a substantial effect on the vibration levels since each stratum can have considerably different dynamic characteristics. |
| Depth to water table | The presence of the water table may have a substantial effect on vibration, but a definite relationship has not been established. |

## 5.4 Receiver Factors that Influence Ground-Borne Vibration and Noise

Ground-borne vibration is a concern almost exclusively inside buildings. Train vibration may be perceptible to people who are outdoors, but it is very rare for outdoor vibration to cause complaints.

The vibration levels inside a building are dependent on the vibration energy that reaches the building foundation, coupling of the building foundation to the soil, and propagation of the vibration through the building. In general, the heavier a building is, the lower the response will be to the incident vibration energy. Common factors that contribute to ground-borne vibration and noise at the receiver are presented in Table 5-4.

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**Table 5-4 Factors that Influence Levels of Ground-Borne Vibration and Noise at the Receiver**

| Receiver Building Factors | Influence |
|---|---|
| Foundation type | The heavier the building foundation, the greater the coupling loss as the vibration propagates from the ground into the building. |
| Building construction | Each building has different characteristics relative to structure-borne vibration, but, in general, the heavier the building, the lower the levels of vibration. The maximum vibration amplitudes of the floors and walls of a building will often occur at the resonance frequencies of the components of the building. |
| Acoustical absorption | The more acoustically absorptive materials in the receiver room, the lower the ground-borne noise level. Note that because ground-borne noise usually is a low-frequency phenomenon, it is affected by low-frequency absorption (e.g., below 250 Hz). |

## 5.5 Human Response to Transit Ground-borne Vibration and Noise

This section contains an overview of human receiver response to ground-borne vibration and noise. It serves as background information for the vibration impact criteria in Section 6.2.

The effects of ground-borne vibration can include perceptible movement of floors in buildings, rattling of windows, shaking of items on shelves or hanging on walls, and low-frequency noise (ground-borne noise). Building damage is not a

factor for typical transportation projects, but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings. Although the perceptibility threshold is approximately 65 VdB, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB (Figure 5-4). A vibration level that causes annoyance is well below the damage risk threshold for typical buildings (100 VdB).

Ground-borne vibration is almost never a problem outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of a building, the motion does not provoke the same adverse human reaction. Ground-borne noise that accompanies the building vibration is usually perceptible only inside buildings and typically is only an issue at locations with subway or tunnel operations where there is no airborne noise path or for buildings with substantial sound insulation such as a recording studio.

One of the challenges in developing suitable criteria for ground-borne vibration is that there has been relatively little research into human response to vibration and, specifically, human annoyance with building vibration. The American National Standards Institute (ANSI) developed criteria for evaluation of human exposure to vibration in buildings in 1983,[40] and the International Organization for Standardization (ISO) adopted similar criteria in 1989[41] and revised them in 2003.[42] The 2003 version of ISO 2631-2 acknowledges that "human response to vibration in buildings is very complex." It further indicates that the degree of annoyance cannot always be explained by the magnitude of the vibration alone. In some cases, complaints are associated with measured vibration that is lower than the perception threshold. Other phenomena such as ground-borne noise, rattling, visual effects such as movement of hanging objects, and time of day (e.g., late at night) all play some role in the response of individuals. To understand and evaluate human response, which is often measured by complaints, all of these related effects need to be considered.

Figure 5-5 illustrates the relationship between the vibration velocity level measured in 22 homes and the general response of the occupants to the vibration from measurements performed for several transit systems along with subjective ratings by researchers and residents. These data are published in the "State-of-the-Art Review of Ground-borne Noise and Vibration."[43] The figure also includes a curve representing the percent of people annoyed by vibration from high-speed trains from a Japanese study for comparison.[44]

Both the occupants and the people who performed the measurements agreed that floor vibration in the Distinctly Perceptible range is unacceptable for a residence. The data indicates that residential vibration exceeding 75 VdB is unacceptable for a repetitive vibration source such as rapid transit trains that pass every 5 to 15 minutes. The results from the Japanese study confirm the conclusion that at a vibration velocity level of 75 to 80 VdB, many people will find the vibration annoying. A Transportation Research Board (TRB) study of human response to vibration from 2009 also supports this finding and indicates that incidence of complaints fall rapidly with a level decreasing below 72 VdB.[42][45]

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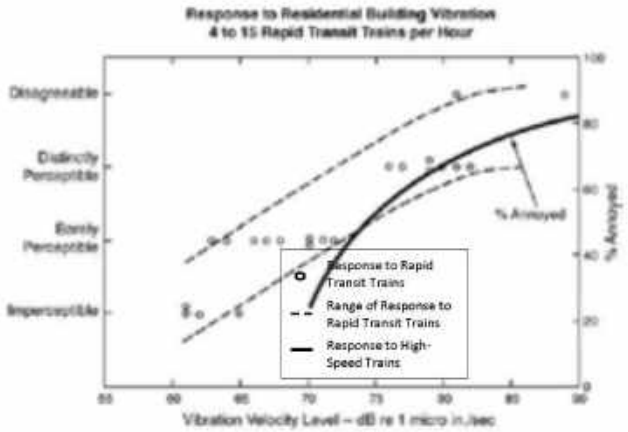


**Figure 5-5 Response to Transit-Induced Residential Vibration**

Table 5-5 presents the human response to different levels of ground-borne vibration and noise on which the criteria presented in Section 6.2 are based. The vibration level (VdB) is presented with the corresponding frequency assuming that the vibration spectrum peaks at 30 Hz or 60 Hz.[xi] The ground-borne noise levels (dBA) are estimated for the specified vibration velocity with a peak vibration spectrum of 30 Hz (Low Freq) and 60 Hz (Mid Freq). Note that the human response differs for vibration velocity level based on frequency. For example, the noise caused by vibrating structural components may cause annoyance even though the vibration cannot be felt. Alternatively, a low-frequency vibration can cause annoyance while the ground-borne noise level it generates does not.

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Cont.

[xi] The A-weighted level of ground-borne noise can be estimated by applying A-weighting to the vibration velocity spectrum and by subtracting an additional 5 dB for a room with average acoustical absorption. Since the A-weighting at 31.5 Hz is -39.4 dB, if the vibration spectrum peaks at 30 Hz, the A-weighted sound level will be approximately 40 dB lower than the velocity level. If the vibration spectrum peaks at 60 Hz, the A-weighted sound level will be approximately 25 dB lower than the velocity level.

**Table 5-5 Human Response to Different Levels of Ground-Borne Vibration and Noise**

| Vibration Velocity Level | Noise Level | | Human Response |
|---|---|---|---|
| | Low Freq* | Mid Freq** | |
| 65 VdB | 25 dBA | 40 dBA | Approximate threshold of perception for many humans. Low-frequency sound: usually inaudible. Mid-frequency sound: excessive for quiet sleeping areas. |
| 75 VdB | 35 dBA | 50 dBA | Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise: tolerable for sleeping areas. Mid-frequency noise: excessive in most quiet occupied areas. |
| 85 VdB | 45 dBA | 60 dBA | Vibration tolerable only if there are an infrequent number of events per day. Low-frequency noise: excessive for sleeping areas. Mid-frequency noise: excessive even for infrequent events for some activities. |

*Approximate noise level when vibration spectrum peak is near 30 Hz.
**Approximate noise level when vibration spectrum peak is near 60 Hz.

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Cont.

SECTION 6

# Vibration Impact Analysis

The FTA vibration impact analysis process is a multi-step process used to evaluate a project for potential vibration impacts. If impact is determined, measures necessary to mitigate adverse impacts are to be considered for incorporation into the project.[3]

The FTA vibration impact analysis steps are summarized as follows and are described in the following sections:

**6.1** Determine vibration analysis level.

**6.2** Determine vibration impact criteria.
- **Option A:** General Vibration Assessment Criteria
- **Option B:** Vibration Impact Criteria for a Detailed Vibration Analysis

**6.3** Evaluate Impact: Vibration Screening Procedure
- **Step 1:** Classify project vehicles.
- **Step 2:** Determine project type.
- **Step 3:** Determine screening distance.
- **Step 4:** Identify vibration-sensitive land uses.

**6.4** Evaluate Impact: General Vibration Assessment.
- **Step 1:** Select base curve for ground surface vibration level.
- **Step 2:** Apply adjustments.
- **Step 3:** Inventory vibration impact.

**6.5** Evaluate Impact: Detailed Vibration Analysis
- **Step 1:** Characterize Existing Vibration
- **Step 2:** Estimate Vibration Impact
- **Step 3:** Assess Vibration Impacts
- **Step 4:** Determine Vibration Mitigation Measures

A similar process for the noise impact analysis is presented in Section 4. After the noise and vibration analyses have been completed, assess construction noise and vibration according to Section 7 and document findings according to Section 8.

## 6.1 Determine Vibration Analysis Level

There are three levels of analysis to assess the potential ground-borne vibration and noise impacts resulting from a public transportation project. The appropriate level of analysis varies by project based on the type and scale of the project, the stage of project development, and its environmental setting. These three levels are: the Vibration Screening Procedure, the General Vibration Assessment, and the Detailed Vibration Analysis. These levels of vibration analysis mirror the levels of noise analysis discussed in Section 4.2.

The Vibration Screening Procedure, performed first, defines the study area of any subsequent vibration impact assessment. Where there is potential for



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impact, the General Vibration Assessment and Detailed Vibration Analysis procedures are used to determine the extent and severity of impact. In some cases, a General Vibration Assessment may be all that is needed. However, if the proposed project is near noise-sensitive land uses and it appears at the outset that the impact would be substantial, it is prudent to conduct a Detailed Vibration Analysis.

The methods for analyzing transit vibration are consistent with those described in recognized handbooks and international standards.[46][47]

*Conduct the vibration screening procedure and then determine the appropriate vibration analysis option:*

**Vibration Screening Procedure** – The Vibration Screening Procedure is a simplified method of identifying the potential for vibration impact from transit projects. The Vibration Screening Procedure is applicable to all types of transit projects and does not require any specific knowledge about the vibration characteristics of the system or the geology of the area. This procedure uses simplified assumptions and considers the type of project and the presence or absence of vibration-sensitive land uses within a screening distance that has been developed to identify most potential vibration impacts. If no vibration-sensitive land uses are present within the defined screening distance, then no further vibration assessment is necessary.

The Vibration Screening Procedure steps are provided in Section 6.3, Step 1.

**General Vibration Assessment** – The General Vibration Assessment is used to examine potential impacts to vibration-sensitive land use areas identified in the screening step more closely. It uses generalized information likely to be available at an early stage in the project development process and during the development of most environmental documents.

Vibration levels at receivers are determined by estimating the overall vibration velocity level and A-weighted ground-borne noise levels as a function of distance from the track and applying adjustments to account for factors such as track support systems, vehicle speed, type of building, and track and wheel conditions.

A General Vibration Assessment is sufficient for the environmental review of many projects, including projects that compare transit modal alternatives or relocate a crossover or turnout. The General Vibration Assessment may also be sufficient if it results in a commitment to mitigation that eliminates the vibration impacts, such as a change in transit mode or alignment. However, if impact is identified through the General Vibration Assessment procedures and not mitigated, a Detailed Vibration Analysis of the selected alternative must be completed. Most vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done.

The General Vibration Assessment procedure is provided in Section 6.3, Step 2.

**Detailed Vibration Analysis** – The Detailed Vibration Analysis procedure is a comprehensive assessment method that produces the most accurate estimates



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Cont.

of vibration impact for a proposed project and is often accomplished during the engineering phase of a project when there are sufficient data identifying potential adverse vibration impacts from the project. However, a Detailed Vibration Analysis may be warranted earlier in the environmental review process if there are potentially severe impacts due to the proximity of vibration-sensitive land uses. This type of assessment requires professionals with experience in performing and interpreting vibration propagation tests.

A Detailed Vibration Analysis may not be necessary for all segments of a project. Generalized prediction curves from the General Vibration Assessment procedures may be sufficient for most of the alignment, and the Detailed Vibration Analysis procedure may only need to be applied to particularly sensitive receivers (Section 6.3). Note that a Detailed Vibration Analysis is typically required when designing special track-support systems such as floating slabs or ballast mats. These and other costly vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done in the engineering phase of the project.

The Detailed Vibration Analysis procedure is presented in Section 6.3, Step 3.

## 6.2 Determine Vibration Impact Criteria

Use the FTA criteria presented in this section when conducting a General Vibration Assessment or a Detailed Vibration Assessment. Like noise, the sensitivity to vibration varies by land use type, and the criteria represent these sensitivities. These criteria are based on national and international standards,[38][39][48] as well as experience on human response to building vibration. See Section 5.5 for additional background information on the development of FTA vibration criteria. The criteria for environmental impact from ground-borne vibration and noise are based on the maximum root-mean-square (rms) vibration velocity levels for repeated events of the same source.

Determine the appropriate criteria based on the level of analysis (Section 6.1). The impact criteria for the General Vibration Assessment are presented in Option A, and the impact criteria for the Detailed Vibration Analysis are presented in Option B.

### Option A: General Vibration Assessment Criteria

Determine the land use according to Step 1 and the frequency of events according to Step 2. The impact criteria for the General Vibration Analysis are presented in Step 3.

#### Step 1: Land Use Categories

*Determine the appropriate land use category for the receiver of vibration impacts of the project or project segment.* Sensitive land use categories for vibration assessment are presented in Table 6-1 in order of sensitivity. Consider indoor use of the buildings when determining land use categories for ground-borne vibration and noise, since impact is experienced indoors.



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**Table 6-1 Land Use Categories for General Vibration Assessment Impact Criteria**

| Land Use Category | Land Use Type | Description of Land Use Category |
|---|---|---|
| - | Special Buildings | This category includes special-use facilities that are very sensitive to vibration and noise that are not included in the categories below and require special consideration. However, if the building will rarely be occupied when the source of the vibration (e.g., the train) is operating, there is no need to evaluate for impact. Examples of these facilities include concert halls, TV and recording studios, and theaters. |
| 1 | High Sensitivity | This category includes buildings where vibration levels, including those below the threshold of human annoyance, would interfere with operations within the building. Examples include buildings where vibration-sensitive research and manufacturing* is conducted, hospitals with vibration-sensitive equipment, and universities conducting physical research operations. The building's degree of sensitivity to vibration is dependent on the specific equipment that will be affected by the vibration. Equipment moderately sensitive to vibration, such as high resolution lithographic equipment, optical microscopes, and electron microscopes with vibration isolation systems are included in this category.** For equipment that is more sensitive, a Detailed Vibration Analysis must be conducted. |
| 2 | Residential | This category includes all residential land use and buildings where people normally sleep, such as hotels and hospitals. Transit-generated ground-borne vibration and noise from subways or surface running trains are considered to have a similar effect on receivers.*** |
| 3 | Institutional | This category includes institutions and offices that have vibration-sensitive equipment and have the potential for activity interference such as schools, churches, doctors' offices. Commercial or industrial locations including office buildings are not included in this category unless there is vibration-sensitive activity or equipment within the building. As with noise, the use of the building determines the vibration sensitivity. |

* Manufacturing of computer chips is an example of a vibration-sensitive process.
** Standard optical microscopes can be impacted at vibration levels below the threshold of human annoyance.
*** Even in noisy urban areas, the bedrooms will often be in quiet buildings with effective noise insulation. However, ground-borne vibration and noise are experienced indoors, and building occupants have practically no means to reduce their exposure. Therefore, occupants in noisy urban areas are just as likely to be exposed to ground-borne vibration and noise as those in quiet suburban areas.

- **Ground-borne Vibration** – Locations with equipment that is highly-sensitive to vibration should be included in category 1 or assessed using the Detailed Vibration Analysis procedures (Section 6.3, Step 3) and criteria (Section 6.2, Option B) or specific criteria of the equipment manufacturer.

  Most computer installations or telephone switching equipment is not considered sensitive to vibration. Although the owners of this type of equipment often are concerned with the potential for ground-borne vibration interrupting smooth operation of their equipment, it is rare for computer or other electronic equipment to be particularly sensitive to vibration. This type of equipment is typically designed to operate in common building environments where the equipment may experience occasional disturbances and continuous background vibration caused by other equipment.

- **Ground-borne Noise** – Ground-borne noise is typically only assessed at locations with subway or tunnel operations where there is no airborne noise path, or for buildings with substantial sound insulation such as a recording studio. For typical buildings with at-grade or elevated transit operations, the interior airborne noise levels are often higher than the



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ground-borne noise levels. For interior rooms or other special cases, ground-borne noise may need to be assessed.

### Step 2: Identify Event Frequency

*Determine the appropriate frequency of events for the project or project segment.*

Community response to vibration correlates with the frequency of events and, intuitively, more frequent events of low vibration levels may evoke the same response as fewer high vibration level events. This effect is accounted for in the ground-borne vibration and noise impact criteria by characterizing projects by frequency of events. Event frequency definitions are presented in Table 6-2.

**Table 6-2 Event Frequency Definitions**

| Category | Definition | Typical Project Types |
|---|---|---|
| Frequent Events | More than 70 events per day | Most rapid transit |
| Occasional Events | 30–70 events per day | Most commuter trunk lines |
| Infrequent Events | Fewer than 30 events per day | Most commuter rail branch lines |

### Step 3: Apply Impact Criteria by Land Use and Event Frequency

Select the appropriate impact criteria for ground-borne vibration and noise based on the previously identified land use categories and frequency of events. It is also important to consider the time of vibration sensitivity. If the building is not typically occupied when the vibration source (e.g., train) is operating, it is not necessary to consider impact.

The criteria in this section are appropriate for assessing human annoyance or interference with vibration-sensitive equipment for common projects. While not typical, existing conditions, freight train operations, and building damage may require consideration.

- **Existing Conditions** – The criteria in this section do not consider existing conditions. In most cases, the existing environment does not include a substantial number of perceptible ground-borne vibration or noise events. However, existing conditions must be evaluated in some cases, such as for projects located in an existing rail corridor. For criteria considering existing conditions, see Step 3b.

- **Freight Train Operations** – The criteria are primarily based on experience with passenger train operations. Passenger train operations (rapid transit, commuter rail, and intercity passenger railroad) create vibration events that last approximately 10 seconds or less while a typical line-haul freight train event lasts approximately two minutes. This manual is oriented to transit projects. However, situations will occur when freight train operations must be evaluated, such as when freight train tracks are relocated for a transit project within a railroad ROW. Guidelines on applying these criteria to freight train operations are presented in Step 3c.



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- **Building Damage** – It is extremely rare for vibration from train operations to cause substantial or even minor cosmetic building damage. However, damage to fragile historic buildings located near the ROW may be of concern. Even in these cases, damage is unlikely except when the track is located very close to the structure. Damage thresholds that apply to these structures are discussed in Section 7.2, Step 4 on Construction Vibration Impacts.

**3a. Choose the impact criteria by land use category and event frequency.** The criteria for ground-borne vibration and noise land use categories 1-3 are presented in Table 6-3. The criteria are presented in terms of acceptable indoor ground-borne vibration and noise levels. Impact will occur if these levels are exceeded. Criteria for ground-borne vibration are expressed in terms of rms velocity levels in VdB, and criteria for ground-borne noise are expressed in terms of A-weighted sound pressure levels in dBA.

**Table 6-3 Indoor Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for General Vibration Assessment**

| Land Use Category | GBV Impact Levels (VdB re 1 micro-inch /sec) | | | GBN Impact Levels (dBA re 20 micro Pascals) | | |
|---|---|---|---|---|---|---|
| | Frequent Events | Occasional Events | Infrequent Events | Frequent Events | Occasional Events | Infrequent Events |
| **Category 1**: Buildings where vibration would interfere with interior operations. | 65 VdB* | 65 VdB* | 65 VdB* | N/A** | N/A** | N/A** |
| **Category 2**: Residences and buildings where people normally sleep. | 72 VdB | 75 VdB | 80 VdB | 35 dBA | 38 dBA | 43 dBA |
| **Category 3**: Institutional land uses with primarily daytime use. | 75 VdB | 78 VdB | 83 VdB | 40 dBA | 43 dBA | 48 dBA |

* This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed.
** Vibration-sensitive equipment is generally not sensitive to ground-borne noise; however, the manufacturer's specifications should be reviewed for acoustic and vibration sensitivity.

The criteria for ground-borne vibration and noise for special land uses are presented in Table 6-4. The criteria are presented in terms of acceptable indoor ground-borne vibration and noise levels. Impact will occur if these levels are exceeded. As for the other land uses, the criteria for ground-borne vibration are expressed in terms of rms velocity levels in VdB, and criteria for ground-borne noise are expressed in terms of sound pressure levels in dBA.

**Table 6-4 Indoor Ground-Borne Vibration and Noise Impact Criteria for Special Buildings**

| Type of Building or Room | Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch/sec) | | Ground-Borne Noise Impact Levels (dBA re 20 micro-Pascals) | |
|---|---|---|---|---|
| | Frequent Events | Occasional or Infrequent Events | Frequent Events | Occasional or Infrequent Events |
| Concert halls | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| TV studios | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| Recording studios | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| Auditoriums | 72 VdB | 80 VdB | 30 dBA | 38 dBA |
| Theaters | 72 VdB | 80 VdB | 35 dBA | 43 dBA |



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**3b. Consider the presence of existing vibration conditions.**
When the project will cause vibration more than 5 dB above the existing vibration, the existing source can be ignored, and the standard vibration criteria in Step 3a are appropriate. When the project will cause vibration less than 5 dB above the existing vibration level, use the instructions presented in this section to determine the appropriate impact criteria for the project. For information on characterizing existing vibration conditions, see Section 6.2, Step 3.

Use Table 6-5 and Figure 6-1 to determine the appropriate impact criteria. Sources of existing vibration are typically longer in duration than the events introduced into the environment due to the project. The frequency of use in the rail corridor is also a factor in characterizing the existing conditions. Both factors are considered in the process of determining appropriate impact criteria in Table 6-5 and Figure 6-1.
Examples of projects considering the existing vibration conditions in Table 6-5 and Figure 6-1 include:

- An automated people mover system planned for a corridor with an existing rapid transit service with 220 trains per day that did not have a significant increase in events from the existing 220 trains per day and that is not 3 dB above the existing vibration level would cause no additional impact.
- Where a new commuter rail line shares a heavily-used corridor with a rapid transit system, the project vibration exceeds the existing vibration level, there is not a significant increase in the number of events, and the project vibration exceeds the existing vibration level by 3 dB or more, the projected vibration levels must be evaluated using the standard impact criteria to determine impact.
- If a new transit project will use an existing railroad ROW and the location of existing railroad tracks are shifted, existing vibration can be substantial. The track relocation and reconstruction can result in lower vibration levels that would benefit the receivers and not introduce any adverse impact. However, if the track relocation causes higher vibration levels at vibration-sensitive receivers, then the projected vibration levels must be evaluated using the standard impact criteria to determine impact.

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**Table 6-5 Impact Criteria Considering Existing Conditions**

| Category | Number of Operations (At present – without project) | Criteria |
|---|---|---|
| Heavily Used | More than 12 trains per day | Use the standard vibration criteria in Section 6.2, Step 3a for the following scenarios:<br>• The existing vibration does not exceed the standard vibration criteria.<br>• The existing vibration exceeds the standard vibration criteria and there is a significant increase in events.*<br>• The existing vibration exceeds the standard vibration criteria, and the project vibration is 3 dB or more above the existing vibration.<br>The project has no impact if the existing vibration exceeds the standard vibration criteria, the number of events does not increase significantly, and the project vibration does not exceed the existing vibration by 3 dB or more. |
| Moderately Used | 5 – 12 trains per day | Use the standard vibration criteria in Section 6.2 Step 3a for the following scenarios:<br>• The existing vibration does not exceed the standard vibration criteria.<br>• The existing vibration exceeds the standard vibration criteria, and the project vibration is not 5 dB or more below the existing vibration.<br>The project has no impact if the existing vibration exceeds the standard vibration criteria and the project vibration is at least 5 dB below the existing vibration. |
| Infrequently Used | Fewer than 5 trains per day | The standard vibration criteria in Section 6.2, Step 3a apply. |

* Approximately doubling the number of events is required for a significant increase.

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**Figure 6-1 Existing Vibration[xi] Criteria Flow Chart**

**3c. Apply criteria to freight trains if part of the project.**
Use the criteria presented in Step 3a to assess the vibration from freight trains in shared ROW scenarios because no specific impact criteria exist for freight railroads. It is important to consider that freight operations occur over substantially greater distances than passenger train operations and have different weight and axle loads.

When assessing vibration from freight train operations, consider the locomotive and rail car vibration separately. Since locomotive vibration lasts for a very short time, it can be characterized by the infrequent events category in Table 6-2. Rail car vibration from a typical line-haul freight train usually lasts for several minutes and can be characterized by the frequent events category in Table 6-2. Note

[xi] Vibration is abbreviated as "vib." in this flowchart.



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Cont.

that locomotives often create vibration levels that are 3 to 8 dB higher than those created by rail cars.

Use good engineering judgment to confirm the approach is reasonable for each project. For example, some spur rail lines carry very little rail traffic (sometimes only one train per week) or have short trains, in which case it may not be necessary to evaluate for impact. If there is uncertainty in how to determine the appropriate criteria, contact the FTA Regional office.

Decisions to relocate freight tracks closer to vibration-sensitive sites should be made with the understanding that increased vibration due to freight rail may not be possible to mitigate. Freight rail vibration may not always be successfully mitigated by the same methods as rail transit systems.

### Option B: Vibration Impact Criteria for a Detailed Vibration Analysis

Determine the appropriate impact criteria for ground-borne vibration and ground-borne noise for a Detailed Vibration Analysis.

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### Step 1: Ground-Borne Vibration

*Choose the appropriate criteria based on Figure 6-2 and Table 6-6.*

Ground-borne vibration criteria presented in this section are more detailed than in the General Vibration Assessment. The criteria are based on international standards for the effects of vibration on people related to annoyance and interference with activities in buildings[39] as well as industry standards for vibration-sensitive equipment.[46] The criteria in this section are used to assess the potential for interference or annoyance from building response and to determine performance of vibration reduction methods. Note that for highly-sensitive equipment, specific vibration criteria provided by the manufacturer supersede the criteria in this section.

The criteria are presented by category in Figure 6-2 and are defined by international and industry standards.[39][46] These criteria define limits for acceptable maximum rms vibration velocity level with a one-second averaging time at the floor of the receiving building in terms of a one-third octave band frequency spectrum. Band levels that exceed a particular criterion curve indicate impact; and therefore, mitigation options should be evaluated considering the specific frequency range in which the treatment is most effective. Interpretations of the criteria are presented in Table 6-6.

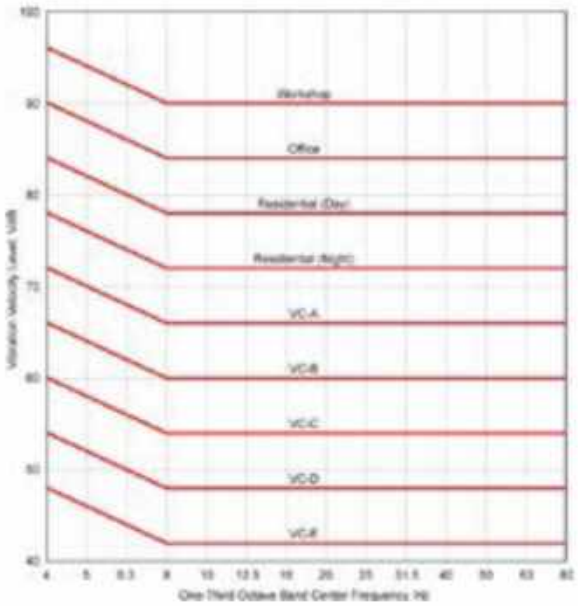


**Figure 6-2 Criteria for Detailed Vibration Analysis**

**Table 6-6 Interpretation of Vibration Criteria for Detailed Vibration Analysis**

| Criterion Curve | Max Lv,* VdB | Description of Use |
|---|---|---|
| Workshop (ISO) | 90 | Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration. |
| Office (ISO) | 84 | Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration. |
| Residential Day (ISO) | 78 | Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20X). |
| Residential Night, Operating Rooms (ISO) | 72 | Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power optical microscopes (100X) and other equipment of low sensitivity. |
| VC-A | 66 | Adequate for medium- to high-power optical microscopes (400X), microbalances, optical balances, and similar specialized equipment. |
| VC-B | 60 | Adequate for high-power optical microscopes (1000X) and inspection and lithography equipment to 3-micron line widths. |
| VC-C | 54 | Appropriate for most lithography and inspection equipment to 1-micron detail size. |
| VC-D | 48 | Suitable in most instances for the most demanding equipment, including electron microscopes operating to the limits of their capabilities. |
| VC-E | 42 | The most demanding criterion for extremely vibration-sensitive equipment. |

* As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hz.



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Cont.

In addition to the uses described in Table 6-6, the detailed vibration criteria can be applied to the three land use categories presented in Table 6-3.

- For residential land uses (category 2), use the residential night criterion curve in Table 6-6.
- For institutional uses (category 3), use the residential day criterion curve in Table 6-6.
- For category 1, the specific use of the building should be matched to the appropriate criterion curve in Table 6-6.
- For special buildings, such as those found in Table 6-4, either the criteria in Table 6-4 or specific criteria presented by the building operator should be used.

These criteria use a frequency spectrum because vibration-related problems generally occur due to resonances of the structural components of a building or vibration-sensitive equipment. Resonant response is frequency-dependent. A Detailed Vibration Analysis can provide an assessment that identifies potential problems resulting from resonances.

The detailed vibration criteria are based on generic cases when people are standing or equipment is mounted on the floor in a conventional manner. Consequently, the criteria are less stringent at very low frequencies below 8 Hz. Where special vibration isolation has been provided in the form of pneumatic isolators, the resonant frequency of the isolation system is very low. Consequently, in this special case, the curves may be extended flat at lower frequencies.

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### Step 2: Ground-borne Noise

Ground-borne noise impacts are assessed based on criteria for human annoyance and activity interference. The Detailed Vibration Analysis procedure provides vibration spectra inside a building. To evaluate ground-borne noise, convert these vibration spectra to sound pressure level spectra in the occupied spaces using the method described in Section 6.5 and compare to the criteria as follows:

- For residential buildings, use the criteria presented in Table 6-3.
- For special buildings listed in Table 6-4, A-weighted noise may not be sufficient to assess activity interference for a Detailed Vibration Analysis. Each special building may have a unique specification for acceptable noise levels and criteria must be determined on a case-by-case basis. For example, a recording studio may have stringent requirements for allowable noise in each frequency band.

## 6.3 Evaluate Impact: Vibration Screening Procedure

*Determine the potential for impact using the Vibration Screening Procedure by identifying any vibration-sensitive land uses (Table 6-1) within the appropriate screening distance.*




**Figure 6-3 Flow Chart of Vibration Screening Process**

## Step 1: Classify Project Vehicles

*Determine the project type and the next step based on the guidelines below.*

**Option A: No Vehicles** – Transit projects that do not involve vehicles do not have potential for vibration impact and do not require further analysis (Box A in Figure 6-3).

Many smaller FTA-funded projects, such as bus terminals, park-and-ride lots, and station rehabilitation are in this category, and do not require further analysis of ground-borne vibration impact. However, if track systems are modified (e.g., tracks moved or switches modified), *proceed to Step 2.*



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**Option B: Steel-wheeled/Steel-rail Vehicles** – Transit projects with steel-wheeled/steel-rail vehicles have potential for vibration impact (Box B in Figure 6-3); *proceed to Step 2*. These rail systems include urban rapid transit, LRT, commuter rail, and steel-wheel intermediate capacity transit (ICT) systems.

**Option C: Rubber-tire Vehicles** – For projects that involve rubber-tire vehicles and do not meet the following conditions, vibration impact is unlikely, and no further analysis is needed. *Proceed to Step 2* for projects that involve rubber-tire vehicles and meet the following conditions (Box A in Figure 6.3):

- **Roadway irregularity** – Expansion joints, speed bumps, or other design features that result in unevenness in the road surface can result in perceptible ground-borne vibration at distances up to 75 ft away.
- **Operation close to vibration-sensitive buildings** – Buses, trucks, or other heavy vehicles operating close to a vibration-sensitive building (within approximately 100 ft from the property line) may impact vibration-sensitive activities, such as research that uses electron microscopes or manufacturing of computer chips.
- **Vehicles operating within buildings** – Special considerations are often required for shared use facilities where vehicles operate inside or directly underneath buildings such bus stations located inside an office building complex.

## Step 2: Determine Project Type

*Determine the project type according to Table 6-7.*

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Cont.

**Table 6-7 Project Types for Vibration Screening Procedure**

| Project Type Number | Project Type | Description |
|---|---|---|
| 1 | Conventional Commuter Railroad | Both locomotives and passenger vehicles create vibration. For commuter trains, the highest vibration levels are typically created by the locomotives. Electric commuter rail vehicles create levels of ground-borne vibration that are comparable to electric rapid transit vehicles. |
| 2 | RRT | Ground-borne vibration impact from rapid transit trains is one of the major environmental issues for new systems. Ground-borne vibration is usually a major concern for subway operations. It is less common for at-grade and elevated rapid transit lines to create intrusive ground-borne vibration and noise since air-borne noise typically dominates. |
| 3 | LRT and Streetcars | The ground-borne vibration characteristics of light rail systems are very similar to those of rapid transit systems. Because the speeds of light rail systems are usually lower, typical vibration levels are usually lower. Steel-wheel/steel-rail AGT is included in either this category or the ICT category depending on the level of service and train speeds. |
| 4 | Intermediate Capacity Transit | Because of the low operating speeds of most ICT systems, vibration problems are not common. However, steel-wheel ICT systems that operate close to* vibration-sensitive buildings have the potential of causing intrusive vibration. With a stiff suspension system, an ICT system could create intrusive vibration. |
| 5 | Bus and Rubber-Tire Transit Projects | This category encompasses most projects that do not include steel-wheel trains of some type. Examples include diesel buses, electric trolley buses, and rubber-tired people movers. Most projects that do not include steel-wheel trains do not cause vibration impacts.** |

*See the screening distances for category 1 land uses in Table 6-8.

** Most complaints about vibration caused by buses and trucks are related to rattling of windows or items hung on the walls. These vibrations are usually the result of airborne noise and not ground-borne vibration. In the case where ground-borne vibration is the source of the complaint, the vibration can usually be attributed to irregularities in the road.

### Step 3: Determine Screening Distance

*Determine the appropriate screening distances based on land use and project type according to Table 6-8.*

The distances are based on the criteria presented in Section 6.3, the procedures in Section 6.4 assuming normal vibration propagation, and include a 5-dB factor of safety. Even so, areas with very efficient vibration propagation can have substantially higher vibration levels.

Because of the 5-decibel safety factor, the screening distances will identify most of the potentially impacted areas, even for areas with efficient propagation. However, when there is evidence of efficient propagation, such as previous complaints about existing transit facilities or a history of problems with construction vibration, increase the distances in Table 6-8 by a factor of 1.5.

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Cont.

**Table 6-8 Screening Distances for Vibration Assessments**

| Type of Project | Critical Distance for Land Use Categories* Distance from ROW or Property Line, ft | | |
|---|---|---|---|
| | Land Use Cat. 1 | Land Use Cat. 2 | Land Use Cat. 3 |
| Conventional Commuter Railroad | 600 | 200 | 120 |
| RRT | 600 | 200 | 120 |
| LRT and Streetcars | 450 | 150 | 100 |
| ICT | 200 | 100 | 50 |
| Bus Projects (if not previously screened out) | 100 | 50 | -- |

*For the Vibration Screening Procedure, evaluate special buildings as follows: Category 1 - concert halls and TV studios, Category 2 - theaters and auditoriums

### Step 4: Identify Vibration-Sensitive Land Uses

Identify all vibration-sensitive land uses (Table 6-1) within the chosen screening distance. If no vibration-sensitive land uses are identified, no further vibration analysis is needed. If one or more of the vibration-sensitive land uses are in the screening distance, complete a General Vibration Assessment (Section 6.4) or a Detailed Vibration Analysis (Section 6.5).

## 6.4 Evaluate Impact: General Vibration Assessment

*Evaluate for impact using the General Vibration Assessment procedure if the Vibration Screening Procedure (Section 6.3) identified vibration-sensitive receivers within the screening distance of the transit vibration source.*

For guidelines on when the General Vibration Assessment is appropriate, review Section 6.1.

The basic approach for the General Vibration Assessment is to define a curve or set of curves that predicts the overall ground-borne vibration as a function of distance from the source, then apply adjustments to these curves to account for factors such as vehicle speed, geologic conditions, building type, and receiver location within the building. When the vehicle type is not covered by the curves included in this section, it will be necessary to define an appropriate curve either by extrapolating from existing information or performing measurements at an existing facility.

### Step 1: Select Base Curve for Ground Surface Vibration Level

*Select a standard vibration curve to represent general vibration characteristics for the source.*

The curves presented in Figure 6-4 are based on measurements of ground-borne vibration at representative North American transit systems and can be used to represent vibration characteristics for standard transportation systems in the General Vibration Assessment.



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Cont.

These curves assume typical ground-borne vibration levels, equipment in good condition, and speeds of 50 mph for the rail systems and 30 mph for buses. Adjustments to account for differences in speed and geologic conditions are included in Step 2.

Select a base curve from Figure 6-4 according to the guidelines in Table 6-9. Equations for the curves in Figure 6-4 are included in Table 6-10. Additional considerations for selecting a base curve for systems not included in Table 6-9 are presented below by transit mode.

**Table 6-9 Ground Surface Vibration Level Base Curve Descriptions**

| Curve | Description |
|---|---|
| Locomotive-Powered Passenger or Freight Curve | Appropriate for vehicles powered by diesel or electric locomotives including intercity passenger trains and commuter rail trains. |
| Rapid Transit or Light Rail Vehicles Curve | Appropriate for both heavy and light-rail vehicles on at-grade and subway track. |
| Rubber-Tired Vehicles Curve | Appropriate for rubber-tire vehicles. These types of vehicles rarely create ground-borne vibration problems unless there is a discontinuity or bump in the road that causes the vibration. This curve represents the vibration level for a typical bus operating on smooth roadway. |

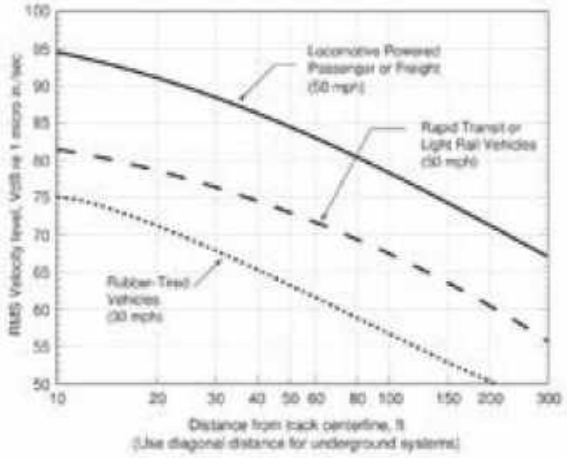


**Figure 6-4 Generalized Ground Surface Vibration Curves**

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Cont.

**Table 6-10 Generalized Ground Surface Vibration Equations**

| Curve | Equation | |
|---|---|---|
| Locomotive Powered Passenger or Freight Curve | $L_v = 92.28 + 14.81\log(D) - 14.17\log(D)^2 + 1.65\log(D)^3$ | Eq. 6-1 |
| Rapid Transit or Light Rail Vehicles Curve | $L_v = 85.88 - 1.06\log(D) - 2.32\log(D)^2 - 0.87\log(D)^3$ | Eq. 6-2 |
| Rubber-Tired Vehicles Curve | $L_v = 66.08 + 34.28\log(D) - 30.25\log(D)^2 + 5.40\log(D)^3$ | Eq. 6-3 |
| $L_v$ = velocity level, VdB<br>$D$ = distance, ft | | |

Considerations for selecting a base curve for different transit modes include:

- **Intercity passenger trains** – Although intercity passenger trains can be an important source of environmental vibration, it is rare that they are considered for FTA-funded projects unless a new transit mode uses an existing rail alignment. When a new transit line uses an existing rail alignment, changes in the intercity passenger traffic can result in either positive or negative impacts. Use the locomotive-powered passenger or freight curve for intercity passenger trains unless there are specific data available on the ground-borne vibration created by the new train operations.
- **Locomotive-powered commuter rail** – Use the locomotive-powered passenger or freight curve for all commuter rail system powered by either diesel or electric locomotives.
- **Electric multiple unit (EMU)** – Use the rapid transit or light rail vehicles curve for self-powered electric commuter rail trains.
- **Diesel multiple unit (DMU)** – Self-powered DMUs create vibration levels somewhere between rapid transit vehicles and locomotive-powered passenger trains. A vibration curve for DMUs can be estimated by lowering the locomotive-powered passenger or freight curve by 5 dB.
- **Subway heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for subway heavy rail and subway light rail. Although vibrations from subway and at-grade tracks have very different characteristics, the overall vibration velocity levels are comparable. When applied to subways, the rapid transit or light rail vehicles curve assumes a relatively lightweight bored concrete tunnel in soil. The vibration levels will be lower for heavier subway structures such as cut-and-cover box structures and stations.
- **At-grade heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for at-grade heavy rail or light rail. Heavy rail and LRT vehicles have similar suspension systems and axle loads and create similar levels of ground-borne vibration.



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Cont.

- **Elevated guideways or aerial structures** – Vibration from operations on an elevated structure is typically not an issue unless the guideway is supported by a building or located very close to buildings. Apply the appropriate adjustment for the aerial structures (Section 6.4, Step 2).

- **Streetcars** – Use the rapid transit or light rail vehicles curve for street cars.

- **ICT** – Use the rapid transit or light rail vehicles curve for ICT systems with steel wheels and the rubber-tired vehicles curve for ICT systems with rubber tires.

- **Other vehicle types** – For less common modes such as magnetically-levitated vehicles (maglev), monorail, or AGT, use good engineering judgment to choose a standard curve to best fit the mode or if a new curve needs to be developed, as a function of distance from the track. Examples include:
  - Vibration from a rubber-tire monorail operating on aerial guideway can be approximated using the rubber-tired vehicles curve with the appropriate adjustment for the aerial structure (Section 6.4, Step 2).
  - Most of the data available on the noise and vibration characteristics of maglev vehicles comes from high-speed systems intended for inter-city service. Even though there is no direct contact between the vehicle and the guideway, the dynamic loads on the guideway can generate ground-borne vibration. Measurements on a German high-speed maglev resulted in ground-borne vibrations at 75 mph which is comparable to the base curve for rubber-tired vehicles at 30 mph.[49]

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## Step 2: Apply Adjustments

*Apply project-specific adjustments to the standard vibration curve.*

Once the base curve has been selected, use the adjustments in the following instructions to develop project-specific vibration projections at each receiver. All adjustments are given as single numbers to add to, or subtract from, the base level.

Adjustments are separated by source, path, and receiver and include speed, wheel and rail type and condition, type of track support system, type of building foundation, and number of floors above the basement level. Calculate the appropriate adjustments to the base level. An example of the General Vibration Assessment is provided at the end of this Section.

It should be recognized that many of these adjustments are strongly dependent on the frequency spectrum of the vibration source and the frequency dependence of the vibration propagation. The adjustments in this section are suitable for generalized evaluation of the vibration impact and vibration

mitigation measures because they are based on typical vibration spectra. However, these adjustments are not adequate for detailed evaluations of impact of vibration-sensitive buildings or for detailed specification of mitigation measures.

**2a.** Apply source adjustments to the base curve using Table 6-11 and the descriptions below to account for the project-specific source characteristics.

**Table 6-11 Source Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Source Factor | Adjustment to Propagation Curve | | | Comment |
|---|---|---|---|---|
| | | Reference Speed | | |
| | Vehicle Speed | 50 mph | 30 mph | |
| Speed | 60 mph | +1.6 dB | +6.0 dB | Vibration level is approximately proportional to 20log(speed/speed$_{ref}$), see Eq. 6-4. |
| | 50 mph | 0.0 dB | +4.4 dB | |
| | 40 mph | -1.9 dB | +2.5 dB | |
| | 30 mph | -4.4 dB | 0.0 dB | |
| | 20 mph | -8.0 dB | -3.5 dB | |
| **Vehicle Parameters (not additive, apply greatest value only)** | | | | |
| Vehicle with stiff primary suspension | +8 dB | | | Transit vehicles with stiff primary suspensions have been shown to create high vibration levels. Include this adjustment when the primary suspension has a vertical resonance frequency greater than 15 Hz. |
| Resilient Wheels | 0 dB | | | Resilient wheels do not generally affect ground-borne vibration except at frequencies greater than about 80 Hz. |
| Worn Wheels or Wheels with Flats | +10 dB | | | Wheel flats or wheels that are unevenly worn can cause high vibration levels. |
| **Track Conditions (not additive, apply greatest value only)** | | | | |
| Worn or Corrugated Track | +10 dB | | | Corrugated track is a common problem. Mill scale* on new rail can cause higher vibration levels until the rail has been in use for some time. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment. |
| Special Trackwork within 200 ft | +10 dB (within 100 ft)<br>+5 dB (between 100 and 200 ft) | | | Wheel impacts at special trackwork will greatly increase vibration levels. The increase will be less at greater distances from the track. Do not include an adjustment for special trackwork more than 200 ft away. |
| Jointed Track | +5 dB | | | Jointed track can cause higher vibration levels than welded track. |
| Uneven Road Surfaces | +5 dB | | | Rough roads or expansion joints are sources of increased vibration for rubber-tire transit. |
| **Track Treatments (not additive, apply greatest value only)** | | | | |
| Floating Slab Trackbed | -15 dB | | | The reduction achieved with a floating slab trackbed is strongly dependent on the frequency characteristics of the vibration. |
| Ballast Mats | -10 dB | | | Actual reduction is strongly dependent on frequency of vibration. |
| High-Resilience Fasteners | -5 dB | | | Slab track with track fasteners that are very compliant in the vertical direction can reduce vibration at frequencies greater than 40 Hz. |

*Mill scale on a new rail is a slightly corrugated condition caused by certain steel mill techniques.

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In addition to the comments in Table 6-11, use the following guidelines to select the appropriate adjustment factors. Some adjustments in the same category are not cumulative (additive) and only the greatest applicable adjustment should be applied. The adjustments that are not additive are noted in Table 6-11 and in the descriptions below. Note that some adjustments are not additive across multiple categories and are noted in the comments of Table 6-11. For example, the adjustment for a vehicle with stiff primary suspension is 8 dB, and the adjustment for wheel flats is 10 dB. If the vehicle has a stiff primary suspension and has wheel flats, the projected vibration levels should be increased by 10 dB, not 18 dB.

In addition, some vibration control measures are targeted for specific frequency ranges. The shape of the actual vibration spectra should be considered so that an appropriate vibration control measure may be selected.

- **Speed** – The levels of ground-borne vibration and noise vary, approximately, as 20 times the logarithm of speed. This means that doubling train speed will increase the vibration levels approximately 6 dB, and halving train speed will reduce the levels by 6 dB. The adjustments in Table 6-11 have been tabulated for reference vehicle speeds of 30 mph for rubber-tired vehicles and 50 mph for steel-wheel vehicles. Use the following relationship to calculate the adjustments for other speeds.

  $$Adj_{speed}\ (dB) = 20\log(\frac{speed}{speed_{ref}})$$ **Eq. 6-4**

  Variation with speed has been observed to be as low as $15\log(\frac{speed}{speed_{ref}})$, but unless specific speed data for vibration for a vehicle has been obtained, use Eq. 6-4.

- **Vehicle Parameters** – The most important factors for the vehicles are the suspension system, wheel condition, and wheel type. Most new heavy rail and light rail vehicles have relatively soft primary suspensions. However, a stiff primary suspension (vertical resonance frequency greater than 15 Hz) can result in higher levels of ground-borne vibration than soft primary suspensions. Vehicles, for which the primary suspension consists of rubber or neoprene around the axle bearing, usually have a very stiff primary suspension with a vertical resonance frequency greater than 40 Hz or more.

  Deteriorated wheel condition is another factor that increases vibration levels. It can be assumed that a new system has vehicles with wheels in good condition. When older vehicles are used on new track, it is important to consider the condition of the wheels, and it may be appropriate to include an adjustment for the wheel condition.

  Resilient wheels will reduce vibration levels at frequencies greater than the effective resonance frequency of the wheel. When this resonance



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frequency is relatively high, greater than 80 Hz, resilient wheels may only have a marginal effect on ground-borne vibration.

The adjustments in this category are not additive; apply the greatest applicable value only.

- **Track Conditions** – This category includes the type of rail (welded, jointed, or special trackwork), the track support system, and the condition of the rail. The base curves assume welded rail in good condition. Jointed rail causes higher vibration levels than welded rail and the increase depends on the condition of the joints.

  Wheel impacts at special trackwork, such as frogs at crossovers, create much higher vibration forces than typical track conditions. Because of the higher vibration levels at special trackwork, crossovers are the principal areas of vibration impact on new systems. Methods of mitigating the vibration impact include modifying the track support system, installing low-impact frogs, or relocating the crossover. Special track support systems such as ballast mats, high-resilience track fasteners, resiliently supported ties, and floating slabs have all been shown to be effective in reducing vibration levels.

  The condition of the running surface of the rails can strongly affect vibration levels. Factors such as corrugations, general wear, or mill scale on new track can cause vibration levels 5 to 15 dB higher than normal. Mill scale will typically wear away after some time in service, but the track must be ground to remove corrugations or to reduce the roughness from wear.

  Roadway surfaces in the rubber-tired vehicle base curve are assumed to be smooth. Rough washboard surfaces, bumps, or uneven expansion joints are the types of running surface defects that cause increased vibration levels over the smooth road condition.

  The adjustments in this category are not additive; apply the greatest applicable value only. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment.

**2b.** Apply path adjustments to the base curve using Table 6-12 and the descriptions below to account for the project-specific path characteristics.

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**Table 6-12 Path Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Path Factor | Adjustment to Propagation Curve | | Comment |
|---|---|---|---|
| Resiliently Supported Ties (Low-Vibration Track, LVT) | -10 dB | | Resiliently supported tie systems have been found to provide very effective control of low-frequency vibration. |
| **Track Structure (not additive, apply greatest value only)** | | | |
| Type of Transit Structure | Relative to at-grade tie & ballast: | | In general, the heavier the structure, the lower the vibration levels. Putting the track in cut may reduce the vibration levels slightly. Rock-based subways generate higher-frequency vibration. |
| | Elevated structure | -10 dB | |
| | Open cut | 0 dB | |
| | Relative to bored subway tunnel in soil: | | |
| | Station | -5 dB | |
| | Cut and cover | -3 dB | |
| | Rock-based | -15 dB | |
| **Ground-borne Propagation Effects** | | | |
| Geologic conditions that promote efficient vibration propagation | Efficient propagation in soil | +10 dB | Refer to the text for guidance on identifying areas where efficient propagation is possible. |
| | Propagation in rock layer | Dist. / Adjust. | The positive adjustment accounts for the lower attenuation of vibration in rock compared to soil. It is generally more difficult to excite vibrations in rock than in soil at the source. |
| | | 50 ft +2 dB | |
| | | 100 ft +4 dB | |
| | | 150 ft +6 dB | |
| | | 200 ft +9 dB | |
| Coupling to building foundation | Wood-Frame Houses | -5 dB | In general, the heavier the building construction, the greater the coupling loss. |
| | 1-2 Story Masonry | -7 dB | |
| | 3-4 Story Masonry | -10 dB | |
| | Large Masonry on Piles | -10 dB | |
| | Large Masonry on Spread Footings | -13 dB | |
| | Foundation in Rock | 0 dB | |

In addition to the comments in Table 6-12, use the following guidelines to select the appropriate adjustment factors.

- **Track Structure** – The weight and size of a transit structure affects the vibration radiated by that structure. In general, vibration levels are lower for heavier transit structures. Therefore, the vibration levels from a cut-and-cover concrete double-box subway can be assumed to be lower than the vibration from a lightweight concrete-lined bored tunnel.

  The vibration from elevated structures is lower than from at-grade track because of the mass and damping of the structure and the extra distance that the vibration must travel before it reaches the receiver. Elevated structures in AGT applications are sometimes designed to bear on building elements. This is a special case and may require detailed design considerations.

  The adjustments in this category are not additive; apply the greatest applicable value only.



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- **Ground-Borne Propagation Effects – Geologic Conditions** – Although it is known that geologic conditions have a considerable effect on the vibration levels, it is rarely possible to develop more than a general understanding of the vibration propagation characteristics for a General Vibration Assessment. One of the challenges with identifying the cause of efficient propagation is the difficulty in determining whether higher than normal vibration levels are due to geologic conditions or due to special source conditions (e.g., rail corrugations or wheel flats).

  Some geologic conditions are repeatedly associated with efficient propagation. Shallow bedrock, less than 30 ft below the surface, is likely to have efficient propagation. Soil type and stiffness are also important factors in determining propagation characteristics. In particular, stiff, clayey soils, consolidated sand, gravel, and glacial till can be associated with efficient vibration propagation. Investigation of soil boring records can be used to estimate depth to bedrock and the presence of problem soil conditions.

  A conservative approach would be to use the 10-dB adjustment for efficient propagation for areas where efficient propagation is likely. However, this adjustment can greatly overstate the potential for vibration impact where efficient propagation is not present and should be applied using good judgment. Review available geological data and any complaint history from existing transit lines and major construction sites near the transit corridor to identify areas where efficient propagation is possible. If there is reason to suspect efficient propagation conditions, conduct a Detailed Vibration Analysis during the engineering phase and include vibration propagation tests at the areas with potential for efficient propagation.

- **Track Structure and Geologic Conditions – Examples**
  - **Subway**

    For a subway, determine if the subway will be founded in bedrock. Bedrock is considered to be hard rock. It is usually appropriate to consider soft siltstone and sandstone to be more like soil than hard rock. Whether a subway is founded in soil or rock can make a 15-dB difference in the vibration levels.

    When a subway structure is founded in rock, include the following Track Structure and Ground-borne Propagation Effects adjustments from Table 6-12:
    - Type of Transit Structure adjustment: Rock-based – 15 dB
    - Geologic Conditions adjustment: Propagation in rock layer for the appropriate distance.

    This adjustment increases with distance because vibration attenuates more slowly in rock than in the soil used as a basis for the reference curve.

- **At-grade** – When considering at-grade vibration sources, determine if the vibration propagation characteristics are typical or efficient. Efficient



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vibration propagation results in vibration levels approximately 10 dB higher than typical levels. This more than doubles the potential impact zone for ground-borne vibration.

- **Ground-Borne Propagation Effects – Coupling to Building Foundation** – Since annoyance from ground-borne vibration and noise is an indoor phenomenon, the effects of the building structure on the vibration must be considered. Wood-frame buildings, such as typical residential structures, are more easily excited by ground vibration than heavier buildings. In contrast, large masonry buildings with spread footings have a low response to ground vibration.

  When a building foundation is directly on the rock layer, there is no coupling loss due to the weight and stiffness of the building. Use the standard coupling factors based on building type if there is at least a 10-foot layer of soil between the building foundation and the rock layer.

**2c.** Apply receiver adjustments to the base curve using Table 6-13 and the descriptions below to account for the project-specific receiver characteristics. The data in Table 6-13 is applicable when the building structural features are known.

For more generic cases that do not have detailed information on individual buildings, use a conservative approach and apply the following adjustments to predict indoor vibration based on the outdoor vibration, instead of using the adjustments in Table 6-13:[43][50]

- Light-weight, wood-frame construction 1st floor: +3 dB
- Light-weight, wood-frame construction 2nd and 3rd floors: +6 dB
- Large buildings: 0 dB
- Small masonry buildings: +3 dB

**Table 6-13 Receiver Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Receiver Factor | Adjustment to Propagation Curve | | Comment |
|---|---|---|---|
| Floor-to-floor attenuation | 1 to 5 floors above grade | -2 dB/floor | This factor accounts for dispersion and attenuation of the vibration energy as it propagates through a building starting with the first suspended floor.* |
| | 5 to 10 floors above grade | -1 dB/floor | |
| Amplification due to resonances of floors, walls, and ceilings | +6 dB | | The actual amplification will vary greatly depending on the type of construction. The amplification is lower near the wall/floor and wall/ceiling intersections. |

* Floor-to-floor attenuation adjustments for the first floor assume a basement.



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In addition to the comments in Table 6-13, use the following guidelines to select the appropriate adjustment factors. Note that receiver adjustments are additive.

- Vibration generally reduces in level as it propagates through a building. As indicated in Table 6-13, a 1- to 2-decibel attenuation per floor is typically appropriate.
- Resonances of the building structure, particularly the floors, will cause some amplification of the vibration. Consequently, for a wood-frame structure, the building-related adjustments nearly cancel out. Example: All adjustments for the first floor assuming a basement are: -5 dB for the coupling loss; -2 dB for the propagation from the basement to the first floor; and +6 dB for the floor amplification. The total adjustment in this case is -1 dB.

**2d.** Apply adjustments to the final adjusted curve using Table 6-14 and the descriptions below to convert ground-borne vibration levels to ground-borne noise levels.

**Table 6-14 Conversion to Ground-borne Noise**

| Conversion to Ground-borne Noise | | | |
|---|---|---|---|
| Noise Level in dBA | Peak frequency of ground vibration: | | Use these adjustments to estimate the A-weighted sound level given the average vibration velocity level of the room surfaces. See text for guidelines for selecting low-, mid-, or high-frequency characteristics. Use the high-frequency adjustment for subway tunnels in rock or if the dominant frequencies of the vibration spectrum are known to be 60 Hz or greater. |
| | Low frequency (<30 Hz) | -50 dB | |
| | Mid Frequency (peak 30 to 60 Hz) | -35 dB | |
| | High frequency (>60 Hz) | -20 dB | |

Estimate the levels of radiated noise using the average vibration amplitude of the room surfaces (floors, walls, and ceiling), and the total acoustical absorption in the room.

The un-weighted sound pressure level is approximately 5 dB[37][43] less than the vibration velocity level when the velocity level is referenced to $1 \times 10^{-6}$ inches/sec; but for a better estimate, it is necessary to consider general frequency ranges. Since ground-borne noise is A-weighted, the adjustments vary by frequency range, as described below. See Appendix B.1.4.1 for more information on A-weighting.

To select the appropriate adjustment, classify the frequency characteristics according to the guidelines below.

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- **Low Frequency (<30 Hz)** – Low-frequency vibration characteristics can be assumed for the following conditions:
  - Subways surrounded by cohesionless sandy soil
  - Vibration isolation track support systems
  - Most surface track
- **Mid Frequency (peak 30 to 60 Hz)** – The mid-frequency vibration characteristic can be assumed for the following conditions:
  - Subways, unless other information indicates that one of the other assumptions is appropriate,
  - Surface track when the soil is very stiff with high clay content
- **High Frequency (>60 Hz)** – High-frequency characteristics can be assumed for the following conditions:
  - Subways with the transit structure founded in rock
  - Subways, when there is very stiff, clayey soil

### Step 3: Inventory of Vibration Impact

*Take inventory of vibration-sensitive land uses with impact and determine if a Detailed Vibration Analysis is required.*

Compare the projected vibration levels, including all appropriate adjustments in Section 6.4, Step 2, to the criteria to determine if impact from ground-borne vibration or noise is likely. Note that for any transit mode, variation in vibration levels under apparently similar conditions is not uncommon. In the General Vibration Assessment, it is preferable to make a conservative assessment of the impact and include buildings that may ultimately not be subject to impact.

The standard curves in Section 6.4, Step 1, represent the upper range of vibration levels from well-maintained systems. Although actual levels fluctuate widely, it is rare that ground-borne vibration will exceed these curves by more than 1 or 2 dB unless there are extenuating circumstances such as wheel- or running-surface defects. However, because actual levels of ground-borne vibration will sometimes differ substantially from the projections, use the following guidelines to interpret vibration impact:

- **Projected vibration is below the impact threshold** – Vibration impact is unlikely, and the environmental document should state this.
- **Projected ground-borne vibration is 0 to 5 dB greater than the impact threshold** – There is a strong chance that actual ground-borne vibration levels will be below the impact threshold. The environmental document should report impact at these locations as exceeding the applicable threshold, present possible mitigation measures and costs, and commit to conducting more detailed studies to refine the vibration impact analysis during the engineering phase. During the Detailed Vibration Analysis, determine appropriate mitigation, if necessary. A site-specific Detailed Vibration Analysis may show that vibration impacts will not occur and control measures are not needed.



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- **Projected ground-borne vibration is 5 dB or greater than the impact threshold** – Vibration impact is probable and Detailed Vibration Analysis must be conducted during the engineering phase to determine appropriate vibration control measures. The environmental document should report impact at these locations as exceeding the applicable threshold, present possible mitigation measures and costs, and commit to conducting more detailed studies to refine the vibration impact analysis during the engineering phase. During the Detailed Vibration Analysis, determine appropriate mitigation, if necessary. A site-specific, Detailed Vibration Analysis may show that very costly vibration mitigation must be incorporated into the project to eliminate the impacts.

FTA recommends the reporting of a vibration level as a single value and not as a range, as ranges tend to confuse the interpretation of impact.

Express the results of the General Vibration Assessment in terms of an inventory with the following components:

- Include all vibration-sensitive land uses as identified in the Vibration Screening Procedure.
- Organize the inventory according to the categories described in Table 6-8.
- Include information on potentially feasible mitigation measures to reduce vibration to acceptable levels based on the generalized reduction estimates provided in this section. To be considered feasible, the measure or combination of measures must provide at least a 5-dB reduction of the vibration levels and be reasonable in terms of cost.

These potential mitigation measures are considered preliminary. Final vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done; see Section 6.5 for more information. Vibration control is frequency-dependent; therefore, specific recommendations of vibration control measures can only be made after evaluating the frequency characteristics of the vibration.

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Cont.

### Example 6-1 General Vibration Assessment – LRT

**General Vibration Assessment for an LRT project**

The hypothetical project is a LRT system that operates at 40 mph on at-grade, ballast and tie track with welded rail. The first floor of houses is at 125 ft from the LRT tracks and there is efficient propagation through the soil. The houses are constructed with wood frames. The houses will be exposed to 260 train passbys per day. Calculate the ground-borne vibration and assess for impact.

**Select Base Curve for Ground Surface Vibration**

Determine the appropriate base curve and the RMS velocity level ($L_v$).

According to Table 6-9, the Rapid Transit or Light Rail Vehicles curve is appropriate.

$L_v = 65\ VdB$ at 125 ft for this curve at 50 mph

**Apply Adjustments**

Apply the appropriate source adjustments using Table 6-11.

$$Source\ Speed\ Adjustment = 20 \log\left(\frac{40}{50}\right) = -1.9\ dB$$
$$L_v = 65 - 1.9 = 63.1\ VdB$$

Apply the appropriate path adjustments using Table 6-12.

$$Efficient\ propagation = +10\ dB$$
$$Coupling\ to\ building\ foundation\ (wood\ frame) = -5\ dB$$
$$L_v = 63.1 + 10 - 5 = 68.1\ VdB$$

Apply the appropriate receiver adjustments using Table 6-13.

$$Amplification\ due\ to\ resonance\ of\ floor = +6\ dB$$
$$First\ floor\ attenuation = -2\ dB$$
$$L_v = 68.1 + 6 - 2 = 72.1\ VdB$$

**Assess for Impact**
Because there are more than 70 events per day, this project is in the Frequent Events category (Table 6-2). For category 2 land uses (residences) with frequent events, the impact criteria is 72 VdB (Table 6-3). Therefore, according to the General Vibration Assessment, there is potential for impact and a Detailed Vibration Analysis should be completed.

## 6.5 Evaluate Impact: Detailed Vibration Analysis

*Evaluate for impact using the Detailed Vibration Analysis procedure, if appropriate (Section 6.1).*

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Cont.

The goal of the Detailed Vibration Analysis is to use all available tools to develop accurate projections of potential ground-borne vibration impact and when necessary, to design mitigation measures. A Detailed Vibration Analysis requires developing estimates of the frequency components of the vibration signal, usually in terms of 1/3-octave-band spectra. The analytical techniques for solving vibration problems are complex, and the technology continually advances. Therefore, the approach presented in this section focuses on the key steps for these analyses. The key elements of the Detailed Vibration Analysis procedure and recommended steps are described below.

The methods in this section generally assume a steel-wheel/rail system. The procedures could be adapted to bus systems. However, this is rarely necessary because vibration impact is very infrequent with rubber-tired transit.

In general, when situations arise that are not explicitly covered in the Detailed Vibration Analysis, professional judgment may be used to extend these methods to cover these unique cases, when appropriate. Appendix G provides information on developing and using non-standard modeling procedures.

### Step 1: Characterize Existing Vibration Conditions

*Conduct measurements to survey and document the existing vibration conditions.*

In contrast to noise impact analysis, the existing ambient vibration is not required to assess vibration impact in most cases; but, it is important to

document general background vibration in the project corridor. Because the existing environmental vibration is usually below human perception, a limited vibration survey is sufficient even for a Detailed Vibration Analysis.

It is particularly valuable to survey vibration conditions at sensitive locations for the following reasons:

- To obtain valuable information on the true sensitivity of the activity to external vibration and obtain a reference condition under which vibration is not problematic.
- To document that existing vibration levels are above or below the normal threshold of human perception for the existing condition.
- To document levels of vibration created by existing rail lines. If vibration from an existing rail line is higher than the proposed train, there may not be impact even if the standard impact criteria are exceeded.
- To use existing vibration sources to characterize propagation. Existing vibration sources such as freight trains, industrial processes, quarrying operations, or normal traffic can be used to characterize vibration propagation. Carefully designed and performed measurements may eliminate the need for more complex propagation tests. See Appendix G for information on using non-standard modeling procedures.
- To identify the potential for efficient vibration propagation. If a measurement site has existing vibration approaching the range of human perception (e.g., the maximum vibration velocity levels are greater than about 65 VdB), then this site should be carefully evaluated for the possibility of efficient vibration propagation.

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Cont.

Conduct measurements to characterize existing vibration conditions. The goal of most ambient vibration measurements is to characterize the rms vertical vibration velocity level at the ground surface. In almost all cases, it is sufficient to measure only vertical vibration and ignore the transverse components of the vibration. Although transverse components[51] can transmit vibration energy into a building, the vertical component typically dominates.

**1a. Choose Measurement Locations** – Conduct outdoor and/or indoor measurements to characterize existing vibration conditions, as appropriate, for the project. Although ground-borne vibration is almost exclusively a problem inside buildings, it is generally recommended to perform measurements outdoors because equipment inside the building may cause more vibration than exterior sources. Additionally, the building structure and the resonances of the building can have strong effects on the vibration that are difficult to predict. It can also be important to measure and document those indoor sources of vibration. These indoor sources may cause vibration greater than that due to external sources like street traffic or aircraft overflights. When measuring (indoor) floor vibration, take measurements near the center of a floor span where the vibration amplitudes are the highest.

**1b. Measurement Considerations**

- **Site selection** – Selecting sites for an ambient vibration survey requires good judgment. Sites selected to characterize a transit corridor should be distributed along the entire project where potential for impacts have been identified and should be representative of the types of vibration environments found in the corridor. This would commonly include:
  - Measurements in quiet, residential areas removed from major traffic arterials to characterize low-ambient vibration areas;
  - Measurements along major traffic arterials and highways or freeways to characterize high-ambient vibration areas;
  - Measurements in any area with vibration-sensitive activities; and
  - Measurements at any major existing source of vibration such as railroad lines.

- **Transducer placement** – Place the transducers near the building setback line. For ambient measurements along railroad lines, it is recommended to include:
  - Multiple sites at several distances from the rail line at each site, and
  - 4 to 10 train passbys for each test.

  Because of the irregular schedule for freight trains and the low number of operations each day, it is often impractical to perform tests at more than two or three sites along the rail line or to measure more than two or three passbys at each site.

  Rail type and condition strongly affect the vibration levels. Consequently, it is important to inspect the track to locate any switches, bad rail joints, corrugations, or other factors that could be responsible for higher than normal vibration levels. Locations with these kinds of irregularities should be represented in addition to locations with rail in better condition.

- **Transducer mounting methods** – The way a transducer is mounted can affect the measured levels of ground-borne vibration.
  - Straightforward methods of mounting transducers on the ground surface or on pavement are adequate for vertical vibration measurements for the frequencies of concern for ground-borne vibration (less than about 200 Hz).
  - Quick-drying epoxy, clay, or beeswax can be used to mount transducers to smooth paved surfaces or metal stakes driven into the ground.
  - Rough concrete or rock surfaces require special mountings. One approach is to use a liberal base of epoxy to attach small aluminum blocks to the surface, and then mount the transducers on the aluminum blocks.
  - When in doubt, review the specific transducer documentation and discuss additional mounting guidance with the transducer manufacturer.



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**1c. Existing Vibration Characterization** – The appropriate methods of characterizing ambient vibration are dependent on the type of information required for the analysis. Consider the following when characterizing the existing vibration:

- **Ambient vibration** – Ambient vibration is usually characterized with a continuous 10- to 30-minute measurement of vibration. The rms velocity level of the vibration velocity level over the measurement period provides an indication of the average vibration energy. The rms velocity level over the measurement period is typically equivalent to a long averaging time rms level.

- **Specific events** – Characterize specific events such as train passbys by the rms level over the time that the train passes by. If the locomotives produce vibration levels more than 5 dB higher than the passenger or freight cars, obtain a separate rms level for the locomotives. The locomotives can usually be characterized by the $L_{max}$ during the train passby. The rms averaging time or time constant should be 1 second when determining $L_{max}$. In some cases, it may be adequate to characterize the train passby using $L_{max}$, which is simpler to obtain than the rms averaged over the entire train passby.

- **Spectral analysis** – Perform a spectral analysis of vibration propagation data. For example, if vibration transmission of the ground is suspected of having particular frequency characteristics, use 1/3-octave band charts to describe vibration behavior. Narrowband spectra also can be valuable, particularly for identifying discrete frequency components and designing specific mitigation measures.

  Note that it is preferred to characterize existing vibration in terms of the rms velocity level instead of the peak PPV, which is commonly used to monitor construction vibration. As discussed in Section 5.1, rms velocity is considered more appropriate than PPV for describing human response to building vibration.

## Step 2: Estimate Vibration Impact

*Estimate ground-borne vibration and noise at sites where significant impact is probable and assess for impact.*

Predicting ground-borne vibration associated with a transportation project continues to be a developing field. Because ground-borne vibration is a complex phenomenon that is difficult to model and predict accurately, most projection procedures that have been used for transit projects rely on empirical data.

The procedure described in this section is based on site-specific tests of vibration propagation. This procedure was developed under a FTA-funded research contract[52] and is recommended for detailed evaluations of ground-borne vibration. Other approaches to a prediction procedure, such as finite element methods, can be used. See Appendix G for information on using non-standard modeling procedures.



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**Overview of Prediction Procedure** – This procedure was developed to allow the use of data collected in one location to accurately predict vibration levels in another site where the geologic conditions may be completely different. The procedure is based on transfer mobility. Transfer mobility is the complex velocity response produced by a point force as a function of frequency. It represents the relationship between a vibration source that excites the ground and the resulting vibration of the ground surface. It is a function of both frequency and distance from the source. The analyses in this manual focus on transfer mobility magnitude, which is the magnitude for the velocity relative to the force without reference to phase. The transfer mobility level is the level in decibels relative to 1E-6 in/lb-s.

The transfer mobility measured at an existing transit system is used to normalize ground-borne vibration data and remove the effects of geology. The normalized vibration is referred to as the force density. Force density is the force per root distance along the track in $lb/ft^{1/2}$. The force density can be combined with transfer mobility measurements at vibration-sensitive sites along a new project to develop projections of future ground-borne vibration.

The transfer mobility between two points completely defines the composite vibration propagation characteristics between the two points. In most practical cases, receivers are close enough to the train tracks that the vibration cannot be considered as originating from a single point. Therefore, the vibration source must be modeled as a line-source. Consequently, the point transfer mobility must be modified to account for a line-source. The subsequent line-source transfer mobility is given in units of decibels relative to 1e-6 in/s/lb/sqrt(ft).

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The prediction procedure considers ground-borne vibration to be divided into several basic components described below and shown in Figure 6-5.

- **Excitation Force (Force Density)** – The vibration energy is created by oscillatory and impulsive forces. Steel wheels rolling on smooth steel rails create random oscillatory forces. When a wheel encounters a discontinuity such as a rail joint, an impulsive force is created. The force excites the transit structure, such as the subway tunnel or the ballast for at-grade track.

  In the prediction method, the combination of the actual force generated at the wheel/rail interface and the vibration of the transit structure are usually combined into an equivalent force density level. The force density level is the level in decibels of the force density relative to 1 $lb/ft^{1/2}$ and describes the force that excites the soil/rock surrounding the transit structure.

- **Vibration Propagation (Transfer Mobility)** – The vibration of the transit structure causes vibration waves in the soil that propagate away from the transit structure. The vibration energy can propagate through the soil or rock in a variety of wave forms. All ground vibration includes shear and compression waves. Rayleigh waves [49] are also created and propagate along the ground surface. These Rayleigh waves can be a

major carrier of vibration energy. The mathematical modeling of vibration is complicated when there are soil strata with different elastic properties, which is common. As indicated in Figure 6-5, the propagation through the soil/rock is modeled using the transfer mobility, which is usually determined experimentally.

The combination of the force density level and the transfer mobility is used to predict the ground- surface vibration. This is the major difference from the General Vibration Assessment, which generalizes estimates of the ground-borne vibration.

- **Building Vibration** – When the ground vibration excites a building foundation, it sets the building into vibratory motion and vibration waves propagate throughout the building structure. The interaction between the ground and the foundation causes some reduction in vibration levels. The amount of reduction is dependent on the mass and stiffness of the foundation. The more massive the foundation, the lower the response to ground vibration. As the vibration waves propagate through the building, they can create vibration that can be felt and cause windows and household items to rattle.

- **Audible Noise** – In addition to vibration that can be felt, the vibration of room surfaces radiates low-frequency sound that may be audible. The sound level is affected by the amount of acoustical absorption in the receiver room.

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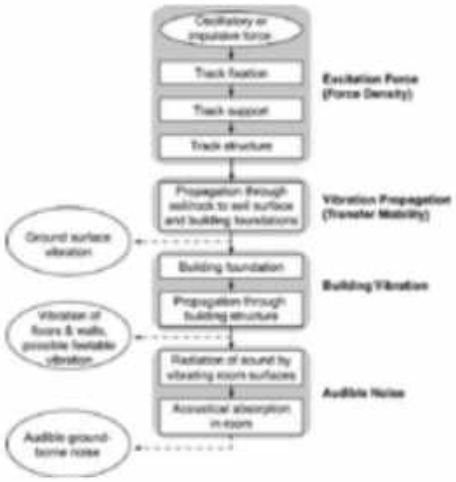


**Figure 6-5 Ground-Borne Vibration and Noise Model**

A fundamental assumption of the prediction approach outlined in this section is that the force density, transfer mobility, and the building coupling to the ground are all independent factors. The following equations are the basis for the

prediction procedure, where all of the quantities are one-third octave band spectral levels in decibels with consistent reference values:

$$L_v = FDL + LSTM + C_{build} \quad \textbf{Eq. 6-5}$$

$$L_A = L_v + K_{rad} + K_{A-wt} \quad \textbf{Eq. 6-6}$$

where:

$L_v$ = rms vibration velocity level in VdB
$FDL$ = force density level in dB for a line vibration source such as a train
$LSTM$ = line-source transfer mobility level in dB from the tracks to the sensitive site
$C_{build}$ = adjustments to account for ground-building foundation interaction and attenuation of vibration amplitudes as vibration propagates through buildings
$L_A$ = A-weighted sound level
$K_{rad}$ = adjustment to account for conversion from vibration to sound pressure level including accounting for the amount of acoustical absorption inside the room. A value of -5 dB can be used for $K_{rad}$ for typical residential rooms when the decibel reference value for $L_v$ is 1 micro in/sec [17,18]
$K_{A-wt}$ = A-weighting adjustment at the 1/3-octave band center frequency

All of the quantities given above are functions of frequency, and the standard approach is to develop projections on a 1/3-octave band basis using the average values for each 1/3-octave band. The end results of the analysis are the 1/3-octave band spectra of the ground-borne vibration and the ground-borne noise.

The spectra are then compared to the vibration criteria for the Detailed Vibration Analysis. The A-weighted ground-borne noise level can be calculated from the vibration spectrum and compared to the criteria. This more detailed approach differs from the General Vibration Assessment, where the overall vibration velocity level and A-weighted sound level are predicted without any consideration of the particular frequency characteristics of the propagation path.

The key steps in obtaining quantities for Eq. 6-5 and Eq. 6-6 are presented in the following steps and include:

**Step 2a.** Estimate force density
**Step 2b.** Measure the point-source transfer mobility
**Step 2c.** Estimate line-source transfer mobility
**Step 2d.** Project ground-borne vibration and ground-borne noise

**2a. Estimate Force Density** – The estimate of force density can be based on previous measurements or a special test program can be designed to measure the force density at an existing facility.

If no suitable measurements are available, conduct testing at a transit facility with equipment similar to the planned vehicles. Adjustments for factors such as train speed, track support system, and vehicle suspension may be needed to match the force density to the conditions at a specific site. Review the report



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"State-of- the-Art Review: Prediction and Control of Ground-Borne Noise and Vibration from Rail Transit Trains" [41] for examples of appropriate adjustments.

Force density is not a quantity that can be measured directly; it must be inferred from measurements of transfer mobility and train vibration at the same site. To derive force density, the best results are achieved by deriving line-source transfer mobility from a line of impacts. The standard approach is to average the force density from measurements at three or more positions at one site. If feasible, it is recommended to take measurements at more than one site and at multiple speeds.

If no suitable measurements are available, see Steps 2b and 2c for guidelines on obtaining line-source transfer mobility.

The force density for each 1/3-octave band is as follows:

$$FDL = L_v - LSTM \qquad \text{Eq. 6-7}$$

where:

$FDL$ = force density level in dB
$L_v$ = measured train ground-borne vibration level in VdB
$LSTM$ = line-source transfer mobility level in dB

Figure 6-6 shows example trackbed force densities in decibels relative to 1 lb/(ft)$^{1/2}$. These force densities were developed from measurements of vibration from heavy and LRT vehicles and represent an incoherent line of vibration force equal to the length of transit trains. This figure provides a comparison of the vibration forces from heavy commuter trains and LRT vehicles with different types of primary suspensions, illustrating the range of vibration forces commonly experienced in a transit system. A force density of a vehicle includes the characteristics of its track support system at the measurement site. Adjustments must be applied to the force density to account for differences between the facility where the force density was measured and the new system being analyzed.

Figure 6-7 shows typical force densities for rail transit vehicles at 40 mph on ballast and tie tracks, which are approximately within the tolerances shown in Figure 6-6. The force densities should be applied very carefully for other track types and speeds. The embedded tracks, although considerably stiffer than ballast and tie tracks, are expected to show similar force density levels.[53] The curves in Figure 6-7 should also be applied with caution for newer generations of light rail vehicles as well as vehicles that utilize direct fixation tracks. The preferred approach for vibration predictions would be to perform force density measurements at a system with vehicles and operations that are similar to those of the future project.

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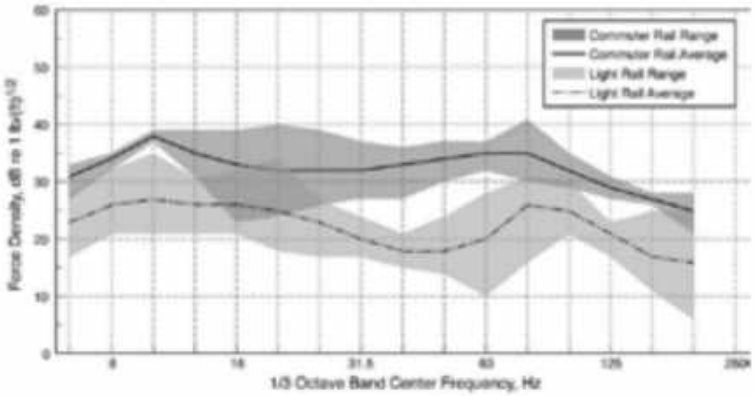


**Figure 6-6 Typical Force Densities for Rail Transit Vehicles, 40 mph**

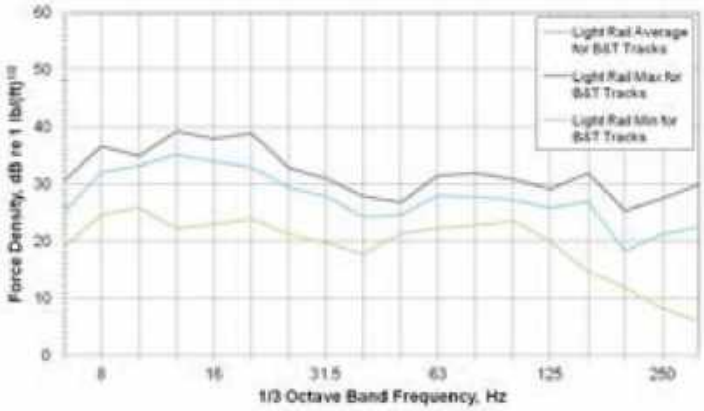


**Figure 6-7 Typical Force Densities for LRT Vehicles, 40 mph**

**2b. Measure Point-Source Transfer Mobility** – Using the appropriate instrumentation, measure point-source transfer mobility for sources with short lengths, such as buses or single car vehicles or columns supporting elevated structures. For longer vehicles, see Section 2c for a discussion of measuring line-source transfer mobilities.

The test procedure to measure point-source transfer mobility consists of impacting the ground by dropping a heavy weight and measuring the force into the ground and the response at several distances from the impact. Other excitation sources may include swept sine, sine-dwell, random vibration, and maximum length sequence. The goal of the test is to create vibration pulses that



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travel from the source to the receiver using the same path that will be taken by the transit system vibration.

Figure 6-8 illustrates the field procedure for measuring both at-grade and subway testing of transfer mobility. A weight is dropped from a height of 3 to 4 ft onto a force transducer. The responses of the force and vibration transducers are recorded on a multichannel recorder for later analysis in the laboratory. An alternative approach is to set up the analysis equipment in the field and capture the signals directly. This complicates the field testing, but eliminates the laboratory analysis of recorded data.

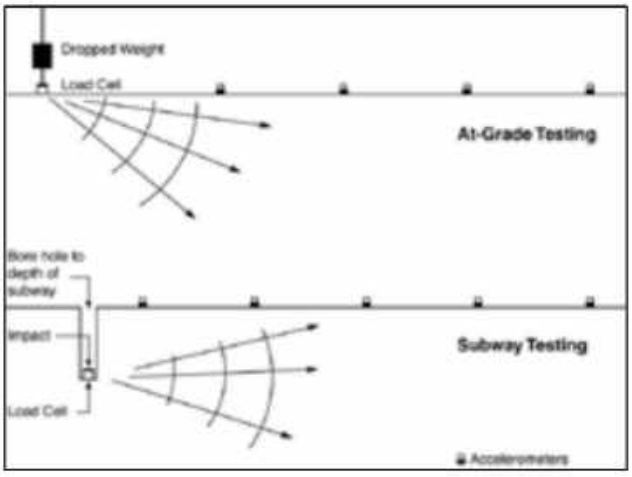


**Figure 6-8 Test Configuration for Measuring Transfer Mobility**

When the procedure is applied to subways, the force must be located at the approximate depth of the subway. This is done by drilling a bore hole and locating the force transducer at the bottom of the hole. The tests are usually performed while the bore holes are drilled to allow for the use of the soil-sampling equipment on the drill rig for the transfer mobility testing. The force transducer is attached to the bottom of the drill string and lowered to the bottom of the hole. A standard soil sampling hammer is used to excite the ground; typically, a 140-pound weight is dropped 18 inches onto a collar that is attached to the drill string. The force transducer must be capable of operating under water if the water table is near the surface or a slurry drilling process is used.

Standard signal-processing techniques are used to determine the transfer function (frequency response function) between the exciting force and the resultant ground-borne vibration. Numerical regression methods are used to combine a number of two-point transfer functions into a smooth point-source transfer mobility level that represents the average vibration propagation characteristics of a site as a function of both distance from the source and



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frequency. The transfer mobility level is usually expressed in terms of a group of 1/3-octave band transfer mobility levels. Figure 6-9 is an example of point-source transfer mobility levels from a series of tests at the Transportation Technology Center in Pueblo, Colorado.[50][54][55][56][57]

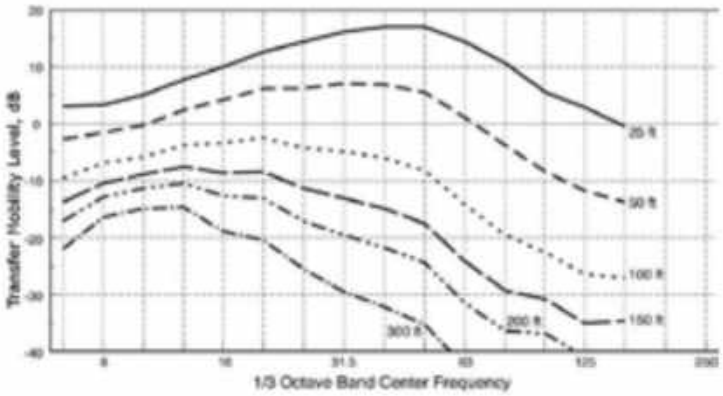


**Figure 6-9 Example of Point-Source Transfer Mobility**

## Instrumentation

Performing a transfer mobility test requires specialized equipment, which is generally available from commercial sources. Typical instrumentation for field-testing and laboratory analysis of transfer mobility is shown in Figure 6-10.

A load cell can be used as the force transducer. The force transducer should be capable of impact loads of 5,000 to 50,000 pounds depending on the hammer used for the impact. For borehole testing, the load cell must be hermetically sealed and capable of being used at the bottom of a 30- to 100-foot-deep hole partially filled with water.

Either accelerometers or geophones can be used as the vibration transducers. Geophones should be carefully mounted so that they are vertical. The requirement is that the transducers with the associated amplifiers be capable of accurately measuring levels of 0.0001 in/sec at 40 Hz and have a flat frequency response from 6 Hz to 400 Hz. Data should be acquired with a digital acquisition system with a flat frequency response over the range of 6 to 400 Hz.

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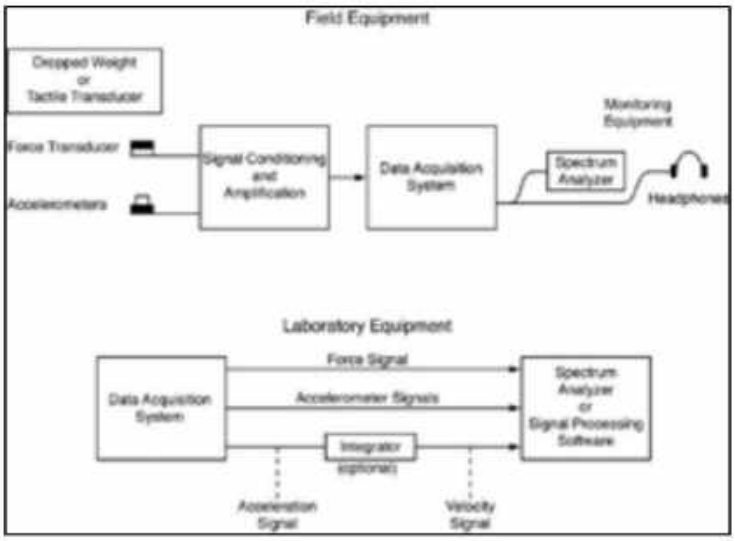


**Figure 6-10 Equipment Required for Field Testing and Laboratory Analysis**

A narrowband spectrum analyzer or signal-processing software can be used to calculate the transfer function and coherence between the force and vibration data. The analyzer must be capable of capturing impulses from at least two channels to calculate the frequency spectrum of the transfer function between the force and vibration channels. All transfer functions should include the average of at least 20 impulses. Time averaging of the impulses will provide substantial signal enhancement, which is usually required to accurately characterize the transfer function. Signal enhancement is particularly important when the vibration transducer is more than 100 ft from the impact.

Alternative methods of determining transfer mobility may be used, provided that these techniques have been demonstrated to provide the same results as the conventional weight-drop method over the frequency range of 6 Hz to 400 Hz. See Appendix G for information on developing and using non-standard procedures. These methods may include using other impulse-response measurement systems involving the use of shakers or electro-mechanical actuators, stimuli such as sweeps or maximum length sequences (MLS), and various signal processing techniques. A forthcoming ANSI Standard will describe in detail the procedures, methodologies, and reporting requirements for performing ground-borne vibration propagation measurements.

The transfer function can be calculated with either a spectrum analyzer or signal-processing software. Note that transfer functions should include the average of at least 20 impulses. Specialized multi-channel spectrum analyzers have built-in capabilities for computing transfer functions and are computationally efficient. However, signal-processing software can offer more



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flexibility in analyzing data signals and allows the use of different digital signal processing methods. Typical measurement programs involve acquisition of data in the field and later processing of the information in a laboratory. However, recent advances in instrumentation and signal-processing software allow data to be collected and analyzed while in the field.

**2c. Estimate Line-Source Transfer Mobility** – Estimate line-source transfer mobility for long sources such as multi-car trains. Line-source transfer mobilities are used to normalize measured vibration velocity levels from train passbys and to obtain force density. Two different approaches can be used to develop estimates of line-source transfer mobility. The first consists of using lines of transducers and the second consists of a line of impact positions.

**Option A: Lines of Transducers** – Develop line-source transfer mobility curves from tests using one or more lines of transducers as shown in Figure 6-11 and described below.

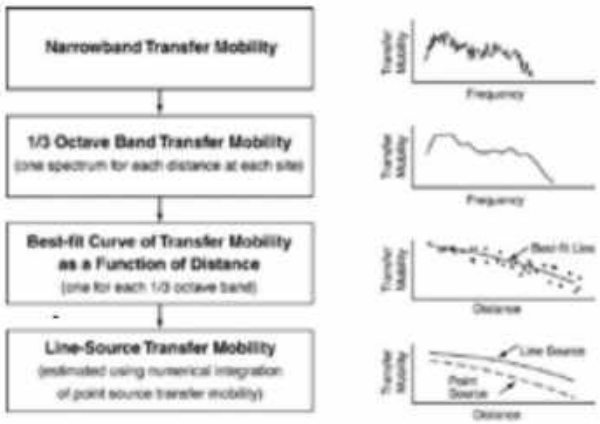


**Figure 6-11 Analysis of Transfer Mobility**

**Ai.** Obtain the narrowband transfer function between source and receiver at each measurement position. There should be a minimum of four distances in any test line. Because of the possibility of local variations in propagation characteristics, two or more lines should be used to characterize a site if possible. A total of 10 to 20 transducer positions are often used to characterize a site.

**Aii.** Calculate the equivalent 1/3-octave band transfer functions, generally between 6 and 400 Hz. This reduces each spectrum to 15 numbers. As shown in Figure 6-11, the 1/3-octave band spectrum is much smoother than the narrowband spectrum.

**Aiii.** Calculate a best-fit curve of transfer mobility as a function of distance for each 1/3-octave band. When analyzing a specific site, the best-fit curve will be



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based on 10 to 20 points. Up to several hundred points could be used to determine average best-fit curves for a number of sites.

**Aiv.** Apply the best-fit curve to the vibration sources. The 1/3-octave band best-fit curves can be directly applied to point vibration sources. Buses can usually be considered point-sources, as can columns supporting elevated structures. However, for a line vibration source such as a train, numerical integration must be used to calculate the equivalent line-source transfer mobility. The numerical integration procedures are detailed in the TRB publication: "A Prediction Procedure for Rail Transportation Ground-Borne Noise and Vibration."[50]

**Option B: Line of Impulses** – This second procedure for estimating line-source transfer mobility is best for detailed assessment of specific vibration paths or specific buildings and is a more direct approach.

**Bi.** Measure multiple point-source transfer mobilities according to the procedures in Step 2b above. The vibration transducers are placed at specific points of interest and a line of impacts is used. For example, a 150-foot train might be represented by a line of 11 impact positions along the track centerline at 15-foot intervals (Figure 6-12).

**Bii.** Sum the point-source results using Simpson's rule[xii] for numerical integration to calculate the line-source transfer mobility.

Figure 6-13 shows an example of line-source transfer mobilities that were derived from the point-source transfer mobilities shown in Figure 6-9.

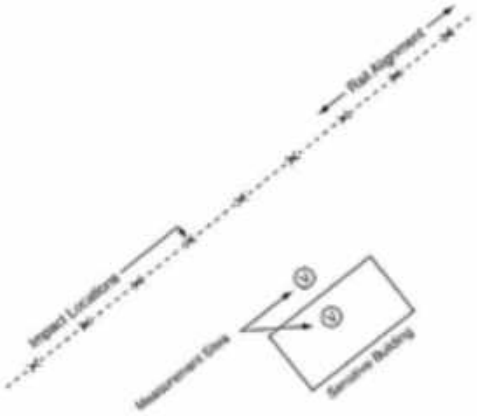


**Figure 6-12 Schematic of Transfer Mobility Measurements Using a Line of Impacts**

[xii] Simpson's rule is a method for approximating integrals.



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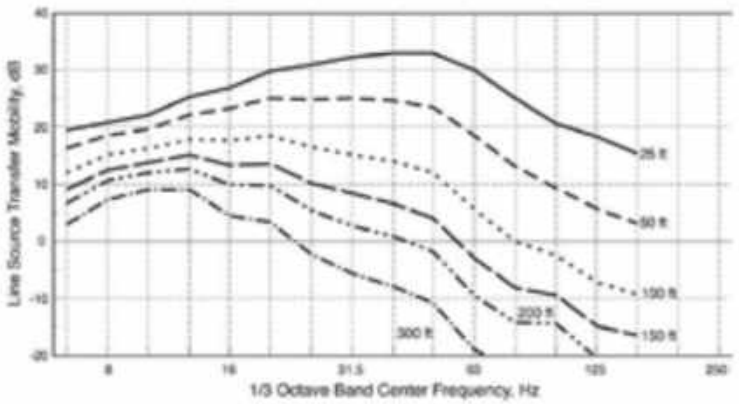


**Figure 6-13 Example of Line-source Transfer Mobility**

**2d. Project Ground-Borne Vibration and Noise** – Combine force density and line-source transfer mobility to project ground-borne vibration. Then, apply adjustment factors to estimate the building response to the ground-borne vibration and to estimate the A-weighted sound level inside buildings.

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The propagation of vibration from the building foundation to the receiver room is very complex and dependent on the specific design of the building. Detailed evaluation of the vibration propagation would require extensive use of numerical procedures such as the finite element method. Such a detailed evaluation is generally not practical for individual buildings considered in this manual. If the detailed features of the individual buildings are available, the recommended procedure is to estimate the propagation of vibration through a building and the radiation of sound by vibrating building surfaces using simple empirical or theoretical models. The recommended procedures are outlined in the Handbook of Urban Rail Noise and Vibration Control.[44] The approach consists of adding the following adjustments to the 1/3-octave band spectrum of the projected ground-borne vibration:

- **Building response or coupling loss** – This adjustment represents the change in the incident ground-borne vibration due to the presence of the building foundation. The adjustments described in the handbook [44] are shown in Figure 6-14. Note that the correction is zero when estimating basement floor vibration or vibration of at-grade slabs. Measured values may be used in place of these generic adjustments.

- **Transmission through the building** – The vibration amplitude typically decreases as the vibration energy propagates from the foundation through the remainder of the building. The general assumption is that vibration attenuates by 1 to 2 dB for each floor.

- **Floor resonances** – Vibration amplitudes will be amplified because of resonances of the floor/ceiling systems. For a typical wood-frame

residential structure, the fundamental resonance is usually in the 15 to 20 Hz range. Reinforced-concrete slab floors in modern buildings will have fundamental resonance frequencies in the 20 to 30 Hz range. An amplification resulting in a gain of approximately 6 dB should be used in the frequency range of the fundamental resonance.

- **Floor vibration and ground-borne noise** – The projected floor vibration is used to estimate the levels of ground-borne noise. The primary factors affecting noise level are the average vibration level of the room surfaces and the amount of acoustical absorption within the room. The radiation adjustment is -5 dB for typical rooms, [37] [50] which gives:

$$L_A \approx L_V + K_{A-wt} - 5 \qquad \text{Eq. 6-8}$$

where:

$L_A$ = A-weighted sound level in a 1/3-octave band
$L_v$ = rms vibration velocity level in that band
$K_{A-wt}$ = A-weighting adjustment at the 1/3-octave band center frequency

The A-weighted levels in the 1/3-octave bands are combined to produce the overall A-weighted sound level.

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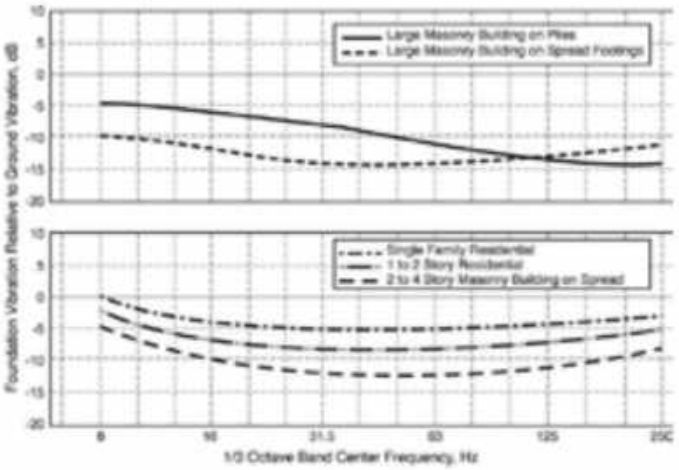


**Figure 6-14 Foundation Response for Various Types of Buildings**

Where detailed information on the structural features of individual buildings are unavailable and there are no site-specific data on outdoor to indoor propagation characteristics, the preferred approach is to apply a combined factor for the foundation response and the gain from floor resonances. Empirical data based on the TCRP D-12 Project from 34 measurement sites across 5 cities in North

America and other studies suggest that the average change in vibration from outdoor to indoor was 0 dB across all 1/3-octave bands with a standard deviation of approximately 5 to 6 dB in the 31.5 to 63 Hz frequency.[43][48] Therefore, the recommended approach for predicting indoor vibration based on outdoor data is to use an adjustment of +3 to +6 dB for light-weight, wood-frame construction and use an adjustment of 0 dB for heavier buildings.

However, for buildings with high-vibration sensitivity or where there is concern regarding interference with vibration-sensitive equipment, it is advisable to measure the outdoor-indoor response of the building, using the process described in Section 2b or 2c, to determine the actual response of the foundation and building to vibration.

### Step 3: Assess Vibration Impact

*Take inventory of vibration-sensitive land uses with impact.*

Assess vibration impact at each receiver of interest using the impact criteria in Section 6.3. Note that ground-borne vibration and noise levels that exceeded criteria in the General Vibration Assessment may not cause impact according to the more detailed procedures of the Detailed Vibration Analysis; in which case, mitigation is not required. But if projected levels still exceed the criteria, evaluate vibration mitigation measures using the spectra provided by the Detailed Vibration Analysis.

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### Step 4: Determine Vibration Mitigation Measures

*Select practical vibration control measures that will be effective at the dominant vibration frequencies and compatible with the given transit structure and track support system.*

The purpose of vibration mitigation is to minimize the adverse effects that the project ground-borne vibration and ground-borne noise will have on sensitive land uses. Because ground-borne vibration is not as common a problem as environmental noise, the mitigation approaches have not been as well defined. In some cases it may be necessary to develop innovative approaches to control the impact. See Appendix G for information on using non-standard methods.

Standard vibration control measures for rail transit systems are discussed in this step. Note that vibration control measures for rail transit systems are not always effective for freight trains.[xiv] Bus systems rarely cause vibration impact, but if impact occurs, roadway roughness or unevenness caused by bumps, pot holes, expansion joints, or driveway transitions are usually the causes. Smoothing the roadway surface is typically the recommended course of action.[xv]

[xiv] The heavy axle loads associated with freight rail are outside the range of applicable design parameters for vibration reduction on lighter rail transit systems. Plans to relocate existing railroad tracks closer to vibration-sensitive sites in order to accommodate a new rail transit line in the ROW must be carefully considered because it may not be possible to mitigate the increased vibration impact from freight trains.

[xv] In cases where a rubber-tired system runs inside a building, such as an airport people mover, vibration control may involve additional measures. Loading and unloading of guideway support beams may generate dynamic forces that transmit into the building structure. Special guideway support systems may be required, similar to the discussion below regarding floating slabs.

Vibration reduction measures incur additional costs to a system. Some of the same treatments for noise mitigation can be considered for vibration mitigation. Costs for noise control measures are documented in a report from the Transit Cooperative Research Program (TCRP).[31] Where applicable to vibration reduction, costs for noise abatement methods from that report are given in the following sections. These costs reflect the noise mitigation costs as of 1997 (unless otherwise noted), and should only be used as representative estimates when considering noise mitigation options. Current noise mitigation costs should be researched before decisions on noise mitigation options are finalized, and then they should be documented according to Section 8.

Mitigation of vibration impacts may involve treatments at the source, along the source-to-receiver propagation path, or at the receiver.

**1a. Evaluate Source Treatments** – The most effective vibration mitigation treatments are applied at the vibration source. This is the preferred approach to mitigation when possible. Possible source treatments include:

- **Preventative Maintenance** – Effective maintenance programs are essential for controlling ground-borne vibration. Key vibration points are discussed below; see Section 4.5, Step 7 for more detailed information on the benefits of effective maintenance programs on controlling transit noise and vibration. While these are not mitigation measures in the traditional sense, and should not be included as mitigation in an environmental document, they can help to keep both noise and vibration levels at a "like-new" level or reduce both in systems with deferred maintenance.
  - **Rail grinding** is a particularly important practice for vibration mitigation for rail that develops corrugations. The TCRP report notes that periodic rail grinding results in a net savings per year on wheel and rail wear. Most transit systems contract out rail grinding, although some of the larger systems make the investment and do their own grinding. As mentioned in Section 4.5, Step 7, the typical rail grinding cost would be $1000 to $7000 per grinding pass mile, with an additional investment of approximately $1 million for the equipment for a larger transit system to do its own grinding.
  - **Dramatic vibration reduction** results can be achieved by removing wheel flats through **wheel truing**. As mentioned in Section 4.5, Step 7, a wheel truing machine costs approximately $1 million, including associated maintenance, materials, and labor costs. The TCRP report figures a system with 700 vehicles would incur a yearly cost of $300,000 to $400,000 for a wheel truing program.
  - **Profile grinding of the rail head** in combination with a wheel truing program may be the most practical approach to controlling and reducing vibration and noise where such practices are not normally conducted. Profiles should be defined during the design phase and should be in place when system opens.[32] The cost of

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wheel and rail profile matching may be incorporated in the new vehicle and new rail costs.

Rough wheels or rails can increase vibration levels by as much as 20 dB in extreme cases, negating the effects of even the most effective vibration control measures. Yet, it is rare that vibration control measures (such as those discussed below) will provide more than 15 to 20 dB attenuation. When there are ground-borne vibration impacts with existing transit equipment, the best vibration control measure often is to implement new or improved maintenance procedures. Grinding rough or corrugated rail and wheel truing to eliminate wheel flats and restore the wheel contour may provide considerable vibration reduction. Regular maintenance may replace the need to modify the existing track system, such as through adding floating slabs.

- **Planning and Design of Special Trackwork** – A large percentage of the vibration impact from a new transit facility is often caused by wheel impacts at special trackwork for turnouts and crossovers. When feasible, the most effective vibration control measure is to relocate the special trackwork to a less vibration-sensitive area. This may require adjusting the location by several hundred feet provided it will not have an adverse impact on the operation plan for the system. Careful review of crossover and turnout locations during the project development phase is an important step to minimizing potential for vibration impact.

  Another approach is to use special devices (frogs) at turnouts and crossovers that incorporate mechanisms to close the gaps between running rails. Frogs with spring-loaded mechanisms and frogs with movable points can substantially reduce vibration levels near crossovers. According to the TCRP report, a spring frog costs about $12,000, twice the cost of a standard frog. A movable point frog involves elaborate signal and control circuitry resulting in higher costs at approximately $200,000.

- **Vehicle Specifications** – The ideal rail vehicle with respect to minimizing ground-borne vibration should have the following characteristics:
  - Low, unsprung weight
  - Soft primary suspension
  - A minimum of metal-to-metal contact between moving parts of the truck
  - Smooth wheels that are perfectly round

  A limit for the vertical resonance frequency of the primary suspension should be included in the specifications for any new vehicle. A vertical resonance frequency of 12 Hz or less is sufficient to control the levels of ground-borne vibration, although some have recommended the vertical resonance frequency be less than 8 Hz.

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- **Special Track Support Systems** – When the vibration assessment indicates that vibration levels will be excessive, the track support system is typically modified to reduce the vibration levels.

  Floating slabs, resiliently supported ties, high-resilience fasteners, and ballast mats can be used to reduce the levels of ground-borne vibration. To be effective, all of these measures must be optimized for the frequency spectrum of the vibration. Most of these relatively standard procedures have been successfully used on several subway projects.

  Applications on at-grade and elevated track are less common. This is because vibration impact is less common for at-grade and elevated track. Note that the cost of these types of vibration control measures is a higher percentage of the overall construction costs for at-grade and elevated track, and exposure to the elements can require substantial design modifications.

  Each major vibration control measure for track support is discussed below. Costs for these treatments are not covered by the TCRP report, but are given as estimates based on transit agency experience.

  - **Resilient fasteners** – Resilient fasteners are used to fasten the rail to concrete track slabs. Standard resilient fasteners are very stiff in the vertical direction, usually in the range of 200,000 lb/in, and do provide some vibration reduction compared to the rigid fastening systems used on older systems (e.g., wood half-ties embedded in concrete).

    Special fasteners with vertical stiffness in the range of 30,000 lb/in may reduce vibration by as much as 5 to 10 dB at frequencies above 30 to 40 Hz. These premium fasteners vary in cost and can be priced competitively when purchased in large quantities.

  - **Ballast mats** – A ballast mat consists of a rubber or other type of elastomer pad that is placed under the ballast. In general, the mat must be placed on a concrete pad to be effective. They will not be as effective if placed directly on the soil or the sub-ballast. Consequently, most ballast mat applications are in subway or elevated structures.

    Ballast mats can provide 8 to 12 dB attenuation at frequencies above 25 to 30 Hz.[58] Ballast mats are often a good retrofit measure for existing tie-and-ballast track where there is vibration impact. Installed ballast mats cost approximately $180 per track-foot.

  - **Undertie pads** – Undertie pads (resiliently supported concrete ties) consist of a rubber pad mounted on the bottom of a concrete tie directly on the ballast. The pads provide vibration isolation at frequencies above 25 Hz and are easy to



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install or retrofit. Installed undertie pads cost approximately $260 per track-foot.

- **Resiliently supported ties** – The resiliently supported tie system consists of concrete ties supported by rubber pads resting on top of a slab track or subway invert. The rails are fastened directly to the concrete ties using standard rail clips. Resiliently supported ties provide vibration reduction in between 15 to 40 Hz, which is particularly appropriate for transit systems with vibration impact in the 20 to 30 Hz range. A resiliently supported tie system costs approximately $400 per track-foot.

- **Floating slabs** – Floating slabs can be very effective at controlling ground-borne vibration and noise and consist of a concrete slab supported on resilient elements such as rubber or a similar elastomer. Floating slabs are effective at frequencies greater than their single-degree-of-freedom vertical resonance frequency.

  Floating slabs are among the most expensive vibration control treatments. A typical double-tie floating slab system costs approximately 4 times the cost of ballast and tie per track foot. Examples of floating slabs include:
  - Floating slabs used in Washington, DC; Atlanta, GA; and Boston, MA, were all designed to have a vertical resonance in the 14 to 17 Hz range.
  - A special system referred to as the double-tie system was first used in Toronto. It consists of 5-foot-long slabs with four or more rubber pads under each slab. This system was designed with a resonance frequency in the 12 to 16 Hz rang3.
  - Another special floating slab was used in San Francisco's Bay Area Rapid Transit (BART) system. It uses a discontinuous precast concrete double-tie system with a resonance frequency in the 5 to 10 Hz frequency range.

- **Tire-derived aggregate (TDA)** – TDA (shredded tires) consists of a layer of tire shreds wrapped in geotech fabric placed underneath the ballast on hard packed ground. This is a new, low-cost option that can provide reduction in vibration levels at frequencies above 25 Hz. This mitigation measure has proven to be effective for the Denver Regional Transportation District (RTD) light rail system as well as the Santa Clara Valley Transportation Authority (VTA) light rail system,[59] but the effective life of TDA has not been determined. Installed TDA costs approximately $260 per track-foot.

- **Other treatments** – Changing any feature of the track support system can change the levels of ground-borne vibration. Approaches



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such as using heavier rail, thicker ballast, or heavier ties can be expected to reduce the vibration levels. There also is some indication that vibration levels are lower with wood ties compared to concrete ties. But there is little confirmation that any of these approaches will make a substantial change in the vibration levels.

- **Operational Changes** – The most effective operational change is to reduce the vehicle speed. Reducing the train speed by a factor of two will reduce vibration levels approximately 6 dB. Other operational changes include:
  - Use of equipment that generates the lowest vibration levels during the nighttime hours when people are most sensitive to vibration and noise.
  - Adjusting nighttime schedules to minimize movements in the most sensitive hours.

While there are tangible mitigation benefits from speed reductions and limits on operations during the most sensitive time periods, FTA does not generally accept speed reduction as a vibration mitigation measure for two important reasons: (1) speed reduction is unenforceable and negated if vehicle operators do not adhere to established policies, and (2) it is contrary to the purpose of the transit investment by FTA, which is to move as many people as possible as efficiently and safely as possible. FTA does not recommend limits on operations as a way to reduce vibration impacts.

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**1b. Evaluate Path Treatments** – When vibration mitigation treatments cannot be applied at the vibration source or additional mitigation is required after treating the source, the next preferred placement of vibration mitigation is along the vibration propagation path between the source and receiver. Possible path treatments include:

- **Trenches** – Use of trenches to control ground-borne vibration is analogous to controlling airborne noise with noise barriers. This approach has not received much attention in the United States, but trenches could be a practical method for controlling transit vibration from at-grade track. A rule-of-thumb given by Richert and Hall[60] is that if the trench is located close to the source, the trench bottom must be at least 0.6 times the Rayleigh wavelength below the vibration source. For most soils, Rayleigh waves travel at around 600 ft/sec, which means that the wavelength at 30 Hz is 20 ft, requiring that a trench be approximately 15 ft deep to be effective at 30 Hz.

  A trench can be effective as a vibration barrier if it is either open or solid. The Toronto Transit Commission tested a trench filled with Styrofoam to keep it open and reported successful performance over a period of at least one year. Solid barriers can be constructed with sheet piling or concrete poured into a trench.

- **Buffer Zones** – Expanding the rail ROW can be the most economical method of reducing the vibration impact by simply increasing the distance between the source and receiver. A similar approach is to

negotiate a vibration easement from the affected property owners (e.g., a row of single-family homes adjacent to a proposed commuter rail line). There may be legal limitations, however, on the ability of funding agencies to acquire land strictly for the purpose of mitigating vibration (or noise) impact.

**1c. Evaluate Receiver Treatments** – When vibration mitigation treatments cannot be applied at the source or along the propagation path, or if combinations of treatments are required, treatments to the receivers can be considered as described below.

- **Building Modifications** – In some circumstances, it is practical to modify the affected building to reduce the vibration level. Vibration isolation of buildings consists of supporting the building foundation on elastomer pads, similar to bridge bearing pads. Vibration isolation of buildings is seldom an option for existing buildings and is typically only possible for new construction. Vibration impacts on sensitive laboratory instruments, such as electron microscopes, may be controlled with vibration isolation tables.

  This approach is particularly important for shared-use facilities such as an office space above a transit station or terminal. When vibration-sensitive equipment such as electron microscopes will be affected by transit vibration, specific modifications to the building structure may be the most cost-effective method of controlling the impact aside from modification of equipment mounting systems. For example, the floor upon which the vibration-sensitive equipment is located could be stiffened and isolated from the remainder of the building to reduce the vibration. Alternatively, the equipment mounting systems could be modified or the equipment could be relocated to a different building at far less cost.

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SECTION 7

# Noise and Vibration during Construction

Construction noise and vibration often generates complaints from the community, even when construction is for a limited timeframe. Public concerns about construction noise and vibration increase considerably with lengthy periods of heavy construction on major projects as well as prevalence of nighttime construction (often scheduled to avoid disrupting workday road and rail traffic). Noise and vibration complaints typically arise from interference with people's activities, especially when the adjacent community has no clear understanding of the extent or duration of the construction. Misunderstandings can arise when the community thinks a contractor is being insensitive, and the contractor believes it is performing the work in compliance with local ordinances. This situation underscores the need for early identification and assessment of potential problem areas.

This section outlines the procedures for assessing noise and vibration impacts during construction. The type of assessment (qualitative or quantitative) and the level of analysis are determined based on the scale of the project and surrounding land uses. In cases where a full quantitative assessment is not warranted, a qualitative assessment of the construction noise and vibration environment can lead to greater understanding and tolerance in the community. For major projects with extended periods of construction at specific locations, a quantitative assessment can aid contractors in making bids by allowing changes in construction approach and including mitigation costs before the construction plans are finalized.

Generally, local noise ordinances are not very useful for evaluating construction noise impact. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land uses. While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.

Procedures for assessing construction noise are presented in Section 7.1. Procedures for assessing construction vibration are presented in Section 7.2.

## 7.1 Construction Noise Assessment

Noise impacts from construction may vary greatly depending on the duration and complexity of the project. The key elements of the Construction Noise Assessment procedure and recommended workflow are as follows.



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**Step 1:** Determine Level of Construction Noise Assessment

**Step 2:** Use a Qualitative Construction Noise Assessment to Estimate Construction Noise

**Step 3:** Use a Quantitative Construction Noise Assessment to Estimate Construction Noise

**Step 4:** Assess Construction Noise Impact

**Step 5:** Determine Construction Noise Mitigation Measures

If there is uncertainty in how to determine the appropriate level of assessment, contact the FTA Regional office.

## Step 1: Determine Level of Construction Noise Assessment

*Determine the appropriate level of assessment based on the scale and type of the project and depending on the stage of environmental review.*

Consider the following factors:

- Scale of the project
- Proximity of noise-sensitive sites to the construction zones
- Number of noise-sensitive receivers in the project area
- Duration of construction activities near noise-sensitive receivers
- Schedule, including the construction days, hours, and time periods
- Method (e.g., cut-and-cover vs. bored tunneling)
- Concern about construction noise expressed in comments by the general public (e.g., through scoping or public meetings)

**1a. Determine if an assessment is required** – Construction Noise Assessments are not required for many small projects including:

- Installation of safety features like grade-crossing signals;
- Track improvements within the ROW; or
- Erecting small buildings and facilities which are similar in scale to the surrounding development.

For small projects like these, include descriptions in the environmental document of the length of construction, the loudest equipment to be used, the expected truck access routes, the avoidance of nighttime activity, and any other relevant planned construction method.

**1b. Determine whether a qualitative or quantitative assessment is required**

- **Qualitative Construction Noise Assessment** – Qualitative Construction Noise Assessments may be required for projects with less than a month of construction time in a noise-sensitive area. See Step 2 for more information on Qualitative Construction Noise Assessments.



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- **Quantitative Construction Noise Assessments** – Quantitative Construction Noise Assessments may be required for projects with a month or more of construction in noise-sensitive areas or if particularly noisy equipment will be involved. See Step 3 for more information on Quantitative Construction Noise Assessments.

### Step 2: Use a Qualitative Construction Noise Assessment to Estimate Construction Noise

*Use a qualitative construction noise assessment to estimate construction noise for appropriate projects per Section 7.1, Step 1b.*

Provide qualitative descriptions in the environmental document of the following elements:

- Duration of construction (both overall and at specific locations)
- Equipment expected to be used (e.g., noisiest equipment)
- Schedule with limits on times of operation (e.g., daytime use only)
- Monitoring of noise
- Forum for communicating with the public
- Commitments to limit noise levels to certain levels, including any local ordinances that apply
- Consideration of application of noise control treatments used successfully in other projects

Effective community outreach and relations are important for these projects. Disseminate information to the public early regarding the kinds of construction equipment, expected noise levels, and durations to forewarn potentially affected neighbors about the temporary inconvenience. Including a general description of the variation of noise levels during a typical construction day may also be helpful.

Note that the construction criteria in Step 4 do not apply to qualitative assessments.

### Step 3: Use a Quantitative Construction Noise Assessment to Estimate Construction Noise

*Use a quantitative construction noise assessment to estimate construction noise for appropriate projects per Section 7.1, Step 1b.*

For Quantitative Construction Noise Assessments, follow the recommended procedure in this step and include a description of the planned construction methods and any basic measures that have been identified to reduce the potential impact, such as prohibiting the noisiest construction activities during the nighttime, in the environmental document. It may be prudent, however, to defer final decisions on noise control measures until the project and construction plans are defined in greater detail during the engineering phase.

- **Noise Source Levels from Typical Construction Equipment and Operations** – The noise levels generated by construction



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equipment vary greatly on factors such as the type of equipment, the equipment model, the operation being performed, and the condition of the equipment. Typically, the dominant source of noise from most construction equipment is the engine, often a diesel engine, which usually does not have sufficient muffling. In other cases, such as impact pile-driving or pavement-breaking, noise generated by the process dominates. Construction equipment can be considered to operate in the following two modes for Construction Noise Assessments:

- **Stationary** – Stationary equipment operates in one location for one or more days at a time, with either a fixed power operation (pumps, generators, compressors) or a variable noise operation (pile drivers, pavement breakers).
- **Mobile** – Mobile equipment moves around the construction site with power applied in cyclic fashion (bulldozers, loaders), or to and from the site (trucks). Movement around the site is considered in the construction noise prediction procedure.

Variation in power imposes additional complexity in characterizing the noise source level from mobile equipment. Describe the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the $L_{eq(t)}$ of the operation.

Typical noise levels from representative equipment are included in Table 7-1. The levels are based on an EPA Report,[61] measured data from railroad construction equipment taken during the 1976 Northeast Corridor Improvement Project, the FHWA Roadway Construction Noise Model, and other measured data.

For equipment that is not represented in Table 7-1, measure the noise levels according to the standard procedures for measuring the exterior noise levels for the certification of mobile and stationary construction equipment by the Society of Automotive Engineers.[62][63]

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**Table 7-1 Construction Equipment Noise Emission Levels**

| Equipment | Typical Noise Level 50 ft from Source, dBA |
|---|---|
| Air Compressor | 80 |
| Backhoe | 80 |
| Ballast Equalizer | 82 |
| Ballast Tamper | 83 |
| Compactor | 82 |
| Concrete Mixer | 85 |
| Concrete Pump | 82 |
| Concrete Vibrator | 76 |
| Crane, Derrick | 88 |
| Crane, Mobile | 83 |
| Dozer | 85 |
| Generator | 82 |
| Grader | 85 |
| Impact Wrench | 85 |
| Jack Hammer | 88 |
| Loader | 80 |
| Paver | 85 |
| Pile-driver (Impact) | 101 |
| Pile-driver (Sonic) | 95 |
| Pneumatic Tool | 85 |
| Pump | 77 |
| Rail Saw | 90 |
| Rock Drill | 95 |
| Roller | 85 |
| Saw | 76 |
| Scarifier | 83 |
| Scraper | 85 |
| Shovel | 82 |
| Spike Driver | 77 |
| Tie Cutter | 84 |
| Tie Handler | 80 |
| Tie Inserter | 85 |
| Truck | 84 |

**3a.** Use the metric $L_{eq(i)}$ to assess construction noise. This unit is appropriate because $L_{eq(i)}$ can be used to describe:

- Noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period
- Noise level during an entire phase
- Average noise over all phases of the construction

**3b.** Use Eq. 7-1 to predict construction noise impact for major transit projects, considering the noise generated by the equipment and noise propagation due to distance. Calculate $L_{eq.equip}$ for all equipment individually, then use decibel addition to sum the $L_{Aeq.equip}$ for all equipment operating during the same time period. See Appendix B.1.1 for information on decibel addition.



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$$L_{eq,equip} = L_{emission} + 10\log(Adj_{Usage}) - 20\log(\frac{D}{50}) - 10G\log(\frac{D}{50}) \quad \textbf{Eq. 7-1}$$

where:

$L_{eq,equip}$ = $L_{eq(t)}$ at a receiver from the operation of a single piece of equipment over a specified time period, dBA
$L_{emission}$ = noise emission level of the particular piece of equipment at the reference distance of 50 ft, dBA
$Adj_{Usage}$ = usage factor to account for the fraction of time that the equipment is in use over the specified time period
$D$ = distance from the receiver to the piece of equipment, ft
$G$ = a constant that accounts for topography and ground effects

Determine the quantities for Eq. 7-1 based on the level of assessment as described below.

- A general assessment of construction noise is warranted for projects in an early assessment stage when the equipment roster and schedule are undefined and only a rough estimate of construction noise levels is practical.
- A detailed analysis of construction noise is warranted when many noise-sensitive sites are adjacent to a construction project or where contractors are faced with stringent local ordinances or heightened public concerns expressed in early outreach efforts.

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Complete the appropriate assessment for each phase of construction. Major construction projects are accomplished in several different phases. Each phase has a specific equipment mix, depending on the work to be accomplished during that phase. As a result of the equipment mix, each phase has its own noise characteristics; some phases have higher continuous noise levels than others, and some have higher impact noise levels than others.

**Option A: General Assessment** – Determine the quantities for Eq. 7-1 based on the following assumptions for a General Assessment of each phase of construction.

- **Noise emission level ($L_{emission}$)** – Determine the emission level at 50 ft according to noise from typical construction equipment described above and Table 7-1.

- **Usage factor ($Adj_{Usage}$)** – Assume a usage factor of 1. This assumes a time period of one-hour with full power operation. Most construction equipment operates continuously for periods of one-hour or more during the construction period.

  Therefore, $10\log(Adj_{usage}) = 0$ and can be omitted from the equation.

- **Distance (D)** – Assume that all equipment operates at the center of the project, or centerline for guideway or highway construction project.

- **Ground effect (G)** – G = 0 assuming free-field conditions and ignoring ground effects. If ground effects are of specific importance to the assessment, consider using the Detailed Analysis procedure.

Only determine the $L_{eq.equip}$ for the two noisiest pieces of equipment expected to be used in each phase of construction. Then, sum the levels for each phase of construction using decibel addition.

**Option B: Detailed Analysis –** Determine the quantities for Eq. 7-1 based on the following assumptions for a Detailed Analysis of each phase of construction. Alternatively, for detailed, long-term, and complex construction projects or projects near a particularly sensitive site, the FHWA's Windows-based screening tool, "Roadway Construction Noise Model (RCNM)," can be used for the prediction of construction noise.[64]

- **Noise emission level ($L_{emission}$)** – Measure or certify the noise emission level for each piece of equipment.

- **Usage factor ($Adj_{Usage}$)** – Long-term construction project noise impact is based on a 30-day average $L_{dn}$, the times of day of construction activity (nighttime noise is penalized by 10 dB in residential areas), and the percentage of time the equipment is used during a period of time that will affect $Adj_{Usage}$.

  For example, an 8-hour $L_{eq(t)}$ is determined by making $Adj_{Usage}$ the percentage of time each individual piece of equipment operates under full power in that period. Similarly, the 30-day average $L_{dn}$ is determined from the $Adj_{Usage}$ expressed by the percentage of time the equipment is used during the daytime hours (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.), separately, over a 30-day period. To account for increased sensitivity to nighttime noise, the nighttime noise levels are adjusted by 10 dB in the $L_{dn}$ computation (see Appendix B.1.4.5).

- **Distance (D)** – Determine the location of each piece of equipment during operation and the distance to each receiver.

- **Ground effect (G)** – Use Table 4-26 in Section 4.5, Step 3 to calculate G to account for the site topography, natural and man-made barriers, and ground effects.

  Compute the 8-hour $L_{eq(t)}$ ( $L_{eq.equip(8hr)}$) and the 30-day average $L_{dn}$ ($L_{dn.equip(30day)}$) for all equipment expected to be used in each phase of construction separately. Then, sum the levels for each phase of construction using Eq. 4-56 and Eq. 4-57 in Table 4-32.

### Step 4: Assess Construction Noise Impact

*Compare the predicted noise levels from the Quantitative Construction Noise Assessment with impact criteria to assess impact from construction noise for each phase of construction.*

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No standardized criteria have been developed for assessing construction noise impact. Consequently, criteria must be developed on a project-specific basis unless local ordinances apply. As stated earlier in this section, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.

The construction impact guidelines are presented based on the level of quantitative assessment.

**Option A: General Assessment** – Compare the combined $L_{eq.equip(1hr)}$ for the two noisiest pieces of equipment for each phase of construction determined in Section 7.1, Step 3 to the criteria below. Then, identify locations where the level exceeds the criteria.

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**Table 7-2 General Assessment Construction Noise Criteria**

| Land Use | $L_{eq.equip(1hr)}$, dBA | |
|---|---|---|
| | Day | Night |
| Residential | 90 | 80 |
| Commercial | 100 | 100 |
| Industrial | 100 | 100 |

**Option B: Detailed Analysis** – Compare the combined $L_{eq.equip(1hr)}$ and the combined $L_{dn.equip(30day)}$ for all equipment for each phase of construction determined in Section 7.1, Step 3 to the criteria below. Then, identify locations where the level exceeds the criteria.

**Table 7-3 Detailed Analysis Construction Noise Criteria**

| Land Use | $L_{eq.equip(8hr)}$, dBA | | $L_{dn.equip(30day)}$, dBA |
|---|---|---|---|
| | Day | Night | 30-day Average |
| Residential | 80 | 70 | 75 |
| Commercial | 85 | 85 | 80* |
| Industrial | 90 | 90 | 85* |

*Use a 24-hour $L_{eq(24hr)}$ instead of $L_{dn.equip(30day)}$.

## Step 5: Determine Construction Noise Mitigation Measures

*Evaluate the need for mitigation and select appropriate mitigation measures.*

Where potential impacts have been identified according to Section 7.1, Step 4, evaluate appropriate control measures. Include descriptions of how each affected location will be treated with one or more mitigation measures in the environmental document.

**5a.** Determine the appropriate approach for construction noise control. Categories of approaches include:

- **Design considerations and project layout**
  - Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.
  - Re-route truck traffic away from residential streets. Select streets with the fewest homes if no alternatives are available.
  - Site equipment on the construction lot as far away from noise-sensitive sites as possible.
  - Construct walled enclosures around especially noisy activities or clusters of noisy equipment. For example, shields can be used around pavement breakers, and loaded vinyl curtains can be draped under elevated structures.
- **Sequence of operations**
  - Combine noisy operations to occur in the same time period. The total noise level produced will not be substantially greater than the level produced if the operations were performed separately.
  - Avoid nighttime activities. Sensitivity to noise increases during the nighttime hours in residential neighborhoods.
- **Alternative construction methods**
  - Avoid impact pile-driving where possible in noise-sensitive areas. Drilled piles or the use of a sonic/vibratory pile driver or push pile driver are quieter alternatives where the geological conditions permit their use.
  - Use specially-quieted equipment, such as quieted and enclosed air compressors and properly-working mufflers on all engines.
  - Select quieter demolition methods. For example, sawing bridge decks into sections that can be loaded onto trucks results in lower cumulative noise levels than impact demolition by pavement breakers.

Include descriptions of how each impacted location will be treated with one or more mitigation measures in the environmental impact assessment when possible.

**5b.** Describe and commit to a mitigation plan that will be developed later when the information is available to make final decisions (not often available during the project development phase) on all specific mitigation measures. This may be the case for large, complex projects. The objective of the plan should be to minimize construction noise using all reasonable (e.g., cost vs. benefit) and feasible (e.g., possible to construct) means available.



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Components of a mitigation plan may include some or all of the following provisions, which should also be specified in construction contracts:

- **Equipment noise emission limits** – Equipment noise limits are absolute noise limits applied to generic classes of equipment at a reference distance (typically 50 ft). The limits should be set no higher than what is reasonably achievable for well-maintained equipment with effective mufflers. Lower limits that require source noise control may be appropriate for certain equipment when needed to minimize community noise impact, if reasonable and feasible. Provisions could also be included to require equipment noise certification testing prior to use on-site.

- **Lot-line construction noise limits** – Lot-line construction noise limits are noise limits that apply at the lot-line of specific noise-sensitive properties. The limits are typically specified in terms of both noise exposure (usually $L_{eq(h)}$ over a 20-30-minute period) and maximum noise level. They should be based on local noise ordinances if applicable, as well as pre-construction baseline noise levels (usually 3 to 5 dB above the baseline).

- **Operational and/or equipment restrictions** – It may be necessary to prohibit or restrict certain construction equipment and activities near residential areas during nighttime hours. This is particularly true for activities that generate tonal, impulsive, or repetitive sounds, such as back-up alarms, hoe ram demolition, and pile-driving.

- **Noise abatement requirements** – In some cases, specifications may be provided for particular noise control treatments based on the results of the design analysis and/or prior commitments made to the public by civic authorities. An example would be the requirement for a temporary noise barrier to shield a particular community area from noisy construction activities.

- **Noise monitoring plan requirements** – Plans can be developed for pre-project noise monitoring to establish baseline noise levels at sensitive locations, as well as for periodic equipment and lot-line noise monitoring during the construction period. The plan should outline the measurement and reporting methods that will be used to demonstrate compliance with the project noise limits.

- **Noise control plan requirements** – For major construction projects, preparation and submission of noise control plans on a periodic basis (e.g., every six months) are generally required. These plans should predict the construction noise at noise-sensitive receiver locations based on the proposed construction equipment and methods. If the analysis predicts that the specified noise limits will be exceeded, the plan should specify the mitigation measures that will be applied and should demonstrate the expected noise reductions these measures will achieve. The objective of this proactive approach is to minimize the



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likelihood of community noise complaints by ensuring that any necessary mitigation measures are included in the construction plans.

- **Compliance enforcement program** – If construction noise is an issue in the community, it is important that a program be implemented to monitor contractor compliance with the noise control specifications and mitigation plan. It is recommended that this function be performed by a construction management team on behalf of the public agency.
- **Public information and complaint response procedures** – To maintain positive community relations, it is recommended to keep the public informed about the construction plans and efforts to minimize noise, and procedures should be established for prompt response and corrective action to noise complaints during construction.

Most of these provisions are appropriate for large-scale projects, where construction activity will continue for many months, if not years. The linked references contain more information on construction noise for major transportation projects.[60][65]

## 7.2 Construction Vibration Assessment

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings founded on the soil near the construction site respond to these vibrations with varying results, ranging from no perceptible effects at the lowest levels, low rumbling sounds and perceptible vibrations at moderate levels, and slight damage at the highest levels.

While ground vibrations from construction activities do not often reach the levels that can damage structures, fragile buildings must receive special consideration. The construction vibration criteria include consideration of the building condition.

The key elements of the Construction Vibration Assessment procedures and recommended workflow are as follows:

**Step 1:** Determine level of construction vibration assessment

**Step 2:** Use a qualitative construction vibration assessment

**Step 3:** Use a quantitative construction vibration assessment

**Step 4:** Assess construction vibration impact

**Step 5:** Determine construction vibration mitigation measures



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Cont.

## Step 1: Determine Level of Construction Vibration Assessment

*Determine the appropriate level of assessment based on the scale and type of the project and the stage of environmental review.*

**1a. Determine if an assessment is required.**
Construction Vibration Assessments are not required for many small projects including:

- Installation of safety features like grade-crossing signals
- Track improvements within the ROW
- Erecting small buildings and facilities, which are similar in scale to the surrounding development

**1b. Determine whether a qualitative or quantitative assessment is required.**

- **Qualitative Construction Vibration Assessment** – A qualitative construction vibration assessment is appropriate for projects where prolonged annoyance or damage from construction vibration is not expected. For example, equipment that generates little or no ground vibration—such as air compressors, light trucks, and hydraulic loaders—only require qualitative descriptions. See Section 7.2, Step 2 for more information on qualitative construction vibration assessments.

- **Quantitative Construction Vibration Assessment** – A quantitative construction vibration analysis is appropriate for projects where construction vibration may result in building damage or prolonged annoyance. For example, activities such as blasting, pile-driving, vibratory compaction, demolition, and drilling or excavation near sensitive structures require a quantitative analysis. See Section 7.2, Step 3 for more information on quantitative construction vibration assessments.

If there is uncertainty in how to determine the appropriate level of assessment, contact the FTA Regional office.

## Step 2: Use a Qualitative Construction Vibration Assessment

*Use a qualitative construction vibration assessment to estimate vibration for appropriate projects per Section 7.2, Step 1b.*

Provide qualitative descriptions in the environmental document of the following elements:

- Duration of construction (both overall and at specific locations)
- Equipment expected to be used
- Description of how ground-borne vibration will be maintained at an acceptable level



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Note that the criteria in Section 7.2, Step 4 do not apply to qualitative assessments.

### Step 3: Use a Quantitative Construction Vibration Assessment

*Use a quantitative construction vibration assessment to estimate vibration for appropriate projects per Section 7.2, Step 1b.*

For quantitative construction vibration assessments, follow the recommended procedure in this step. Vibration source levels from typical construction equipment and operations are provided below, and procedures on how to estimate construction vibration for damage and annoyance are provided in Steps 3a and 3b, respectively.

- **Vibration Source Levels from Construction Equipment** – Table 7-4 presents average source levels in terms of velocity for various types of construction equipment measured under a wide variety of construction activities. The approximate rms vibration velocity levels were calculated from the PPV limits using a crest factor of 4, representing a PPV-rms difference of 12 dB. Note that although the table gives one level for each piece of equipment, there is considerable variation in reported ground vibration levels from construction activities. The data in Table 7-4 provide a reasonable estimate for a wide range of soil conditions.[66][67][68][69]

**Table 7-4 Vibration Source Levels for Construction Equipment**

| Equipment | | PPV at 25 ft, in/sec | Approximate Lv* at 25 ft |
|---|---|---|---|
| Pile Driver (impact) | upper range | 1.518 | 112 |
| | typical | 0.644 | 104 |
| Pile Driver (sonic) | upper range | 0.734 | 105 |
| | typical | 0.17 | 93 |
| Clam shovel drop (slurry wall) | | 0.202 | 94 |
| Hydromill (slurry wall) | in soil | 0.008 | 66 |
| | in rock | 0.017 | 75 |
| Vibratory Roller | | 0.21 | 94 |
| Hoe Ram | | 0.089 | 87 |
| Large bulldozer | | 0.089 | 87 |
| Caisson drilling | | 0.089 | 87 |
| Loaded trucks | | 0.076 | 86 |
| Jackhammer | | 0.035 | 79 |
| Small bulldozer | | 0.003 | 58 |

*RMS velocity in decibels, VdB re 1 micro-in/sec

#### 3a. Damage Assessment

Assess for building damage for each piece of equipment individually. Construction vibration is generally assessed in terms of peak particle velocity (PPV), as described in Section 5.1.



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- Determine the vibration source level ($PPV_{ref}$) for each piece of equipment at a reference distance of 25 ft as described above and in Table 7-4.
- Use Eq. 7-2 to apply the propagation adjustment to the source reference level to account for the distance from the equipment to the receiver. Note that the equation is based on point sources with normal propagation conditions.

$$PPV_{equip} = PPV_{ref} \times (\frac{25}{D})^{1.5} \qquad \text{Eq. 7-2}$$

where:

$PPV_{equip}$ = the peak particle velocity of the equipment adjusted for distance, in/sec
$PPV_{ref}$ = the source reference vibration level at 25 ft, in/sec
$D$ = distance from the equipment to the receiver, ft

**3b. Annoyance Assessment**

Assess for annoyance for each piece of equipment individually. Ground-borne vibration related to human annoyance is related to rms velocity levels, expressed in VdB as described in Section 5.1.

Estimate the vibration level ($L_v$) using Eq. 7-3.

$$L_{v.distance} = L_{vref} - 30log(\frac{D}{25}) \qquad \text{Eq. 7-3}$$

where:

$L_{v.distance}$ = the rms velocity level adjusted for distance, VdB
$L_{vref}$ = the source reference vibration level at 25 ft, VdB
$D$ = distance from the equipment to the receiver, ft

## Step 4: Assess Construction Vibration Impact

*Compare the predicted vibration levels from the Quantitative Construction Vibration Assessment with impact criteria to assess impact from construction vibration.*

Assess potential damage effects from construction vibration for each piece of equipment individually. Note that equipment operating at the same time could increase vibration levels substantially, but predicting any increase could be difficult. The criteria presented in this section should be used during the environmental impact assessment phase to identify problem locations that must be addressed during the engineering phase.

Compare the PPV and approximate $L_v$ for each piece of equipment determined in Section 7.2, Step 3 to the vibration damage criteria in Table 7-5, which is presented by building/structural category, to assess impact.[70][71] The approximate rms vibration velocity levels were calculated from the PPV limits using a crest factor of 4.

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**Table 7-5 Construction Vibration Damage Criteria**

| Building/ Structural Category | PPV, in/sec | Approximate $L_v$* |
|---|---|---|
| I. Reinforced-concrete, steel or timber (no plaster) | 0.5 | 102 |
| II. Engineered concrete and masonry (no plaster) | 0.3 | 98 |
| III. Non-engineered timber and masonry buildings | 0.2 | 94 |
| IV. Buildings extremely susceptible to vibration damage | 0.12 | 90 |

*RMS velocity in decibels, VdB re 1 micro-in/sec

Compare the $L_v$ determined in Section 7.2, Step 3 to the criteria for the General Vibration Assessment in Section 6.2 to assess annoyance or interference with vibration-sensitive activities due to construction vibration.

## Step 5: Determine Construction Vibration Mitigation Measures

*Evaluate the need for mitigation and select appropriate mitigation measures where potential human impacts or building damage from construction vibration have been identified according to Section 7.2, Step 4.*

**5a.** Determine the appropriate approach for construction vibration mitigation considering equipment location and processes.

- **Design considerations and project layout**
  - Route heavily-loaded trucks away from residential streets. Select streets with the fewest homes if no alternatives are available.
  - Operate earth-moving equipment on the construction lot as far away from vibration-sensitive sites as possible.
- **Sequence of operations**
  - Phase demolition, earth-moving, and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration level produced could be substantially less when each vibration source operates separately.
  - Avoid nighttime activities. Sensitivity to vibration increases during the nighttime hours in residential neighborhoods.
- **Alternative construction methods**
  - Carefully consider the use of impact pile-driving versus drilled piles or the use of a sonic/vibratory pile driver or push pile driver where those processes might create lower vibration levels if geological conditions permit their use.
    - Pile-driving is one of the greatest sources of vibration associated with equipment used during construction of a project. The source levels in Table 7-4 indicate that sonic pile drivers may provide substantial reduction of vibration levels compared to impact pile drivers. But, there are some additional vibration effects of sonic pile drivers that may limit their use in sensitive locations.
    - A sonic pile driver operates by continuously shaking the pile at a fixed frequency, literally vibrating it into the ground. Continuous operation at a fixed frequency may, however, be more



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noticeable to nearby residents, even at lower vibration levels. Furthermore, the steady-state excitation of the ground may induce a growth in the resonant response of building components. Resonant response may be unacceptable in cases of fragile buildings or vibration-sensitive manufacturing processes. Impact pile drivers, however, produce a high vibration level for a short time (0.2 seconds) with sufficient time between impacts to allow any resonant response to decay.

- Select demolition methods involving little to no impact, where possible. For example, sawing bridge decks into sections that can be loaded onto trucks results in lower vibration levels than impact demolition by pavement breakers. Milling generates lower vibration levels than excavation using clam shell or chisel drops.
- Avoid vibratory rollers and packers near sensitive areas.

**5b.** Describe and commit to a mitigation plan that will be developed and implemented during the engineering and construction phase when the information available during the project development phase will not be sufficient to define specific construction vibration mitigation measures. The objective of the plan should be to minimize construction vibration damage using all reasonable and feasible means available. The plan should include the following components:

- A procedure for establishing threshold and limiting vibration values for potentially affected structures, based on an assessment of each structure's ability to withstand the loads and displacements due to construction vibrations
- A commitment to develop a vibration monitoring plan during the engineering phase and to implement a compliance monitoring program during construction

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SECTION 8

# Documentation of Noise and Vibration Assessment

The level of required documentation is determined according to the project class of action. Section 2.1 covers the appropriate class of action (EIS, EA, or CE) for different projects. If there is uncertainty in the appropriate level of documentation, contact the FTA Regional office.

The noise and vibration analysis must be articulated to the public in a clear, comprehensive manner for all levels of documentation. The technical data and information necessary to withstand scrutiny in the environmental review process must be documented in a way that remains intelligible to the public. Justification for all assumptions used in the analysis, such as selection of representative measurement sites and all baseline conditions, must be presented for review.

A separate technical report or memorandum is often prepared as a supplement to the environmental document. A technical report is appropriate in cases when including the data from the assessment would create an unreasonably long environmental document. The details of the analysis are important for establishing the basis for the assessment. Therefore, all details in the technical report should be contained in a well-organized format for easy access to the information.

For large-scale projects, the environmental document should contain a summary of the essential analysis information to provide subject matter context and the analysis findings. For these projects, separate technical reports are usually prepared as supplements to the EIS or EA and referred to in the environmental document. For smaller projects, or projects with minimal noise or vibration impact, all of the technical information may be presented in the environmental document itself or in a technical memorandum. Other projects might have no potential for noise or vibration impacts. For those projects, that environmental documentation should explain that no noise or vibration impacts are expected.

This section provides guidance on presenting the necessary noise and vibration information in the environmental document (Section 8.1) and the associated technical report (Section 8.2).

## 8.1 Environmental Document

In the environmental document, provide a summary of the comprehensive noise and vibration information from the technical report and emphasize the salient points of the analysis in a format and style that the public can understand. Smaller projects may have all of the technical information contained within the environmental document, so take special care in summarizing the technical details to convey the information adequately.



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## Step 1: Choose the Information to Include

*Choose the appropriate noise and vibration analysis information to include based on the level of environmental review and the associated documentation.*

**1a. Provide full disclosure of noise and vibration impacts** in the environmental document, including identification of locations where impacts cannot be mitigated below the severe impact level. In general, an EIS describes significant impacts and plans to mitigate the impacts. For EAs, completion of the environmental review with a finding of no significant impact (FONSI) may depend on mitigation being considered for incorporation in the proposed project. The way mitigation is presented in the environmental document depends on the type of impact (noise or vibration) and the stage of project development and environmental review. Projects that meet the criteria of a CE may also require the completion of a noise and/or vibration analysis, and the results of such an analysis should be documented in a noise memo or the CE documentation.

**1b. Document noise impacts** – Typically, airborne noise impacts can be accurately predicted during the environmental review. For projects that focus on a single alternative, noise impacts can be accurately identified in the draft environmental document. If mitigation is anticipated, then mitigation options should be explored in the EA or draft EIS; firm decisions on mitigation can be deferred to the final document. But for all projects, decisions on noise mitigation should be made before the final document is approved.

**1c. Document vibration impacts** – Predicting vibration impacts accurately is more complex because ground-borne vibration may be strongly influenced by subsurface conditions. The geotechnical studies that reveal these conditions are normally undertaken during the engineering phase, after the environmental review process is complete. Therefore, the final environmental document will usually not be able to state with certainty whether mitigation is needed for ground-borne vibration and noise.

If the engineering phase is conducted at the same time as the final environmental document, report the results of the Detailed Vibration Analysis in the final environmental document. If the engineering phase is conducted after the final environmental document, report the results of the General Vibration Assessment in the final environmental document. If impact is determined, include a commitment in the final document to conduct a Detailed Vibration Analysis during the engineering phase to complete the impact assessment. Also, include a discussion on various control measures that could be used and the likelihood that the criteria could be met through the use of one or more of the measures. It may be possible to state a commitment in the final environmental document to adhere to the impact criteria for the Detailed Vibration Analysis, while deferring the selection of specific vibration control measures until the completion of detailed studies in the engineering phase. When work is conducted after FTA signs its final decision document (i.e., ROD, combined FEIS/ROD, or FONSI), additional documentation, such as a reevaluation of the previous decision, may be necessary. FTA recommends contacting the FTA Regional office directly in these situations.



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**1d. Describe mitigation measures in the decision document** – After the decision document is approved, incorporate the mitigation measures by reference in the actual grant agreements signed by FTA and the project sponsor. The mitigation measures then become contractual conditions that must be adhered to by the project sponsor.

It is typically appropriate to include the following noise and vibration information in the environmental document, as described in Section 8.1:

- The existing conditions (affected environment)
- The direct impacts from operation (environmental consequences)
- The construction impacts (environmental consequences)

## Step 2: Organize information in the Environmental Document

*Include information in the following sections of the environmental document separating out the noise and vibration information.*

**2a. Existing Conditions (Affected Environment)** – Describe the existing conditions (conditions without the project) in terms of the existing noise and vibration conditions in this section of the document. The primary function of this section is to establish the focus and baseline conditions for the discussion of environmental impacts. Include the following basic information and separate the noise and vibration sections.

- **Description of noise/vibration metrics, effects and typical levels** – Include a targeted summary of relevant information from Section 3 of this manual. This will serve as background for the discussions of noise/vibration levels and characteristics that will follow in later sections. Provide illustrative material to convey typical levels to the public.

- **Inventory of noise/vibration-sensitive sites** – Describe the approach for identifying noise- and vibration-sensitive sites as well as the identified sites and site descriptions. Use sufficient detail to demonstrate completeness. Document these results on a map.

- **Noise/vibration measurements** – Document the basis for selecting measurement sites, including tables of sites coordinated with maps showing locations of sites. Summarize the measurement approach and include the justification for the measurement procedures used.

  Present measurement data in well-organized tables and figures with a summary and interpretation of measured data. Measurements are often included in the table of measurement sites described in the previous paragraph. In some cases, measurements may be supplemented or replaced by collected data relevant to the noise and vibration characteristics of the area. For example, soil information for estimating ground-borne vibration propagation characteristics may be available from other projects in the area.



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A summary and interpretation of how the collected data define the project setting is fundamental to this section.

**2b. Direct Impacts** – Include the following in the discussion on direct impacts due to project operation:

- **Overview of approach** – Provide a targeted summary of relevant information on the assessment procedure for determining noise/vibration impacts as a framework for the following sections.

- **Estimated noise/vibration levels** – Provide a general description of prediction models used to estimate project noise/vibration levels. Describe any distinguishing features unique to the project, such as source levels associated with various technologies.

  Describe the results of the predictions in general terms first, followed by a detailed accounting of predicted noise levels. Supplement this information with tables and illustrate by contours, cross-sections, or shaded mapping. If contours are included in a technical report, it is not necessary to repeat them in this section.

- **Criteria for noise/vibration impact** – Describe the impact criteria for the project in detail and reference the appropriate section in this manual. Include tables listing the criteria levels or the figures included in this manual.

- **Noise/vibration impact assessment** – Present the impact assessment in its own section or combined with the section above.

  Describe the locations, as identified in the screening procedure, where noise/vibration impact is expected to occur without implementation of mitigation measures, based on the screening results, predicted future levels, existing levels, and application of the impact criteria.

  Include inventory tables of impacted noise- and vibration-sensitive sites to quantify the impacts for all noise/vibration-sensitive sites included in the Affected Environment (Existing Conditions) as described in the Existing Conditions section above.

- **Noise/vibration mitigation measures** – Perhaps the greatest difference between the technical report and the environmental document is with mitigation. The technical report discusses mitigation options and recommendations, while the environmental document provides the vehicle for reaching decisions on appropriate mitigation measures.

  Begin this section with a summary of the noise/vibration mitigation measures considered for the impacted locations. Describe the specific measures selected for implementation in detail. Also, include any

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applicable, specific noise or vibration policies the project sponsor may have in place.

In cases where it is not possible to commit to a specific mitigation measure in the final environmental document, it may be possible to commit to a certain noise/vibration level. For example, the environmental document could include a commitment to meet or exceed the impact criteria specified in Sections 4.1 and 6.2.

- **Unavoidable adverse environmental effects** – If it is projected that adverse noise/vibration impacts will result after all reasonable abatement measures have been incorporated, identify these impacts in this section.

**2c. Construction Impacts** – Discuss construction impacts in the environmental document's section on construction impacts, if present. If, because of the scale of the project, the environmental document does not have a separate construction impacts section, then the construction impacts should be discussed with the rest of the resource impacts.

When a special section on construction noise/vibration impacts is included in the document, it should be organized according to the comprehensive outline on long-term impacts described above. For projects with relatively minor effects, include a brief summary of impact.

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## 8.2 Technical Report on Noise and Vibration

The technical report is intended to present complete technical data and descriptions in a manner that can be understood by the general public, but is more technical than the information found in the environmental document. All necessary background information should be present in the technical report, including tables, maps, charts, drawings, and references that may be too detailed for the environmental document, but which are important in helping to draw conclusions about the project's noise and vibration impacts and mitigation options.

Include the following major subject headings and key information described below. If both noise and vibration have been assessed, include separate sections for noise and vibration with subsections for key information as described below. Additional details on documentation requirements for the technical report of non-standard procedures and methodologies are included in Appendix G.

- **Overview** – Include a brief description of the project and an overview of the noise/vibration concerns to highlight initial considerations in framing the scope of the study.

- **Inventory of Noise/Vibration-Sensitive Sites** – Describe the approach for identifying noise- and vibration-sensitive sites as well as the identified sites and site descriptions. Use sufficient detail to demonstrate completeness. Document results on a map.

- **Measurements of Existing Noise/Vibration Conditions**
  - Document the basis for selecting measurement sites, including tables of sites coordinated with maps showing locations of sites. Summarize the measurement approach with justification for the measurement procedures used.
  - If the measurement data are used to estimate existing conditions at other locations, include the rationale and the method of estimation. Describe measurement procedures in detail.
  - Include tables of measurement instruments documenting manufacturer, type, serial number, and date of most recent calibration by authorized testing laboratory. Document measurement periods, including the time of day and length of time at each site to demonstrate adequate representation of ambient conditions.
  - Present measurement data in well-organized tables and figures with a summary and interpretation of measured data.

- **Additional Measurements Related to the Project** – Include detailed description of measurements and results for projects that require specialized measurements at noise- and vibration-sensitive sites. Examples include:
  - Outdoor-to-indoor noise level reduction of homes
  - Transmission of vibration into concert halls and recording studios
  - Special source-level characterization

- **Predictions of Noise/Vibration from the Project**
  - Describe the prediction model used to estimate future project conditions and specific data used as input to the models. Reference the appropriate section in this manual. Document any change or extension to the models recommended in this manual, so that the validity of the adjustments can be confirmed. See Appendix G for more information.
  - Describe in detail the modeled scenarios and why the scenarios were chosen.
  - Tabulate computed levels and illustrate by contours, cross-sections, or shaded mapping. Illustrate noise/vibration impacts with base maps at a scale with enough detail to provide reference for the location.

- **Noise/Vibration Criteria**
  - Describe the impact criteria for the project in detail and reference the appropriate section in this manual. Include tables specifying the criteria levels or the figures included in this manual.
  - If construction noise and/or vibration assessments were conducted, include the construction criteria in a separate section with the construction assessment details. See below for more information.

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- **Noise/Vibration Impact Assessment**
  - Describe the impact assessment according to the appropriate noise and/or vibration impact assessment sections in this manual.
  - If an alternatives analysis was conducted, present a resulting impact inventory for each alternative mode or alignment in a format that allows comparison among alternatives.
  - Tabulate the inventory according to the different types of affected noise- and vibration-sensitive sites. Present the results of the assessment both before and after mitigation.

- **Noise/Vibration Mitigation**
  - Begin this section with a summary of all treatments considered, including those not carried to final consideration.
  - Consider final candidate mitigation treatments separately and provide a description of the features of the treatment, including costs, expected benefit in reducing impacts, locations where the benefit would be realized, and a discussion of the practicality of alternative treatments.
  - Include enough noise and vibration impact information to allow the project sponsor and FTA to reach decisions on mitigation prior to issuance of an environmental decision document.

- **Construction Noise/Vibration Impacts**
  - Describe criteria adopted for construction noise or vibration if construction noise and/or vibration assessments were conducted.
  - Describe the method used for predicting construction noise or vibration and include inputs to the models such as equipment roster by construction phase, equipment source levels, assumed usage factors, and other assumed site characteristics.
  - Present predicted levels for noise- and vibration-sensitive sites and identify short-term impacts.
  - In cases where construction impacts are identified, discuss feasible abatement methods using enough detail to allow construction contract documents to include mitigation measures.

- **References** – Provide references for all criteria, approaches, and data used in the analyses, as well as other reports related to the project that may be relied on for information, e.g., geotechnical reports.

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# Appendix A: Glossary of Terms

Terminology used through the manual is defined in this appendix.[49][72]

| | |
|---|---|
| A-weighting | A standardized filter used to alter the sensitivity of a sound level meter with respect to frequency so that the instrument is less sensitive at low and high frequencies where the human ear is less sensitive. Abbreviated as dBA. |
| Absolute Noise Impact | Noise that interferes with activities independent of existing noise levels and is expressed as a fixed level threshold. |
| Accelerometer | A transducer that converts vibratory motion to an electrical signal proportional to the acceleration of that motion. |
| Ambient | The pre-project background noise or vibration level, which is often used interchangeably with "existing noise" in this manual. |
| Amplitude | Difference between the extremes of an oscillating signal. |
| Alignment | The horizontal location of a railroad or transit system as described by curved and tangent track. |
| At-grade | Tracks on the ground surface. |
| Automated Guideway Transit (AGT) | Guided steel-wheel or rubber-tired transit passenger vehicles operating singly or in multi-car trains with a fully automated system on fixed-guideways along an exclusive ROW. AGT includes personal rapid transit, group rapid transit, and automated people mover systems. |
| Auxiliaries | The term applied to a number of separately driven machines, operated by power from the main engine or electric generation. They include the air compressor, radiator fan, traction motor blower, and air conditioning equipment. |
| Ballast mat | A 2- to 3-inch-thick elastomer mat placed under the normal track ballast on top of a rigid slab or packed sub-grade. |
| Ballast | Granular material placed on the trackbed for the purpose of holding the track in line and at surface. |
| Bus Rapid Transit (BRT) | A type of limited-stop bus operation that relies on technology to help speed up the service. Buses can operate on exclusive transitways, high-occupancy-vehicle lanes, expressways, or ordinary streets. |
| Catenary | On electric railroad and LRT systems, the term describing the overhead conductor that is contacted by the pantograph or trolley, and its support structure. |
| Commuter rail | Conventional passenger railroad serving areas surrounding an urban center. Most commuter railroads utilize locomotive-hauled coaches, often in push-pull configuration. |
| Consist | The total number and type of cars, locomotives, or transit vehicles in a trainset. |
| Continuous welded rail | A number of rails welded together to form unbroken lengths of track without gaps or joints. |
| Corrugated rail | A rough condition of alternating ridges and grooves which develops on the rail head in service. |
| Crest factor | The ratio of peak particle velocity to maximum RMS amplitude in an oscillating signal. |
| Criteria | Plural form of "criterion," the relationship between a measure of exposure (e.g., sound or vibration level) and its corresponding effect. |
| Cross tie | The transverse member of the track structure to which the rails are spiked or otherwise fastened to provide proper gage and to cushion, distribute, and transmit the stresses of traffic through the ballast to the trackbed. |
| Crossover | Two turnouts with the track between the frogs arranged to form a continuous passage between two nearby and generally parallel tracks. |
| Cumulative | The summation of individual sounds into a single total value related to the effect over time. |
| Cut | A terrain feature typically created to allow for a trackbed to be at a lower level than the surrounding ground. |



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| dB | See Decibel. |
| dBA | See A-weighting. |
| Decibel | The standard unit of measurement for sound pressure level and vibration level. Technically, a decibel is the unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm of this ratio. Abbreviated as dB. |
| DMU | Diesel-powered multiple unit. See Multiple Unit. |
| DNL | See $L_{dn}$. |
| Electrification | A term used to describe the installation of overhead wire or third rail power distribution facilities to enable operation of trains. |
| Embankment | A bank of earth, rock, or other material constructed above the natural ground surface. |
| Equivalent level | The level of a steady sound, which, in a stated time period and at a stated location, has the same sound energy as the time-varying sound. Also, written as $L_{eq}$. |
| Event | A passby of a vehicle (e.g., train, bus, or car) of any size consist. |
| Ferry boat | A transit mode comprised of vessels to carry passengers and/or vehicles over a body of water. |
| Fixed-guideway | A public transportation facility with a separate ROW for the exclusive use of public transportation and other high-occupancy vehicles. |
| Flange | The vertical projection along the inner rim of a wheel that serves, together with the corresponding projection of the mating wheel of a wheel set, to keep the wheel set on the track. |
| Floating slab | A special track support system for vibration isolation, consisting of concrete slabs supported on resilient elements, usually rubber or similar elastomer. |
| Force density | Force density is the force per root distance along the track in $lb/ft^{1/2}$. The force density level is the level in decibels of the force density relative to 1 $lb/ft^{1/2}$ and describes the vehicle force that excites the soil/rock surrounding the transit structure. |
| Frequency | The number of times that a periodically occurring quantity repeats itself in a specified period. With reference to noise and vibration signals, the number of cycles per second. |
| Frequency spectrum | Distribution of frequency components of a noise or vibration signal. |
| Frog | A track structure used at the intersection of two running rails to provide support for wheels and passageways for their flanges, thus permitting wheels on either rail to cross the other. |
| Gage (of track) | The distance between the rails on a track. |
| Grade crossing | The point where a rail line and a motor vehicle road intersect at the same vertical elevation. |
| Guideway | Supporting structure to form a track for rolling or magnetically-levitated vehicles. |
| Head-End Power (HEP) | A system of furnishing electric power for a complete railway train from a single generating plant in the locomotive. |
| Heavy rail | See Rail Rapid Transit. |
| Hertz (Hz) | The unit of acoustic or vibration frequency representing cycles per second. |
| Hourly average sound level | The time-averaged A-weighted sound level, over a 1-hour period, usually calculated between integral hours. Abbreviated as $L_{(1h)}$. |
| Hybrid Bus | A rubber-tired vehicle that features a hybrid diesel-electric propulsion system. A diesel engine runs an electric generator that powers the entire vehicle including electric drive motors that deliver power to the wheels. |
| Idle | The speed at which an engine runs when it is not under load. |
| Intermediate Capacity Transit (ICT) | A transit system with less capacity than rail rapid transit (RRT), but more capacity than typical bus operations. Examples of ICT include bus rapid transit (BRT), automated guideway transit (AGT), monorails, and trolleys. |
| Intermodal facility | Junction of two or more modes of transportation where transfers may occur. |
| Jointed rail | A system of joining rails with steel members designed to unite the abutting ends of contiguous rails. |



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| $L_{(1h)}$ | See Hourly Average Sound Level. |
| $L_{dn}$ | Day-Night Sound Level. The sound exposure level for a 24-hour day calculated by adding the sound exposure level obtained during the daytime (7 a.m. to 10 p.m.) to 10 times the sound exposure level obtained during the nighttime (10 p.m. to 7 a.m.). This unit is used throughout the United States for environmental impact assessment. Also, written as DNL. |
| $L_{eq(1hr)}$ | Equivalent Sound Level. The metric for cumulative noise exposure over a specific time interval is the equivalent sound level |
| Light Rail Transit (LRT) | A mode of public transit with tracked vehicles in multiple units operating in mixed traffic conditions on streets as well as sections of exclusive ROW. Vehicles are generally powered by electricity from overhead lines. |
| Locomotive | A self-propelled, non-revenue rail vehicle designed to convert electrical or mechanical energy into tractive effort to haul railway cars. See also Power Unit. |
| Main line | The principal line or lines of a railway. |
| Maglev | Magnetically-levitated vehicle; a vehicle or train of vehicles with guidance and propulsion provided by magnetic forces. Support can be provided by either an electrodynamic system wherein a moving vehicle is lifted by magnetic forces induced in the guideway or an electromagnetic system wherein the magnetic lifting forces are actively energized in the guideway. |
| Maximum sound level | The highest exponential-time-average sound level, in decibels, that occurs during a stated time period. Abbreviated as $L_{max}$. The standardized time periods are 1 second for $L_{max,}$ slow, and 0.125 second for $L_{max,}$ fast. |
| Metric | Measurement value or a quantitative descriptor used to identify a specific measure of sound level. |
| Monorail | Guided transit vehicles operating on or suspended from a single rail, beam, or tube. |
| Multimodal Project | In this manual, the term multimodal project is used to describe a project that includes changes to both transit and highway components in segments of the project. |
| Multiple Unit (MU) | A term referring to the practice of coupling two or more diesel-powered or electric-powered passenger cars together with provision for controlling the traction motors on all units from a single controller. |
| Noise | Any disagreeable or undesired sound or other audible disturbance. |
| Octave band | A standardized division of a frequency spectrum in which the interval between two divisions is a frequency ratio of 2. |
| One-third octave band | A standardized division of a frequency spectrum in which the octave bands are divided into thirds for more detailed information. The interval between center frequencies is a ratio of 1.25. |
| Pantograph | A device for collecting current from an overhead conductor (catenary), consisting of a jointed frame held up by springs or compressed air and having a current collector at the top. |
| Park-and-ride facility | A parking garage and/or lot used for parking passengers' automobiles while they use transit agency facilities and vehicles. |
| Peak factor | See Crest factor. |
| Plan-and-profile | Mapping used by transportation planners that shows two-dimensional plan views (x- and y- axes) on the same page as two-dimensional profiles (x- and z-axes) of a road or track. |
| Peak Particle Velocity (PPV) | The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States. |
| Peak-to-Peak (P-P) Value | Of an oscillating quantity, the algebraic difference between the extreme values of the quantity. |
| Power unit | A self-propelled vehicle, running on rails and having one or more electric motors that drive the wheels and thereby propel the locomotive and train. The motors obtain electrical energy either from a rail laid near, but insulated from, the track rails, or from a wire suspended above the track. Contact with the overhead wire is made by a pantograph mounted on top of the unit. |
| Project segment | Portions of a project with similar characteristics. |



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| Pure tone | Sound of a single frequency. |
| Radius of curvature | A measure of the severity of a curve in a track structure based on the length of the radius of a circle that would be formed if the curve were continued. |
| Rail | A rolled steel shape, commonly a T-section, designed to be laid end to end in two parallel lines on cross ties or other suitable supports to form a track for railway rolling stock. |
| Rail Rapid Transit (RRT) | Often called "Heavy Rail Transit." A mode of public transit with tracked vehicles in multiple units operating in exclusive rights-of-way. Trains are generally powered by electricity from a third rail alongside the track. |
| Receiver | A stationary far-field position at which noise or vibration levels are specified. |
| Relative Noise Impact | Noise increase above existing levels. |
| Resonance frequency | The phenomenon that occurs in a structure under conditions of forced vibration such that any change in frequency of excitation results in a decrease in response. |
| Right-of-Way | Abbreviated as ROW. Lands or rights used or held for railroad or transit operation. |
| Root Mean Square (rms) | The square root of the mean-square value of an oscillating waveform, where the mean-square value is obtained by squaring the value of amplitudes at each instant of time and then averaging these values over the sample time. |
| RMS Velocity Level (LV) | See Vibration Velocity Level. |
| SEL | See Sound Exposure Level. |
| Sound Exposure Level | The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second. Abbreviated as SEL. |
| Sound | A physical disturbance in a medium that is capable of being detected by the human ear. |
| Spectrum | See Frequency Spectrum. |
| Sub-ballast | Any material of a superior character, which is spread on the finished subgrade of the roadbed and below the top-ballast, to provide better drainage, prevent upheaval by frost, and better distribute the load over the roadbed. |
| Subgrade | The finished surface of the roadbed below the ballast and track. |
| Suburban bus | A bus similar to an intercity bus with high-backed seats but no luggage compartment, often used in express mode to city centers from suburban locations. |
| Switch | A track structure used to divert rolling stock from one track to another. |
| Tangent track | Track without curvature. |
| Track | An assembly of rail, ties, and fastenings over which cars, locomotives, and trains are moved. |
| Traction motor | A specially designed direct current series-wound motor mounted on the trucks of locomotives and self-propelled cars to drive the axles. |
| Trainset | A group of coupled cars including at least one power unit. |
| Transducer | Device designed to receive an input signal of a given kind (motion, pressure, heat, etc.) and to provide an output signal of a different kind (electrical voltage, amperage, etc.) in such a manner that desired characteristics of the input signal appear in the output signal for measurement purposes. |
| Transfer mobility | Transfer mobility is the complex velocity response produced by a point force as a function of frequency and represents the relationship between a vibration source that excites the ground and the resulting vibration of the ground surface. |
| Transit center | A fixed location where passengers interchange from one route or vehicle to another. |
| Trolley bus | A rubber-tired, electrically-powered bus operating on city streets drawing power from overhead lines. |
| Truck | The complete assembly of parts including wheels, axles, bearings, side frames, bolster, brake rigging, springs, and all associated connecting components, the function of which is to provide support, mobility, and guidance to a railroad car or locomotive. |
| Trunk line | See Mainline. The mainline of a commuter railroad where the branch line traffic is combined. |



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|---|---|
| Turnout | An arrangement of a switch and a frog with closure rails, by means of which rolling stock may be diverted from one track to another. |
| VdB | See Vibration Velocity Level. |
| Vibration Velocity Level (LV) | Ten times the common logarithm of the ratio of the square of the amplitude of the RMS vibration velocity to the square of the amplitude of the reference RMS vibration velocity. The reference velocity in the United States is one micro-inch per second. Abbreviated as VdB. |
| Vibration | An oscillation wherein the quantity is a parameter that defines the motion of a mechanical system. |
| Wheel flat | A localized flat area on a steel wheel of a rail vehicle, usually caused by skidding on steel rails, causing a discontinuity in the wheel radius. |
| Wheel squeal | The noise produced by wheel-rail interaction, particularly on curves where the radius of curvature is smaller than allowed by the separation of the axles in a wheel set. |

Additional, relevant acoustic terminology and formulas are defined in ANSI S1.1-1994 (49).

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# Appendix B: Fundamentals of Noise

Noise is generally considered to be unwanted sound. Sound is what we hear when our ears are exposed to small pressure fluctuations in the air. There are many ways in which pressure fluctuations are generated, but typically they are caused by vibrating movement of a solid object. This manual uses the terms noise and sound interchangeably because there is no physical difference between them. Noise can be described in terms of three variables: amplitude (loud or soft); frequency (pitch); and time pattern (variability).

## B.1 Amplitude

The loudness of a sound is described by the sound wave's amplitude of pressure fluctuations above and below atmospheric pressure. Pressure is measured in Pascals. The mean value of the positive and negative pressure fluctuations is the static atmospheric pressure and is not a useful metric of sound. However, the effective magnitude of the sound pressure in a sound wave can be expressed by the rms of the oscillating pressure. See Figure B-1 for an illustration of the rms pressure.

The rms pressure is calculated according to Eq. B-1. The values of sound pressure are squared and time-averaged to smooth out variations. The rms pressure is the square root of this time-averaged value.

$$P_{rms} = \sqrt{\frac{1}{N}\sum_{i=1}^{N} P_i^2} \qquad \textbf{Eq. B-1}$$

where:

$P_{rms}$ = sound pressure
$P_i$ = individual sound pressure
$N$ = number of samples
$i = 1$ = index of summation

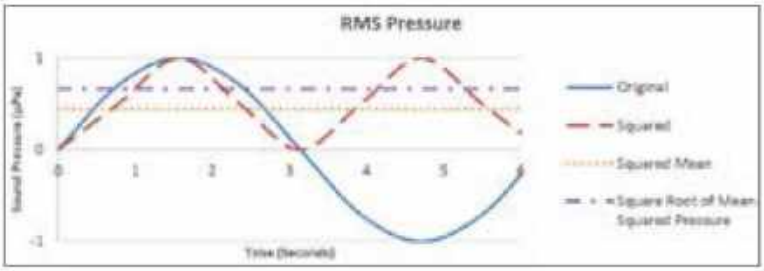


**Figure B-1 RMS Pressure Illustration**

Most humans with typical or average hearing can perceive sounds ranging from approximately 20 microPascals to 20 million microPascals or more. Because of the difficulty in dealing with such an extreme range of numbers, acousticians use a logarithmic scale to describe sound levels. Acousticians use a compressed scale based on logarithms of the ratios of the sound energy contained in the wave related to the square of sound pressures instead of the sound pressures themselves, resulting in the "sound pressure level" in decibels (dB). The 'B' in dB is always capitalized because the unit is named after Alexander Graham Bell, a leading 19th century innovator in communication.



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Sound pressure level ($L_p$) is defined as:

$$L_p = 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}); or$$

$$L_p = 20log_{10}(\frac{P_{rms}}{P_{ref}})\ dB \qquad \textbf{Eq. B-2}$$

where

$L_p$ = sound pressure level, dB
$P_{rms}$ = RMS sound pressure
$P_{ref}$ = 20 microPascals

Inserting the range of sound pressure values mentioned above into Eq. B-2 results in a typical quietest sound at 20 microPascals at 0 dB. A typical loudest sound of 20 million microPascals is 120 dB.

## B.1.1 Decibel Addition

The combination of two or more sound pressure levels at a single location requires decibel addition, which is the addition of logarithmic quantities of sound energy ($P^2_{rms}$).

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To add sound energy from multiple, unique sources, add the sound energy as shown Eq. B-3.

$$L_p = 10log_{10}(\frac{P_1{}^2 + P_2{}^2 + \cdots + P_n{}^2}{P_{ref}^2}) \qquad \textbf{Eq. B-3}$$

where

$L_p$ = sound pressure level, dB
$P_1, P_2, P_n$ = individual source RMS sound pressures to add
$P_{ref}$ = 20 microPascals

A doubling of identical sound sources results in a 3-dB increase, as shown mathematically below.

$$L_p = 10log_{10}(2\frac{p_{rms}^2}{p_{ref}^2})$$

$$= 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}) + 10log_{10}(2)$$

$$= 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}) + 3$$

To add decibel levels (instead of sound energy) use the following equation:

$$L_p = 10log_{10}(\sum_{i=1}^{N} 10^{(L_i/10)})$$

where

$L_p$ = sound pressure level, dB
$N$ = number of samples
$i$ = index of summation
$L_i$ = individual sound pressure levels, dB
$L_p$ = sound pressure level, dB
$L_1, L_2, L_n$ = individual source sound pressure levels to add

The equation above can be rewritten as follows:

$$L_p = 10log_{10}(10^{\frac{L_1}{10}} + 10^{\frac{L_2}{10}} + \cdots + 10^{\frac{L_n}{10}}) \quad \textbf{Eq. B-4}$$

where

$L_1, L_2, L_n$ = individual source sound pressure levels to add

Decibel addition can be quickly approximated using Figure B-2.

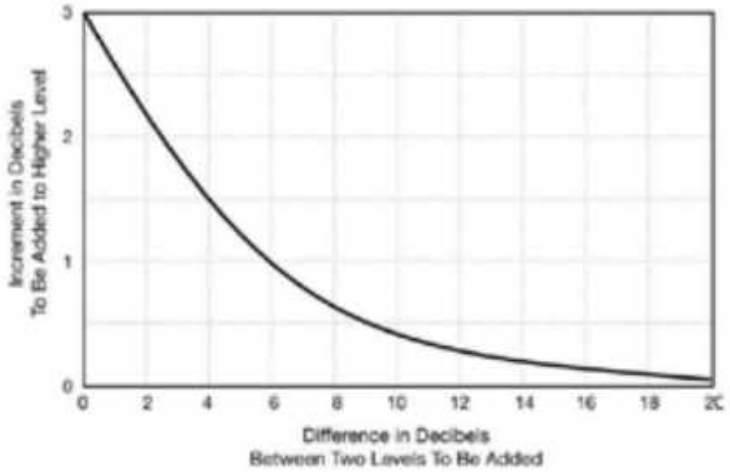


**Figure B-2 Graph for Approximate Decibel Addition**

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**Example B-1 Decibel Addition – Identical Buses**

**Decibel Addition**

What is the combined sound pressure level of two identical buses if the noise from one bus resulted in a sound pressure level of 70 dB?

Since a doubling of identical sound sources results in a 3-dB increase:

$$L_p = 70 + 3 = 73\ dB$$

**Example B-2 Decibel Addition – Two Sources**

**Decibel Addition**

What is the combined sound pressure level of 64 dB and 60 dB?

**Using Eq. B-4:**

$$L_p = 10log_{10}(10^{64/10} + 10^{60/10}) = 65.5\ dB$$

**Using Figure B-2:**
The x-axis values represent the difference between the two sound levels, 64 and 60 dB. The difference between the sound levels in this example is 4. The point on the curve corresponding to 4 on the x-axis is 1.5. The y-axis values represent the increment that is added to the higher level.

$$L_p = 64 + 1.5 = 65.5\ dB$$

## B.1.2 Frequency

Sound is a fluctuation of air pressure. The number of times the fluctuation occurs in one second is called its frequency. In acoustics, frequency is quantified in cycles per second, or Hertz (Hz). The hearing for a typical human covers the frequency range from 20 Hz to 20,000 Hz.

Some sounds, like whistles, are associated with a single frequency; this type of sound is called a pure tone. However, most often, noise is made up of many frequencies, called a spectrum. Analyzing a noise spectrum allows for identification of dominant frequency ranges and can assist in identifying noise sources. Often a frequency spectrum is divided into standardized frequency bands for analysis. Most commonly, the frequency bands for transit analyses are octave bands (where the interval between two divisions is a frequency ratio of 2) and one-third octave bands (where the interval between center frequencies is a ratio of 1.25).[73]

If the spectrum associated with a transit noise source is dominated by many low-frequency components, the noise will have a characteristic like the rumble of thunder; this is often associated with noise from a subway. Mid-range frequencies are often associated with wheel/rail noise, and high frequencies may be associated with wheel squeal due to sharp curves on a track.

The spectrum in Figure B-3 illustrates the full range of acoustical frequencies that can occur near a transit system. In this example, the noise spectrum was measured near a train on an elevated steel structure with a sharp curve.



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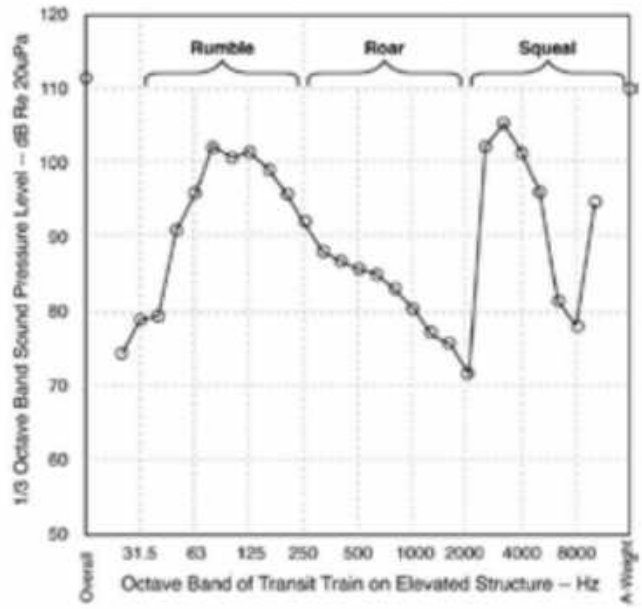


**Figure B-3 Noise Spectrum of Transit Train on Curve and Elevated Structure**

The human auditory system does not respond equally to all frequencies of sound. For sounds normally heard in our environment, low frequencies below 250 Hz and frequencies above 10,000 Hz are generally considered less audible than the frequencies in between. This is because our ears are less sensitive in those areas. To better represent human hearing, frequency response functions were developed to characterize the way people respond to different frequencies. These are referred to as A-, B-, and C-weighted curves and represent human auditory response to normal, very loud, and extremely loud sound levels, respectively. Environmental noise is generally considered to be in the normal sound level range; and, therefore, the A-weighted sound level is considered best to represent the human response.

The A-weighting curve is shown in Figure B-4. This curve illustrates that sounds at 50 Hz would have to be amplified by 30 dB to be perceived as loud as a sound at 1000 Hz at normal sound levels.



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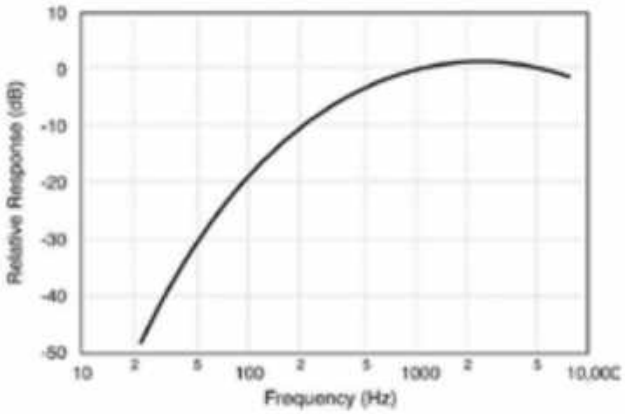


**Figure B-4 A-Weighting Curve**

Low frequencies have longer wavelengths of sound (cycles are less frequent) and, conversely, high frequencies have shorter wavelengths (cycles are more frequent). The size of the wavelength in feet is dependent on frequency and speed of sound as follows:

$$f\lambda = c \qquad \textbf{Eq. B-5}$$

where

$f$ = frequency in cycles per second, Hz
$\lambda$ = wavelength, ft
$c$ = speed of sound, ft/sec

The speed of sound in air varies with temperature; but at standard conditions, it is approximately 1000 ft per second. Therefore, at standard conditions, a frequency of 1000 Hz has a wavelength of 1 foot and a frequency of 50 Hz has a wavelength of 20 ft. The scale of these waves explains, in part, the reason humans perceive sounds of 1000 Hz better than those of 50 Hz. A wavelength of 1 foot is similar to the size of a person's head; whereas, a wavelength of 20 ft is similar to dimensions associated with a house, which is why low-frequency sounds (such as those from an idling locomotive) are sometimes not attenuated by walls and windows of a home. These sounds transmit indoors with relatively little reduction in strength.

## B.1.3 Time Pattern

The third important characteristic of noise is its variation in time. Environmental noise is considered to be a combination of all outdoor noise sources. When combined, sources such as distant traffic, wind in trees, and distant industrial or farming activities often create a low-level background noise in which no particular individual source is identifiable. Background noise is often relatively constant from moment to moment, but varies slowly over time as natural forces change or as human activity follows its daily cycle. In addition to this low-level, slowly varying background noise, a succession of identifiable noisy events of relatively brief duration may be added. These events may include single-vehicle passbys, aircraft flyovers,



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screeching of brakes, and other short-term events, which all cause the noise level to substantially fluctuate from moment to moment.

It is possible to describe these fluctuating noises in the environment using single-number metrics to allow for manageable measurements, computations, and impact assessment. The search for adequate single-number noise metrics has encompassed hundreds of attitudinal surveys and laboratory experiments in addition to decades of practical experience with many alternative metrics.

## B.1.4 Noise Metrics

The noise metrics referred to in this manual are described in the sections below.

### B.1.4.1 A-weighted Sound Level: The Basic Noise Unit

The basic noise unit for transit noise is the A-weighted sound level and is described in ANSI S1.1-1994 (49). It describes the noise level at the receiver at any moment in time and can be read directly from noise-monitoring equipment when frequency weighting is set to A-weighting. Figure B-5 shows examples of typical A-weighted sound levels for both transit and non-transit sources, ranging from approximately 30 dBA (very quiet) to 90 dBA (very loud).

The unit dBA denotes the decibel level is A-weighted. The letter "A" indicates that the sound has been filtered to reduce the strength of very low and very high-frequency sounds to emulate the human response to sound levels as described in Appendix B.1.2. This allows for events that are out of the range of human hearing, such as high-frequency dog whistles and low-frequency seismic disturbances, to be filtered out. On average, each A-weighted sound level increase of 10 dB corresponds to an approximate doubling of subjective loudness.

A-weighted sound levels are adopted as the basic noise unit for transit noise impact assessments because they:

- Can be measured easily,
- Approximate the human ear's sensitivity to sounds of different frequencies,
- Match attitudinal-survey tests of annoyance better than other basic units,
- Have been in use since the early 1930s, and
- Are endorsed as the proper basic unit for environmental noise by most agencies concerned with community noise throughout the world.

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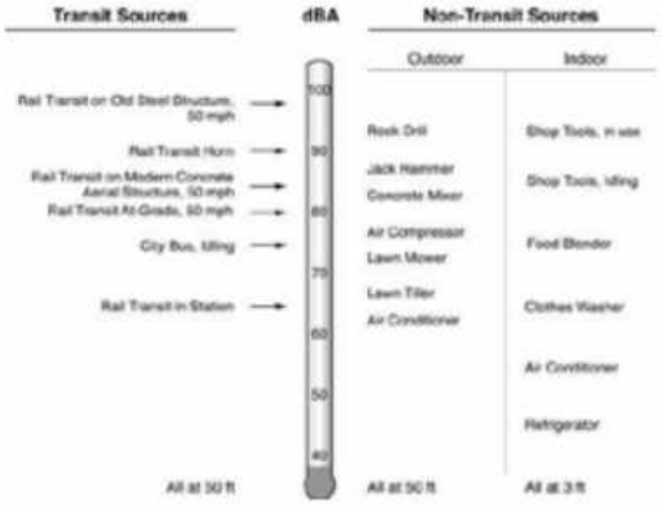


**Figure B-5 Typical A-weighted Sound Levels**

## B.1.4.2 Maximum Sound Level ($L_{max}$) During a Single Noise Event

As a transit vehicle approaches, passes by, and then recedes into the distance, the A-weighted sound level rises, reaches a maximum, and then fades into the background noise. The maximum A-weighted sound level reached during this passby is called the maximum sound level, [49] abbreviated here as $L_{max}$. $L_{max}$ is illustrated in Figure B-6 where time is plotted horizontally, and A-weighted sound level is plotted vertically.

Although $L_{max}$ is commonly used in vehicle-noise specifications,[xxi] it is not used for transit environmental noise impact assessment. $L_{max}$ does not include the number and duration of transit events, which are important for assessing people's reactions to noise. It also cannot be normalized to a one-hour or 24-hour cumulative measure of impact, and therefore, is not conducive to comparison among different transportation modes. For example, cumulative noise metrics commonly used in highway noise assessments are $L_{eq(1hr)}$ and $L_{10}$, the noise level exceeded for 10 percent of the peak hour.

[xxi] For noise compliance tests of transient sources, such as moving transit vehicles under controlled conditions with smooth wheel and rail conditions, $L_{max}$ is typically measured with the sound level meter's time weighting set to "fast." However, for tests of continuous or stationary transit sources, it is usually more appropriate to use the "slow" setting. When set to "slow," sound level meters ignore some of the very-transient fluctuations, which are negligible when assessing the overall noise level.



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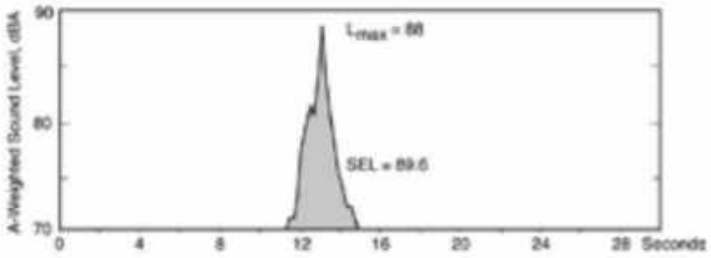


**Figure B-6 Typical Transit-Vehicle Passby**

## B.1.4.3 Sound Exposure Level (SEL): Exposure from a Single Noise Event

Sound exposure level, abbreviated here as SEL, is the cumulative noise exposure from a single noise event, normalized to one second (49). SEL contains the same overall sound energy as the actual varying sound energy during the event. It is the primary metric for the measurement of transit vehicle noise emissions and an intermediate metric in the measurement and calculation of both $L_{eq(1hr)}$ and $L_{dn}$. The SEL metric is A-weighted and is expressed in the unit dBA.

This concept is illustrated in Figure B-6 and Figure B-7 where the shaded regions are the sound exposure during and event. The example in Figure B-6 is a transit-vehicle passby and Figure B-7 is an example of a fixed-transit facility as a transit bus is started, warmed up, and then driven away. For this event, the noise exposure is large due to duration of the event.

SEL is an A-weighted cumulative measure that is referenced to one second. Louder events have greater SELs than quieter events, and events of longer duration have greater SELs than shorter events. This is generally consistent with community response to noise. Noise events of longer duration are considered more disruptive than events of shorter duration with equal maximum A-weighted sound levels.

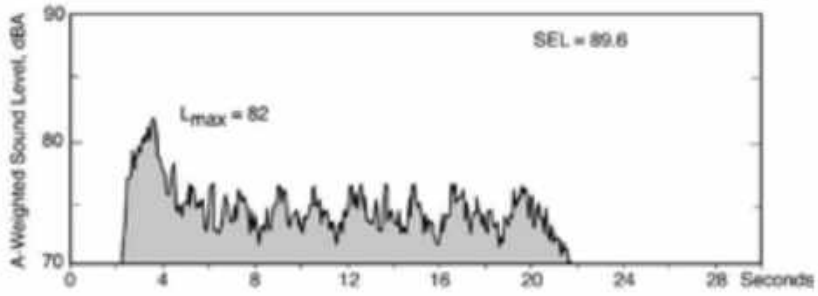


**Figure B-7 Typical Fixed-Facility Noise Event**



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Cont.

Conceptually, the sound exposure level can be expressed as:

$$SEL = 10log_{10}(\frac{Total\ sound\ energy}{during\ the\ event})$$

Mathematically, the sound exposure level is computed as follows:

$$SEL = 10log_{10}(\sum_{i=1}^{N} 10^{(L_i/10)}) \qquad \textbf{Eq. B-6}$$

where

$SEL$ = Sound exposure level, dBA
$N$ = number of samples
$i$ = index of summation
$L_i$ = individual A-weighted sound level, dBA

The events shown in Figure B-6 and Figure B-7 are compared graphically in Figure B-8 using a logarithmic vertical scale. The shaded zones in these figures indicate noise exposure over time. The actual event shows the noise exposure over the time of the event, and the equivalent SEL shows the total noise exposure normalized to one second. Note that events 1 and 2 in Figure B-8 have different time periods and noise levels throughout the event, but the same resulting SEL.

SEL is used in transit noise analyses because it:

1. Accounts for both the duration and amplitude of an event,
2. Allows a uniform assessment method for both transit-vehicle passbys and fixed-facility noise events, and
3. Can be used to calculate the one-hour and 24-hour cumulative metrics for comparison across different transportation modes.

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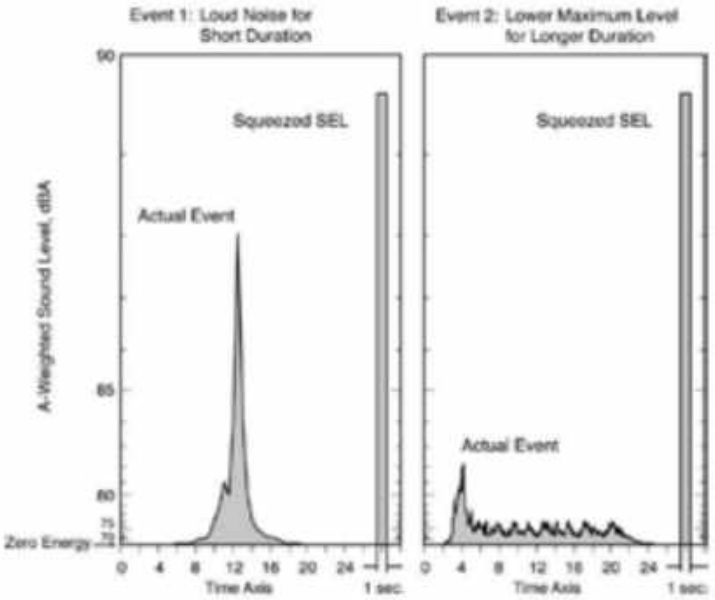


**Figure B-8 An Energy View of Noise Events**

## B.1.4.4 Equivalent Sound Level ($L_{eq(t)}$)

The metric for cumulative noise exposure over a specific time interval is the equivalent sound level (49). It is a single decibel value that accounts for total sound energy from all sound levels over a specified time interval (or time period). The time period associated with the equivalent sound level metric can vary for different types of analyses. This metric is abbreviated as $L_{eq(t)}$, where "t" is the duration of the time period. $L_{eq(t)}$ represents a hypothetical constant sound level and contains the same overall sound energy as the actual varying sound energy during the time period "t". For most transit noise analyses, an A-weighted, hourly equivalent sound level is used, abbreviated here as $L_{eq(1hr)}$. $L_{eq(1hr)}$ is expressed in the unit, dBA.

Figure B-9 shows examples of typical unmitigated hourly $L_{eq(1hr)}$'s, both for transit and non-transit sources ranging from 40 (quiet) to 80 dB (loud). Note that these $L_{eq(1hr)}$'s depend upon both the number of events during the hour as well as each event's duration, which is affected by vehicle speed. For example, doubling the number of events during the hour will increase the $L_{eq(1hr)}$ by 3 decibels, as will doubling the duration of each individual event.



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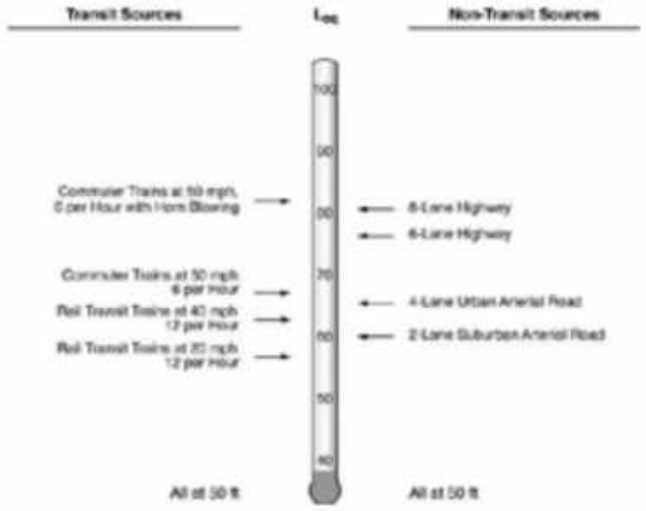


**Figure B-9 Typical Hourly $L_{eq(1hr)}$'s**

An example of sound levels over time for a single noise event such as a train passing on nearby tracks is illustrated in the top frame of Figure B-10. As the train approaches, passes by, and then recedes into the distance, the A-weighted sound level rises, reaches a maximum, and then fades into the background noise. The equivalent sound level is shown for three different time periods Figure B-10. The area under the curve in this top frame is the noise that reaches the receiver (noise exposure) over this five-minute period. The center frame of the figure shows sound levels over the one-hour period, including the five-minute period from the top frame. The area under the curve represents the noise exposure for one hour. The bottom frame shows sound levels over a full 24-hour period and is discussed in Appendix B.1.4.5.



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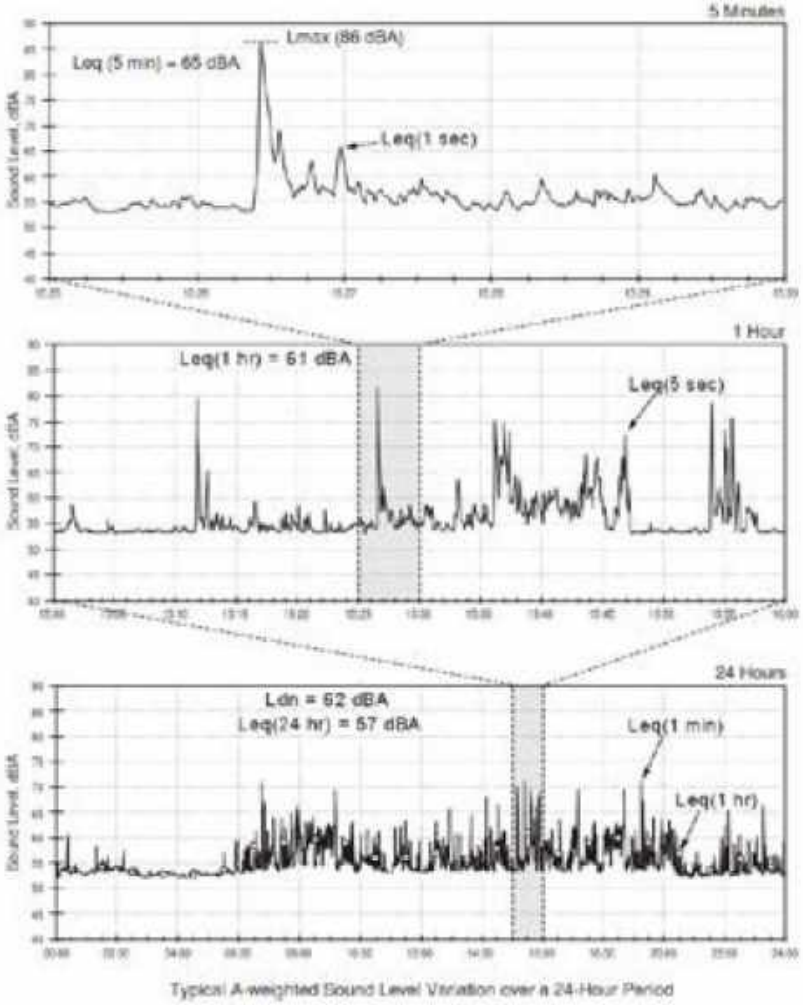


Typical A-weighted Sound Level Variation over a 24-Hour Period

**Figure B-10 Example A-weighted Sound Level Time Histories**

Conceptually, the equivalent sound level can be expressed as:

$$L_{eq}(t) = 10log_{10}(\frac{Total\ Sound\ Energy}{Time\ Period})$$

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Cont.

Mathematically, the equation is as follows:

$$L_{eq}(t) = 10log_{10}(\frac{1}{T}\sum_{i=1}^{N} 10^{(L_i/10)})$$

where

$L_{eq(t)}$ = equivalent sound level of time period "t", dBA
$T$ = time period, sec (3600 for an hourly $L_{eq(1hr)}$)
$N$ = number of samples, sec (3600 for an hourly $L_{eq(1hr)}$)
$i$ = index of summation
$L_i$ = individual A-weighted sound level, dBA

The equation above can be rewritten as follows for a one-hour time period:

$$L_{eq}(1h) = 10log_{10}[Total\ Sound\ Energy\ in\ 1\ hr] - 35.6 \qquad \textbf{Eq. B-7}$$

where

35.6 = numerical adjustment for a time period of 1 hour ($10\log_{10}(t)$)

The sound energy is totaled over a full hour (3600 seconds) and is accumulated for all noise events during that hour. When computing the equivalent sound level for a time period other than one hour, T is modified in the equation to the duration of the time period in seconds. The numerical adjustment (35.6) accounts for time period of interest, in this case, one hour.

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An alternate way for computing $L_{eq(1hr)}$ for a series of transit-noise events using sound exposure levels can be expressed conceptually as follows:

$$L_{eq}(1h) = 10log_{10}(\frac{Energy\ Sum\ of}{all\ SELs}) - 35.6$$

Mathematically, the equation is as follows:

$$L_{eq}(t) = 10log_{10}(\frac{1}{T}\sum_{i=1}^{N} 10^{(SEL_i/10)}) \qquad \textbf{Eq. B-8}$$

where

$L_{eq(t)}$ = equivalent sound level of time period "t", dBA
$T$ = time period, sec (3600 for an hourly $L_{eq(1hr)}$)
$N$ = number of sample, sec (3600 for an hourly $L_{eq(1hr)}$)
$i$ = index of summation
$SEL$ = individual sound exposure level, dBA

Hourly $L_{eq(1hr)}$ is adopted as the measure of cumulative noise impact for non-residential land uses (those not involving sleep) because $L_{eq(1hr)}$:

- Correlates well with speech interference in conversation and on the telephone – as well as interruption of TV, radio, and music enjoyment;
- Increases with the duration of transit events;
- Accounts for the number of transit events over the hour, which is also important to people's reactions; and

- Is used by the Federal Highway Administration in assessing highway-traffic noise impact.(Thus, this noise metric can be used for directly comparing and contrasting highway, transit, and multimodal alternatives).

## B.1.4.5 Day-Night Sound Level ($L_{dn}$): 24-Hour Exposure from All Events

The metric for cumulative 24-hour exposure is the Day-Night Sound Level, [49] abbreviated here as $L_{dn}$. It is a single, A-weighted decibel value that accounts for total sound energy from all sound sources over 24 hours and is expressed in the unit, dBA. Events between 10 p.m. and 7 a.m. are increased by 10 dB to account for people's greater nighttime sensitivity to noise.

Figure B-11 shows examples of typical $L_{dn}$'s, both for transit and non-transit sources, ranging from 50 to 80 dB, where 50 is considered a quiet 24-hour period and 80 a loud 24-hour period. Note that these $L_{dn}$'s depend upon the number of events during day and night separately, including each event's duration, which is affected by vehicle speed.

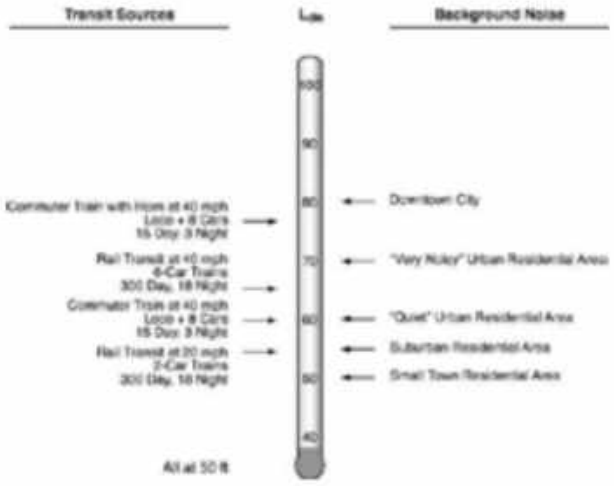


**Figure B- 11 Typical $L_{dn}$'s**

An example of sound level variation over 24 hours is visualized in the bottom frame of Figure B-10. The area under the curve represents the receiver's noise exposure over the 24 hours. Note that some vehicle passbys occur at night, when the background noise is typically lower and the 10 dB adjustment is applied.

Conceptually, the day-night level can be expressed as:

$$L_{dn} = 10log_{10}(\frac{Total\ Sound\ Energy_{Day}}{Time\ Period_{Day}\ (seconds)} + \frac{n_{adj,n} \times Total\ Sound\ Energy_{Night}}{Time\ Period_{Night}\ (seconds)})$$



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Mathematically, the equation is as follows:

$$L_{dn} = 10log_{10}\left(\frac{1}{T_d}\sum_{i=1}^{N} t_i \times 10^{(L_{d,i}/10)} + \frac{1}{T_n}\sum_{j=1}^{M} t_j \times 10^{((L_{n,j}+n_{adj,n})/10)}\right) \quad \textbf{Eq. B-9}$$

where

$L_{dn}$ = cumulative 24-hour exposure (day-night sound level), dBA
$T_d$ = time period during the daytime, between 7 a.m. and 10 p.m. sec (54,000)
$N$ = number of samples during the daytime (54,000)
$i$ = index of summation
$t_i$ = time interval of measurements in seconds (1)
$L_{d,i}$ = individual A-weighted sound level during the daytime, dBA
$T_n$ = time period during the nighttime, between 10 p.m. and 7 p.m. sec (32,400)
$M$ = number of samples during the nighttime (32,400)
$j$ = index of summation
$t_j$ = time interval of measurements, sec (1)
$L_{n,j}$ = individual A-weighted sound level during the nighttime, dBA
$n_{adj,n}$ = nighttime noise adjustment (10 dB)

The equation above can be rewritten as follows:

$$L_{dn} = 10log_{10}\left[\left(15 * Total\ Sound\ Energy_{Day}\right) + \left(9 * n_{adj,n} * Total\ Sound\ Energy_{Night}\right)\right] - 49.4$$

The sound energy is totaled over a full 24 hours, and the sound energy is accumulated from all noise events during that time period. The numerical adjustment (49.4) accounts for time period of interest, in this case, 24 hours.

An alternative way of computing $L_{dn}$ from twenty-four hourly $L_{eq(1hr)}$'s can be expressed conceptually as follows:

$$L_{dn} = 10log_{10}\left(\frac{Energy\ sum\ of\ daytime,\ hourly\ Leqs + \left(n_{adj,n} * Energy\ sum\ of\ nighttime,\ hourly\ Leqs\right)}{Time\ period\ (seconds)}\right)$$

The equation above can be rewritten as:

$$L_{dn} = 10log_{10}\left(\frac{Energy\ sum\ of\ daytime,\ hourly\ Leqs + \left(n_{adj,n} * Energy\ sum\ of\ nighttime,\ hourly\ Leqs\right)}{\left(\frac{86400}{3600}\right)}\right)$$

The equation above can be reduced further and rewritten as:

$$L_{dn} = 10log_{10}\left(Energy\ sum\ of\ daytime,\ hourly\ Leqs + \left(n_{adj,n} * Energy\ sum\ of\ nighttime,\ hourly\ Leqs\right)\right) - 13.8 \quad \textbf{Eq. B-10}$$

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$L_{dn}$ due to a series of transit-noise events can also be computed in terms of SEL. The equation below assumes that transit noise dominates the 24-hour noise environment, where nighttime SELs are increased by 10 dB before totaling:

$$L_{dn} = 10log_{10}(\frac{Energy\ sum\ of}{all\ daytime\ SELs} + (n_{adj,n} * \frac{Energy\ sum\ of}{all\ nighttime\ SELs})) - 49.4 \qquad \textbf{Eq. B-11}$$

$L_{dn}$ is adopted as the measure of cumulative noise impact for residential land uses (those involving sleep), because it:

- Correlates well with the results of attitudinal surveys of residential noise impact
- Increases with the duration of transit events
- Accounts for the number of transit events over the full twenty-four hours
- Accounts for the increased sensitivity to noise at night, when most people are asleep
- Allows composite measurements to capture all sources of community noise combined
- Allow quantitative comparison of transit noise with other community noises
- Is the designated metric of choice of other Federal agencies (e.g., HUD, FAA, and EPA) and has wide international acceptance

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# Appendix C: Background for Transit Noise Impact Criteria

The noise criteria presented in Section 4.1 of this manual have been developed based on well-documented criteria and research on human response to community noise. The primary goals in developing the noise criteria were to ensure that the impact limits are firmly founded in scientific studies, realistically based on noise levels associated with new transit projects, and represent a reasonable balance between community benefit and project costs. This appendix provides background information on the development of these criteria.

## C.1 Relevant Literature

The following is an annotated list of the documents that are particularly relevant to the noise impact criteria:

1. **U.S. EPA's "Levels Document"**[74]
   This report identifies noise levels consistent with the protection of public health and welfare against hearing loss, annoyance, and activity interference. It has been used as the basis of numerous community noise standards and ordinances.

2. **Committee on Hearing, Bioacoustics and Biomechanics (CHABA) Working Group 69, "Guidelines for Preparing Environmental Impact Statements on Noise"**[75]
   This report was the result of deliberations by a group of leading acoustical scientists with the goal of developing a uniform national method for noise impact assessment. Although the CHABA's proposed approach has not been adopted, the report serves as an excellent resource documenting research in noise effects. It provides a strong scientific basis for quantifying impacts in terms of $L_{dn}$.

3. **American Public Transportation Association (APTA) Guidelines for Design of Rapid Transit Facilities**[76]
   The noise and vibration sections of the APTA Guidelines have been used successfully in the past for the design of rail transit facilities. The APTA Guidelines include criteria for acceptable community noise and vibration. Experience has shown that meeting the APTA Guidelines will usually result in acceptable noise levels; but the metric used in the APTA Guidelines is not appropriate for environmental assessment purposes.

   The APTA Guidelines criteria are in terms of $L_{max}$ for conventional RRT vehicles, and they cannot be used to compare among different modes of transit. Since the APTA Guidelines are expressed in terms of maximum passby noise, they are not sensitive to the frequency or duration of noise events for transit modes other than conventional RRT operations with 5 to 10 minute headways. Therefore, the APTA criteria are questionable for assessing the noise impact of other transit modes that differ from conventional rapid transit with respect to source emission levels and operating characteristics (e.g., commuter rail, AGT, and a variety of bus projects).

4. **Synthesis of Social Surveys on Noise Annoyance**[77]
   In 1978, Theodore J. Schultz, an internationally known acoustical scientist, synthesized the results of a large number of social surveys concerning annoyance due to transportation noise. A group of these surveys were remarkably consistent, and the author proposed that their average



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results be taken as the best available prediction of transportation noise annoyance. This synthesis has received essentially unanimous acceptance by acoustical scientists and engineers. The "universal" transportation response curve developed by Schultz (Figure 3-7) shows that the percent of the population highly annoyed by transportation noise increases from zero at an $L_{dn}$ of approximately 50 dBA to 100% when $L_{dn}$ is approximately 90 dBA. Most importantly, this curve indicates that for the same increase in $L_{dn}$, there is a greater increase in the number of people highly annoyed at high noise levels than at low noise levels. For example, a 5 dB increase at low ambient levels (40 - 50 dB) has less impact than at higher ambient levels (65 - 75 dB). A recent update of the original research containing several railroad, transit, and street traffic noise surveys, confirming the shape of the original Schultz curve [12].

5. **HUD's Standards**[19]
   HUD has developed noise standards, criteria, and guidelines to ensure that housing projects supported by HUD achieve the goal of a suitable living environment. The HUD acceptability standards define 65 dB ($L_{dn}$) as the threshold for a normally unacceptable living environment (moderate impact for FTA) and 75 dB ($L_{dn}$) as the threshold for an unacceptable living environment (severe impact for FTA).

## C.2 Basis for Noise Impact Criteria Curves

The lower curve in Figure 4-2 represents the onset of moderate impact and is based on the following considerations:

- The EPA finding that a community noise level of $L_{dn}$ less than or equal to 55 dBA is "requisite to protect public health and welfare with an adequate margin of safety."[72]
- The conclusion by EPA and others that a 5 dB increase in $L_{dn}$ or $L_{eq(1hr)}$ is the minimum required for a change in community reaction.
- The research concludes that there are very few people highly annoyed when the $L_{dn}$ is 50 dBA, and that an increase in $L_{dn}$ from 50 dBA to 55 dBA results in an average of 2% more people highly annoyed (Figure 3-7).

The increase in noise level from an existing ambient level of 50 dBA to a cumulative level of 55 dBA because of a project is found to cause minimal impact, with 2% of people highly annoyed, as described in the bullets above. This is considered the lowest threshold where impact starts to occur. Therefore, for an existing ambient noise level of 50 dBA, the curve representing the onset of moderate impact is at 53 dBA, the combination of which yields a cumulative level of 55 dBA by decibel addition. The remainder of the lower curve in Figure 4-2 was determined from the annoyance curve (Figure 3-7) by allowing a fixed 2% increase in annoyance at other levels of existing ambient noise. As cumulative noise increases, the increment to attain the same 2% increase in highly annoyed people is smaller. While it takes a 5-dB noise increase to cause a 2% increase in highly annoyed people at an existing ambient noise level of 50 dB, an increase of only 1 dB causes a 2% increase of highly annoyed people at an existing ambient noise level of 70 dBA.

The upper curve in Figure 4-2 represents the onset of severe impact based on a total noise level, corresponding to a higher degree of impact. The severe noise impact curve is based on the following considerations:

- HUD defines an $L_{dn}$ of 65 as the onset of a normally unacceptable noise zone (moderate impact for FTA) in its environmental noise standards [19]. FAA considers that residential land uses are not compatible with noise environments where $L_{dn}$ is greater than 65 dBA (20).



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- An increase of 5 dB in $L_{dn}$ or $L_{eq(t)}$ is commonly assumed as the minimum required increase for a change in community reaction.
- The research concludes that an increase of 5 dB in $L_{dn}$ or $L_{eq(t)}$ represents a 6.5% increase in the number of people highly annoyed (Figure 3-7).

The increase in noise level from an existing ambient level of 60 dBA to a cumulative level of 65 dBA caused by a project represents a change from an acceptable noise environment to the threshold of an unacceptable noise environment. This is considered the level at which severe impact starts to occur with a 6.5% increase in the number of people highly annoyed as described in the bullets above. Therefore, for an existing ambient noise level of 60 dBA, the curve representing the onset of severe impact is at 63 dBA, the combination of which yields a cumulative level of 65 dBA by decibel addition. The remainder of the upper curve in Figure 4-2 was determined from the annoyance curve (Figure 3-7) by allowing a fixed increase of the 6.5% increase in annoyance at all existing ambient noise levels.

Both curves incorporate a maximum limit for the transit project noise in noise-sensitive areas. Independent of existing noise levels, moderate impact for land use categories 1 and 2 is considered to occur whenever the transit $L_{dn}$ equals or exceeds 65 dBA, and severe impact occurs whenever the transit $L_{dn}$ equals or exceeds 75 dBA. These absolute limits are intended to restrict activity interference caused by the transit project alone.

Both curves also incorporate a maximum limit for cumulative noise increase at low existing noise levels (below approximately 45 dBA). This is a conservative limit that reflects the lack of social survey data on people's reactions to noise at such low ambient levels. Like the FHWA approach in assessing the relative impact of a highway project, the transit noise criteria include limits on noise increase of 10 dB and 15 dB for moderate impact and severe impact, respectively, relative to the existing noise level.

Note that due to the types of land use included in category 3, the criteria allow the project noise for category 3 sites to be 5 dB greater than for category 1 and category 2 sites. This difference is reflected by the offset in the vertical scale on the right side of Figure 4-2. Aside from active parks, which are clearly less sensitive to noise than category 1 and 2 sites, category 3 sites include primarily indoor activities. Therefore, the criteria account for some noise reduction from the building structure.

## C.3 Equations for Noise Impact Criteria Curves

The equations for the noise impact criteria curves shown in Figure 4-2 are included in this section. These equations may be useful when performing the noise assessment methodology using spreadsheets, computer programs, or other analysis tools. Otherwise, such mathematical detail is generally not necessary to implement the criteria, and direct use of Figure 4-2 is adequate and less time-consuming.

A total of four continuous curves are included in the criteria, creating two threshold curves for moderate and severe impact for category 1 and 2, and two curves for category 3 (See Table C-1). Note that for each level of impact, the overall curves for categories 1 and 2 are offset by 5 dB from category 3. While each curve is graphically continuous, each one is defined by a set of three discrete equations. These equations are approximately continuous at the transition points. The following is a description of the three equations:

- The first equation in each set is a linear relationship, representing the portion of the curve in which the existing noise exposure is low, and the allowable increase is limited to 10 dB and 15 dB for moderate impact and severe impact, respectively.



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- The second equation in each set represents the impact threshold over the range of existing noise exposure for which a fixed percentage of increase in annoyance is allowed, as described in Appendix C.2. This curve is a third-order, polynomial approximation derived from the Schultz curve[75] and covers the range of noise exposure encountered in most populated areas. This curve is used for determining noise impact in most cases for transit projects.
- The third equation represents the absolute limit of project noise imposed by the criteria for areas with high existing noise exposure. For land use category 1 and 2, the absolute limit is 65 dBA for moderate impact and 70 dBA for severe impact. For land use category 3, the absolute limit is 75 dBA for moderate impact and 80 dBA for severe impact.

**Table C-1 Threshold of Moderate and Severe Impacts**

**Threshold of Moderate Impact**

***Category 1 and 2***

$$L_p = \begin{cases} 11.450 + 0.953L_E, & L_E < 42 \\ 71.662 - 1.164L_E + 0.018{L_E}^2 - 4.088 \times 10^{-5}{L_E}^3, & 42 \le L_E \le 71 \\ 65, & L_E > 71 \end{cases} \quad \text{Eq. C- 12}$$

***Category 3***

$$L_p = \begin{cases} 16.450 + 0.953L_E, & L_E < 42 \\ 76.662 - 1.164L_E + 0.018{L_E}^2 - 4.088 \times 10^{-5}{L_E}^3, & 42 \le L_E \le 71 \\ 70, & L_E > 71 \end{cases} \quad \text{Eq. C- 13}$$

**Threshold of Severe Impact**

***Category 1 and 2***

$$L_p = \begin{cases} 17.322 + 0.940L_E, & L_E < 44 \\ 96.725 - 1.992L_E + 3.02 \times 10^{-2}{L_E}^2 - 1.043 \times 10^{-4}{L_E}^3, & 44 \le L_E \le 77 \\ 75, & L_E > 77 \end{cases} \quad \text{Eq. C- 14}$$

***Category 3***

$$L_p = \begin{cases} 22.322 + 0.940L_E, & L_E < 44 \\ 101.725 - 1.992L_E + 3.02 \times 10^{-2}{L_E}^2 - 1.043 \times 10^{-4}{L_E}^3, & 44 \le L_E \le 77 \\ 80, & L_E > 77 \end{cases} \quad \text{Eq. C- 15}$$

$L_E$ = the existing noise exposure in terms of $L_{dn}$ or $L_{eq(1hr)}$
$L_p$ = the project noise exposure which determines impact in terms of $L_{dn}$ or $L_{eq(1hr)}$

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# Appendix D: Clustering Receivers of Interest

This appendix supplements the information in Section 4.5 on clustering receivers of interest.

The general approach to selecting noise-sensitive receivers in the study area is included in Section 4.5, Step 1. General guidelines are as follows:

- Select the following types of receivers to evaluate individually:
  - Every major noise-sensitive public building
  - Every isolated residence
  - Every relatively small outdoor noise-sensitive area
- Residential neighborhoods and relatively large outdoor noise-sensitive areas can often be clustered and represented by a single receiver.

Clustering similar receivers reduces the number of computations needed later, especially for large-scale projects where a greater number of noise-sensitive sites may be affected. For this approach to be effective, it is essential that the representative receiver accurately represents the noise environment of the cluster.

The major steps in clustering receivers include:

1. First, cluster receivers according to approximately equal exposure to the primary project noise source. These areas typically run parallel to a linear project or circle major stationary sources relative to the proposed project.
2. Next, cluster receivers according to major sources of ambient noise. These areas typically run parallel to or encircle major sources of ambient noise.
3. Then, cluster receivers according to changes in the project layout or operations along the corridor.
4. Finally, select a representative receiver for each cluster.

The major steps are expanded below and include instructions on how to draw cluster boundaries on a map.

1. **Boundaries along the proposed project** – Draw cluster boundaries along the proposed project as described below to separate clusters based on distance from the project. Draw these cluster boundaries for the project sources listed as major in Table 4-19.

   **Within both residential and noise-sensitive outdoor areas:**
   - **Primary project source**
     Draw cluster boundaries at the following distances from the near edge of the primary project source: 0 ft, 50 ft, 100 ft, 200 ft, 400 ft, and 800 ft. For linear sources, such as a rail line, draw these boundaries as lines parallel to the proposed ROW line. For stationary sources, draw these boundaries as approximate circles around the source, starting at the property line.

     Do not extend boundaries beyond the noise study area, identified in the Noise Screening Procedure in Section 4.3 or the General Noise Assessment of Section 4.4.



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- **Remaining project sources** – Repeat the process for the primary project source for all other project listed as major in Table 4-19, such as substations and crossing signals. If several project sources are located approximately together, only consider one source, since the others would produce approximately the same boundary.

  It is good practice to optimize the number of clusters for a project to simplify the procedure.

**Where rows of buildings parallel the transit corridor:**

- Ensure that cluster boundaries fall between the following rows of buildings, counting back away from the proposed project:
  - Between rows 1 and 2
  - Between rows 2 and 3
  - Between rows 3 and 4
- Add cluster boundaries between these rows if not already included.

2. **Boundaries along sources of ambient noise** – Draw cluster boundaries along all major sources of ambient noise based upon distance from these sources, as described below.
   - Draw cluster boundaries along all interstates and major roadway arterials at the following distances from the near edge of the roadway: 0 ft, 100 ft, 200 ft, and 500 ft.
   - Draw cluster boundaries along all other roadways that have state or county numbering at 0 ft and 100 ft from the near edge of the roadway.
   - For all major industrial sources of noise, draw cluster boundaries that encircle the source at the following distances from the near property line of the source: 0 ft, 100 ft, 200 ft, and 400 ft.

3. **Boundaries based on changes in project layout or operations** – Further subdivision is needed to account for changes in project noise where proposed project layout or operating conditions change considerably along the corridor. Draw a cluster boundary perpendicular to the corridor extending straight outward to both sides at the following locations:
   - Where parallel tracks previously separated by more than approximately 100 ft are moved closer together
   - Approximately where speed and/or throttle are reduced when approaching stations and where steady service speed is reached after departing stations
   - Approximately 200 ft up and down the line from grade crossing bells
   - At transitions from jointed to welded rail
   - At transitions from one type of cross section to another including on structure, on fill, at-grade and in cut
   - At transitions from open terrain to heavily wooded terrain
   - At transitions between areas free of locomotive horn noise and areas subject to this noise source
   - Any other positions along the line where project noise is expected to change considerably, such as up and down the line from tight curves where wheels may squeal

4. **Selection of a representative receiver from each cluster** – Determine a representative receiver for each cluster boundary drawn in the steps above.
   - **Residential clusters**
     Select a representative receiver within the cluster at the house closest to the proposed project. If this receiver is not the clear choice, select the receiver furthest from major sources of ambient noise.
   - **Outdoor noise-sensitive clusters (e.g., urban park or amphitheater)**



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Cont.

Select a representative receiver within the cluster at the closest point of active noise-sensitive use. If this receiver is not the clear choice, select the receiver farther from major sources of ambient noise.

Note that some clusters may fall between areas with receivers of interest. This could occur when operational changes or track layouts change in an open, undeveloped area. Retain these clusters. Do not merge them with adjacent clusters. Do not select a representative receiver of interest from them.

## Example D-1 Clustering Receivers

**Receivers of Interest and Clustering Receivers**

In this hypothetical situation, a new rail transit line, labeled "new rail line" in Figure D-1, is proposed along a major urban street with commercial land use. A residential area is located adjacent to the commercial strip, located approximately one-half block from the proposed transit alignment. A major arterial, labeled "highway," crosses the alignment.

**Cluster Receivers Along the Primary Project Source**

*Primary Project Source*

The primary project source in this example is the new rail line. Boundaries are first drawn at distances of 0 ft from the right-of- way line (edge of the street in this example), 50 ft, 100 ft, 200 ft, 400 ft, and 800 ft, (Figure D-1). Distances are labeled at the top of the figure.

This is proposed to be a constant speed section of track, so there are no changes in boundaries due to changes in operations along the corridor. Moreover, no other project sources are shown here, but if there had been a station with a parking lot, lines would have been drawn enveloping the station site at the specified distances from the property line.

*Rows of Buildings Parallel to the Transit Corridor*

This example includes rows of buildings parallel to the transit corridor. The first set of boundary lines satisfies the requirement that cluster boundaries fall between rows 1 and 2, and between rows 2 and 3, but there is no line between rows 4 and 5. Consequently, a cluster boundary labeled "R" at the top of the figure has been drawn between the 4th and 5th row of buildings.

**Cluster Receivers Along the Primary Project Source**

The roadway arterial (labeled "highway") is the only major source of ambient noise shown.

Cluster boundaries are drawn at 0 ft, 100 ft, 200 ft and 500 ft from the near edge of the roadway on both sides. These lines are shown with distances labeled at the side of the figure.

**Select a Representative Receiver from Each Cluster**

Representative receivers are shown as filled circles in Figure D-1. Note that the receivers labeled with "REC" are primarily for use in Appendix E.

Locate receiver, "REC 3". Note that this cluster is located at the outer edge of influence from the major source ("highway") where local street traffic is the dominant source for ambient noise (in practice, this would be verified by a measurement).

"REC 3" is chosen to represent this cluster because it is among the houses closest to the proposed project source in this cluster and it is in the middle of the block affected by the dominant local street. Ambient noise levels at one end of the cluster may be influenced more by the highway and the other end may be affected more by the cross street, but the majority of the cluster would be represented by receiver site "REC 3."

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Cont.




Figure D-1 Example of Receiver Map Showing Cluster Boundaries

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Cont.

# Appendix E: Determining Existing Noise

Different options of determining existing noise, including full measurement, computation from partial measurements, and tabular look-up, are described in Section 4.5, Step 5. This appendix provides additional details associated with each method and examples of when each method could be used.

Additional details on the methods for estimating existing noise are provided below:

**Option 1: $L_{eq(1hr)}$ measurement (non-residential)** – Full one-hour measurements are recommended to determine existing noise for non-residential receivers of interest. These measurements are preferred over all other options and will accurately represent the $L_{eq(1hr)}$. The following procedures apply to these full-duration measurements:

- Measure $L_{eq(1hr)}$ at the receiver of interest during a typical hour of use on two non-successive days. Choose the hour in which maximum project activity will occur. The $L_{eq(1hr)}$ will be accurately represented using this method. Typically, measuring between noon Monday and noon Friday is recommended, but weekend days may be more appropriate for places of worship.
- Position the measurement microphone for all sites as shown in Figure 4-19, considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.

**Option 2: $L_{dn}$ measurement (residential)** – Full 24-hour measurements are recommended to determine ambient noise for residential receivers of interest. These measurements are preferred over all other options and will accurately represent the $L_{dn}$. The following procedures apply to these full-duration measurements:

- Measure a full 24-hour $L_{dn}$ at the receiver of interest for a single weekday (generally between noon Monday and noon Friday).
- Position the measurement microphone for all sites as shown in Figure 4-19 considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.

**Option 3: $L_{dn}$ computation of $L_{dn}$ from 3 partial $L_{eq(1hr)}$ measurements (residential)** – An alternative way to determine $L_{dn}$ is to measure $L_{eq(1hr)}$ for three typical hours of the day, then compute the $L_{dn}$ from these three $L_{eq(1hr)}$ measurements. This method is less precise than its full-duration measurement. The following procedures apply to this partial-duration measurement method for $L_{dn}$:

- Measure the $L_{eq(1hr)}$ during each of the following time periods:
  - During peak-hour roadway traffic
  - Midday, between the morning and afternoon roadway-traffic peak hours
  - During late night between midnight and 5 a.m.
- Position the measurement microphone for all sites as shown in Figure 4-19 considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.
- Compute the $L_{dn}$ using the equation below



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Cont.

$$L_{dn} \approx 10\log(3 \times 10^{\frac{L_{eq,peakhour}-2}{10}} + 12 \times 10^{\frac{L_{eq,midday}-2}{10}} + 9 \times 10^{\frac{L_{eq,latenight}+8}{10}}) - 13.8 \quad \textbf{Eq. E-1}$$

The resulting $L_{dn}$ will be slightly underestimated due to the adjustment to the measured levels in these equations. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$. If using this method, a minimum time duration of one hour should be used for each measurement period in computing an Ldn.

**Option 4: Computation of $L_{dn}$ from 1 partial $L_{eq(1hr)}$ measurement (residential)** – $L_{dn}$ can also be determined by measuring $L_{eq(1hr)}$ for one hour of the day, and then computing $L_{dn}$ from the $L_{eq(1hr)}$. This method is less precise than computing $L_{dn}$ from 3 $L_{eq(1hr)}$ measurements. This method may be useful for projects with are many sites assessed by the General Noise Assessment. This method may also be appropriate when determining if a particular receiver of interest represents a cluster in a Detailed Noise Analysis. The following procedures apply to this partial-duration measurement option for $L_{dn}$:

- Measure the $L_{eq(1hr)}$ for the loudest hour of project-related activity during hours of noise sensitivity. If this hour is not selected, other hours may be used with the understanding that the estimate is less precise.
- Position the measurement microphone for all sites as shown in Figure 4-19, considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.
- Convert the measured hourly $L_{eq(1hr)}$ to $L_{dn}$ with the appropriate equation below.

For measurements between 7 a.m. and 7 p.m.:

$$L_{dn} \approx L_{eq} - 2 \quad \textbf{Eq. E-2}$$

For measurements between 7 p.m. and 10 p.m.:

$$L_{dn} \approx L_{eq} + 3 \quad \textbf{Eq. E-3}$$

For measurements between 10 p.m. and 7 a.m.:

$$L_{dn} \approx L_{eq} + 8 \quad \textbf{Eq. E-4}$$

The resulting $L_{dn}$ will be moderately underestimated due to the use of the adjustment constants in these equations. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$. If using this method, a minimum time duration of one hour should be used for each measurement period in computing an Ldn.

**Option 5: Computation of $L_{eq(1hr)}$ or $L_{dn}$ from $L_{eq(1hr)}$ or $L_{dn}$ of a comparable site (all land uses)** – Computing $L_{eq(1hr)}$ or $L_{dn}$ from the $L_{eq(1hr)}$ or $L_{dn}$ of a comparable site where the ambient noise is dominated by the same source that is comparable in precision to Option 4. This method can be used to characterize noise in several neighborhoods by using a single representative receiver. It is critical that the measurement site has a similar noise environment to all areas represented. If measurements made by others are available and the sites are equivalent, the existing measurements can be used to reduce the amount of project noise monitoring. The following procedures apply to this method of determining of ambient noise:

- Choose another receiver that is comparable to the receiver (CompRec) of interest with the following:
  - The same source of dominant ambient noise

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Cont.

- The ambient level of the comparable receiver was measured according to Option 1 or Option 2 above
- The ambient measurement at the comparable receiver was made in direct view of the major source of ambient noise, unshielded by noise barriers, terrain, rows of buildings, or dense tree zones

- Determine the following from a plan or aerial photograph:
  - The distance ($D_{CompRec}$) from the comparable receiver to the near edge of the ambient source
  - The distance ($D_{Rec}$) from this receiver of interest to the near edge of the ambient source
- Determine the number of rows of buildings (N) that intervene between the receiver of interest and the ambient source.
- Compute the ambient level at the receiver of interest (Rec) with the appropriate equation below

If roadway sources dominate:

$$L_{Rec} \approx L_{CompRec} - 15\log(\frac{D_{Rec}}{D_{CompRec}}) - 3N \qquad \textbf{Eq. E-5}$$

If other sources dominate:

$$L_{Rec} \approx L_{CompRec} - 25\log(\frac{D_{Rec}}{D_{CompRec}}) - 3N \qquad \textbf{Eq. E-6}$$

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Cont.

The resulting $L_{Rec}$ will be moderately underestimated. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$.

**Option 6: Estimation of $L_{dn}$ by table look-up (all land uses)** – The least precise way to determine the ambient noise is to estimate the level using a table. A tabular look-up can be used to establish baseline conditions for a General Noise Assessment if a noise measurement cannot be made. This method should not be used for a Detailed Noise Analysis. The following instruction applies to this method of determining of ambient noise:

Estimate either the $L_{eq(1hr)}$ or the $L_{dn}$ using Table 4-17 based on distance from major roadways, rail lines, or upon population densities. In general, these tabulated values are substantially underestimated.

The underestimation is intended to compensate for the reduced precision of the estimated ambients.

**Examples –** Examples of when each method of determining existing noise may be appropriate are provided below using the example from Appendix D. Existing noise at the receivers labeled "REC" in Figure D-1 could be estimated as follows:

- **Option 1: $L_{eq(1hr)}$ measurement** – Existing noise at REC 1 is due to the highway at the side of this church. $L_{eq(1hr)}$ can be measured during a typical church hour.
- **Option 2: $L_{dn}$ measurement –** Existing noise at the residence REC 2 is due to a combination of the highway and local streets. $L_{dn}$ can be measured for a full 24-hours.
- **Option 3: $L_{dn}$ computation of $L_{dn}$ from 3 partial $L_{eq(1hr)}$ measurements** – Existing noise at the residence REC 3 is due to the street in front of this residence. $L_{dn}$ can be computed from three $L_{eq(1hr)}$ measurements.

- **Option 4: Computation of $L_{dn}$ from 1 partial $L_{eq(1hr)}$ measurement** – Existing noise at the residence REC 4 is due to the highway. Because the highway has a predictable diurnal pattern, $L_{dn}$ can be computed from one $L_{eq(1hr)}$ measurement.
- **Option 5: Computation of $L_{dn}$ from $L_{dn}$ of a comparable site** – Existing noise at the residence REC 5 is due to Kee Street. REC 3 is also affected by local street traffic and is a comparable distance from the highway. $L_{dn}$ for REC 5 can be computed based on the $L_{dn}$ at REC-3.
- **Option 6: Estimation of $L_{dn}$ by table look-up** – Existing noise at the residence REC 6 is due to local traffic. $L_{dn}$ can be estimated by tables based on population density along this corridor.

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Cont.

# Appendix F: Computing Source Levels from Measurements

This appendix contains the procedures for computing source reference levels ($SEL_{ref}$) from source measurements in cases where the source reference tables in Section 4.5, Step 2 indicate measurements are preferred, data are not available for the source of interest, or more precise data are required than available in the table.

Close-by source measurements for vehicle passbys may capture either the vehicle's sound exposure level (SEL) or maximum noise level ($L_{max}$). Both metrics can be measured directly by commonly available sound level meters. While the $L_{max}$ metric is not used for transit noise impact assessments, it can be used to compute SEL source reference levels. $L_{max}$ measurements are often available from transit-equipment manufacturers and some transit system equipment specifications may limit close-by $L_{max}$ levels.

Close-by source measurements for stationary sources capture the source's SEL over one source event, where the event duration may be chosen based on measurement convenience. The duration will factor out of the computation when the measured value is converted to reference operating conditions.

This manual does not specify elaborate methods for undertaking the close-by source measurements, but rather, provides general processes. It is required that all measurements conform to good engineering practice, guided by the standards of the American National Standards Institute and other such organizations (27, 28, 29).

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Cont.

This appendix presents information according to noise source as follows:

- Appendix F.1: Highway and rail vehicle passbys for vehicles of the same type
- Appendix F.2: Stationary sources
- Appendix F.3: $L_{max}$ for single train passbys (for trains of mixed consists)

## F. 1 Highway and Rail Vehicle Passbys

This section provides information on appropriate conditions for vehicle passby measurements, instructions on converting measurements made under non-reference conditions to source reference levels, and examples of these computations.

The following conditions are required for vehicle passbys, in addition to good engineering practice:

- Measured vehicles must be representative of project vehicles in all aspects, including representative acceleration and speed conditions for buses.
- Track must be relatively free of corrugations and train wheels relatively free of flats, unless these conditions are typical of the proposed project.
- Road surfaces must be smooth and dry, unless these conditions are typical of the proposed project.
- Perpendicular distance between the measurement position and the source's centerline must be 100 ft or less.
- Vehicle speed must be 30 mph or greater, unless typical project speeds are less than that.
- No noise barriers, terrain, buildings, or dense tree zones may break the lines-of-sight between the source and the measurement position.

When close-by source measurements are made under non-reference conditions, use the instructions below and the equations in Table F-1 to convert the measured values to source reference levels. For rail vehicles, measure/convert a group of locomotives or a group of cars separately. This computation requires that all measured vehicles be of the same type. For trains of mixed consists, see Appendix F.3.

**SEL measured for a highway-vehicle passby, or a passby of a group of identical rail vehicles**

- Collect the following input information:
  - $SEL_{meas}$, the measured SEL for the vehicle passby
  - N, the consist of the measured group of rail cars or group of locomotives
  - T, the average throttle setting of the measured diesel-powered locomotive(s)
  - $S_{meas}$, the measured passby speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the Source Reference Level $SEL_{ref}$, using Eq. F-1.

**$L_{max}$ measured for a passby of a group of identical rail vehicles**

- Collect the following input information:
  - $L_{max}$, measured for the group passby
  - N, the consist of the measured group of rail cars or group of locomotives
  - T, the average throttle setting of the measured diesel-powered locomotive(s)
  - $S_{meas}$, the measured passby speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
  - $L_{meas}$, the total length of the measured group of locomotives or group of rail cars, in feet
- Compute the Source Reference Level $SEL_{ref}$, using either Eq. F-2 or Eq. F-3, as appropriate, for locomotives or rail cars.

**$L_{max}$ measured for a highway-vehicle passby**

- Collect the following input information:
  - $L_{max}$, measured for the highway-vehicle passby
  - $S_{meas}$, the vehicle speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the Source Reference Level, SELref, using Eq. F-4.

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Cont.

**Table F-1 Conversion to Source Reference Levels at 50 ft – Highway and Rail Sources**

| Measured | Source | Equation | |
|---|---|---|---|
| SEL | Vehicle passby | $SEL_{ref} = SEL_{meas} + 10\log(\frac{S_{meas}}{50}) + 10log(\frac{D_{meas}}{50}) + C_{consist} + C_{emissions}$ | Eq. F-1 |
| $L_{max}$ | Rail-vehicle passby, locomotives only | $SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log(2\propto) + C_{consist} + C_{emissions} + 3.3$ | Eq. F-2 |
| | Rail-vehicle passby, cars only | $SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log\,[2\propto + \sin(2\propto)] + C_{consist} + C_{emissions} + 3.3$ | Eq. F-3 |
| | Highway-vehicle passby | $SEL_{ref} = L_{Amax} + 20\log(\frac{D_{meas}}{50}) + C_{emissions} + 3.3$ | Eq. F-4 |

$S_{meas}$ = speed of measured vehicle(s), mph

$D_{meas}$ = closest distance between measurement position and source, ft

$C_{consist}$ = 0 for buses and automobiles
$-10\log(N_{Cars})$ for locomotives and rail cars
where N is the number of locomotives or rail cars in the measured group

$C_{emissions}$ = 0 for T < 6 for locomotives
-2 (T-5) for T ≥ 6
where T is average throttle setting of measured diesel – electric locomotive(s)

$-30\log(\frac{S_{meas}}{50})$ for rail cars

$-25\log(\frac{S_{meas}}{50})$ for buses

$-38.1\log(\frac{S_{meas}}{50})$ for automobiles

$E_{meas}$ = event duration of measurement, sec

$L_{meas}$ = total length of measured group of locomotives or rail cars, ft

$\propto$ = $\arctan(\frac{L_{meas}}{2D_{meas}})$, rad

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Cont.

## Example F-1 Calculate $SEL_{ref}$ – Locomotives

**Computation of $SEL_{ref}$ from SEL Measurement of Fixed-guideway Source**

SEL was measured for a passby of two diesel-powered locomotives with the following conditions:

$SEL_{meas}$ = 90 dBA
$N_{Cars}$ = 2
T = 6
$S_{meas}$ = 55 mph
$D_{meas}$ = 65 ft

Compute the source reference level using Eq. F-1.

$$SEL_{ref} = SEL_{meas} + 10\log\left(\frac{S_{meas}}{50}\right) + 10log\left(\frac{D_{meas}}{50}\right) + C_{consist} + C_{emissions}$$
$$= 90 + 10\log\left(\frac{55}{50}\right) + 10\log\left(\frac{65}{50}\right) - 10\log(2) + (-2(6-5))$$
$$= 86.5 \text{ dBA}$$

## Example F-2 Calculate $SEL_{ref}$ – Rail Cars

**Computation of $SEL_{ref}$ from $L_{max}$ Measurement of Fixed-Guideway Source**

$L_{max}$ was measured for a passby of a 4-car consist of 70-ft long rail cars with the following conditions:

$L_{max}$ = 90 dBA
$N_{Cars}$ = 4
$S_{meas}$ = 70 mph
$D_{meas}$ = 65 ft
$L_{meas}$ = 280 ft
$\propto$ = 1.14

Compute the source reference level using Eq. F-3.

$$SEL_{ref} = L_{Amax} + 10\log\left(\frac{L_{meas}}{50}\right) + 10\log\left(\frac{D_{meas}}{50}\right) - 10\log\left[2\propto + \sin(2\propto)\right] + C_{consist} + C_{emissions} + 3.3$$
$$= 90 + 10\log\left(\frac{280}{50}\right) + 10\log\left(\frac{65}{50}\right) - 10\log\left[2(1.14) + \sin(2(1.14))\right] - 10\log(4) - 30\log\left(\frac{70}{50}\right) + 3.3$$
$$= 86.7 \text{ dBA}$$

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Cont.

**Example F-3 Calculate $SEL_{ref}$ – Bus**

**Computation of $SEL_{ref}$ from $L_{max}$ Measurement of Highway Vehicle Source**

$L_{max}$ was measured for a bus with the following conditions:

$L_{max}$ = 78 dBA
$D_{meas}$ = 80 ft
$S_{meas}$ = 40 mph

Compute the source reference level using Eq. F-4

$$SEL_{ref} = L_{max} + 20\log(\frac{D_{meas}}{50}) + C_{emissions} + 3.3$$
$$= 78 + 20\log(\frac{80}{50}) - 25\log(\frac{40}{50}) + 3.3$$
$$= 87.8 \text{ dBA}$$

## F.2 Stationary Sources

This section provides information on appropriate conditions for stationary source measurements, instructions on converting measurements made under non-reference conditions to source reference levels, and an example of this type of computation.

The following conditions are required for stationary sources, in addition to good engineering practice:

- Measured source operations must be representative of project operations in all aspects.
- The following ratio must be 2 or less, and the distance to the closest source component must be 200 ft or less.

$$\frac{Distance\ to\ the\ farthest\ source\ component}{Distance\ to\ the\ closest\ source\ component}$$

  If both conditions cannot simultaneously be met, separate close-by measurements of individual components of this source must be made, for which these distance conditions can be met.

- The following ratio must be 2 or less:

$$\frac{Lateral\ length\ of\ the\ source\ area}{Distance\ to\ the\ closest\ source\ component}$$

  The lateral length of the source area is measured perpendicular to the general line-of-sight between source and measurement positions.

  If this condition cannot be met, then make separate close-by measurements of individual components of this source, for which this condition can be met.

- No noise barriers, terrain, buildings, or dense tree zones may break the lines-of-sight between the source and the measurement position.

When close-by source measurements are made under non-reference conditions, use the instructions below and the equation in Table F- 2 to convert the measured values to source reference levels.

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**SEL was measured for a stationary noise source**

- Collect the following input information:
  - $SEL_{meas}$, the measured SEL for the noise source, for whatever source "event" is convenient to measure
  - $E_{meas}$, the event duration, in seconds
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the source reference level, SELref using Eq. F- 5.

**Table F-2 Conversion to Source Reference Levels at 50 ft - Stationary Sources**

| Measured | Source | Equation |
|---|---|---|
| SEL | Stationary noise source | $SEL_{ref} = SEL_{meas} - 10\log(\frac{E_{meas}}{3600}) + 20\log(\frac{D_{meas}}{50})$ Eq. F- 5 |

$S_{meas}$ = speed of measured vehicle(s), in miles per hour
$E_{meas}$ = event duration of measurement, in seconds
$D_{meas}$ = closest distance between measurement position and source, in feet

**Example F-4 Calculate $SEL_{ref}$ – Signal Crossing**

**Computation of $SEL_{ref}$ from SEL Measurement of Stationary Source**

SEL was measured for a signal crossing with the following conditions:

$SEL_{meas}$ = 70 dBA
$E_{meas}$ = 10 sec
$D_{meas}$ = 65 ft

Compute the source reference level using Eq. F-5.

$$SEL_{ref} = SEL_{meas} - 10\log(\frac{E_{meas}}{3600}) + 20\log(\frac{D_{meas}}{50})$$
$$= 70 - 10\log(\frac{10}{3600}) + 20\log(\frac{65}{50})$$
$$= 97.8 \text{ dBA}$$

## F.3 $L_{max}$ for Single Train Passby

This section provides procedures for the computation of $L_{max}$ for a single train passby. This procedure can be used to characterize trains of mixed consists using $L_{max}$. Follow the instructions below.

- Collect the following input information:
  - $SEL_{ref}$, from Section 4.5, specific to both the locomotive type and car type of the train
  - $N_{loco}$, the number of locomotives in the train
  - $N_{cars}$, the number of cars in the train
  - $L_{loco}$, the total length of the train's locomotive(s), in feet (or $N_{loco}$ unit length)
  - $L_{cars}$, the total length of the train's set of rail car(s), in feet (or $N_{cars}$ unit length)
  - S, the train speed, in miles per hour
  - D, the closest distance between the receiver of interest and the train, in feet

- Use the equations in Table F-3 to compute the following:
  - $L_{max/loco}$ for the locomotive(s) using Eq. F-6



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- $L_{max,cars}$ for the rail car(s) using the Eq. F-7
- $L_{max,total}$, the larger $L_{max}$ from the locomotives(s) and rail car(s) is the $L_{max}$ for the total train passby, see Eq. F- 8.

**Table F-3 Conversion to Lmax at the Receiver, for a Single Train Passby**

| Source | Equation | |
|---|---|---|
| Locomotives | $L_{max\,Loco} = SEL_{Locos} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2\propto) - 3.3$ | Eq. F-6 |
| Rail Cars | $L_{max\,Rcars} = SEL_{Rcars} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto + \sin(2\propto)) - 3.3$ | Eq. F-7 |
| Total Train | $L_{max\,total} = max(L_{max\,Loco}\ or\ L_{max\,RCars})$ | Eq. F-8 |

L = total length of measured group of locomotive(s) or rail car(s), ft
S = vehicle speed, mph
$\propto$ = arctan $\left(\frac{L}{2D}\right)$, rad
D = closest distance between receiver and source, ft

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Cont.

## Example F-5 Calculate $L_{max}$ – Train Passby

### Computation of $L_{max}$ for Train Passby

Calculate the $L_{max}$ of commuter train at receiver of interest according to the following conditions:

$SEL_{ref}$ = 92 dBA for locomotives
= 82 dBA for rail cars
$N_{Loco}$ = 1
$N_{Cars}$ = 6
S = 43 miles per hour
D = 125 ft
$\propto_{locos}$ = 0.27
$\propto_{cars}$ = 1.03

The locomotive and rail cars each have a unit length (L) of 70 ft.

Determine the total length of the locomotive and rail cars.

$L_{Locs}$ = 70 ft
$L_{cars}$ = 420 ft

Compute $L_{max}$ for the locomotive using Eq. F-6:

$$L_{max\,Loco} = SEL_{loco} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2\propto) - 3.3$$
$$= 92 + 10log\left(\frac{43}{50}\right) - 10log\left(\frac{70}{50}\right) + 10\log(2 \times 0.27) - 3.3$$
$$= 84.0 \text{ dBA}$$

Compute $L_{max}$ for the rail cars using Eq. F-7:

$$L_{max\,Rcars} = SEL_{Rcars} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2\propto + \sin(2\propto)) - 3.3$$
$$= 82 + 10log\left(\frac{43}{50}\right) - 10log\left(\frac{420}{50}\right) + 10\log((2 \times 1.03) + \sin(2 \times 1.03)) - 3.3$$
$$= 73.5 \text{ dBA}$$

Find the total $L_{max}$ for the train passby using Eq. F-8.

$$L_{max\,total} = max(L_{max\,Loco}\ or\ L_{max\,Rcars})$$
$$= 84.0 \text{ dBA}$$



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Cont.

# Appendix G: Non-Standard Modeling Procedures and Methodology

This manual provides guidance for preparing and reviewing the noise and vibration sections of environmental documents, as well as FTA-approved methods and procedures to determine the level of noise and vibration impact resulting from most federally-funded transit projects. Situations may arise, however, that are not explicitly covered in this manual. Professional judgment may be used to extend the basic methods to cover these cases, when appropriate. It is important to note that each project is unique and must be evaluated on a case-by-case basis. This appendix provides procedures for the use of non-standard noise and vibration modeling procedures and methodologies on public transportation projects.

**Submittal Procedure** – The procedure for using non-standard modeling procedures and methodology is as follows:

1. The transit project manager should contact the FTA Regional office to discuss the proposed methods and/or data not described in this manual prior to use of the non-standard approach.
2. The non-standard methodology should be documented according to the guidelines below as part of the technical report described in Section 8.2.

**Examples of Methods that Require Communication and Documentation** – The following noise and vibration analysis methods and data require communication with the FTA Regional office and documentation:

- Non-standard transit noise and vibration modeling and analysis methods not described in this manual (including non-standard adjustments, computations, and assumptions). This includes modifications to standard FTA noise and vibration methods.
- Non-standard transit noise and vibration reference data not described in this manual (including measured data, substitution data, data at non-standard reference distances and/or speeds, new transit noise sources, and transit noise sources operating in non-standard conditions).
- Non-standard transit noise and vibration impact criteria not described in this manual, including the maximum sound pressure level metric.
- Non-standard methods of evaluating construction noise, including non-standard construction noise impact criteria.
- Other noise modeling tools besides the FTA Noise Impact Assessment Spreadsheet or Traffic Noise Model (TNM®) for highway noise modeling, such as the development of a finite element method model.
- Any transit noise and vibration analysis that involves an impact area or noise source that is controversial.

**Documentation Guidelines** – The use of non-standard noise and vibration analysis methods or data requires the following documentation components in a technical memorandum attached to the environmental document:

- **Background**
  Briefly describe the transit project for which non-default methods or data are needed. State the dominant noise sources, type of analysis, and the impact criteria. Include any additional relevant information.



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- **Statement of Benefit**
  Briefly describe the benefit of the non-default noise and vibration methods or data to the transit project. Describe the appropriateness of the non-default methods or data, as well as why the standard method or data are insufficient or problematic.

- **Non-standard Data Description**
  Describe the non-standard noise or vibration data in detail. Include source type, manufacturer, reference conditions (speed, distance, and operational conditions), name of data supplier, and a date associated with data development/measurement. For measured noise or vibration data, provide corresponding data documentation (such as a data measurement or a development report). For substitution data, a comparison between the non-standard data and corresponding standard data should be provided. Furthermore, if outside sources recommend the use of the non-standard data (such as a technical society, a standards organization, or a vehicle manufacturer), references for those recommendations should be included.

- **Non-standard Methods Description**
  Describe the non-standard noise or vibration analysis method in detail. This should include a detailed description and derivation of the method (including data used in the development of the method), a description of the usage of the method, and a comparison between the non-standard method and the corresponding standard method in the context of the transit analysis. If the method has been validated against measurement data, a description of that validation analysis should be provided. If the method is derived from another source (such as a different transportation noise or vibration method), provide corresponding documentation for that source. A description of how the method is conservative (for example, estimating the worst-case scenario) or some discussion on the probability of exceeding the predicted level should be provided. Furthermore, if outside sources recommend the use of the non-standard method (such as a technical society or standards organization), references for those recommendations should be included.

- **Non-standard Tools Description**
  Describe in detail any non-standard noise or vibration models that have not been explicitly recommended in this manual. This should include a detailed description of the tool (including data used, the computations implemented in the tool, any modifications or adjustments to the tool or the corresponding data, and the usage of the tool), a description of the validation of the tool (including reference documentation and validation analyses), and a comparison between the non-standard tool and the equivalent standard tool in the context of the transit analysis. Quantitative comparisons, such as the standard deviation of the non-standard tool and an estimate of the least mean square of differences between the standard and non-standard tools, should be provided and explained. A description of how the method is conservative (for example, estimating the worst-case scenario) or some discussion on the probability of exceeding the predicted level should be provided. If outside sources recommend the use of the non-standard tool (such as a technical society or standards organization), references for those recommendations should be included.

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## ENDNOTES


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16 The Department of Transportation Act of 1966, Section 4(f); P.L. 89-670, 15 October 1966.

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O4-28
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U.S. Department of Transportation
**Federal Transit Administration**

U.S. Department of Transportation
Federal Transit Administration
East Building
1200 New Jersey Avenue, SE
Washington, DC 20590
*https://www.transit.dot.gov/about/research-innovation*

**EXHIBIT E**

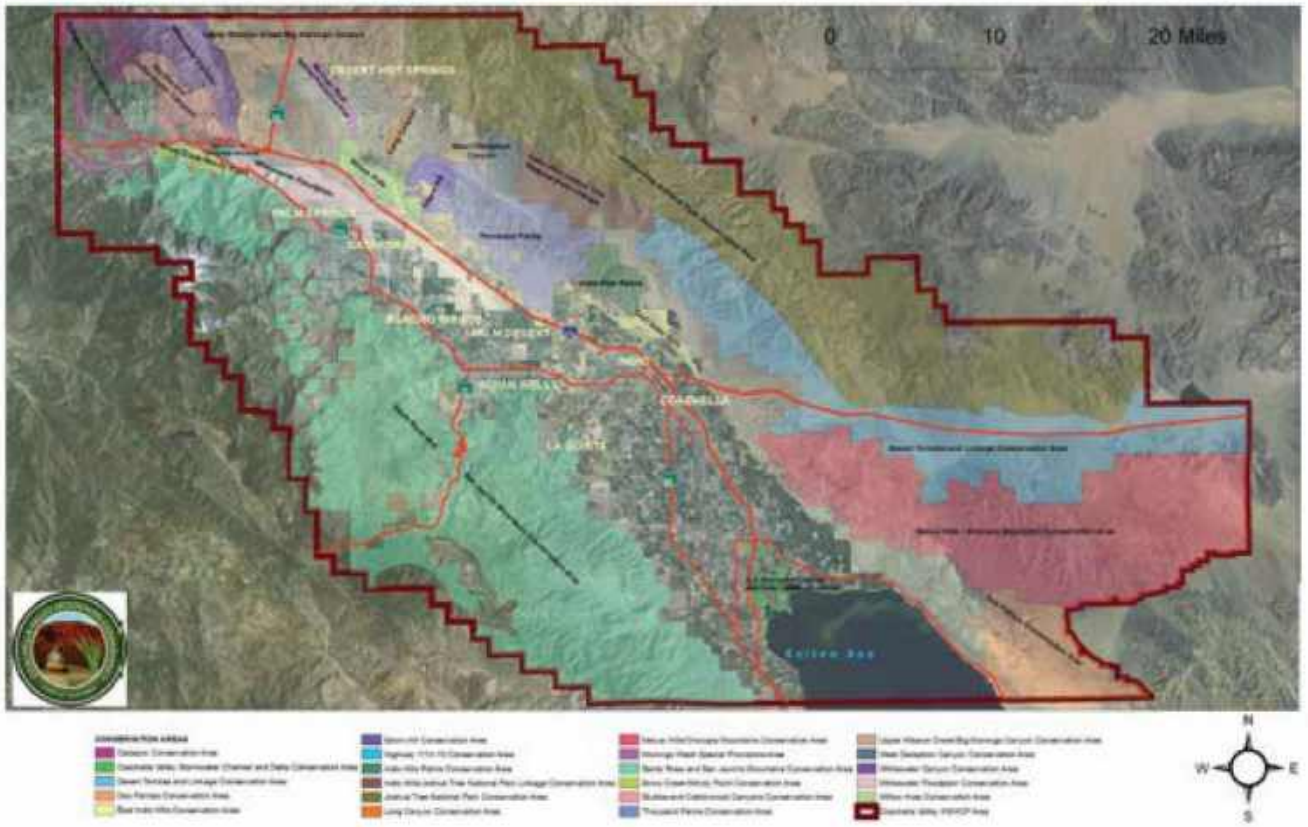


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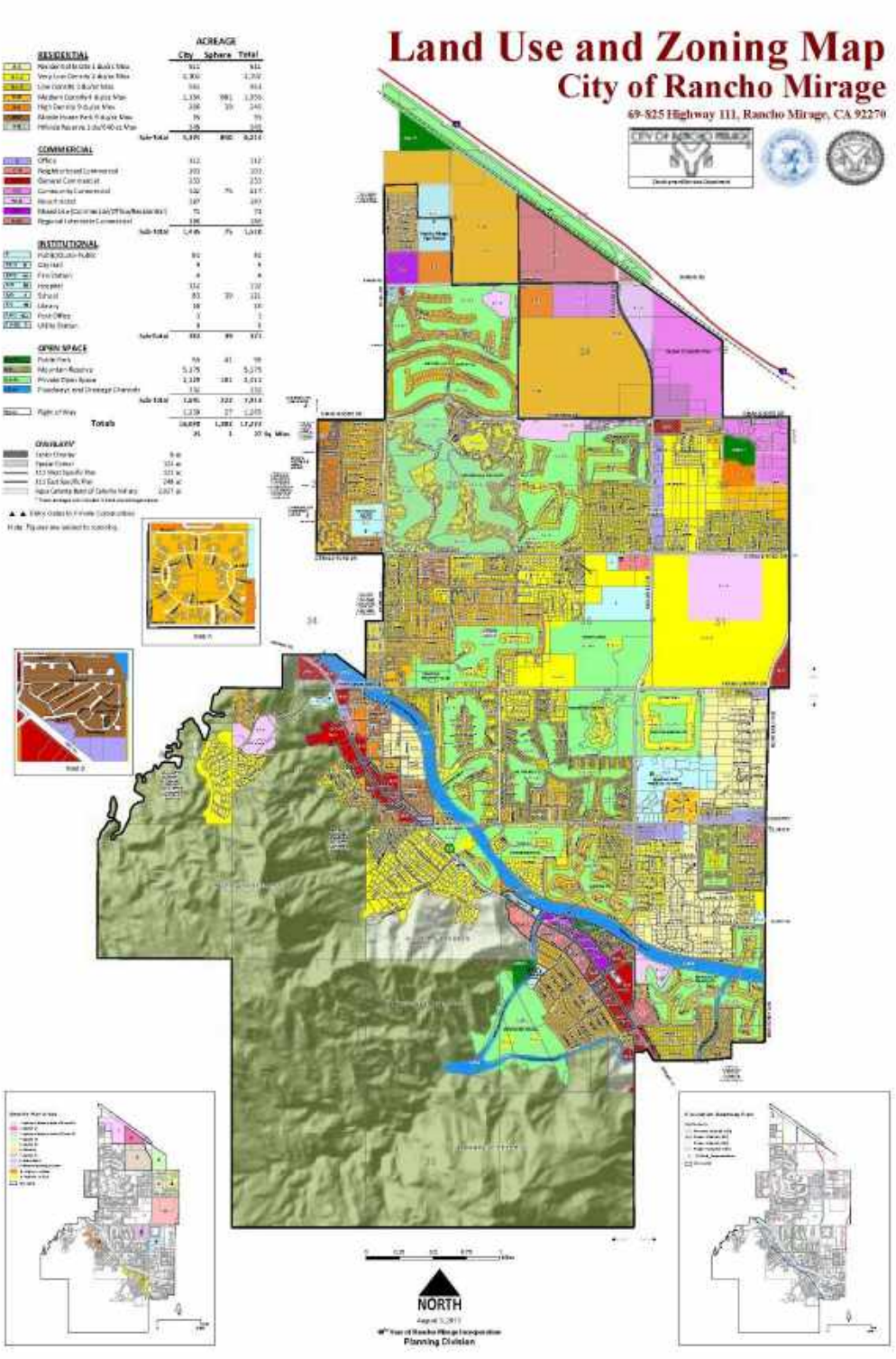
**EXHIBIT F**


Land Use and Zoning Map
City of Rancho Mirage
69-825 Highway 111, Rancho Mirage, CA 92270
ACREAGE
RESIDENTIAL
COMMERCIAL
INSTITUTIONAL
OPEN SPACE
OVERLAYS
NORTH
Planning Division

04-30

# Response to Comment Letter 04

**Western States Council of Carpenters**
**August 20, 2024**

**04-1** The City acknowledges the comment as an introduction to comments that follow. This comment is included in the Final MND for review and consideration by the decision-makers prior to a final decision on the project. No further response is required.

**04-2** The comment provides a summary of the project description and project location. The commenter incorrectly identifies the acreage, square footage of buildings, total parking spaces, inclusion of the existing Ritz-Carlton Rancho Mirage, and Assessor's Parcel Numbers identified in the MND project description, see Chapter 1, Project Description. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**04-3** The comment states that the WSRCC previously commented on the previous circulated MND on April 9, 2024 that weren't address in the RMND and provides a summary of comments to follow. Responses to the previous comment letter are addressed in Response to comments 01-1 through 01-30. Please see Response to comments 04-4 through 04-30 for responses to this comment letter.

**04-4** The comment provides background information on the Western States Regional Council of Carpenters and an introduction to the comments that follow. The comment also requests that all notices related to the project be sent to the WSRCC. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**04-5** The comment recommends the use of local workers who have graduated from a Joint Labor-Management Apprenticeship Program or similar for the project to benefit the local economy and to reduce environmental impacts by mitigating GHG emissions, improving air quality, and reducing transportation impacts. The comment provides information from Exhibit A, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling, and other resources. Please refer to Response to Comment 01-4.

**04-6** The comment makes general recommendations for the City to adopt training, certification, and safe on-site construction work practices for construction workers on any developments within the City's General Plan Area. The comment also recommends that the project include construction site designs, testing, and planning practices to prevent community spread of COVID-19 and other infectious diseases. COVID-19 is a topic outside the purview of CEQA and CEQA requires the evaluation of potential physical environmental impacts of the project on the environment. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**04-7** The comment provides background information on Environmental Impact Reports under CEQA. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**04-8** The comment provides background information on Initial Studies, Negative Declarations, and Mitigated Negative Declarations under CEQA. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

04-9 The comment is an introduction to the detailed concerns provided later in the comment letter. The comment states that the RMND fails to support all of its findings with sufficient analysis and substantial evidence and fails to incorporate mitigation measures. The commenter incorrectly identifies the acreage and square footage of buildings identified in the MND project description, see Chapter 1, Project Description. The comment also states that the project will have a significant impact on the environment and an EIR is required. The project will not have a significant effect on the environment with the proposed mitigation measures, as discussed in the RMND and an EIR is not required. The specific concerns about the adequacy of analysis and mitigation measures brought up by the commenter are addressed in Responses to Comments 04-11 through 04-20.

04-10 The comment states that the mitigation measures in the RMND fail to adequately analyze or mitigate the project's impacts and are improperly deferred, so an EIR is required. The RMND includes specific mitigation measures that reduce impacts to less than significant, so an EIR is not required. The detailed concerns about the adequacy of mitigation measures are addressed in Responses to Comments 01-10 through 01-19.

04-11 The comment provides background on significant effects under CEQA. The comment states that the RMND fails to provide analysis on the project's biological resource impacts The comment states that the RMND cannot conclude that the proposed mitigation measures will reduce biological resource impacts to less than significant without first conducting field surveys and subsequent analysis. The comment states that the project should be subject to a more comprehensive EIR review due to the potential occurrence of special-status species. The comment also states that at a minimum, pre-construction biological surveys specifications should be disclosed as part of the proposed mitigation measures. Please refer to Response to comment 01-10.

04-12 The comment states that the mitigation measures do not provide for any pre-construction training for the project's construction workers to properly identify sensitive cultural resources or human remains. The comment also states the MND does not specify due diligence for Tribal coordination. Because of these, the comment states that the analysis as related to cultural resources is inadequate. The comment requests that MM-CUL-1 and MM-CUL-2 at a minimum be revised to adequately mitigate potential significant impacts to cultural resources. Please refer to Response to comment 01-12.

04-13 The comment states that an EIR must prepared because the project may have a significant noise impact. The comment states that the MND fails to measure ambient noise levels near the most sensitive receptors at the southern edge of the project and that the three locations (L1, L2, and L3) are inadequate. Please refer to Response to Comment 01-13.

04-14 The comment states that the MND incorrectly concludes that there will be no significant impact to sensitive receptors and uses the 85 dBA identified in NIOSH Occupational Noise Exposure as the threshold for significant impact. The comment notes that NIOSH Occupational Noise Exposure does not provide an adequate threshold to assess external noise levels for private property and identifies FTA Transit Noise and Vibration Impact Assessment as the preferred source. The comment notes that the FTA Transit Noise and Vibration Impact Assessment states that any noise increase of 15 dBA or greater for a residence is considered a severe impact. The comment states that the selected survey locations, although inadequate, have the potential to exceed thresholds using FTA standards and have a significant noise impact. Please refer to Response to Comment 01-14

04-15 The comment states that MM-NOI-1 would have little to no mitigating effect on the exposure of nearby sensitive receptors to overall project construction noise and should include provisions for noise barriers near the southern edge of the project. The comment calls for at least a revised MND with updated mitigation measures if a full EIR is not prepared. Please refer to Response to Comment O1-15.

04-16 The comment states that additional measures are necessary to reduce operational GHG emissions and energy use. The comment states that the RMND is not consistent with the GBC, noting the lack of EV vehicle accommodations. The comment states that because this analysis is missing, the RMND conclusions regarding significance of impacts is flawed. The comment also states that project has the potential to result in significant impacts in the form of GHG emissions and conflicting with the 2022 CARB Scoping Plan and GBC because the project would not construct EVCS while proclaiming compliance. Additionally, the comment states that the RMND is missing an analysis of energy use and GHG emissions impacts with and without EVCS infrastructure, which results in a potentially significant impact and requires an EIR. The commenter incorrectly states that because the CARB requirements are deemed not appropriate, that the project would be relieved of the GBC EVCS requirements. Please refer to Response to Comment O1-16.

04-17 The comment provides background on general plans in California. The comment states the analysis regarding rezoning on significance of impact is flawed. The comment states that the biological mitigation measures do not adequately mitigate potential impacts associated with rezoning Mountain Reserve Land to Resort/Hotel use. The comment states that the only way for the rezoning impacts to be properly mitigated to less than significant is if the project creates protections for other natural lands multiple times larger than the Mountain Reserve Land targeted for development. Please refer to Response to Comment O1-17.

04-18 The comment states that project requires significant revisions and resolutions of evidence which at least calls for a revision and recirculation of the RMND if it does not prepare an EIR. Please refer to Response to Comment O1-18.

04-19 The comment provides background information on project descriptions. The comment requests that the project include an adequate project description with the details listed in CEQA Guidelines Section 15124. Please refer to Response to Comment O1-19.

04-20 The comment states that the project must be approved by a two-thirds vote of the Rancho Mirage electorate in addition to the City. The comment states that the intention is to make ensure that proper approval procedures are followed. Please refer to Response to Comment O1-20.

04-21 The comment provides concluding remarks and summarizes the recommendations identified earlier in the comment letter. These recommendations are addressed in Responses to Comments O1-4, O1-5, O1-08, and O1-17.

04-22 The comment provides background information on CalEEMod and how it is used to calculate VMT and quantify GHG Emissions, and states that vehicle running emissions can be reduced by decreasing overall trip length, by local hire or otherwise. The comment explains how local hire requirements and associated worker trip length reductions impact GHG calculations using CalEEMod. Please refer to Response to Comment O1-22.

04-23 The comment uses the City of Claremont as an example of the impact of a local hire requirement on construction-related GHG emissions. The example project GHG emissions associated with construction work trips would decrease if a local hire provision with a 10-mile radius was implemented, but the comment states that this example does not indicate that local hire requirements would result in reduced construction-related GHG emissions for all projects. The comment does not identify specific issues with the adequacy of the MND. No further response is required. Also, as discussed in the MND, VMT and GHG impacts were determined to be less than significant with. No mitigation measures is required.

04-24 The comment is a disclaimer and provides concluding remarks. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

04-25 The comment includes Attachment A through Attachment C for Exhibit A. The comment includes supporting Air Basin and Specific Plan data for Exhibit A. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

04-26 The comment includes the resume of Paul Rosenfeld. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

04-27 The comment includes the resume of Matthew F. Hagemann. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

04-28 The comment includes the Transit Noise and Vibration Impact Assessment Manual from the Federal Transit Administration as supporting information for the comment letter. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

04-29 The comment includes the Conservancy Territory Map for Coachella Valley Mountain Conservancy as supporting information for the comment letter. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

04-30 The comment includes the Land Use and Zoning Map for the City of Rancho Mirage as supporting information for the comment letter. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

Comment Letter 05

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*Of Counsel*
MARC D. JOSEPH
DANIEL L. CARDOZO

August 20, 2024

**VIA EMAIL AND OVERNIGHT MAIL**
ATTN: Ben Torres, Planning Manager
City of Rancho Mirage
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Rancho Mirage, CA 92270
**Email**: bent@ranchomiragecа.gov

**Re: Comments on the Recirculated Initial Study/Mitigated Negative Declaration for the Ritz-Carlton Rancho Mirage Project (SCH 2024030267; Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004, and TPM23-0002).**

Dear Mr. Torres:

We are writing on behalf of Californians Allied for a Responsible Economy ("CARE CA") to provide comments on the revised and recirculated Initial Study/Mitigated Negative Declaration ("Revised IS/MND") prepared by the City of Rancho Mirage ("City") for the Ritz-Carlton Rancho Mirage (SCH 2024030267; Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004, and TPM23-0002) ("Project"), proposed by Kam Sang International ("Applicant"). 05-1

The City previously circulated an IS/MND for public comment from March 11 to April 9, 2024. CARE CA submitted timely comments on the IS/MND demonstrating that the IS/MND lacked substantial evidence to support its conclusions and provided substantial evidence supporting a fair argument that the IS/MND failed to adequately disclose and mitigate the Project's potentially significant impacts on public health, air quality, energy, and transportation. In response to CARE CA's comments, the Revised IS/MND includes a health risk assessment which shows that, without mitigation, the Project's construction emissions would result in significant health risk impacts, as previously demonstrated in CARE CA's comments. The Revised IS/MND identifies mitigation which the City claims would fully mitigate this impact, but the mitigation is inadequate and the Revised IS/MND's significance conclusion remains unsupported by substantial evidence. 05-2

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The Revised IS/MND fails to otherwise correct flaws identified in CARE CA's comments. The Revised IS/MND's air quality, energy, and transportation analyses were not updated to respond to or otherwise address CARE CA's comments, and remain unsupported by substantial evidence.

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The instant comments further provide substantial evidence supporting a fair argument that the Project would result in potentially significant noise and vibration impacts not adequately analyzed and mitigated in the Revised IS/MND. The City cannot approve the Project until the errors in the Revised IS/MND are remedied by preparing an environmental impact report ("EIR") which fully discloses and mitigates the Project's potentially significant impacts.

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We reviewed the IS/MND with the assistance of noise expert Jack Meighan,[1] and air quality and health risk expert Paul E. Rosenfeld, PhD from Soil / Water / Air Protection Enterprise ("SWAPE").[2] The City must separately respond to these technical comments. We reserve the right to supplement these comments at later proceedings and hearings related to the Project.[3]

## I. STATEMENT OF INTEREST

CARE CA is an unincorporated association of individuals and labor organizations that may be adversely affected by the potential public and worker health and safety hazards, and the environmental impacts of the Project. The coalition includes Rancho Mirage residents Norman Gerler and Michael Sanholtzer, the District Council of Ironworkers and Southern California Pipe Trades DC 16, along with their members, their families, and other individuals who live and work in the City of Rancho Mirage and in Riverside County.

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CARE CA advocates for protecting the environment and the health of their communities' workforces. CARE CA seeks to ensure a sustainable construction industry over the long-term by supporting projects that offer genuine economic and employment benefits, and which minimize adverse environmental and other impacts on local communities. CARE CA members live, work, recreate, and raise their families in the City of Rancho Mirage and surrounding communities. Accordingly, they would be directly affected by the Project's environmental and

[1] Mr. Meighan's comments and curricula vitae are attached hereto as Exhibit A ("Meighan Comments").
[2] Dr. Rosenfeld's comments and curricula vitae are attached hereto as Exhibit B ("SWAPE Comments").
[3] Gov. Code § 65009(b); PRC § 21177(a); *Bakersfield Citizens for Local Control v. Bakersfield* ("*Bakersfield*") (2004) 124 Cal. App. 4th 1184, 1199-1203; *see Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal. App. 4th 1109, 1121.

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health and safety impacts. Individual members may also work on the Project itself. They will be first in line to be exposed to any health and safety hazards that exist onsite.

In addition, CARE CA has an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for its members. Environmentally detrimental projects can jeopardize future jobs by making it more difficult and more expensive for business and industry to expand in the region, and by making the area less desirable for new businesses and new residents. Indeed, continued environmental degradation can, and has, caused construction moratoriums and other restrictions on growth that, in turn, reduce future employment opportunities.

05-4 Cont.

## II. THE CITY MUST PREPARE AN ENVIRONMENTAL IMPACT REPORT TO COMPLY WITH CEQA

CEQA requires that lead agencies analyze any project with potentially significant environmental impacts in an EIR.[4] "Its purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, the EIR protects not only the environment, but also informed self-government."[5] The EIR has been described as "an environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return."[6]

CEQA's purpose and goals must be met through the preparation of an EIR, except in certain limited circumstances.[7] CEQA contains a strong presumption in favor of requiring a lead agency to prepare an EIR. This presumption is reflected in the "fair argument" standard. Under that standard, a lead agency "shall" prepare an EIR whenever substantial evidence in the whole record before the agency supports a fair argument that a project may have a significant effect on the environment.[8]

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[4] *See* Pub. Resources Code, § 21000; CEQA Guidelines, § 15002.
[5] *Citizens of Goleta Valley v. Bd. of Supervisors* ("*Goleta Valley*") (1990) 52 Cal.3d 553, 564, internal citations omitted.
[6] *County of Inyo v. Yorty* (1973) 32 Cal.App.3d 795, 810.
[7] *See* Pub. Resources Code, § 21100
[8] Pub. Resources Code, §§ 21080, subd. (d), 21082.2, subd. (d); CEQA Guidelines, §§ 15002, subd. (k)(3), 15064, subds. (f)(1), (h)(1); *Laurel Heights Improvement Assn. v. Regents of the Univ. of Cal.* ("*Laurel Heights II*") (1993) 6 Cal.4th 1112, 1123; *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 75, 82; *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 150-151; *Quail Botanical Gardens Found., Inc. v. City of Encinitas* ("*Quail Botanical*") (1994) 29 Cal.App.4th 1597, 1601- 1602.



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In contrast, a mitigated negative declaration may be prepared only when, after preparing an initial study, a lead agency determines that a project may have a significant effect on the environment, but:

> (1) revisions in the project plans or proposals made by, or agreed to by, the applicant before the proposed negative declaration and initial study are released for public review *would avoid the effects or mitigate the effects to a point where clearly no significant effect on the environment would occur*, and (2) there is *no substantial evidence* in light of the whole record before the public agency that the project, as revised, *may* have a significant effect on the environment.[9]

Courts have held that if "no EIR has been prepared for a nonexempt project, but substantial evidence in the record supports a fair argument that the project may result in significant adverse impacts, the proper remedy is to order preparation of an EIR."[10] The fair argument standard creates a "low threshold" favoring environmental review through an EIR, rather than through issuance of a negative declaration.[11] An agency's decision not to require an EIR can be upheld only when there is no credible evidence to the contrary.[12]

"Substantial evidence" required to support a fair argument is defined as "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached."[13] According to the CEQA Guidelines, when determining whether an EIR is required, the lead agency is required to apply the principles set forth in Section 15064, subdivision (f):

> [I]n marginal cases where it is not clear whether there is substantial evidence that a project may have a significant effect on the environment, the lead agency shall be guided by the following principle: If there is disagreement among expert opinion supported by facts over the significance of an effect on

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[9] Pub. Resources Code, § 21064.5 (emphasis added).
[10] *See, e.g., Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal.4th 310, 319-320.
[11] *Citizens Action to Serve All Students v. Thornley* (1990) 222 Cal.App.3d 748, 754
[12] *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th, 1307, 1318; *see also Friends of B Street v. City of Hayward* (1980) 106 Cal.App.3d 988, 1002 ("*Friends of B Street*") ("If there was substantial evidence that the proposed project might have a significant environmental impact, evidence to the contrary is not sufficient to support a decision to dispense with preparation of an EIR and adopt a negative declaration, because it could be 'fairly argued' that the project might have a significant environmental impact").
[13] CEQA Guidelines, § 15384, subd. (a).

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the environment, the Lead Agency shall treat the effect as significant and shall prepare an EIR.[14]

Furthermore, CEQA documents, including EIRs and MNDs, must mitigate significant impacts through measures that are "fully enforceable through permit conditions, agreements, or other legally binding instruments."[15] Deferring formulation of mitigation measures to post-approval studies is generally impermissible.[16] Mitigation measures adopted after Project approval deny the public the opportunity to comment on the Project as modified to mitigate impacts.[17] If identification of specific mitigation measures is impractical until a later stage in the Project, specific performance criteria must be articulated and further approvals must be made contingent upon meeting these performance criteria.[18] Courts have held that simply requiring a project applicant to obtain a future report and then comply with the report's recommendations is insufficient to meet the standard for properly deferred mitigation.[19]

With respect to this Project, the IS/MND fails to satisfy the basic purposes of CEQA. The IS/MND fails to adequately disclose, investigate, and analyze the Project's potentially significant impacts, and fails to provide substantial evidence to conclude that impacts will be mitigated to a less than significant level. Because the IS/MND lacks basic information regarding the Project's potentially significant impacts, the IS/MND's conclusion that the Project will have a less than significant impact on the environment is unsupported.[20] Moreover, substantial evidence shows that the Project may result in potentially significant impacts that are not reduced to less than significant levels with the mitigation measures included in the IS/MND. Therefore, a fair argument can be made that the Project may cause significant impacts requiring the preparation of an EIR.

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**A. The Project Would Result in Potentially Significant Noise Impacts**

05-6

[14] Pub. Resources Code, § 21064.5.
[15] CEQA Guidelines, § 15126.4, subd. (a)(2).
[16] *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 308-309; Pub. Resources Code, § 21061.
[17] *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1393; *Quail Botanical, supra*, 29 Cal.App.4th at pg. 1604, fn. 5.
[18] *Id.*
[19] *Id.*
[20] Pub. Resources Code, § 21064.5.

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**1. The Revised IS/MND's Construction Noise Significance Threshold is Unsupported by Substantial Evidence**

The Revised IS/MND states that, to evaluate whether the Project will generate potentially significant temporary construction noise levels at off-site sensitive receiver locations, a 85 dBA threshold was adapted from the National Institute for Occupational Safety and Health's ("NIOSH") Criteria for Recommended Standard: Occupational Noise Exposure.[21] The Revised IS/MND finds that noise impacts from construction activities would be less than significant because they would not exceed a daytime noise level limit of 85 dBA Leq.[22]

The application of this threshold for residential receptors is not supported by substantial evidence. Mr. Meighan explains that the NIOSH threshold referenced in the IS/MND was developed as a threshold to prevent occupational noise-induced hearing loss.[23] The threshold does not reflect any consideration of whether residents' ability to work from home, relax, or converse would be significantly impacted by increases in noise levels resulting from the Project's construction.[24] The Revised IS/MND's discussion of operational noise impacts acknowledges that effects of noise below the level of hearing loss, including "human reactions of annoyance and dissatisfaction," can constitute significant noise impacts.[25] As such, the City's exclusive reliance on a hearing loss threshold to evaluate significant construction noise impacts is not supported by substantial evidence, and masks potentially significant noise impacts that fall short of resulting in hearing loss.

05-6 Cont.

The Revised IS/MND's 85 dBA construction noise threshold is also not supported by substantial evidence because it fails to reflect whether the Project would result in "[g]eneration of a *substantial temporary or permanent increase in ambient noise* levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies."[26] California courts have clearly held that "the lead agency should consider both the increase in noise level and the absolute noise level associated with a project."[27] The courts have held that reliance on a maximum noise level as the sole threshold of significance for noise impacts violates CEQA because it fails to consider

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[21] *Id.* at 18.
[22] IS/MND, Appendix E, pg. 21.
[23] Meighan Comments, pg. 3.
[24] *Id.* at 3.
[25] IS/MND, Appendix E, pg. 19.
[26] Appendix G of the CEQA Guidelines.
[27] *Keep Our Mountains Quiet v. County of Santa Clara* (2015) 236 Cal.App.4th 714, 733; see *King and Gardiner Farms, LLC v. County of Kern* (2020) 45 Cal.App.5th 814, 894 (citing *Keep Our Mountains Quiet*).

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whether the magnitude of changes in noise levels is significant.[28] In *Keep our Mountains Quiet v. County of Santa Clara*,[29] neighbors of a wedding venue sued over the County of Santa Clara's failure to prepare an EIR for a proposed project to allow use permits for wedding and other party events at a residential property abutting an open space preserve. Neighbors and their noise expert contended that previous events at the facility had caused significant noise impacts that reverberated in neighbors' homes and disrupted the use and enjoyment of their property.[30] The County's EIR relied on the noise standards set forth in its noise ordinance as its thresholds for significant noise exposure from the project, deeming any increase to be insignificant so long as the absolute noise level did not exceed those standards.[31] The Court examined a long line of CEQA cases which have uniformly held that conformity with land use regulations is not conclusive of whether or not a project has significant noise impacts[32] in holding that the County's reliance on the project's compliance with noise regulations did not constitute substantial evidence supporting the County's finding of no significant impacts.[33]

05-7 Cont.

In *King and Gardiner Farms, LLC v. County of Kern*,[34] the Court of Appeal cited *Keep our Mountains Quiet* and decisions cited therein when it rejected the use of a single "absolute noise level" threshold of significance (construction and operational noise impacts were only deemed significant if they exceeded 65 dBA CNEL) on the grounds that the sole use of such a threshold fails to consider the magnitude or severity of increases in noise levels attributable to the project in different environments. The Court explained the lead agency failed to "refer to evidence showing why the magnitude of an increase was irrelevant in determining the significance of a change in noise."[35]

The Revised IS/MND itself, in its discussion of operational noise impacts, acknowledges that "[u]nder CEQA, consideration must be given to the magnitude of

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[28] *King & Gardiner Farms, LLC*, 45 Cal.App.5th at 865.
[29] *Keep our Mountains Quiet v. County of Santa Clara* (2015) 236 Cal.App.4th 714.
[30] *Id.* at 724.
[31] *Id.* at 732.
[32] *Id., citing Citizens for Responsible & Open Government v. City of Grand Terrace* (2008) 160 Cal.App.4th 1323, 1338; *Oro Fino Gold Mining Corp. v. County of El Dorado* (1990) 225 Cal.App.3d 872, 881–882; *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1416 (project's effects can be significant even if "they are not greater than those deemed acceptable in a general plan"); *Environmental Planning & Information Council v. County of El Dorado* (1982) 131 Cal.App.3d 350, 354, ("CEQA nowhere calls for evaluation of the impacts of a proposed project on an existing general plan").
[33] *Id.* at 732-734; see also *King & Gardiner Farms, LLC v. County of Kern* (2020) 45 Cal.App.5th 814, 893, as modified on denial of rehearing (Mar. 20, 2020).
[34] *King and Gardiner Farms, LLC, supra*, 45 Cal.App.5th 814.
[35] *Id.* at 894.

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the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact."[36] As is evident in the Appendix G of the CEQA Guidelines' reference to "substantial **temporary or permanent** increase in ambient noise levels" this requirement is not limited to operational noise impacts, and would include analysis of temporary construction noise impacts.[37]

Here, the Revised IS/MND's construction noise threshold violates CEQA's requirement that the lead agency consider both the increase in noise level and the absolute noise level associated with a project. The construction noise threshold is a maximum noise threshold that fails to consider the magnitude of increases in noise over ambient levels. Under the City's single threshold, the increase in noise is irrelevant so long as the overall levels do not exceed a particular level. But, as in *King and Gardiner Farms*, the Revised IS/MND fails to refer to substantial evidence showing why the magnitude of an increase was irrelevant in determining the significance of a change in noise. An EIR must be prepared that applies a legally adequate construction noise threshold.

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**2. Construction Noise Impacts are Potentially Significant and Unmitigated**

The Revised IS/MND's operational noise analysis cites noise standards that use increases over ambient levels. Referencing guidance from the Federal Interagency Committee on Noise ("FICON"), the Revised IS/MND provides that "if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur."[38] The IS/MND describes what increases over the existing ambient noise level would be considered significant:

> When the noise levels at existing and future noise-sensitive land uses (e.g., residential, etc.):
> - are less than 60 dBA Leq and the Project creates a readily perceptible 5 dBA Leq or greater Project-related noise level increase; or
> - range from 60 to 65 dBA Leq and the Project creates a barely perceptible 3 dBA Leq or greater Project-related noise level increase; or
> - already exceed 65 dBA Leq, and the Project creates a community noise level impact of greater than 1.5 dBA Leq (FICON, 1992).[39]

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[36] IS/MND, Appendix E, pg. 19.
[37] CEQA Guidelines, Appendix G, Section XIII.
[38] IS/MND, Appendix E, pg. 21.
[39] *Id.*



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Applying these standards to the Project's construction activities, Mr. Meighan demonstrates that the Project's construction noise impacts would exceed these thresholds at the nearest residential sensitive receptors. Mr. Meighan observes that ambient noise levels at the sensitive receptors are below 60 dBA.[40] For example, the ambient noise level at location L3 (Mirada Estates) is measured at 53.4 dBA, as shown in Table 5-1.[41]

**TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS**

| Location[1] | Description | Energy Average Noise Level (dBA $L_{eq}$)[2] | | |
|---|---|---|---|---|
| | | Daytime | Evening | Nighttime |
| L1 | Located north of the Project site near the existing Villas of Mirada single-family homes and an open dirt parking lot. | 49.7 | 46.7 | 44.1 |
| L2 | Located near the eastern boundary of the Project site near the existing Ritz-Carlton hotel and vacant land. | 53.4 | 48.0 | 48.1 |
| L3 | Located by the western boundary of the Project site near to the gated entrance of the Mirada Estates. | 50.4 | 46.6 | 41.7 |

Since ambient levels are less than 60 dBA, a 5 dBA increase in noise (58.4 dBA) over the MND's threshold would be significant. Increases greater than 5 dBA are shown in the noise study's Table 10-2.

05-9 Cont.

[40] Meighan Comments, pg. 3; IS/MND, Appendix E, Table 5-1.
[41] IS/MND, Appendix E, pg. 25.



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**TABLE 10-2: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY**

| Receiver Location[1] | Construction Noise Levels (dBA $L_{eq}$) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Demolition | Site Preparation | Grading | Building Construction | Paving | Architectural Coating | Highest Levels[2] |
| R1 | 48.8 | 52.2 | 50.4 | 48.5 | 48.1 | 42.1 | 52.2 |
| R2 | 66.2 | 69.6 | 67.8 | 65.9 | 65.5 | 59.5 | 69.6 |
| R3 | 66.9 | 70.3 | 68.5 | 66.6 | 66.2 | 60.2 | 70.3 |
| R4 | 67.2 | 70.6 | 68.8 | 66.9 | 66.5 | 60.5 | 70.6 |
| R5 | 66.8 | 70.2 | 68.4 | 66.5 | 66.1 | 60.1 | 70.2 |
| R6 | 61.8 | 65.2 | 63.4 | 61.5 | 61.1 | 55.1 | 65.2 |
| R7 | 63.1 | 66.5 | 64.7 | 62.8 | 62.4 | 56.4 | 66.5 |
| R8 | 52.7 | 56.1 | 54.3 | 52.4 | 52.0 | 46.0 | 56.1 |

05-9 Cont.

Mr. Meighan observes that every single construction phase except Architectural Coating would exceed proposed thresholds at receivers R3, R4, and R5, which are the closest locations along Mirada Circle.[42] Mr. Meighan further demonstrates that the exceedances may be greater than analyzed in the Revised IS/MND. After remodeling remodeled the analysis, using the source inputs of Table 10-1 in Appendix E, and using those with the spec levels and calculations in the Federal Highway Administration's Roadway Noise Construction Model, Mr. Meighan modeled a noise level of 89.7 dBA at receptor R3 (greater than the 70.3 analyzed in the IS/MND).[43] Mr. Meighan concludes that the 12 dBA increase over ambient levels analyzed in the Revised IS/MND and 31 dBA increase calculated by Mr. Meighan would represent a 'readily perceptible' increase in ambient noise levels. Mr. Meighan's findings provide substantial evidence supporting a fair argument that the Project will result in a significant noise impact which the Revised IS/MND fails to disclose or mitigate. The City must analyze and mitigate this potentially significant impact in an EIR.

### 3. The Revised IS/MND Fails to Mitigate Potentially Significant Vibration Impacts from Jackhammers and Loaded Trucks

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The Revised IS/MND discloses that vibration impacts from use of jackhammers and loaded trucks would result in potentially significant impacts on nearby residences. As shown below, Table 13-6 of the Revised IS/MND discloses

[42] Meighan Comments, pg. 4; IS/MND, Appendix E, Table 10-2.
[43] Meighan Comments, pg. 4.



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that jackhammers and loaded trucks would exceed the Revised IS/MND's 80 VdB significance threshold if used close to residences.[44]

**Table 13-6. Unmitigated Construction Equipment Vibration Levels**

| Receiver[1] | Distance to Const. Activity (Feet)[2] | Receiver Vibration Levels (VdB)[3] | | | | | Threshold (VdB)[4] | Threshold Exceeded?[5] |
|---|---|---|---|---|---|---|---|---|
| | | *Small Bulldozer* | *Jack-hammer* | *Loaded Trucks* | *Large Bulldozer* | *Highest Vibration Levels* | | |
| R1 | 591 | 16.8 | 37.8 | 44.8 | 45.8 | 45.8 | 80 | No |
| R2 | 66 | 45.4 | 6.4 | 73.4 | 74.4 | 74.4 | 80 | No |
| **R3** | **21** | **60.3** | **81.3** | **88.3** | **89.3** | **89.3** | **80** | **Yes** |
| **R4** | **33** | **54.4** | **75.4** | **82.4** | **83.4** | **83.4** | **80** | **Yes** |
| R5 | 69 | 44.8 | 65.8 | 72.8 | 73.8 | 73.8 | 80 | No |
| R6 | 108 | 38.9 | 59.9 | 66.9 | 67.9 | 67.9 | 80 | No |

The Revised IS/MND claims that these potentially significant impacts would be mitigated through implementation of MM-NOI-1, which provides:

> During proposed project construction, the applicant shall require that large-loaded trucks and dozers (greater than 80,000 pounds) shall not be used within 50 feet along the entire southern property line. Instead, small rubber-tired or alternative equipment shall be used within this area during proposed project construction to reduce vibration effects. If all mobile equipment used during proposed project construction are less than 80,000 pounds, then the 50-foot buffer mitigation is not required.[45]

But this measure does not apparently apply to either jackhammers or loaded trucks – two sources of potentially significant vibration. Mr. Meighan observes that MM-NOI-1 does not apply to sources weighing less than 80,000 pounds.[46] As such, this mitigation measure does not mitigate vibration from jackhammers, which are under 80,000 pounds. Concerning loaded trucks, MM-NOI-1's 50-foot vibration buffer zone mitigation only applies to "trucks and dozers (greater than 80,000 pounds)." Mr. Meighan explains that 80,000 pounds is the maximum legal weight allowed for trucks on the interstate highway system in the United States, and that most trucks operating on the Project site would therefore be loaded *below* the 80,000 pound threshold weight. Thus, MM-NOI-1's 80,000-pound exemption therefore effectively excludes loaded trucks. Additionally, the Revised IS/MND fails to provide evidence that loaded trucks or other mobile equipment weighing less than 80,000

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[44] IS/MND, pg. 154.
[45] *Id.* at 155.
[46] Meighan Comments, pg. 2.



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pounds would not result in potentially significant vibration impacts.[47] As such, neither the Revised IS/MND nor the noise study provide substantial evidence demonstrating that MM-NOI-1 would mitigate significant vibration impacts from jackhammers and loaded trucks. These potentially significant impacts remain unmitigated, requiring preparation of an EIR.

05-10 Cont.

**4. The Revised IS/MND Fails to Mitigate Potentially Significant Vibration Impacts from Vibratory Rollers**

The Revised IS/MND assumes that construction could require two rollers,[48] but the IS/MND fails to disclose potentially significant vibration impacts from vibratory rollers during construction. Mr. Meighan observes that vibratory rollers were not considered in the noise study or reflected in MM-NOI-1.[49] Use of vibratory rollers is reasonably foreseeable because they are well-suited for work on granular soils like sand, gravel, and crushed stone.[50] Here, the Revised IS/MND's geotechnical report indicates that site materials consist generally of outcropping pre-Cretaceous metasedimentary rocks overlain by an approximately 1- to 5-foot layer of gravelly sand with silt to silty sand with gravel.[51] Further, the Revised IS/MND does not preclude use of vibratory rollers.

Mr. Meighan demonstrates that vibratory rollers would result in greater vibration impacts than the large bulldozer analyzed in the Revised IS/MND. Whereas a large bulldozer would have a vibration source level at 25 feet of 87 VdB, a vibratory roller would have a 94 VdB source level.[52] Mr. Meighan calculates that the 80 VdB vibration threshold would be exceeded at 76 feet during the use of a vibratory roller.[53] An EIR must be prepared to analyze and mitigate the potentially significant impacts from this equipment.

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[47] Meighan Comments, pg. 3.
[48] IS/MND, Appendix A-1, PDF pg. 35.
[49] Meighan Comments, pg. 4.
[50] Multiquip Inc., Soil Compaction Handbook, 2011, https://www.multiquip.com/multiquip/pdfs/Soil_Compaction_Handbook_low_res_0212_DataId_59525_Version_1.pdf, pg. 11, 13; https://www.eaglepowerandequipment.com/blog/2019/05/types-of-rollers-used-in-compaction-work/; https://www.bigrentz.com/blog/types-of-rollers?srsltid=AfmBOorH6tVCTNh5AOYaVs6lT9ZyKFPILRp22RBW2p8OftTlk2ewBtE-;
[51] IS/MND, Appendix G, pg. 109
[52] Meighan Comments, pg. 4.
[53] *Id.*

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**5. The Revised IS/MND Fails to Disclose and Mitigate Potentially Significant Noise Impacts from HVACs**

The Revised IS/MND provides that operational noise impacts would be significant if Project-related operational (stationary-source) noise levels exceed the base exterior noise level standard of 45 dBA Leq during the nighttime hours (10:00 p.m. to 7:00 a.m.) for noise-sensitive residential and institutional uses in the Project study area.[54] The Revised IS/MND calculates nighttime operational noise levels as high as 44.6 dBA at location R3, only 0.4 dBA under the 45 dBA threshold.[55] This conclusion is based on the assumption that HVAC units are estimated to operate for an average 39 minutes per hour during the daytime hours, and 28 minutes per hour during the nighttime hours.[56]

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Mr. Meighan explains that the Revised IS/MND likely underestimates the amount of time HVAC systems would be running. Mr. Meighan observes that in Rancho Mirage, the average daily temperature can reach a high of over 105 degrees Fahrenheit in July.[57] Even the daily minimum can reach as high as 79 degrees. As a result, Mr. Meighan states that it would not be uncommon for an HVAC system to be running constantly. Mr. Meighan calculates that if the nighttime HVAC ran for just 4 more minutes per hour (32/60 minutes) than assumed in the IS/MND (28/60 minutes), the 45 dBA threshold would be broken.[58] As such, an exceedance of the nighttime operation is possible. This potentially significant impact must be analyzed and mitigated in an EIR.

**6. The Revised IS/MND Fails to Consider Noise and Vibration Impacts from Construction of Utility Trenches**

According to the Revised IS/MND, "the proposed project would require sewer, water, and fire-serve water line lateral connections to the existing facilities in Frank Sinatra Drive."[59] The geotechnical report, Appendix G, states that "[s]ome blasting may be necessary in the deeper cut areas of the site, and may be desirable from an efficiency standpoint even where ripping with heavy equipment is feasible."[60] But the Revised IS/MND's noise and vibration analysis does not address the possibility of blasting. This omission undermines the Revised IS/MND's findings because blasting can generate large noise and vibration impacts beyond what has

05-13

[54] IS/MND, Appendix E, pg. 21.
[55] *Id.* at 45, Table 9-2.
[56] *Id.* at 43.
[57] Meighan Comments, pg. 4-5.
[58] *Id.* at 5.
[59] IS/MND, pg. 16.
[60] IS/MND, Appendix G, pg. 17.



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been disclosed in the Revised IS/MND.[61] The City must evaluate in an EIR whether blasting is required for the construction of the Project, analyze the potentially significant noise and vibration impacts, and identify feasible mitigation.

05-13 Cont.

**B. The Project Would Have Potentially Significant Health Risk Impacts**

**1. Health Risk Impacts Are Significant When Evaluating Both Construction and Operational Phases**

The Revised IS/MND includes a health risk assessment of the Project's construction phase.[62] The HRA estimates an unmitigated cancer risk of 32.23 in one million and a mitigated cancer risk of 6.65 in one million, which is below the IS/MND's 10 in one million significance threshold.[63] This cancer risk does not reflect the community's exposure to toxic air contaminants from the Project's operations. As explained in CARE CA's comments on the first IS/MND, diesel particulate matter would be emitted from the Project's emergency generator.

05-14

SWAPE explains that the Revised IS/MND's HRA is not supported by substantial evidence because it fails to evaluate the combined lifetime cancer risk resulting from Project construction and operation together.[64] According to Office of Environmental Health Hazard Assessment ("OEHHA") guidance, "the excess cancer risk is calculated separately for each age grouping and then summed to yield cancer risk at the receptor location."[65] SWAPE observes that the IS/MND's HRA fails to sum each age bin to evaluate the total cancer risk over the course of the Project's total construction and operation.

SWAPE prepared a screening-level health risk analysis for the Project's operational phase, using the annual PM10 exhaust estimates from the IS/MND's CalEEMod "Ritz Carlton Rancho Mirage" model's output files.[66] PM10 emissions are commonly used as a proxy for DPM emissions in health risk assessments to

[61] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, pg. 117, 118, available at https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf; Assessment of the Ground Vibration During Blasting In Mining Projects Using Different Computational Approaches, Hosseini et al., https://www.nature.com/articles/s41598-023-46064-5.
[62] IS/MND, Appendix A-2.
[63] *Id.* at 5.
[64] SWAPE Comments, pg. 2.
[65] *Id.*
[66] *Id.* at 3.

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ensure that all DPM emissions are included – not just the fine size emissions.[67] The total excess cancer risk associated with Project operation is approximately 42.4 in one million.[68] When summing the Project's mitigated construction-related cancer risk (6.65 in one million), as estimated by the Revised IS/MND, with SWAPE's operational cancer risk (42.4 in one million), the excess cancer risk is approximately **49 in one million** over the course of a 30-year residential lifetime.[69] This cancer risk exceeds the 10 in one million significance threshold, resulting in a significant impact.[70] This potentially significant impact must be analyzed and mitigated in an EIR.

O5-14 Cont.

**2. The Revised IS/MND's Mitigation for Significant Health Risk Impacts is Inadequate**

The Revised IS/MND estimates an unmitigated cancer risk of 32.23 in one million, which would be reduced to 6.65 in one million via implementation of MM-AQ-1.[71] MM-AQ-1 calls for use of Tier 4 construction equipment, but "in the event of changed circumstances (e.g., changes in the availability of specific types of construction equipment), the applicant may submit a request to the City to apply an equivalent method of achieving project-generated construction emissions that fall below the numeric cancer risk standards established by the South Coast Air Quality Management District (SCAQMD)."[72] "If the documentation demonstrates that project-generated construction emissions will remain below the applicable SCAQMD cancer risk threshold, then the City may approve the alternate construction method(s), at the City's discretion."[73]

O5-15

[67] https://pantheonstorage.blob.core.windows.net/environment/2022-July-Updated-HRA-Report.pdf ("When evaluating health risks for DPM, particulate matter with a diameter of 10 microns or less (PM10) was selected as a surrogate for DPM (OEHHA 2015)"); https://beaumontca.gov/DocumentCenter/View/37631/42-Air-Quality ("The cancer and chronic health risks are based on the annual average concentration of PM10 (used as a proxy for DPM"); https://www.sandiegocounty.gov/content/dam/sdc/pds/ProjectPlanning/CottonwoodSandMine/DEIR/3.1.1%20Air%20Quality.pdf ("The maximum daily on-site emissions of exhaust PM10 (a proxy for DPM) during grading are anticipated to be 0.6 pound per day"); https://files.ceqanet.opr.ca.gov/91463-3/attachment/vejHMVGzizJa-EFOUH19TL5GCmcWHhVhTxb470nsetcSq3v4I3ZSdIabV7vbZKkIliM7QjBOHZ7SZeI60 ("PM10 emissions were used as a proxy for DPM."); https://www.beaumontca.gov/DocumentCenter/View/37278/032_Air-Quality ("The cancer and chronic health risks are based on the annual average concentration of PM10 (used as a proxy for DPM)").
[68] SWAPE Comments, pg. 6.
[69] *Id.*
[70] The Revised IS/MND contains no operational air quality mitigation. MM AQ-1 applies only to construction equipment, and would not reduce operational health risk.
[71] IS/MND, Appendix A-2, pg. 5-6.
[72] IS/MND, pg. 86.
[73] *Id.*

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The Revised IS//MND fails to discuss, identify, quantify emissions reductions from, or analyze the feasibility of obtaining any equipment which would purportedly provide the "alternate construction methods" to achieve Tier 4 equivalent construction emissions reductions. This analysis is required to be included in the CEQA document, and cannot be deferred until after Project approval.

05-15 Cont.

Moreover, MM-AQ-1 improperly defers formulation of alternative construction methods should Tier 4 equipment not be available. Courts have held that deferral of mitigation may be permitted only where the lead agency: (1) undertakes a complete analysis of the significance of the environmental impact; (2) proposes potential mitigation measures early in the planning process; and (3) articulates specific performance criteria that would ensure that adequate mitigation measures were eventually implemented.[74]

05-16

MM-AQ-1 fails to adequately propose potential mitigation measures early in the planning process. The HRA's analysis of the Project's mitigated health risk impacts assumes all construction equipment would be Tier 4 Final. However, Tier 4 Final equipment is of limited availability.[75] The IS/MND fails to demonstrate that similar reductions would be achieved through use of "alternative construction method(s)." Accordingly, the IS/MND must identify alternative construction methods that would achieve the necessary reductions to meet the 10 in one million threshold. Although MM-AQ-1 requires the applicant to submit documentation showing that the project-generated construction emissions would remain below the threshold, the IS/MND must include substantial evidence demonstrating that such reductions are feasible.

MM-AQ-1 fails to articulate specific performance criteria that would ensure that adequate mitigation measures are eventually implemented. If Tier 4 equipment is not used, MM-AQ-1 requires that "[d]ocumentation using industry-standard emission estimation methodologies shall be furnished to the City demonstrating that estimated project-generated construction emissions would not exceed the applicable SCAQMD cancer risk threshold." This measure fails to specify what type of documentation and methodologies would be accepted by the City. This ambiguity may allow the applicant to rely on methodologies unsupported by substantial evidence. In the initial IS/MND, the City claimed that because the Project's emissions would not exceed Localized Significance Thresholds ("LSTs"),

05-17

[74] *Comtys. for a Better Env't v. City of Richmond* (2010) 184 Cal.App.4th 70, 95; *Cal. Native Plant Socy' v. City of Rancho Cordova* (2009) 172 Cal.App.4th 603, 621.
[75] South Coast AQMD, 2022 Air Quality Management Plan Policy Brief, available at https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/final-2022-aqmp/black-box_final.pdf?sfvrsn=4.

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the Project's localized air quality impacts would not expose sensitive receptors to substantial air pollutant concentrations.[76] But CARE CA's initial comments demonstrated that LSTs do not apply to DPM and other TACs, and thus do not disclose the magnitude of the Project's emissions and resultant health impacts.[77] The initial IS/MND also claimed that health risk from construction activities would be less than significant because construction would last 22 months, and not constitute a long-term (30-year) source of TAC emissions.[78] But CARE CA explained that the OEHHA risk assessment guidelines recommend an HRA for short-term construction exposures to TACs lasting longer than 2 months.[79] And in the Revised IS/MND, the City failed to consider the combined health risk of the construction and operational phases of the Project. To ensure that health risk impacts would be reduced below the 10 in one million significance thresholds, MM-AQ-1 must be revised to require a quantitative HRA that considers all components of the Project before any alternative construction methods can be approved.

O5-17 Cont.

Because MM-AQ-1 improperly defers analysis and formulation of mitigation measures and its effectiveness is not supported by substantial evidence, the health risk impact identified in the Revised IS/MND remains potentially significant. An EIR must be prepared that fully mitigates this impact.

## III. CONCLUSION

The Revised IS/MND fails to provide substantial evidence demonstrating that the Project will have less than significant impacts. Moreover, substantial evidence supports a fair argument that the Project's impacts may be significant and unmitigated. Due to the Revised IS/MND's deficiencies, the City cannot conclude that the Project's impacts have been mitigated to a less than significant level.

O5-18

[76] March IS/MND, pg. 81.
[77] South Coast Air Quality Management District, Final Localized Significance Threshold Methodology (June 2003, Revised July 2008) www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2; http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

[78] *Id.*
[79] Office of Environmental Health Hazard Assessment (OEHHA), Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments, February 2015 (OEHHA 2015), Section 8.2.10: Cancer Risk Evaluation of Short Term Projects, pp. 8-17/18; https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

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CARE CA urges the City to prepare an EIR which complies with CEQA and fully addresses the issues raised in this comment letter and the unresolved issues in CARE CA's original IS/MND.

O5-18 Cont.

Sincerely,

Aidan P. Marshall

Attachments
APM:acp

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# EXHIBIT A

Page 19 of 64 in Comment Letter O5

WILSON IHRIG
ACOUSTICS, NOISE & VIBRATION

CALIFORNIA
WASHINGTON
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WI #24-001.41

August 20th, 2024

Mr. Aidan P. Marshall
Adam Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

**SUBJECT:** **Ritz-Carlton Residences Project**
**Rancho Mirage, CA**
**DRAFT: Review and Comments on IS/MND Noise Analysis**

Dear Mr. Marshall,

As requested, we have reviewed the information and noise impact analysis for the Ritz-Carlton Residences Project in Rancho Mirage, CA. The project proposes to expand the existing Ritz-Carlton hotel with 106 residential dwelling units, a 6,966 square foot restaurant, and a 23,843 square foot venue. The site is bordered to the south by residences along Mirada Circle. This letter is based on the recirculated July 2024 Initial Study/ Mitigated Negative Declaration (IS/MND) prepared by the City of Rancho Mirage, with an emphasis on Appendix E, *Ritz-Carlton Residences Noise Impact Analysis*, prepared by Urban Crossroads and dated February 18, 2020.

05-19

Wilson Ihrig is an acoustical consulting firm that has practiced exclusively in the field of acoustics since 1966. During our almost 58 years of operation, we have prepared hundreds of noise studies for Environmental Impact Reports and Statements. We have one of the largest technical laboratories in the acoustical consulting industry. We also utilize industry-standard acoustical programs such as Roadway Construction Noise Model (RCNM), SoundPLAN, and CadnaA. In short, we are well qualified to prepare environmental noise studies and review studies prepared by others.

## Adverse Effects of Noise[1]

Although the health effects of noise are not taken as seriously in the United States as they are in other countries, they are real and, in many parts of the country, pervasive.

05-20

**Noise-Induced Hearing Loss.** If a person is repeatedly exposed to loud noises, he or she may experience noise-induced hearing impairment or loss. In the United States, both the Occupational Health and Safety Administration (OSHA) and the National Institute for Occupational Safety and

[1] More information on these and other adverse effects of noise may be found in *Guidelines for Community Noise*, eds B Berglund, T Lindvall, and D Schwela, World Health Organization, Geneva, Switzerland, 1999. (https://www.who.int/publications/i/item/a68672)

Health (NIOSH) promote standards and regulations to protect the hearing of people exposed to high levels of industrial noise.

**Speech Interference.** Another common problem associated with noise is speech interference. In addition to the obvious issues that may arise from misunderstandings, speech interference also leads to problems with concentration fatigue, irritation, decreased working capacity, and automatic stress reactions. For complete speech intelligibility, the sound level of the speech should be 15 to 18 dBA higher than the background noise. Typical indoor speech levels are 45 to 50 dBA at 1 meter, so any noise above 30 dBA begins to interfere with speech intelligibility. The common reaction to higher background noise levels is to raise one's voice. If this is required persistently for long periods of time, stress reactions and irritation will likely result.

**Sleep Disturbance.** Noise can disturb sleep by making it more difficult to fall asleep, by waking someone after they are asleep, or by altering their sleep stage, e.g., reducing the amount of rapid eye movement (REM) sleep. Noise exposure for people who are sleeping has also been linked to increased blood pressure, increased heart rate, increase in body movements, and other physiological effects. Not surprisingly, people whose sleep is disturbed by noise often experience secondary effects such as increased fatigue, depressed mood, and decreased work performance.

**Cardiovascular and Physiological Effects.** Human's bodily reactions to noise are rooted in the "fight or flight" response that evolved when many noises signaled imminent danger. These include increased blood pressure, elevated heart rate, and vasoconstriction. Prolonged exposure to acute noises can result in permanent effects such as hypertension and heart disease.

**Impaired Cognitive Performance.** Studies have established that noise exposure impairs people's abilities to perform complex tasks (tasks that require attention to detail or analytical processes) and it makes reading, paying attention, solving problems, and memorizing more difficult. This is why there are standards for classroom background noise levels and why offices and libraries are designed to provide quiet work environments.

05-20 Cont.

## Mitigation Measure does Not Remove all Exceedances

Page 155 of the MND states that with the "implementation of MM-NOI-1, impacts would be less than significant." MM-NOI-1 states that "large-loaded trucks and dozers (greater than 80,000 pounds) shall not be used within 50 feet along the entire southern property line." The measure limits the heaviest equipment from use at the most sensitive locations.

However, there are several errors with this logic. The first is Table 13-6 shows that jackhammers are over the 80 VdB construction vibration threshold. Yet, MM-NOI-1 does nothing to reduce or regulate vibration from sources significantly less than 80,000 pounds. A jackhammer is less than 80,000 pounds. As such, this mitigation measure does not bring vibration from jackhammers under the limit, and there still are unmitigated significant impacts in the MND.

Additionally, the 50-foot vibration buffer zone mitigation is only for "trucks and dozers (greater than 80,000 pounds)" This 80,000-pound exemption is significantly too lenient. 80,000 pounds is the maximum weight any truck can be for use on the interstate highway system in the United States[2].

05-21

[2] https://ops.fhwa.dot.gov/freight/sw/overview/index.htm

California has the same restriction on all truck traffic within the state[3]. It stands to reason that most trucks are then at or below the legal threshold weight and would not be subject to the MND's vibration buffer zone mitigation. This means the weight chosen for the mitigation is too high – any truck that exceeds it is not legal to drive away from the site to the next destination, and is therefore unlikely (or illegal) to be used at the Project site in the first place.

Finally, the MND provides no evidence that correlates truck load (e.g., 80,000 lb) with vibration generated by the trucks or experienced at the wayside. The MND therefore provides no analysis or proof that this 80,000 lb limit is meaningful – which could be done by citing case studies, building computer models, or discussing applicable regulations. Truck speed and the presence of bumps or uneven surfaces along the haul road are also defining variables, not just truck load. Requiring less-vibration inducing construction equipment is a legitimate mitigation measure – but it must be accompanied by documentation showing that it will feasibility reduce levels, which is proven by calculations of new, mitigated levels in the original model.

O5-21 Cont.

## Analysis Improperly Considers Construction Noise Thresholds

Appendix E states that "The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise induced hearing loss" (page 13) and because of this uses an 85 dBA construction noise threshold.

The 85 dBA "hearing loss" threshold is not an appropriate threshold for evaluating all potentially significant impacts on sensitive receptors from increases in ambient noise. This was developed as a threshold to prevent occupational noise induced hearing loss. Given that an impact is defined in the MND as a "substantial temporary or permanent increase in ambient noise levels in the vicinity of the project" (page 19), it stands to reason that a 'substantial' increase in the <60 dBA ambient levels would occur before a hearing loss threshold. The ability to work from home, relax, or even the capability to have a conversation would be impacted before noise reaches an 85 dBA level. By relying on the 85 dBA threshold, the MND fails to identify these potentially significant impacts.

The MND already cites noise standards that use increases over ambient levels, stating that the "Federal Interagency Committee on Noise (FICON) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level" (page 19), continuing that "although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics" (Page 20). The FICON recommendations provide that "if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur" (page 20).

Other jurisdictions explicitly use thresholds tied to ambient levels for construction noise. The Los Angeles CEQA Thresholds Guide[4] on Page I.1-3 states that a "project would normally have a significant impact on noise levels from construction if ... Construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise sensitive use."

O5-22

[3] https://dot.ca.gov/programs/traffic-operations/legal-truck-access/weight-limitation
[4] https://planning.lacity.gov/eir/CrossroadsHwd/deir/files/references/A07.pdf

Table 5-1 shows that all ambient noise levels are below 60 dBA. There are no noise measurements taken at the sensitive locations along Miranda Circle. However, noise measurement location L3 is exposed to noise from Frank Sinatra Drive, which should have similar traffic levels and overall ambient conditions. The daytime ambient is measured at 53.4 dBA. Since ambient levels are less than 60 dBA, the 'readily perceptible' increase of noise would occur at 5 dBA over the MND's threshold based on FICON, which is 58.4 dBA.

Table 10-2 presents modeled construction noise levels. Every single construction phase but Architectural Coating is over both proposed thresholds at receivers R3, R4, and R5, which are the closest locations along Mirada Circle. For receiver R3 during site preparation (the worst-case scenario), Appendix E models a level of 70.3 dBA. We built our own model, using the source inputs of Table 10-1 in Appendix E, and using those with the spec levels and calculations in the Federal Highway Administration's (FHWA) Roadway Noise Construction Model (RCNM). We modeled a level of 89.7 dBA. This result is attached as an Appendix to this letter. The discrepancy is because of the lower source levels used in Table 10-1 of Appendix E in the MND. These recorded source levels should be included as a supplementary appendix to verify their validity and measurements assumptions. As it stands now, the MND may be underestimating impact levels. Without citing the source levels that are much lower than what is typically used in the FHWA RCNM model, it stands to reason the calculation may be flawed. **The MND's construction noise model is 12 dBA over ambient levels, while our construction noise model is 31 dBA over ambient levels.** 10 dBA is usually considered a doubling of loudness[5]. Both would represent a 'readily perceptible' increase and a 'substantial' temporary increase in ambient noise levels. As such, this should be more thoroughly in an Environmental Impact Report.

05-22 Cont.

## Analysis May Omit Possible Construction Vibration Exceedance

While the construction vibration was analyzed in section 10.4, the assessment or mitigation measures do not consider or restrict the use of a vibratory roller. The buffer distances identified in mitigation measure MM NOI-1 were calculated using a large bulldozer, which has a vibration source level at 25 feet of 87 VdB, compared to 94 VdB for a vibratory roller. Project design feature NOI-1 prohibits the use of large bulldozer within a buffer zone, but not vibratory rollers. The use of a vibratory roller should either be prohibited in a new NOI, or if a vibratory roller is necessary for the construction of the Project, a modified buffer distance would need to be implemented to avoid exceedances of the specified vibration threshold at nearby receptors.

Using the same procedure used in Table 13-6 of Appendix E of the IS/MND, the 80 VdB construction vibration threshold is exceeded at 76 feet during the use of a vibratory roller. Therefore, a new NOI-2 should be added banning the use of a vibratory roller, or NOI-1 should be modified, as below (changes in **bold**):

> *During proposed project construction, the applicant shall require that large-loaded trucks, **vibratory rollers,** and dozers (greater than 80,000 pounds) shall not be used within **76** feet along the entire southern property line. Instead, small rubber-tired or alternative equipment shall be used within this area during proposed project construction to reduce vibration effects.*

05-23

[5] https://www.nps.gov/subjects/sound/understandingsound.htm

*If all **non-vibratory roller** mobile equipment used during proposed project construction are less than 80,000 pounds, then the 50-foot buffer mitigation is not required.*

05-23 Cont.

## Analysis has Optimistic Assumptions Regarding HVAC Source Levels

Section 9.2.2 of Appendix E details source levels and assumptions for the air conditioning units and states that HVAC units are "estimated to operate for an average 39 minutes per hour during the daytime hours, and 28 minutes per hour during the nighttime hours." This may not be realistic for conditions in the Project vicinity. In Rancho Mirage, the average daily temperature can reach a high of over 105 degrees Fahrenheit in July[6]. Even daily minimum can reach as high as 79 degrees. As a result, we believe that it would not be uncommon for an HVAC system to be running constantly.

As presented in Table 9-1 in Appendix E, Air Conditioner Units are the only source considered for nighttime predictions. Table 9-2 shows that nighttime operational noise levels are as high as 44.6 dBA (at R3), only 0.4 dBA under the 45 dBA threshold. If the nighttime HVAC ran for 4 more minutes during the hour on a hot night, the 45 dBA threshold would be broken[7]. An HVAC system running 32 minutes out of 60 is very likely to occur in hot summer night conditions. As such, an exceedance is possible and should be studied in an Environmental Impact Report.

05-24

## Conclusions

There are several errors and omissions in the MND noise analysis, including improper construction noise thresholds, missing analysis of typically used equipment, and optimistic operational noise assumptions. Correcting these would potentially identify several significant impacts which require mitigation. Please feel free to contact me with any questions on this information.

05-25

Very truly yours,
WILSON IHRIG



Jack Meighan
Associate

rancho mirage ritz comments on the ismnd noise analysis.docx

[6] https://weatherspark.com/s/2120/1/Average-Summer-Weather-in-Rancho-Mirage-California-United-States#Figures-Temperature
[7] This is using the formula 10log(U.F/100). U.F.is Usage Factor, the % of time where the equipment is running.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date 8/20/2024
Case Description:

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) Daytime | Evening | Night |
|---|---|---|---|---|
| R3 | Residential | 85 | 85 | 85 |

| Description | Impact Device | Usage(%) | Equipment Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Dozer | No | 40 | 85 | | 21 | 0 |
| Backhoe | No | 40 | 80 | | 21 | 0 |

05-26

Results

| | Calculated (dBA) | | Noise Limits (dBA) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Day | | Evening | | Night | |
| Equipment | *Lmax | Leq | Lmax | Leq | Lmax | Leq | Lmax | Leq |
| Dozer | 92.5 | 88.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Backhoe | 87.5 | 83.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Total | 92.5 | 89.7 | N/A | 58.4 | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

| Noise Limit Exceedance (dBA) | | | | | |
|---|---|---|---|---|---|
| Day | | Evening | | Night | |
| Lmax | Leq | Lmax | Leq | Lmax | Leq |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | 31.3 | N/A | N/A | N/A | N/A |

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# JACK MEIGHAN

*Associate*

Jack joined Wilson Ihrig in 2021 and is an experienced acoustics engineer with expertise in projects involving rail transit systems, highways, CEQA analysis, environmental noise reduction, mechanical drawing reviews, and construction noise and vibration mitigation. He has hands-on experience with project management, including client coordination and presentations, as well as in designing, developing, and testing MATLAB code used in acoustics applications. Additionally, his expertise includes taking field measurements, developing test plans and specifying, purchasing, setting up and repairing acoustic measurement equipment. He has experience in using Traffic Noise Model (TNM), CadnaA, EASE, Visual Basic, LabView, and CAD software.

## Education

- B.S. in Mechanical Engineering, University of Southern California, Los Angeles, CA

## Project Experience

***Metro Regional Connector, Los Angeles CA***
Planned, took, and processed measurements as part of a team to determine the effectiveness of floating slab trackwork for a new subway in downtown Los Angeles that travels below the Walt Disney Concert Hall and the Colburn School of Music.

***Rodeo Credit Enterprise CEQA Analysis for New Construction, Palmdale, CA***
Wrote an accepted proposal and executed it for a noise study project to determine noise mitigation requirements on a new housing development. Led all aspects of the project and managed the budget during all phases of project completion. Completed 5 separate projects of this type for this developer.

***Blackhall Studios, Santa Clarita, CA***
Led the vibration measurement effort for a new soundstage directly adjacent to an existing freight and commuter rail line. Tested equipment, processed data, and analyzed results to determine the vibration propagation through the soil to the proposed soundstage locations, and was part of the team that developed mitigation techniques for the office spaces directly next to the rail line.

***Octavia Residential Condos CEQA Study, San Francisco, CA***
Calculated the STC ratings for the proposed windows to meet Title 24 requirements, modeled the acoustic performance of floor and ceiling structures, researched noise codes, helped with a mechanical design review, and wrote a report summarizing the results for a new Condominium project being developed in San Francisco.

***San Diego International Airport Terminal I Replacement, CA***
Conducted interior noise and vibration measurements, analyzed measurement data to help determine project criteria, modeled the existing and future terminals in CadnaA, and was part of a team that did a complete HVAC analysis of the entire terminal, as part of a CEQA analysis where a new terminal for the airport is being designed.

05-27

***Five Points Apartments Noise Study, Whittier, CA***
Took measurements, researched sound data and solutions, and recommended mitigation for a new apartment complex that was located next to an existing car wash, as part of a CEQA review.

***USC Ellison Vibration Survey, Los Angeles, CA***
Conducted vibration measurements as part of a survey to determine the effectiveness of vibration isolation platforms that are used to insulate cell growth in a cancer research facility. Determined the effectiveness and presented this information to the client. Researched and recommended a permanent monitoring system so the client could view data in real time.

***TEN50 Condos 'Popping' Noise Investigation, Los Angeles, CA***
Was part of a team that investigated the noise source of an unwanted popping noise in luxury condos in Downtown Los Angeles. Helped isolate the noise source location with accelerometers to determine where vibrations were occurring first and used an acoustic camera to determine where in the condo the noise was coming from.

***2000 University Project, Berkely, CA***
Wrote a construction noise monitoring plan based on environmental noise calculations, wrote a report summarizing the results, and attending a meeting with the client to discuss options.

---

***Bay Area Rapid Transit (BART) On-Track, CA, San Francisco Bay Area, CA****
Day to day project manager, responsible for meetings, presentations, and coordination with the client for an ongoing noise study on the BART system. Developed MATLAB code to process measurements and determine areas where high corrugation was present, contributing to excessively high in-car noise levels. Performed noise measurements inside both the right of way and the vehicle cabin, in addition to rail corrugation measurements.

***California I-605/SR-60 Interchange Improvement, Los Angeles, CA****
Developed a noise model of the area that predicted sound levels for abatement design, in addition to conducting noise measurements and analysis. Led the Team in use of the FHWA Traffic Noise Model Software for the project, involving three major highways and two busy interchanges extending over 17 miles in southern California.

***Sound Transit On-Track, Seattle, WA****
Took measurements, fixed equipment, and developed software in MATLAB to process Corrugation Analysis Trolley measurements as part of an ongoing noise study on the Sound Transit Link system. Tested vibration data to determine the best measurement and processing techniques to store the data in an online database for in-car measurements.

***LA Metro CRRC Railcar Testing, Los Angeles, CA****
Led the effort to plan the measurements, determine measurement locations and finalize the test plan. Formulated a method to capture speed data directly from legacy train vehicles. Executed noise and vibration specification measurements for new rail cars delivered by CRRC.

***City of Los Angeles, Pershing Square Station Rehabilitation Noise Monitoring, CA****
Built noise models, wrote a construction noise plan, and assisted in on-site construction noise issues as they arose for a renovation of the Pershing Square metro station in downtown Los

** Work done prior to working for Wilson Ihrig*

05-27
Cont.

Angeles. Trained construction personnel in techniques for noise reduction and how to conduct noise monitoring measurements to meet project specifications.

***City of Orange Metrolink Parking Garage Construction Monitoring, CA****
Wrote an adaptive management vibration monitoring plan, set up equipment to monitor live vibration levels, and generated weekly reports as part of an effort to build a new parking garage. Designed, planned, and completed measurements to predict and mitigate pile driving construction impacts at three historic building locations adjacent to the construction site. Coordinated with the client whenever an on-site problem arose.

***LA Metro Westside Subway Construction, Los Angeles, CA****
Planned, organized, and processed noise measurements for the Purple Line extension construction. Implemented both long term microphones to measure noise levels and accelerometers to measure vibration levels in existing subway tunnels. Oversaw noise monitoring at sensitive construction sites for the project and worked with the contractor to find ways to reduce construction noise levels by approximately 10dB.

***Montreal Réseau Express Métropolitain, Canada****
Conducted vibration propagation measurements used to create models to predict operational vibration levels for an under-construction transit line. Managed equipment, solved problems in the field, and wrote parts of the report summarizing the findings of the acoustic study.

***NHCRP Barrier****
Took on-highway measurements and wrote, designed, developed, and tested MATLAB code to identify specific spectrograms to use for analyses for a project evaluating barrier reflected highway traffic noise differences in the presence of a single absorptive or reflective noise barrier.

***Siemens Railcar Testing for Sound Transit, Seattle, WA****
Measured in-car noise and vibration for new rail cars delivered by Siemens. Developed new internal techniques for measurements based on the written specifications. Contributed to the team that helped identify issues that new cars had in meeting the Sound Transit specifications for noise and vibration. Participated in developing the test plan and specified then acquired new equipment for the measurement.

***Toronto/Ontario Eglinton Crosstown Light Rail, Final Design, Canada****
Assisted in vibration propagation measurements, analysis, and recommendations for mitigation for a 12-mile light-rail line both on and under Eglinton Avenue. Set up and ran equipment for at-grade measurements with an impact hammer for underground measurements with an impact load cell that was used during pre-construction borehole drilling.

** Work done prior to working for Wilson Ihrig*

05-27
Cont.

# EXHIBIT B

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SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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August 20, 2024

Aidan P. Marshall
Adams Broadwell Joseph & Cardozo
601 Gateway Blvd #1000
South San Francisco, CA 94080

**Subject:** **Comments on the Ritz-Carlton Rancho Mirage Project**

Dear Mr. Marshall,

We have reviewed the July 2024 Recirculated Initial Study/Mitigated Negative Declaration ("IS/MND") for the Ritz-Carlton Rancho Mirage Project ("Project") located in the City of Rancho Mirage ("City"). The Project proposes to construct 106 residential suites and hotel villas encompassing approximately 200,474-square feet ("SF"), 23,840-SF of event space, 6,273-SF of commercial, 5,510-SF of amenity space, and 499 parking spaces on the 16.13-acre site. 05-28

Our review concludes that the IS/MND fails to adequately evaluate the Project's health risk impacts. As a result, emissions and health risk impacts associated with construction and operation of the proposed Project may be underestimated and inadequately addressed. An Environmental Impact Report ("EIR") should be prepared to adequately assess and mitigate the potential health risk impacts that the Project may have on the environment. 05-29

## Air Quality

### Diesel Particulate Matter Emissions Inadequately Evaluated

The IS/MND conducts a health risk analysis ("HRA") evaluating impacts as a result of exposure to diesel particulate matter ("DPM") emissions from Project construction. Specifically, the Health Risk Assessment Technical Memorandum ("HRA Memo"), included as Appendix A-2 to the MND, estimates that, after the implementation of Mitigation Measure ("MM") AQ-1, the maximum cancer risk posed to nearby, existing residential sensitive receptors as a result of Project construction would be 6.65 in one million, which would not exceed the South Coast Air Quality Management District ("SCAQMD") significance threshold of 10 in one million (see excerpt below) (p. 5, Table 3). 05-30

**Table 3. Construction Health Risk Assessment Results - Mitigated**

| Impact Parameter | Units | Project Impact | CEQA Threshold | Level of Significance |
|---|---|---|---|---|
| Cancer Risk – MEIR | Per Million | 6.65 | 10 | Less than Significant |
| Chronic Hazard Index – MEIR | Index Value | 0.004 | 1.0 | Less than Significant |

**Source**: Attachment B.
**Note**: CEQA = California Environmental Quality Act; MEIR = Maximally Exposed Individual Resident.

05-30 Cont.

The IS/MND, however, fails to mention the DPM impacts or evaluate the health risks associated with Project operation. The IS/MND's evaluation of the Project's potential health risk impacts, as well as the subsequent less-than-significant impact conclusion, is unsupported for four reasons.

First, by failing to prepare a quantified operational HRA, the Project is inconsistent with to California Environmental Quality Act ("CEQA")'s requirement to make "a reasonable effort to substantively connect a project's air quality impacts to likely health consequences."[1]

Second, operation of the Project is anticipated to generate 1,068 daily vehicle trips, which would produce additional exhaust emissions and continue to expose nearby, existing sensitive receptors to DPM emissions (p. 178). However, the IS/MND and associated documents fail to evaluate the TAC emissions associated with Project operation or indicate the concentrations at which such pollutants would trigger adverse health effects. Without making a reasonable effort to connect the Project's TAC emissions to the potential health risks posed to nearby receptors, the IS/MND is inconsistent with CEQA's requirement to correlate Project-generated emissions with potential adverse impacts on human health and fails to uphold the warehouse best practices as established by the California DOJ.

05-31

Third, while the IS/MND includes a HRA evaluating the health risk impacts to nearby, existing receptors as a result of Project construction, the HRA fails to evaluate the combined lifetime cancer risk to nearby, existing receptors as a result of Project construction and operation together. According to OEHHA guidance, "the excess cancer risk is calculated separately for each age grouping and then summed to yield cancer risk at the receptor location."[2] The IS/MND's HRA fails to sum each age bin to evaluate the total cancer risk over the course of the Project's total construction and operation. This is unsupported and an updated analysis should quantify the sum of the Project's construction and operational health risks to compare to the SCAQMD threshold of 10 in one million, as referenced by the IS/MND (p. 71, Table 3-4).

05-32

Fourth, the Project's implementation of MM-AQ-1 is unsupported. MM-AQ-1 states:

> "Use of Tier 4 Engines Prior to the commencement of construction activities for the project, the applicant shall require its construction contractor to use California Air Resources Board (CARB)-certified Tier 4 engines for all diesel-powered equipment pieces that are 75 horsepower or

05-33

[1] "Sierra Club v. County of Fresno." Supreme Court of California, December 2018, *available at:* https://ceqaportal.org/decisions/1907/Sierra%20Club%20v.%20County%20of%20Fresno.pdf.
[2] "Guidance Manual for preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf p. 8-4

> greater throughout all phases of construction. In the event of changed circumstances (e.g., changes in the availability of specific types of construction equipment), the applicant may submit a request to the City to apply an equivalent method of achieving project-generated construction emissions that fall below the numeric cancer risk standards established by the South Coast Air Quality Management District (SCAQMD)" (IS/MND, p. 223).

The IS/MND fails to analyze the feasibility of procuring any proposed "equivalent method" emissions controls described in MM-AQ-1, and instead defers that analysis until after project approval. The IS/MND's claim that "the applicant may submit a request to the City to apply an equivalent method" is inconsistent with CEQA's requirement to disclose unmitigated and mitigated emissions in the CEQA document, and to avoid language, when writing mitigation measures, that is "vague, unenforceable and lack[s] specific performance criteria."[3] By omitting specific methods of mitigating health risk impacts, the Project is inconsistent with CEQA Guidelines §15126.4(a)(1)(B), which states:

> "Where several measures are available to mitigate an impact, each should be discussed and the basis for selecting a particular measure should be identified. Formulation of mitigation measures shall not be deferred until some future time"

The IS/MND is consequently required under CEQA to elaborate upon all proposed, feasible mitigation. Until the IS/MND and associated documents refine the definition of MM-AQ-1, the Project's less-than-significant health risk determination should not be relied upon.

O5-33 Cont.

## Screening-Level Analysis Demonstrates Potentially Significant Health Risk Impact

We prepared a screening-level risk assessment using AERSCREEN, which is a screening level air quality dispersion model.[4] AERSCREEN uses a limited amount of site-specific information to generate maximum reasonable downwind concentrations of air contaminants to which nearby sensitive receptors may be exposed. If an unacceptable air quality hazard is estimated using AERSCREEN, a more refined modeling approach should be conducted prior to approval of the Project.

We prepared a preliminary HRA of the Project's construction and operational health risk impact to residential sensitive receptors using the annual $PM_{10}$ exhaust estimates from the IS/MND's CalEEMod "Ritz Carlton Rancho Mirage" model's output files. Consistent with recommendations set forth by OEHHA, we assumed residential exposure begins during the third trimester stage of life. Subtracting the 667-day construction period from the total residential duration of 30 years, we assumed that after Project construction, the sensitive receptor would be exposed to the Project's operational DPM for an additional 28.17 years. The IS/MND's operational CalEEMod emissions indicate that operational activities will generate approximately 85 pounds of DPM per year throughout operation. The AERSCREEN model relies on a continuous average emission rate to simulate maximum downward concentrations from point, area, and volume emission sources. To account for the variability in

O5-34

[3] "Sierra Club v. County of Fresno." Supreme Court of California, December 2018, available at: https://ceqaportal.org/decisions/1907/Sierra%20Club%20v.%20County%20of%20Fresno.pdf, p. 5.
[4] "AERSCREEN Released as the EPA Recommended Screening Model," U.S. EPA, April 2011, *available at:* https://www.epa.gov/sites/default/files/2020-10/documents/20110411_aerscreen_release_memo.pdf.

equipment usage and truck trips over Project construction, we calculated an average DPM emission rate by the following equation:

$$\text{Emission Rate } \left(\frac{\text{grams}}{\text{second}}\right) = \frac{84.8 \text{ lbs}}{365 \text{ days}} \times \frac{453.6 \text{ grams}}{\text{lbs}} \times \frac{1 \text{ day}}{24 \text{ hours}} \times \frac{1 \text{ hour}}{3{,}600 \text{ seconds}} = \mathbf{0.00122\ g/s}$$

Using this equation, we estimated a construction emission rate of 0.00122 grams per second ("g/s"). Operation was simulated as a 16.13-acre rectangular area source in AERSCREEN, with approximate dimensions of 361- by 181-meters. A release height of three meters was selected to represent the height of stacks of operational equipment and other heavy-duty vehicles, and an initial vertical dimension of one and a half meters was used to simulate instantaneous plume dispersion upon release. An urban meteorological setting was selected with model-default inputs for wind speed and direction distribution. The population of the City of Rancho Mirage was obtained from U.S. 2022 Census data.[5]

The AERSCREEN model generates maximum reasonable estimates of single-hour DPM concentrations from the Project Site. U.S. Environmental Protection Agency ("U.S. EPA") guidance suggests that in screening procedures, the annualized average concentration of an air pollutant to be estimated by multiplying the single-hour concentration by 10%.[6] The IS/MND indicates that "the nearest sensitive receptors are single family residential dwellings adjacent and south of the project site" (p. 83). However, according to the AERSCREEN output files, the MEIR is located approximately 175 meters downwind of the Project site. Thus, the single-hour concentration estimated by AERSCREEN for Project operation is approximately 0.8993 µg/m$^3$ DPM at approximately 175 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.08993 µg/m$^3$ for Project operation at the MEIR.[7]

We calculated the excess cancer risk to the MEIR using applicable HRA methodologies prescribed by OEHHA, as recommended by SCAQMD.[8] Specifically, guidance from OEHHA and the CARB recommends the use of a standard point estimate approach, including high-point estimate (i.e. 95$^{th}$ percentile) breathing rates and age sensitivity factors ("ASF") in order to account for the increased sensitivity to carcinogens during early-in-life exposure and accurately assess risk for susceptible subpopulations such as children. The residential exposure parameters, such as the daily breathing rates ("BR/BW"), exposure duration ("ED"), ASFs, fraction of time at home ("FAH"), and exposure frequency ("EF") utilized for the various age groups in our screening-level HRA are as follows:

O5-34
Cont.

[5] "City of Rancho Mirage." U.S. Census Bureau, 2022, *available at:* https://datacommons.org/place/geoId/0659500.
[6] "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources Revised." U.S. EPA, October 1992, *available at:* https://www.epa.gov/sites/default/files/2020-09/documents/epa-454r-92-019_ocr.pdf.
[7] See Attachment A for HRA calculations and Attachment B for AERSCREEN output files.
[8] "Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics 'Hot Spots' Information and Assessment Act." SCAQMD, October 2020, available at: http:// http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab-2588-supplemental-guidelines.pdf?sfvrsn=19, p. 19; see also "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

| Exposure Assumptions for Residential Individual Cancer Risk | | | | | | |
|---|---|---|---|---|---|---|
| Age Group | Breathing Rate (L/kg-day)[9] | Age Sensitivity Factor[10] | Exposure Duration (years) | Fraction of Time at Home[11] | Exposure Frequency (days/year)[12] | Exposure Time (hours/day) |
| 3rd Trimester | 361 | 10 | 0.25 | 1 | 350 | 24 |
| Infant (0 - 2) | 1090 | 10 | 2 | 1 | 350 | 24 |
| Child (2 - 16) | 572 | 3 | 14 | 1 | 350 | 24 |
| Adult (16 - 30) | 261 | 1 | 14 | 0.73 | 350 | 24 |

For the inhalation pathway, the procedure requires the incorporation of several discrete variates to effectively quantify dose for each age group. Once determined, contaminant dose is multiplied by the cancer potency factor ("CPF") in units of inverse dose expressed in milligrams per kilogram per day ($mg/kg/day^{-1}$) to derive the cancer risk estimate. To assess exposures, we utilized the following dose algorithm:

O5-34 Cont.

$$\text{Dose}_{\text{AIR,per age group}} = C_{air} \times EF \times \left[\frac{BR}{BW}\right] \times A \times CF$$

where:

$\text{Dose}_{AIR}$ = dose by inhalation (mg/kg/day), per age group
$C_{air}$ = concentration of contaminant in air (µg/m3)
EF = exposure frequency (number of days/365 days)
BR/BW = daily breathing rate normalized to body weight (L/kg/day)
A = inhalation absorption factor (default = 1)
CF = conversion factor (1x10-6, µg to mg, L to m3)

To calculate the overall cancer risk, we used the following equation for each appropriate age group:

$$\text{Cancer Risk}_{\text{AIR}} = \text{Dose}_{\text{AIR}} \times \text{CPF} \times \text{ASF} \times \text{FAH} \times \frac{\text{ED}}{\text{AT}}$$

[9] "Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics 'Hot Spots' Information and Assessment Act." SCAQMD, October 2020, available at: http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab-2588-supplemental-guidelines.pdf?sfvrsn=19, p. 19; see also "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

[10] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 8-5 Table 8.3.

[11] "Risk Assessment Procedures." SCAQMD, August 2017, available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1401/riskassessmentprocedures_2017_080717.pdf, p. 7.

[12] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 5-24.

where:

$Dose_{AIR}$ = dose by inhalation (mg/kg/day), per age group
CPF = cancer potency factor, chemical-specific $(mg/kg/day)^{-1}$
ASF = age sensitivity factor, per age group
FAH = fraction of time at home, per age group (for residential receptors only)
ED = exposure duration (years)
AT = averaging time period over which exposure duration is averaged (always 70 years)

Consistent with the 667-day construction schedule, the annual annualized average concentration for operation was used for the remainder of the 30-year exposure period, which makes up the latter 0.48 years of the infantile stage of life, as well as the entire child stage of life (2 – 16 years) and adult stage of life (16 – 30 years). The results of our calculations are shown in the table below.

**The Maximally Exposed Individual at an Existing Residential Receptor**

| Age Group | Emissions Source | Duration (years) | Concentration (ug/m3) | Cancer Risk |
|---|---|---|---|---|
| 3rd Trimester | Construction | 0.25 | * | * |
| | *Construction* | *1.58* | * | * |
| | *Operation* | *0.42* | *0.0899* | *6.20E-06* |
| Infant (0 - 2) | Total | 2 | | 6.20E-06 |
| Child (2 - 16) | Operation | 14 | 0.0899 | 3.26E-05 |
| Adult (16 - 30) | Operation | 14 | 0.0899 | 3.61E-06 |
| **Lifetime** | | **30** | | **4.24E-05** |

* Construction-related cancer risk calculated by the IS/MND was used.

As demonstrated in the table above, the excess cancer risks for infants, children, and adults at the MEIR located approximately 175 meters away, over the course of Project operation, are approximately 0.397, 6.2, 32.6, and 3.61 in one million, respectively. The total excess cancer risk associated with Project operation is approximately 42.4 in one million. When summing the Project's construction-related cancer risk, as estimated by the IS/MND, with SWAPE's operational cancer risk, we estimate an excess cancer risk of approximately 49 in one million over the course of a 30-year residential lifetime (p. 5, Table 3).[13]

O5-34 Cont.

[13] Calculated: 6.65 in one million (IS/MND's estimated construction-related cancer risk) + 42.4 in one million (SWAPE's estimated operational cancer risk) = 49 in one million.

As such, the child and lifetime cancer risks exceed the SCAQMD threshold of 10 in one million, resulting in a potentially significant impact not previously addressed or identified in the IS/MND.[14]

The purpose of the screening-level HRA is to demonstrate the potential link between Project-generated emissions and adverse health risk impacts. According to the U.S. EPA:

> "EPA's Exposure Assessment Guidelines recommend completing exposure assessments iteratively using a tiered approach to 'strike a balance between the costs of adding detail and refinement to an assessment and the benefits associated with that additional refinement' (U.S. EPA, 1992).
>
> In other words, an assessment using basic tools (e.g., simple exposure calculations, default values, rules of thumb, conservative assumptions) can be conducted as the first phase (or tier) of the overall assessment (i.e., a screening-level assessment).
>
> The exposure assessor or risk manager can then determine whether the results of the screening-level assessment warrant further evaluation through refinements of the input data and exposure assumptions or by using more advanced models."

Screening-level analyses warrant further evaluation in a refined modeling approach. Our screening-level HRA demonstrates that construction and operation of the Project could result in a potentially significant health risk impact, and therefore an EIR should be prepared to include a refined health risk analysis which adequately and accurately evaluates health risk impacts associated with both Project construction and operation.

O5-34 Cont.

## Disclaimer

SWAPE has received limited discovery regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

O5-35

Sincerely,

[14] Moreover, the health risk posed by operational emissions is not reduced to any extent by MM AQ-1 because MM AQ-1 applies only to construction equipment and does not reduce operational DPM emissions.

Matt Hagemann, P.G., C.Hg.

Paul E. Rosenfeld, Ph.D.

**Attachment A: HRA Calculations**
**Attachment D: AERSCREEN Output Files**
**Attachment C: Matt Hagemann CV**
**Attachment D: Paul Rosenfeld CV**

Attachment A

| Operation | |
|---|---|
| **Emission Rate** | |
| Annual Emissions (tons/year) | 0.0424 |
| Daily Emissions (lbs/day) | 0.232328767 |
| Total DPM (lbs) | 84.8 |
| Emission Rate (g/s) | 0.001219726 |
| Release Height (meters) | 3 |
| Total Acreage | 16.13 |
| Max Horizontal (meters) | 361.32 |
| Min Horizontal (meters) | 180.66 |
| Initial Vertical Dimension (meters) | 1.5 |
| Setting | Urban |
| Population | 17,633 |
| Start Date | 2/1/2023 |
| End Date | 11/29/2024 |
| Total Construction Days | 667 |
| Total Years of Construction | 1.83 |
| Total Years of Operation | 28.17 |

05-36

| The Maximally Exposed Individual at an Existing Residential Receptor | | | | |
|---|---|---|---|---|
| **Age Group** | **Emissions Source** | **Duration** (years) | **Concentration** (ug/m3) | **Cancer Risk** |
| 3rd Trimester | Construction | 0.25 | * | * |
| | *Construction* | *1.58* | * | * |
| | *Operation* | *0.42* | *0.0899* | *6.20E-06* |
| Infant (0 - 2) | Total | 2 | | 6.20E-06 |
| Child (2 - 16) | Operation | 14 | 0.0899 | 3.26E-05 |
| Adult (16 - 30) | Operation | 14 | 0.0899 | 3.61E-06 |
| **Lifetime** | | **30** | | **4.24E-05** |

* Construction-related cancer risk calculated by the IS/MND was used.

O5-36 Cont.

**Attachment B**

```
AERSCREEN 21112 / AERMOD 21112                                    07/23/24
                                                                  00:54:08

TITLE: Rancho Mirage Ritz-Carlton Operation


------------------------------------------------------------------------------
****************************  AREA PARAMETERS  ****************************
------------------------------------------------------------------------------

SOURCE EMISSION RATE:         0.122E-02 g/s             0.968E-02 lb/hr

AREA EMISSION RATE:           0.187E-07 g/(s-m2)        0.148E-06 lb/(hr-m2)
AREA HEIGHT:                       3.00 meters               9.84 feet
AREA SOURCE LONG SIDE:           361.32 meters            1185.43 feet
AREA SOURCE SHORT SIDE:          180.66 meters             592.72 feet
INITIAL VERTICAL DIMENSION:        1.50 meters               4.92 feet
RURAL OR URBAN:                   URBAN
POPULATION:                       17633

INITIAL PROBE DISTANCE =           5000. meters             16404. feet


------------------------------------------------------------------------------
**********************  BUILDING DOWNWASH PARAMETERS  **********************
------------------------------------------------------------------------------

              BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES


------------------------------------------------------------------------------
**************************  FLOW SECTOR ANALYSIS  ****************************
                25 meter receptor spacing: 1. meters - 5000. meters
------------------------------------------------------------------------------


   MAXIMUM  IMPACT  RECEPTOR

   Zo        SURFACE   1-HR CONC  RADIAL  DIST   TEMPORAL
   SECTOR    ROUGHNESS  (ug/m3)    (deg)   (m)    PERIOD
  ----------------------------------------------------
      1*       1.000    0.8993       5   175.0     WIN
* = worst case diagonal



------------------------------------------------------------------------------
```

O5-37

```
*********************  MAKEMET METEOROLOGY PARAMETERS  ********************
-----------------------------------------------------------------------------

MIN/MAX TEMPERATURE:    250.0 / 310.0 (K)

MINIMUM WIND SPEED:       0.5 m/s

ANEMOMETER HEIGHT:     10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE:    Average Moisture
DOMINANT SEASON:          Winter

ALBEDO:                  0.35
BOWEN RATIO:             1.50
ROUGHNESS LENGTH:       1.000 (meters)

SURFACE FRICTION VELOCITY (U*) NOT ADUSTED


       METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT
       -------------------------------------------------------------

 YR MO DY JDY HR
 -- -- -- --- --
 10 01 10  10 01

    H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 -1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50

    HT  REF TA     HT
- - - - - - - - - - -
  10.0   310.0    2.0



-----------------------------------------------------------------------------
************************ AERSCREEN AUTOMATED DISTANCES *********************
                  OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE
-----------------------------------------------------------------------------


                     MAXIMUM                                MAXIMUM
            DIST     1-HR CONC                  DIST      1-HR CONC
             (m)      (ug/m3)                    (m)       (ug/m3)
         ---------------------                ---------------------
            1.00    0.6816                    2525.00    0.3230E-01
```

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| | | | |
|---|---|---|---|
| 25.00 | 0.7203 | 2550.00 | 0.3188E-01 |
| 50.00 | 0.7569 | 2575.00 | 0.3147E-01 |
| 75.00 | 0.7903 | 2600.00 | 0.3107E-01 |
| 100.00 | 0.8209 | 2625.00 | 0.3067E-01 |
| 125.00 | 0.8491 | 2650.00 | 0.3028E-01 |
| 150.00 | 0.8750 | 2675.00 | 0.2990E-01 |
| 175.00 | 0.8993 | 2700.00 | 0.2953E-01 |
| 200.00 | 0.8871 | 2725.00 | 0.2916E-01 |
| 225.00 | 0.6696 | 2750.00 | 0.2880E-01 |
| 250.00 | 0.5596 | 2775.00 | 0.2845E-01 |
| 275.01 | 0.4937 | 2800.00 | 0.2811E-01 |
| 300.00 | 0.4418 | 2825.00 | 0.2778E-01 |
| 325.00 | 0.4060 | 2850.00 | 0.2745E-01 |
| 350.00 | 0.3755 | 2875.00 | 0.2713E-01 |
| 375.00 | 0.3488 | 2900.00 | 0.2681E-01 |
| 400.00 | 0.3253 | 2925.00 | 0.2651E-01 |
| 425.00 | 0.3043 | 2950.00 | 0.2621E-01 |
| 450.00 | 0.2855 | 2975.00 | 0.2591E-01 |
| 475.00 | 0.2685 | 3000.00 | 0.2562E-01 |
| 500.00 | 0.2532 | 3025.00 | 0.2534E-01 |
| 525.00 | 0.2394 | 3050.00 | 0.2506E-01 |
| 550.00 | 0.2267 | 3075.00 | 0.2478E-01 |
| 575.00 | 0.2152 | 3100.00 | 0.2451E-01 |
| 600.00 | 0.2045 | 3125.00 | 0.2425E-01 |
| 625.00 | 0.1948 | 3150.00 | 0.2399E-01 |
| 650.00 | 0.1858 | 3175.00 | 0.2374E-01 |
| 675.00 | 0.1775 | 3200.00 | 0.2349E-01 |
| 700.00 | 0.1699 | 3225.00 | 0.2324E-01 |
| 725.00 | 0.1626 | 3250.00 | 0.2300E-01 |
| 750.00 | 0.1560 | 3275.00 | 0.2277E-01 |
| 775.00 | 0.1498 | 3300.00 | 0.2253E-01 |
| 800.00 | 0.1440 | 3325.00 | 0.2231E-01 |
| 825.00 | 0.1386 | 3350.00 | 0.2246E-01 |
| 850.00 | 0.1335 | 3375.00 | 0.2224E-01 |
| 875.00 | 0.1288 | 3400.00 | 0.2201E-01 |
| 900.00 | 0.1243 | 3425.00 | 0.2179E-01 |
| 925.00 | 0.1200 | 3450.00 | 0.2158E-01 |
| 950.00 | 0.1160 | 3475.00 | 0.2136E-01 |
| 975.00 | 0.1123 | 3500.00 | 0.2116E-01 |
| 1000.00 | 0.1088 | 3525.00 | 0.2095E-01 |
| 1025.00 | 0.1054 | 3550.00 | 0.2075E-01 |
| 1050.00 | 0.1022 | 3575.00 | 0.2055E-01 |
| 1075.00 | 0.9916E-01 | 3600.00 | 0.2036E-01 |
| 1100.00 | 0.9626E-01 | 3625.00 | 0.2016E-01 |
| 1125.00 | 0.9351E-01 | 3650.00 | 0.1998E-01 |
| 1150.00 | 0.9090E-01 | 3675.00 | 0.1979E-01 |
| 1175.00 | 0.8843E-01 | 3700.00 | 0.1961E-01 |
| 1200.00 | 0.8607E-01 | 3725.00 | 0.1943E-01 |
| 1225.00 | 0.8384E-01 | 3750.00 | 0.1925E-01 |
| 1250.00 | 0.8167E-01 | 3775.00 | 0.1908E-01 |

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| | | | |
|---|---|---|---|
| 1275.00 | 0.7960E-01 | 3800.00 | 0.1891E-01 |
| 1300.00 | 0.7762E-01 | 3825.00 | 0.1874E-01 |
| 1325.00 | 0.7571E-01 | 3850.00 | 0.1857E-01 |
| 1350.00 | 0.7388E-01 | 3875.00 | 0.1841E-01 |
| 1375.00 | 0.7213E-01 | 3900.00 | 0.1825E-01 |
| 1400.00 | 0.7045E-01 | 3925.00 | 0.1809E-01 |
| 1425.00 | 0.6885E-01 | 3950.00 | 0.1793E-01 |
| 1450.00 | 0.6730E-01 | 3975.00 | 0.1778E-01 |
| 1475.00 | 0.6582E-01 | 4000.00 | 0.1762E-01 |
| 1500.00 | 0.6440E-01 | 4025.00 | 0.1747E-01 |
| 1525.00 | 0.6302E-01 | 4050.00 | 0.1733E-01 |
| 1550.00 | 0.6168E-01 | 4075.00 | 0.1718E-01 |
| 1575.00 | 0.6040E-01 | 4100.00 | 0.1704E-01 |
| 1600.00 | 0.5916E-01 | 4125.00 | 0.1690E-01 |
| 1625.00 | 0.5796E-01 | 4150.00 | 0.1676E-01 |
| 1650.00 | 0.5681E-01 | 4175.00 | 0.1662E-01 |
| 1675.00 | 0.5570E-01 | 4200.00 | 0.1649E-01 |
| 1700.00 | 0.5463E-01 | 4225.00 | 0.1635E-01 |
| 1725.00 | 0.5359E-01 | 4250.00 | 0.1622E-01 |
| 1750.00 | 0.5258E-01 | 4275.00 | 0.1609E-01 |
| 1775.00 | 0.5160E-01 | 4300.00 | 0.1596E-01 |
| 1800.00 | 0.5065E-01 | 4325.00 | 0.1584E-01 |
| 1825.00 | 0.4974E-01 | 4350.00 | 0.1571E-01 |
| 1850.00 | 0.4885E-01 | 4375.00 | 0.1559E-01 |
| 1875.00 | 0.4799E-01 | 4400.00 | 0.1547E-01 |
| 1900.00 | 0.4716E-01 | 4425.00 | 0.1535E-01 |
| 1925.00 | 0.4636E-01 | 4450.00 | 0.1523E-01 |
| 1950.00 | 0.4557E-01 | 4475.00 | 0.1512E-01 |
| 1975.00 | 0.4480E-01 | 4500.00 | 0.1500E-01 |
| 2000.00 | 0.4405E-01 | 4525.00 | 0.1489E-01 |
| 2025.00 | 0.4333E-01 | 4550.00 | 0.1478E-01 |
| 2050.00 | 0.4263E-01 | 4575.00 | 0.1467E-01 |
| 2075.00 | 0.4194E-01 | 4600.00 | 0.1456E-01 |
| 2100.00 | 0.4128E-01 | 4625.00 | 0.1445E-01 |
| 2125.00 | 0.4063E-01 | 4650.00 | 0.1434E-01 |
| 2150.00 | 0.4001E-01 | 4675.00 | 0.1424E-01 |
| 2175.00 | 0.3940E-01 | 4700.00 | 0.1414E-01 |
| 2200.00 | 0.3880E-01 | 4725.00 | 0.1403E-01 |
| 2225.00 | 0.3822E-01 | 4750.00 | 0.1393E-01 |
| 2250.00 | 0.3766E-01 | 4775.00 | 0.1383E-01 |
| 2275.00 | 0.3711E-01 | 4800.00 | 0.1373E-01 |
| 2300.00 | 0.3658E-01 | 4825.00 | 0.1364E-01 |
| 2325.00 | 0.3606E-01 | 4850.00 | 0.1354E-01 |
| 2350.00 | 0.3555E-01 | 4875.00 | 0.1345E-01 |
| 2375.00 | 0.3506E-01 | 4900.00 | 0.1335E-01 |
| 2400.00 | 0.3457E-01 | 4925.00 | 0.1326E-01 |
| 2425.00 | 0.3410E-01 | 4950.00 | 0.1317E-01 |
| 2450.00 | 0.3363E-01 | 4975.00 | 0.1308E-01 |
| 2475.00 | 0.3318E-01 | 5000.00 | 0.1303E-01 |
| 2500.00 | 0.3274E-01 | | |

O5-37
Cont.

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**********  AERSCREEN MAXIMUM IMPACT SUMMARY  **********
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3-hour, 8-hour, and 24-hour scaled
concentrations are equal to the 1-hour concentration as referenced in
SCREENING PROCEDURES FOR ESTIMATING THE AIR QUALITY
IMPACT OF STATIONARY SOURCES, REVISED (Section 4.5.4)
Report number EPA-454/R-92-019
http://www.epa.gov/scram001/guidance_permit.htm
under Screening Guidance

                    MAXIMUM       SCALED       SCALED       SCALED       SCALED
                     1-HOUR       3-HOUR       8-HOUR      24-HOUR       ANNUAL
  CALCULATION          CONC         CONC         CONC         CONC         CONC
   PROCEDURE       (ug/m3)      (ug/m3)      (ug/m3)      (ug/m3)      (ug/m3)
---------------    ----------   ----------   ----------   ----------   ----------
FLAT TERRAIN       0.9059       0.9059       0.9059       0.9059         N/A

DISTANCE FROM SOURCE        182.00 meters


IMPACT AT THE
AMBIENT BOUNDARY   0.6816       0.6816       0.6816       0.6816         N/A

DISTANCE FROM SOURCE          1.00 meters
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Cont.

**Attachment C**

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

2656 29th Street, Suite 201
Santa Monica, CA 90405

Matt Hagemann, P.G, C.Hg.
(949) 887-9013
mhagemann@swape.com

**Matthew F. Hagemann, P.G., C.Hg., QSD, QSP**

**Geologic and Hydrogeologic Characterization**
**Investigation and Remediation Strategies**
**Litigation Support and Testifying Expert**
**Industrial Stormwater Compliance**
**CEQA Review**

**Education:**
M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

**Professional Certifications:**
California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

**Professional Experience:**
Matt has 30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring. For the past 15 years, as a founding partner with SWAPE, Matt has developed extensive client relationships and has managed complex projects that include consultation as an expert witness and a regulatory specialist, and a manager of projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2104, 2017;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

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- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

**Senior Regulatory and Litigation Support Analyst:**

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 300 environmental impact reports and negative declarations since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at more than 100 industrial facilities.
- Expert witness on numerous cases including, for example, perfluorooctanoic acid (PFOA) contamination of groundwater, MTBE litigation, air toxins at hazards at a school, CERCLA compliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.



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- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

**Executive Director:**

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

**Hydrogeology:**

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted



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public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

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**Policy:**

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9.

Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific

principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

**Geology:**

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

**Teaching:**

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt is currently a part time geology instructor at Golden West College in Huntington Beach, California where he taught from 2010 to 2014 and in 2017.

**Invited Testimony, Reports, Papers and Presentations:**

**Hagemann, M.F.**, 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

**Hagemann, M.F.**, 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

**Hagemann, M.F.**, 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

**Hagemann, M.F.**, 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).



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Cont.

**Hagemann, M.F.**, 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

**Hagemann, M.F.**, 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

**Hagemann, M.F.**, 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

**Hagemann, M.F.**, 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

**Hagemann, M.F.**, 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

**Hagemann, M.F.**, 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

**Hagemann, M.F.**, 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.



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Cont.

**Hagemann, M.F.**, 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

**Hagemann, M.F.**, 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

**Hagemann, M.F.**, 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

**Hagemann, M.F.**, and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F.** 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

**Hagemann, M.F.**, 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

**Hagemann, M.F.**, 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

**Hagemann, M.F.**, and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

**Hagemann, M.F.**, Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

**Hagemann, M. F.**, Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

**Hagemann, M.F.**, 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

**Hagemann, M.F.** and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

**Hagemann, M.F.**, 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.



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Cont.

**Hagemann, M.F.**, 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

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Cont.

**Other Experience:**

Selected as subject matter expert for the California Professional Geologist licensing examinations, 2009-2011.

**Attachment D**

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

SOIL WATER AIR PROTECTION ENTERPRISE
2656 29th Street, Suite 201
Santa Monica, California 90405
Attn: Paul Rosenfeld, Ph.D.
Mobil: (310) 795-2335
Office: (310) 452-5555
Fax: (310) 452-5550
Email: prosenfeld@swape.com

## *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**Risk Assessment & Remediation Specialist**

## Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Focus on wastewater treatment.

## Professional Experience

Dr. Rosenfeld has over 25 years of experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, industrial, military and agricultural sources, unconventional oil drilling operations, and locomotive and construction engines. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities. Dr. Rosenfeld has also successfully modeled exposure to contaminants distributed by water systems and via vapor intrusion.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, creosote, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at sites and has testified as an expert witness on numerous cases involving exposure to soil, water and air contaminants from industrial, railroad, agricultural, and military sources.

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## Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex $H_2O$ Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

## Publications:

**Rosenfeld P. E.,** Spaeth K., Hallman R., Bressler R., Smith, G., (2022) Cancer Risk and Diesel Exhaust Exposure Among Railroad Workers. *Water Air Soil Pollution.* **233,** 171.

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P.**, (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science,* 8(6), 622-632.

**Rosenfeld, P.E.** & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry,* Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences.* 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health.* 73(6), 34-46.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry.* Amsterdam: Elsevier Publishing.

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Wu, C., Tam, L., Clark, J., **Rosenfeld, P.** (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution*, 123 (17), 319-327.

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**Rosenfeld, P. E.**, Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

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**Rosenfeld, P. E. (**1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

## Presentations:

**Rosenfeld, P.E.**, "The science for Perfluorinated Chemicals (PFAS): What makes remediation so hard?" Law Seminars International, (May 9-10, 2018) 800 Fifth Avenue, Suite 101 Seattle, WA.

**Rosenfeld, P.E.,** Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society*. Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

**Rosenfeld, P.E.** (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

**Rosenfeld, P.E.** (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

**Rosenfeld, P. E.** (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.



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**Rosenfeld, P. E.** (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld P. E.** (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

**Rosenfeld P. E.** (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting*. Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition*. Lecture conducted from Boston Massachusetts.

**Paul Rosenfeld Ph.D.** (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference*. Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

**Paul Rosenfeld Ph.D.** (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

**Paul Rosenfeld Ph.D.** (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel in Irvine, California.

**Paul Rosenfeld Ph.D.** (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference*. Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

**Paul Rosenfeld Ph.D.** (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

**Paul Rosenfeld Ph.D.** (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld Ph.D.** (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

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**Paul Rosenfeld, Ph.D.** (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust.* Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives.* Lecture conducted from Parker, AZ.

**Paul Rosenfeld, Ph.D.** (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association.* Lecture conducted from Radison Hotel, Sacramento, California.

**Rosenfeld, P. E.**, Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants.*. Lecture conducted from Hyatt Regency Phoenix Arizona.

**Paul Rosenfeld, Ph.D.** (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum.* Lecture conducted from Marriott Hotel, Anaheim California.

**Paul Rosenfeld, Ph.D.** (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable.* Lecture conducted from Sacramento California.

**Rosenfeld, P.E.** and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association.* Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association.* Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association.* Lecture conducted from Vancouver Washington..

**Rosenfeld, P.E.** and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conference.* Lecture conducted from Indianapolis, Maryland.

**Rosenfeld. P.E.** (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

**Rosenfeld. P.E.** (October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

**Rosenfeld, P.E.** (2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association.* Lecture conducted from Sacramento California.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings.* Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America.* Lecture conducted from Salt Lake City Utah.



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Cont.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

**Rosenfeld, P.E.**, C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

**Rosenfeld, P.E.** C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America.* Lecture conducted from Anaheim California.

## Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board. April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering. February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

## Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.



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James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

## Deposition and/or Trial Testimony:

In the Superior Court of the State of California, County of San Bernardino
Billy Wildrick, Plaintiff vs. BNSF Railway Company
Case No. CIVDS1711810
Rosenfeld Deposition 10-17-2022

In the State Court of Bibb County, State of Georgia
Richard Hutcherson, Plaintiff vs Norfolk Southern Railway Company
Case No. 10-SCCV-092007
Rosenfeld Deposition 10-6-2022

In the Civil District Court of the Parish of Orleans, State of Louisiana
Millard Clark, Plaintiff vs. Dixie Carriers, Inc. et al.
Case No. 2020-03891
Rosenfeld Deposition 9-15-2022

In The Circuit Court of Livingston County, State of Missouri, Circuit Civil Division
Shirley Ralls, Plaintiff vs. Canadian Pacific Railway and Soo Line Railroad
Case No. 18-LV-CC0020
Rosenfeld Deposition 9-7-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jonny C. Daniels, Plaintiff vs. CSX Transportation Inc.
Case No. 20-CA-5502
Rosenfeld Deposition 9-1-2022

In The Circuit Court of St. Louis County, State of Missouri
Kieth Luke et. al. Plaintiff vs. Monsanto Company et. al.
Case No. 19SL-CC03191
Rosenfeld Deposition 8-25-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jeffery S. Lamotte, Plaintiff vs. CSX Transportation Inc.
Case No. NO. 20-CA-0049
Rosenfeld Deposition 8-22-2022

In State of Minnesota District Court, County of St. Louis Sixth Judicial District
Greg Bean, Plaintiff vs. Soo Line Railroad Company
Case No. 69-DU-CV-21-760
Rosenfeld Deposition 8-17-2022

In United States District Court Western District of Washington at Tacoma, Washington
John D. Fitzgerald Plaintiff vs. BNSF
Case No. 3:21-cv-05288-RJB
Rosenfeld Deposition 8-11-2022



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In Circuit Court of the Sixth Judicial Circuit, Macon Illinois
Rocky Bennyhoff Plaintiff vs. Norfolk Southern
Case No. 20-L-56
Rosenfeld Deposition 8-3-2022

In Court of Common Pleas, Hamilton County Ohio
Joe Briggins Plaintiff vs. CSX
Case No. A2004464
Rosenfeld Deposition 6-17-2022

In the Superior Court of the State of California, County of Kern
George LaFazia vs. BNSF Railway Company.
Case No. BCV-19-103087
Rosenfeld Deposition 5-17-2022

In the Circuit Court of Cook County Illinois
Bobby Earles vs. Penn Central et. al.
Case No. 2020-L-000550
Rosenfeld Deposition 4-16-2022

In United States District Court Easter District of Florida
Albert Hartman Plaintiff vs. Illinois Central
Case No. 2:20-cv-1633
Rosenfeld Deposition 4-4-2022

In the Circuit Court of the 4th Judicial Circuit, in and For Duval County, Florida
Barbara Steele vs. CSX Transportation
Case No.16-219-Ca-008796
Rosenfeld Deposition 3-15-2022

In United States District Court Easter District of New York
Romano et al. vs. Northrup Grumman Corporation
Case No. 16-cv-5760
Rosenfeld Deposition 3-10-2022

In the Circuit Court of Cook County Illinois
Linda Benjamin vs. Illinois Central
Case No. No. 2019 L 007599
Rosenfeld Deposition 1-26-2022

In the Circuit Court of Cook County Illinois
Donald Smith vs. Illinois Central
Case No. No. 2019 L 003426
Rosenfeld Deposition 1-24-2022

In the Circuit Court of Cook County Illinois
Jan Holeman vs. BNSF
Case No. 2019 L 000675
Rosenfeld Deposition 1-18-2022

In the State Court of Bibb County State of Georgia
Dwayne B. Garrett vs. Norfolk Southern
Case No. 20-SCCV-091232
Rosenfeld Deposition 11-10-2021



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In the Circuit Court of Cook County Illinois
Joseph Ruepke vs. BNSF
Case No. 2019 L 007730
Rosenfeld Deposition 11-5-2021

In the United States District Court For the District of Nebraska
Steven Gillett vs. BNSF
Case No. 4:20-cv-03120
Rosenfeld Deposition 10-28-2021

In the Montana Thirteenth District Court of Yellowstone County
James Eadus vs. Soo Line Railroad and BNSF
Case No. DV 19-1056
Rosenfeld Deposition 10-21-2021

In the Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al.cvs. Cerro Flow Products, Inc.
Case No. 0i9-L-2295
Rosenfeld Deposition 5-14-2021
Trial October 8-4-2021

In the Circuit Court of Cook County Illinois
Joseph Rafferty vs. Consolidated Rail Corporation and National Railroad Passenger Corporation d/b/a AMTRAK,
Case No. 18-L-6845
Rosenfeld Deposition 6-28-2021

In the United States District Court For the Northern District of Illinois
Theresa Romcoe vs. Northeast Illinois Regional Commuter Railroad Corporation d/b/a METRA Rail
Case No. 17-cv-8517
Rosenfeld Deposition 5-25-2021

In the Superior Court of the State of Arizona In and For the Cunty of Maricopa
Mary Tryon et al. vs. The City of Pheonix v. Cox Cactus Farm, L.L.C., Utah Shelter Systems, Inc.
Case No. CV20127-094749
Rosenfeld Deposition 5-7-2021

In the United States District Court for the Eastern District of Texas Beaumont Division
Robinson, Jeremy et al vs. CNA Insurance Company et al.
Case No. 1:17-cv-000508
Rosenfeld Deposition 3-25-2021

In the Superior Court of the State of California, County of San Bernardino
Gary Garner, Personal Representative for the Estate of Melvin Garner vs. BNSF Railway Company.
Case No. 1720288
Rosenfeld Deposition 2-23-2021

In the Superior Court of the State of California, County of Los Angeles, Spring Street Courthouse
Benny M Rodriguez vs. Union Pacific Railroad, A Corporation, et al.
Case No. 18STCV01162
Rosenfeld Deposition 12-23-2020

In the Circuit Court of Jackson County, Missouri
Karen Cornwell, Plaintiff, vs. Marathon Petroleum, LP, Defendant.
Case No. 1716-CV10006
Rosenfeld Deposition 8-30-2019



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In the United States District Court For The District of New Jersey
Duarte et al, Plaintiffs, vs. United States Metals Refining Company et. al. Defendant.
Case No. 2:17-cv-01624-ES-SCM
Rosenfeld Deposition 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" Defendant.
Case No. 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No. BC615636
Rosenfeld Deposition 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No. BC646857
Rosenfeld Deposition 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiffs vs. The 3M Company et al., Defendants
Case No. 1:16-cv-02531-RBJ
Rosenfeld Deposition 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No. 1923
Rosenfeld Deposition 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintifs vs. Chevron Corporation, et al., Defendants
Cause No. C12-01481
Rosenfeld Deposition 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition 8-23-2017

In United States District Court For The Southern District of Mississippi
Guy Manuel vs. The BP Exploration et al., Defendants
Case No. 1:19-cv-00315-RHW
Rosenfeld Deposition 4-22-2020

In The Superior Court of the State of California, For The County of Los Angeles
Warm Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No. LC102019 (c/w BC582154)
Rosenfeld Deposition 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., Plaintiffs, vs. Meritor Inc., et al., Defendants
Case No. 4:16-cv-52-DMB-JVM
Rosenfeld Deposition July 2017



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In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No. RG14711115
Rosenfeld Deposition September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No. LALA002187
Rosenfeld Deposition August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action No. 14-C-30000
Rosenfeld Deposition June 2015

In The Iowa District Court for Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No. 4980
Rosenfeld Deposition May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case No. CACE07030358 (26)
Rosenfeld Deposition December 2014

In the County Court of Dallas County Texas
Lisa Parr et al, Plaintiff, vs. Aruba et al, Defendant.
Case No. cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., Plaintiffs, vs. Republic Services, Inc., et al., Defendants
Case No. 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition October 2012

In the United States District Court for the Middle District of Alabama, Northern Division
James K. Benefield, et al., Plaintiffs, vs. International Paper Company, Defendant.
Civil Action No. 2:09-cv-232-WHA-TFM
Rosenfeld Deposition July 2010, June 2011

In the Circuit Court of Jefferson County Alabama
Jacanette Moss Anthony, et al., Plaintiffs, vs. Drummond Company Inc., et al., Defendants
Civil Action No. CV 2008-2076
Rosenfeld Deposition September 2010

In the United States District Court, Western District Lafayette Division
Ackle et al., Plaintiffs, vs. Citgo Petroleum Corporation, et al., Defendants.
Case No. 2:07CV1052
Rosenfeld Deposition July 2009



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Cont.

# Response to Comment Letter O5

Care CA
August 20, 2024

**O5-1** The City acknowledges the comment as an introduction to comments that follow. This comment is included in the Final MND for review and consideration by the decision-makers prior to a final decision on the project. No further response is required.

**O5-2** The comment restates that the MND was circulated for public review from March 11, 2024, though April 9, 2024, and that Care CA has previously submitted comments stating that the MND lacks support for the conclusions and mitigation measures regarding potential impacts related to public health, air quality, energy, and transportation. The comment also states that the HRA does not adequately analyze the significant impacts regarding potential health risks. Additionally, the comment states that the recirculated MND failed to address the previous Care CA comments. Please refer to Comment Letter O2, where the previous Care CA comments were addressed. The Care CA letter and responses will be available for the public review in the Final MND.

**O5-3** The comment summarizes comments to follow, concluding that the MND does not comply with CEQA and states that an EIR is required. Additionally, the comment indicates that additional comments are included in the comment letter from Jack Meighan and Paul Rosenfeld which require response. The comment does not identify specific issues with the adequacy of the MND. No further response is required. The comments from Jack Meighan are addressed in Response to Comments O5-19 through O5-27 and the comments from Paul Rosenfeld are addressed in Response to Comments O5-28 through O5-35.

**O5-4** The comment provides an introduction to CARE CA. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O5-5** The comment provides background information regarding CEQA and the requirements for an EIR and MND. The comment states that the MND lacks basic information regarding potentially significant impacts and has unsupported conclusions. The comment states that there is evidence that the project may result in potentially significant impacts that are not reduced to less than significant with the proposed mitigation measures, calling for an EIR. The project will not have a significant effect on the environment with the proposed mitigation measures, as discussed in the Initial Study/MND and an EIR is not required. The detailed concerns about the adequacy of analysis and mitigation measures are addressed in Responses to Comments O5-6 through O5-18.

**O5-6** The comment summarizes the conclusions from the MND related to construction noise impacts. The comment further states that the NIOSH threshold referenced in the MND does not reflect consideration of the ability for surrounding residence's ability to work from home, relax, or converse from home during construction activities and should not only rely on thresholds that would trigger hearing loss. Please refer to Response to Comment O1-14

**O5-7** The comment states that the 85 dBA noise construction threshold is not appropriate because it fails to reflect if the project would result generation of an increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, etc. The comment further

summarizes court cases where the court deemed that there was a need to analyze the magnitude of change in noise level and the use of an absolute noise level. Please refer to Response to Comment O1-14.

**05-8** The comment states that the MND's threshold does not analyze both the increase in noise level and the absolute noise level, and an EIR must be prepared. The updated MND analyzes the increase in noise level and shows that the temporary increase in construction noise will be less than the typically-used 20 dBA Leq limit.

**05-9** The comment states that project construction activities would result in a significant impact related to construction resources on noise sensitive land uses, specifically the surrounding residences. The comment states that the ambient level at the nearest sensitive receptor is below 60 dBA and therefore an increase of 5dBA in noise would be significant. This comment begins by referencing operational noise standards and comes to its conclusions based on construction noise level predictions. Construction noise criteria are not the same as operational noise criteria. Operational noise analyses were performed and resulted in showing a less than significant impact. Also, the construction noise analysis has been updated (and included as Appendix E-2) using the FHWA RCNM model (as suggested in the comment) and the calculated results still show a less than significant impact. In any case, construction activities are temporary and are evaluated by different standards. These clarifications do not change the analyzed impacts or findings in the MND and do not represent new information or significant changes that alter the conclusions of the MND.

**05-10** The comment states that the MND states that the vibration impacts from jackhammer and trucks would be potentially significant, however, MM-NOI-1 does not apply to jackhammers or trucks and therefore does not mitigate vibration impacts from jackhammers. The construction vibration analyses (included as Appendix E-2) have been updated to include jackhammers, trucks, and vibratory rollers, and MM-NOI-1 has been revised to include those pieces of equipment. Further, the buffer included in MM-NOI-1 has been increase from 50 feet to 75 feet. These clarifications do not change the analyzed impacts or findings in the MND and do not represent new information or significant changes that alter the conclusions of the MND.

**05-11** The comment states that the noise study does not consider the vibration impacts of vibratory rollers, and impacts are potentially significant. The updated construction vibration analyses includes vibratory rollers and is included as Appendix E-2. These clarifications do not change the analyzed impacts or findings in the MND and do not represent new information or significant changes that alter the conclusions of the MND.

**05-12** The comment states that the MND does not address or mitigate noise impacts from HVAC systems. The comment status that the assumptions for the operation time per hour is longer, and would result in potentially significant impacts. The author of the noise and vibration study report (Urban Crossroads) states that they have tested many HVAC systems and spoken with many manufacturers about this, and they have concluded that an HVAC unit would fail to function in a year if it were to run at 100 percent all the time. They have empirical measurements on hot days and the typical run time has been found to be 45 minutes or less during daytime hours and 30 minutes or less at night.

**05-13** The comment states that the MND does not address noise impacts related to blasting associated with construction of utilities. No blasting is proposed as a part of the project and therefore was not analyzed.

**05-14** The comment states that the MND's HRA does not include a sufficient analysis on construction and operation. The comment also summarizes the findings and data from SWAPE, prepared for the project's operational usage concluding that the health risks result in significant impact and recommends the MND should be analyzed and mitigated as an EIR. The data and findings from SWAPE are addressed in Responses to Comments 05-28 through 05-35.

**05-15** The comment incorrectly states that the MND does not evaluate the feasibility of obtaining any equipment that would potentially be used as an alternative method under Tier 4. As described in MM-AQ-1, Documentation using industry-standard emission estimation methodologies shall be furnished to the City demonstrating that estimated project-generated construction emissions would not exceed the applicable SCAQMD cancer risk threshold with the alternate construction method(s). If the documentation demonstrates that project-generated construction emissions will remain below the applicable SCAQMD cancer risk threshold, then the City may approve the alternate construction method(s), at the City's discretion. This analysis would only be required if the project would occur if the project applicant would not be able to use Tier 4 equipment. Further, a performance standard (SCAQMD cancer risk threshold), has been identified in the mitigation measure.

**05-16** The comment states that MM-AQ-1 improperly defers mitigation. Please refer to Response to Comment 05-15.

**05-17** The comment states that tier 4 equipment has limited availability and the alternative construction methods need to be identified in the IS/MND. The comment further states that MM-AQ-1 fails to identify a specific performance criteria and fails to analyze the combined impacts of TACS during for construction and operational phases.

The need for alternative construction methods would only occur if Tier 4 were not to be available. If this were the case, it is not known the exact mix of construction vehicles that would be available, in which case, MM-AQ-1 relies on the applicable SCAQMD cancer risk threshold. Further, the project would not include any overlap between construction and operation.

**05-18** The comment provides a conclusion to the detailed comments provided in the comment letter. The comment concludes that the project may have significant, unmitigated impacts. The comment calls for the preparation of an EIR. As discussed in the Responses to Comments 02-5 through 02-20 and 05-6 through 05-17, the MND complies with CEQA, and impacts are less than significant with the implementation of the proposed mitigation measures. Therefore, EIR is not required.

**05-19** The comment provides a summary of the project description and provides an introduction to Wilson Ihrig. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**05-20** The comment provides background information on potential health effects related to noise. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**05-21** The comment states that all sources generating significant vibration levels were not included in the analysis. Please refer to the Response to Comment for 05-10.

05-22 The comment states that the construction noise criteria used for the impact analyses are not appropriate. Please refer to the Response to Comment for O1-14.

05-23 The comment states that vibratory rollers were not considered in the construction vibration analyses. Please refer to the Response to Comment for O5-10.

05-24 The comment states that the assumptions used for the HVAC system analysis were not appropriate. Please refer to the Response to Comment for O5-11.

05-25 The comment includes concluding remarks and reiterates a summary of concerns regarding noise. The comment also states the noise analysis is inaccurate and calls for the MND to re-elevate the noise analysis. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

05-26 The comment includes the roadway construction noise model conducted by Jack Meighan. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

05-27 The comment includes the resume of Jack Meighan. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

05-28 The comment provides a summary of the project description and is an introduction to the comments that follow. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

05-29 The comment summarizes the detailed comments that follow. The comment states that the MND does not evaluate the health risk impacts and emissions and an EIR should be prepared to assess and mitigate these effects. Please refer to Responses to Comments O2-25 through O2-28 and O5-30 through O5-34.

05-30 The comment states that the evaluation of potential health risks and conclusion of a less than significant impact is incorrect, and the comment introduces four reasons for this. The detailed reasons are addressed in Responses to Comments O2-25 through O2-27 and O5-31 through O5-33.

05-31 The comment states that the MND does not include a quantified construction health risk analysis and does not connect the project's construction TAC emissions to the potential health risk of nearby receptors, which makes the project inconsistent with CEQA. Please refer to Response to Comments O2-25 where these concerns are addressed.

05-32 The comment states that the MND does not analyze cancer risks from combined construction and operation of the project and does not sum each age bin when assessing cancer risks. The comments states that an updated analysis is needed to accurately quantify the risks. Please refer to Response to Comments O2-27 where these concerns are addressed.

05-33 The comment incorrectly states that the MND does not evaluate the feasibility of obtaining any equipment that would potentially be used as an alternative method under Tier 4. Please refer to Response to comment O5-15.

**05-34** The comment provides background information on AERSCREEN, a screening-level risk assessment, and describes the methodology and inputs used to prepare a preliminary health risk analysis. The comment states that the cancer risk for the construction and operation of the project, is approximately 42.4 in one million which exceeds the SCAQMD threshold of 10 in one million and results in a potential significant impact not addressed by the MND. The comment clarifies that the results from AERSCREEN represent a screening-level analysis which warrants further evaluation and an EIR. Please refer to Response to Comments O2-28 where these concerns are addressed.

**05-35** The comment is a disclaimer and provides concluding remarks. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**05-36** The comment includes HRA Calculation. The comment does not identify specific issues with the adequacy of the MND. No further response is required

**05-37** The comment includes AERSCREEN output files, The comment does not identify specific issues with the adequacy of the MND. No further response is required

**05-38** The comment includes the resume of Matthew F. Hagemann, P.G., C.Hg., QSD, QSP. The comment does not identify specific issues with the adequacy of the MND. No further response is required

**05-39** The comment includes the resume of Paul Rosenfeld, Ph.D. The comment does not identify specific issues with the adequacy of the MND. No further response is required

INTENTIONALLY LEFT BLANK

**ATTACHMENT 4**

**CITY OF RANCHO MIRAGE**
69-825 Highway 111, Rancho Mirage, CA 92270-2898 (760) 324-4511/328-2266

## NOTICE OF DETERMINATION AND NEGATIVE DECLARATION

To: ☒ State Clearinghouse
1400 Tenth Street
Sacramento, CA 95814

☒ Chief Deputy County Clerk
3470 12th Street
Riverside, CA 92501

**Project Title/Case Nos**. Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21-0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case Number TPM23-0002 (TPM38768) – Ritz Carlton Rancho Mirage

**Applicant:** Kam Sang Company on behalf of Newage Rancho Mirage LLC/ Ritz Carlton

**Project Location:** The project site (68900 Frank Sinatra Drive) occurs along Frank Sinatra Drive approximately 0.85 miles southwest of the intersection with Highway 111 within the City of Rancho Mirage (APNs: 689-330-026, -028, -031, -032, -034; 689-020-012, -014; & 689-331-001, -018). Project size is 35.07 acres (excluding previously approved Tennis Villas Site 7.96 acres on APN:689-330-011).

**Project Description:** Consideration to construct the Ritz Carlton residences which is a modification to previously approved entitlements consisting of 106 condo units; event space and room for amenities; subterranean parking structure; and additional residential parking spaces. Additionally, the Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. As part of the proposed project, a General Plan Zoning Map Amendment is proposed to amend the Mountain Reserve (MR) designation for the project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014). A Tentative Parcel Map (TPM38768) proposes to establish three parcels (excluding Sky Mesa area) with Parcel 3 of the map containing condo units (Ritz Carlton residences). A Major Modification is proposed for modifications to the prior 2006 entitlements by providing updated engineering, architectural, and landscaping plans for review and also includes new development with the Sky Mesa recreational area. Lastly, a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment") is proposed. Please note that the proposed project (excluding Sky Mesa) is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums.

**Notice of Determination**

Filing of Notice of Determination in compliance with Public Resources Code, Section 21108 or 21152. The City of Rancho Mirage has approved the above described project on _____and has determined:

1. The project ☐will ☒ will not have a significant effect/impact on the environment.
2. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
3. ☒ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
4. Mitigation measures ☒ were ☐ were not made conditions of approval for the project.
5. A mitigation reporting or monitoring plan ☒ was ☐ was not adopted for this project.
6. A Statement of Overriding Considerations ☐ was ☒ was not adopted for this project.
7. Findings ☒ were ☐ were not made pursuant to the provisions of CEQA.

The City Council adopted the following Finding: The proposed project has been reviewed in compliance with the provisions of the California Environmental Quality Act (CEQA). This is to certify that the project file and record of project approval are available to the general public at: City of Rancho Mirage, 69-825 Highway 111, Rancho Mirage, CA 92270.

**Mitigated Negative Declaration - Rancho Mirage City Council**

Date: _____

_____
Ben Torres
Planning Manager

I hereby certify that the City of Rancho Mirage has made the above findings of fact and that based upon the Mitigated Negative Declaration and hearing record the project will not have a significant effect on the environment.

Date: _____

☒ Lead Agency ☐ Responsible Agency

_____
Ben Torres
Planning Manager

# CITY OF RANCHO MIRAGE

## PLANNING COMMISSION MEETING
## THURSDAY, JANUARY 9, 2025 - 2:00 P.M.

# MINUTES

Meeting Location:
City of Rancho Mirage
City Hall - Council Chamber
69-825 Highway 111
Rancho Mirage, CA 92270

**CALL TO ORDER - 2:01 P.M.**

a) Flag Salute: Led by Commissioner Curran.
b) Roll Call: Bryant, Curran, Grey, Vice Chair Chanter, Chair Agostini – All Present.

**COMMISSIONER COMMENTS**

Commissioner Grey noted the flags were at half-mast to honor former President Jimmy Carter. He also addressed the fires in Los Angeles County and shared a personal story about a coworker who evacuated and lost his home.

Vice Chair Chanter shared her experience with the 2017 Tubbs fire in Northern California, where over 5,000 homes were lost. She emphasized the importance of community support during such difficult times. She also thanked City staff for their hard work in preparing the meeting, noting the time spent reviewing the agenda.

Chair Agostini echoed the previous remarks and expressed appreciation for staff's efforts in preparing the presentation. He thanked everyone for their time and extended a warm welcome to the year 2025. He also shared his heartfelt sympathy for all the families and victims affected by the fires.

Commissioner Bryant commented that he supported the City Council's decision to adopt abbreviated minutes for meetings and noted that full meeting videos would be available online 24/7. Commissioner Bryant explained that Planning Commission members volunteered their time and faced significant preparation with today's agenda including 4,000 to 4,500 pages. He thanked staff for their support and emphasized the Commissioners' shared goal of improving the quality of life for residents and fostering a vibrant business community.

**NON-AGENDA PUBLIC COMMENTS**

The following individual provided non-agenda public comments: Brad Anderson.

**APPROVAL OF MINUTES** – December 12, 2024, Regular Meeting.

**MOVED/SECONDED BY GREY/CHANTER TO APPROVE THE DECEMBER 12, 2024, REGULAR MEETING MINUTES AS PRESENTED. MOTION CARRIED 5/0.**

## ACTION ITEM

1. **Periodic Review of Development Agreements:** Rancho Mirage Self Storage, Westin Vacation Club, Makena (Stonebridge), Del Webb, Ferrari, The Residences at Rancho Mirage Country Club, Section 31 Specific Plan, In-N-Out Burger, Tentative Tract Map 36620, Porcupine Wellness Center, Rancho Mirage Auto Center, Eisenhower MCA, and Desert Island Hotel.

Colin Kirkpatrick, City Attorney provided a brief summary of development agreements.

Lezlee Perez, Assistant Planner, presented the staff report.

The following individuals provided public comments: Mark Coons, Rob Kovacs, Mike Massoodnia, and Tim Adams.

A discussion ensued.

**MOVED/SECONDED BY GREY/CURRAN TO RECOMMEND THAT THE CITY COUNCIL FIND THAT THE SUBJECT DEVELOPERS AND/OR PROPERTY OWNERS ARE CURRENTLY IN COMPLIANCE WITH THE TERMS AND CONDITIONS OF THE FOLLOWING THIRTEEN (13) DEVELOPMENT AGREEMENTS: RANCHO MIRAGE SELF STORAGE, WESTIN VACATION CLUB, MAKENA (STONEBRIDGE), DEL WEBB, FERRARI, THE RESIDENCES AT RANCHO MIRAGE COUNTRY CLUB, SECTION 31 SPECIFIC PLAN, IN-N-OUT BURGER, TENTATIVE TRACT MAP 36620, PORCUPINE WELLNESS CENTER, RANCHO MIRAGE AUTO CENTER, EISENHOWER MCA, AND DESERT ISLAND HOTEL.**

**MOTION CARRIED 5/0.**

## PUBLIC HEARING

2. **Priviere Villas - Environmental Assessment Case No. EA24-0001; General Plan Zoning Map Amendment Case No. GPZMA24-0001; Tentative Tract Map Case No. TTM24-0001 (TTM38868); and Preliminary Development Plan Case No. PDP24-0001.** Applicant: MSA Consulting, Inc. on behalf of Palm Coast Modular. Consideration of a residential community, consisting of 28 residential lots, accessory dwelling units, and associated improvements such as retention areas, paved drive aisles, and two points of access. The 10.08-acre project site currently consists of vacant undeveloped land located east of Via Josefina and south of Ginger Rogers Road. The primary access point will be on Via Josefina. The project includes a General Plan Zoning Map Amendment to amend the project General Plan and Zoning designation from Very Low Density (R-L-2) and Medium Density Residential (R-M) designations to Low Density Residential 3 du/ac max. (R-L-3). APNs: 685-100-007 & 685-110-017.

   A. Consider the recommendation for the Planning Commission to adopt Resolution No. 2025-PC-(Next-in-Order), that the City Council take the following actions:

      1. Adopt Resolution No. 2025-(Next-in-Order) approving and adopting the Mitigation Monitoring and Reporting Program and Mitigated Negative Declaration (SCH#2024101279) for the Proposed Project based on Environmental Assessment Case No. EA24-0001.

      2. Adopt Resolution No. 2025-(Next-in-Order) approving General Plan Zoning Map Amendment (GPZMA24-0001), to change the underlying zoning designation of the

Subject Property from Very Low Density (R-L-2) and Medium Density Residential (R-M) designations to Low Density Residential 3 du/ac max. (R-L-3), Tentative Tract Map No. TTM24-0001 (TTM38868), and Preliminary Development Plan Case No. PDP24-0001.

Pilar Fløtterud, Senior Planner, presented the staff report.

Christopher Brizuela from MSA Consulting, Inc. and Adam Nester, CEO of Palm Coast Modular, made a presentation.

A discussion ensued.

No public testimony was provided.

**MOVED/SECONDED BY CHANTER/GREY TO ADOPT RESOLUTION NO. 2025-PC-(NEXT-IN ORDER) RECOMMENDING THAT THE CITY COUNCIL TAKE THE FOLLOWING ACTIONS:**

1. **ADOPT RESOLUTION NO. 2025-(NEXT-IN-ORDER) APPROVING AND ADOPTING THE MITIGATION MONITORING AND REPORTING PROGRAM AND MITIGATED NEGATIVE DECLARATION (SCH#2024101279) FOR THE PROPOSED PROJECT BASED ON ENVIRONMENTAL ASSESSMENT CASE NO. EA24-0001.**

2. **ADOPT RESOLUTION NO. 2025-(NEXT-IN-ORDER) APPROVING GENERAL PLAN ZONING MAP AMENDMENT (GPZMA24-0001), TO CHANGE THE UNDERLYING ZONING DESIGNATION OF THE SUBJECT PROPERTY FROM VERY LOW DENSITY (R-L-2) AND MEDIUM DENSITY RESIDENTIAL (R-M) DESIGNATIONS TO LOW DENSITY RESIDENTIAL 3 DU/AC MAX. (R-L-3), TENTATIVE TRACT MAP NO. TTM24-0001 (TTM38868), AND PRELIMINARY DEVELOPMENT PLAN CASE NO. PDP24-0001.**

**MOTION CARRIED 5/0.**

3. **Ritz Carlton Rancho Mirage – Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21 0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case Number TPM23-0002 (TPM38768)**. Applicant: Kam Sang Company on behalf of Newage Rancho Mirage LLC/ Ritz Carlton. Consideration to construct the Ritz Carlton residences which is a modification to previously approved entitlements consisting of 106 condo units; event space and room for amenities; subterranean parking structure; and additional residential parking spaces. Additionally, the Sky Mesa recreational area will include a restaurant, additional lawn event space and pool area. As part of the proposed project, a General Plan Zoning Map Amendment is proposed to amend the Mountain Reserve (MR) designation for the project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014). A Tentative Parcel Map (TPM38768) proposes to establish three parcels (excluding Sky Mesa area) with Parcel 3 of the map containing condo units (Ritz Carlton residences). A Major Modification is proposed for modifications to the prior 2006 entitlements by providing updated engineering, architectural, and landscaping plans for review and also includes new development with the Sky Mesa recreational area. Lastly, a 10$^{th}$ Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10$^{th}$ Amendment") is proposed. Please note that the proposed project (excluding Sky Mesa) is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums. The 35.07acre project site (68900 Frank Sinatra Drive) occurs along Frank Sinatra Drive approximately 0.85 miles southwest of the intersection with Highway 111 within

the City of Rancho Mirage (APNs: 689-330-026, -028, -031, -032, -034; 689-020-012, -014; & 689-331-001, -018).

A. Consider the recommendation for the Planning Commission to adopt Resolution No. 2025-PC-(Next-in-Order), that the City Council take the following actions:

   1. Adopt Resolution No. 2025-(Next-in-Order), approving the Mitigation Monitoring and Reporting Program and Mitigated Negative Declaration (SCH# 2024030267) for the Proposed Project based on Environmental Assessment Case No. EA21-0002.

   2. Adopt Resolution No. 2025-(Next-in-Order), approving General Plan Zoning Map Amendment (GPZMA21-0001), Tentative Parcel Map Case No. TPM23-0002, & Major Modification Case No. MOD21-0004.

   3. Introduce and adopt Ordinance (Next-In-Order), approving Development Agreement Amendment (DA21-0002).

Ben Torres, Planning Manager, presented the staff report.

The following individuals provided public testimony: Louie Lopez, John Sisley, Rob Ramos, Zack Cohoon, Joseph Barrera, Josh Gastelum, Omar Cobian, Zach Strasters, Aidan Marshall, and Kramer Kristin Greenwood.

A discussion ensued.

**MOVED/SECONDED BY GREY/CHANTER TO CONTINUE THE ITEM TO THE 02/27/2025 PLANNING COMMISSION MEETING. MOTION FAILED 2/3.**

**MOVED/SECONDED BY CURRAN/BRYANT TO ADOPT RESOLUTION NO. 2025-PC-(NEXT IN ORDER) RECOMMENDING THAT THE CITY COUNCIL TAKE THE FOLLOWING ACTIONS:**

1. **ADOPT RESOLUTION NO. 2025-(NEXT-IN-ORDER), APPROVING THE MITIGATION MONITORING AND REPORTING PROGRAM AND MITIGATED NEGATIVE DECLARATION (SCH# 2024030267) FOR THE PROPOSED PROJECT BASED ON ENVIRONMENTAL ASSESSMENT CASE NO. EA21-0002.**

2. **ADOPT RESOLUTION NO. 2025-(NEXT-IN-ORDER), APPROVING GENERAL PLAN ZONING MAP AMENDMENT (GPZMA21-0001), TENTATIVE PARCEL MAP CASE NO. TPM23-0002, & MAJOR MODIFICATION CASE NO. MOD21-0004.**

3. **INTRODUCE AND ADOPT ORDINANCE (NEXT-IN-ORDER), APPROVING DEVELOPMENT AGREEMENT AMENDMENT (DA21-0002).**

**MOTION CARRIED 4/1 WITH COMMISSIONER GREY ABSTAINED.**

## ADJOURNMENT

With no further business to consider, the Planning Commission meeting was adjourned at 4:47 P.M.

**Prepared by:** Deanna Mendoza, Development Services Technician

**Date Approved by Planning Commission: 2/13/2025**

# CITY OF RANCHO MIRAGE

## ARCHITECTURAL REVIEW BOARD
**MONDAY, FEBRUARY 27, 2023**

**12:30 P.M.**

# MINUTES

City of Rancho Mirage
City Hall – Council Chambers
69-825 Highway 111
Rancho Mirage, CA 92270

**CALL TO ORDER – 12:30 P.M.**

**Roll Call:** Doczi, Greenwood, Lockyer, Milander, O'Donnell, Patel, and Sanborn.

Doczi, Greenwood, Milander, O'Donnell, Patel, and Sanborn **– Present**

Lockyer **– Absent**

Ben Torres, Planning Manager, informed the board that Board Member Lockyer will be resigning from the Architectural Review Board effective March 1, 2023.

**MOVED/SECONDED BY GREENWOOD/O'DONNELL TO EXCUSE BOARD MEMBER LOCKYER'S ABSENCE. MOTION CARRIED 6/0.**

**APPROVAL OF MINUTES** – January 23, 2023

**MOVED/SECONDED BY GREENWOOD/MILANDER TO APPROVE THE JANUARY 23, 2023 REGULAR MEETING MINUTES AS PRESENTED.**

**MOTION CARRIED 6/0.**

**ACTION ITEM**

1. Review and recommend to the City Council the Architectural Review Board annual report for 2022.

Ben Torres, Planning Manager, presented the staff report.

Public comment: - None.

**MOVED/SECONDED BY GREENWOOD/PATEL TO RECOMMEND THAT THE CITY COUNCIL RECEIVE AND FILE THE 2022 ARCHITECTURAL REVIEW BOARD REPORT. A ROLL CALL VOTE WAS TAKEN AND MOTION CARRIED 6/0.**

**DISCUSSION ITEM**

2. **Environmental Assessment Case No. EA22-0012, General Plan Zoning Map Amendment Case No. GPZMA22-0002, Specific Plan Amendment Case No. SPA22-0002, Tentative Parcel Map Case No. TPM22-0004, Development Agreement Case No. DA22-0003, and Preliminary Development Plan Case No. PDP22-0001** – Desert Island Hotel. The Desert Island Specific Plan Amendment will occupy 17.2 acres within the existing Desert Island development. A General Plan/Zoning Map Amendment is to amend the underlying designation of Private Open Space (OS/PV) to Resort Hotel (Rs-H) for 10.5 acres of the existing Desert Island golf course for the development of a new 42-key boutique hotel and 11 private hotel residences along with passive outdoor gathering areas, tennis, pool, café, and yoga amenities. A new golf training park and new maintenance building will be built to replace the existing driving range and old maintenance building being displaced by the hotel project. Located south of Frank Sinatra Drive and west of Island Drive on a portion of the Desert Island golf course (APNs:688-040-001; 688-050-002; -005; 688-060-008; - 023)

Pilar Lopez, Senior Planner, presented the staff report.

Chair O'Donnell opened the meeting to board questions for staff.

Board Member Greenwood asked what the relationship with the HOA is? What is the oversight that Desert Island Homeowner's Association has and what review has happened?

Ms. Lopez stated that the project has received HOA approval, which is on file with the Planning Division and the applicant and team have met with the residents of the community.

Board Member Greenwood commented on the roofing component of the two-story building and expressed his concerns. He asked for confirmation that the existing Clubhouse will not service or provided any function to the hotel.

Ms. Lopez stated that the applicant has expressed that clubhouse staff would be crossed trained.

Board Member Greenwood asked in what ways would the clubhouse staff assist the hotel functions.

Ms. Lopez deferred the operational question to the applicant.

Chair O'Donnell asked if any other board member had further questions for staff.

Board Member Doczi asked about the access gate and when it would be open.

Ms. Lopez explained the main gate would remain open during the hotel's operation.

Board Member Doczi, asked for an elaboration the hotel entrance, circulation, path of travel, and turnaround point.

Ms. Lopez deferred to the applicant.

Chair O'Donnell asked the applicant to make a presentation on the revised project.

Paul Depalatis, the applicant's representative, further clarified the comments made earlier and deferred to the project architect regarding the architectural questions. Mr. Depalatis further explained the project components and their proposed location and the changes that had been made to the project with highlighted details.

James Myer, the project architect, answered the board members' questions and explained the design philosophy is for minimalistic architecture. The intent is to maximize the open space and landscaping he emphasized that the residences and hotel be densified to maximize the natural landscaping. He stated that they have not contracted a mechanical engineer but would internalize everything to try to have a minimal footprint.

Chair O'Donnell asked if any other board member had any other questions of the applicant?

Board Member Doczi asked how the pool area's fencing would be proposed.

Mark Lenning, the project landscape architect, explained the design of the pool area.

Majna Dukic, Development Services Director, added that the project would have to comply with all safety codes for both the commercial and residential pools.

Chair O'Donnell asked if anyone else had questions for the applicant.

Board Member Greenwood commented that the site is a commercial development that would need to comply with ADA standards and asked for clarification on how these standards are being met.

Mr. Myers explained the ADA design and mechanical plan design.

Ms. Dukic added that if that is something that the board is concerned about, the board can direct staff to ensure that all mechanical equipment is screened with the final development plan if the project is approved. If there are changes that go outside of the approved boundaries, then either a minor modification or a major modification application would be required.

Mr. Myers addressed the mechanical concerns. He also explained the reasoning behind the vision and articulation of the project design. He discussed the different material types such as wood, stone, and color elements.

Board Member Greenwood asked about the operations, support functions, and programmatic functions of the hotel.

Mr. Myers explained the concept of the support functions.

Board Member Doczi asked applicant to explain the landscape areas between the Grand Aisle parking area and the hotel entrances.

Mr. Lenning, project landscape architect described his team's approach to the landscaping design.

Chair O'Donnell asked the architect about the parking. He asked if Mr. Myers had tried working on different design overlay to move the Grand Aisle parking to a different location in order to create a pedestrian-oriented instead of vehicle-oriented design.

Mr. Myers explained that the concept of the grand isle and it was meant to celebrate the concept.

Chair O'Donnell commented he is struggling that this could be a landscape court and layers of landscape elements and summarized his concerns regarding the drive aisle design.

Miguel Nelson, project applicant and owner, described the hotel's open space and how it enhances of the quality of this area.

Chair O'Donnell opened the meeting to board discussion.

Board Member Milander asked the is the next process for the project.

Ms. Lopez answered there are three options. Option 1, the project can be recommended approval by the ARB as is and go to the Planning Commission, option 2 the project can be recommended approval by the ARB with conditions of approval that have to be met before the FDP is approved and then go to the Planning Commission with those conditions, or option 3, the project comes back to the ARB for further review.

Board Member Milander asked if the FDP would come in front of the board.

Ms. Lopez answered no, the FDP is approved at staff level.

Mr. Torres answered for clarification the FDP is the full construction submittal. Planning staff reviews it for conformance of the final approved plans and also final conditions of approval to confirm that all conditions are being responded to as well.

Board Member Doczi said that the project is seeking six entitlements: General Plan Zoning Map Amendment, Specific Plan Amendment, Tentative Parcel Map, Development Agreement Case, and Preliminary Development Plan, and asked for clarification on what the ARB was reviewing and approving.

Ms. Lopez asked if the board is hoping to move this forward but come back to review site plan and landscape plan.

Board Member Milander clarified that Board Member Doczi would like to approve the entitlements without approving the design of the project.

Ms. Lopez clarified that at this point what is being approved by the ARB is the Specific Plan Amendment and the Preliminary Development Plan.

Board Member Milander summarized his comments and questions. He feels that they learned nothing new from the previous meeting except for the location of the mechanical units.

Chair O'Donnell clarified the board and Planning Commission's role. He stated that project can stand on its own and the details would be worked out.

Board Milander questioned the functions that are missing to fully analyze the project.

Vice Chair Patel concurred with Chair O'Donnell.

Board Member Doczi added his comments and questions.

Board Member Milander added his comments and questions.

Chair O'Donnell asked if Doczi can put his comments into a motion.

Ms. Lopez asked board members to list out the concerns for the applicant can respond to the questions and comments.

Board Milander stated that the board had previously provided a list of concerns to be addressed and they weren't addressed.

Ms. Lopez asked if give the board would like the applicant to revisit the list and provided a revised project.

Board Member Greenwood commend the applicant for what they are doing there, but noted that this project was headed to a continuance. He stated that there is a lot that still needs to be determined from a program standpoint, the construction methodology has to be a blend and take into account the consistency. This type of methodology is taking precedence over trying to blend in a mixing of additional architecture. He expressed interest in seeing a restudy of the two-story building of bring it closer to the design of the one-story residence units. He said he would be supportive of a continuance of the project and a restudy of elements of that nature.

Public comment: - None.

Chair O'Donnell asked Board Member Greenwood to state a motion.

Board Member Milander asked the question of continuance versus just denying the project.

Chair O'Donnell confirmed that we are asking for a restudy.

Board Member Greenwood concurred with asking for a restudy.

Board Member Greenwood mentioned he would like to see a continuance of the project.

Chair O'Donnell add that it is a consensus that the board would restudy the project.

**MOVED/SECONDED BY GREENWOOD/PATEL TO RECOMMEND THAT THE PROJECT BE CONTINUED TO A DATE TO BE DETERMINED BY STAFF AND THE APPLICANT TO RESTUDY BASED ON THE BOARD COMMENTS. MOTION CARRIED 5/1**

3. **Environmental Assessment Case No. EA22-0018, Preliminary Development Plan Case No. PDP22-0004, and Street Name Change Case No. STN22-0001 – Linea.** Applicant: Prest Vuksic Greenwood Architects for Linea Rancho Mirage, LLC. Consideration to construct 9 single-family residences on 4.63 acres of vacant land on the southern half of Tract Map No. 35089 between Ginger Rogers Road and Via Florencia. The project consists of 3 house concepts and range in size from 4,870 to 5,688 square feet. This project includes a request to change the current street name of Bellavia Court South to Via Linea. (APNs: 685-351-001 through -016).

***Note:*** Board Member Greenwood recused himself from Discussion Item 3.

Joy Tsai, Senior Planner, presented the staff report.

Chair O'Donnell opened the meeting to board questions for staff.

Board Member Milander inquired about how the subdivision and grading plans were approved and completed without Architectural Review Board review.

Ms. Tsai clarified the project site's history: The tentative tract map was approved in 2008 and the map was extended throughout the years through automatic time extensions from the state. The final map was recorded in 2018. She further stated that subdivision improvements are required as a part of the subdivision process.

Board Member Milander asked why the residential rear yards are not a part of the project and as a part of their review.

Ms. Tsai explained that as the project is a small tract home development, landscape plans for the rear yard are not required and that only the front yard landscape plans are required.

Board Member Milander asked whether the street name change will affect both private streets in the subdivision or not.

Ms. Tsai responded that the street name change request is only applicable for the south side of the Ginger Rogers Road and that the north and south half of the subdivision have different property owners. The project property owner requested to change the private street name in order to differentiate their project.

Vice Chair Patel commented that the project is well thought off and very articulated architecture as well as the layout of the plans over simple architecture that works very well.

Board Member Sanborn inquired about the reason why the project is being presented to the ARB if they are only proposing single-family residences.

Mr. Torres replied that the project is being presented to the ARB because the applicant submitted a Preliminary Development Plan (PDP) application for home designs for the subdivision. If the applicant were to submit applications for single-family residences under Senate Bill 9 (SB 9), then the residences would be reviewed at the ministerial level.

Chair O'Donnell asked about the side-loading garages and pointed out that there is only one lot that proposed a side-loading garage. He asked staff to confirm whether the City's zoning ordinance allows a reduction of front yard setback for a side-loading garage.

Ms. Tsai answered in the affirmative to Chair O'Donnell's question.

Chair O'Donnell asked the applicant to make a quick presentation.

Andrew Adler, applicant, presented the proposed project and addressed the board members' questions.

Chair O'Donnell asked if any other board member had questions for the applicant.

Board Member Milander expressed his concern about water usage.

Mr. Adler elaborated the landscape design intent for the project and the CC&R's that will be in place.

Board Member Sanborn asked about placement of the solar panels and vents.

Mr. Adler answered member Sanborn's questions and concerns.

Chair O'Donnell expressed concerns about prevailing wind and solar orientation and the layout of the homes. He recommended that the applicant re-study the floor plans of the homes based on prevailing wind and solar orientation. He pointed out that this community will be a community with a garage-dominate façade. He asked if there was a way to allow reductions in setbacks with a side-loading garage to improve the community's curb appeal.

Mr. Torres replied that side-loading garages may be set back a minimum of fifteen feet from the front property line and that the building setback line for the front is twenty-five feet for the Very Low Density Residential (R-L-2) zoning district.

Chair O'Donnell asked if a minor modification or variance could help reduce the building setback requirement another twenty five percent.

Mr. Torres responded that the director may grant a minor variance, up to a maximum of ten percent of the standards being modified, if certain findings can be made.

Public comment: - None.

Board Member Milander added if it was possible to add provisions to prohibit live turf.

Mr. Torres added that municipal code permits no more than 10% of landscape to be water intensive uses for all development projects.

Ms. Tsai clarified that the City's landscape standards are already incorporated as a standard condition of approval for all projects and that the City's landscape standards provide that only ten percent of the total landscaped area (in addition to turfed area) is allowed to be non-drought tolerant species.

**MOVED/SECONDED BY MILANDER/SANBORN TO RECOMMEND THE PROJECT TO THE PLANNING COMMISSION AS PRESENTED. A ROLL CALL VOTE WAS TAKEN AND THE MOTION CARRIED 5/0 WITH BOARD MEMBER GREENWOOD RECUSED.**

**Note:** Board took a five-minute break.

4. **Environmental Assessment Case No. EA22-0014, Development Agreement Case No. DA22-0002, and Preliminary Development Plan Case No. PDP22-0002 – Eisenhower Medical Center Memory Care, Child Care, and Administration Building.** Applicant: Prest Vuksic Greenwood Architects for Eisenhower Health. Consideration to construct three single story buildings on 4.31 acres. The buildings will consist of 19,890 square feet for a memory care center, 17,116 square feet for childcare center, and 37,724 for an administration office. Located at the southeast corner of Country Club Drive and Wilshire Palm Drive. (APN: 682-010-021).

Ben Torres, Planning Manager, presented the staff report.

***Note:*** Board Member Greenwood recused himself from Discussion Item 4.

Chair O'Donnell opened the meeting to board questions for staff.

Board Member Milander asked if staff could go over existing zoning, and what is being proposed to change.

Mr. Torres clarified they are not changing the zone. The zoning for this site is Public/Quasi-Public zone.

Board Member Milander asked, what is the height of the parking lot lighting?

Mr. Torres explained that the height of the light poles is 16 feet 6 inches excluding the base.

Board Member Sanborn inquired if the applicant had any meeting with the neighboring community to over the site plan development and landscape.

Mr. Torres mentioned that the applicant can respond to that question.

Chair O'Donnell questioned the day care vehicular traffic and intensity.

Mr. Torres explained that Mr. Ali Tourkaman, Eisenhower representative can better explain the hospitals staff schedule.

Chair O'Donnell asked the applicant to make a quick presentation.

Nicole Williams, project representative addressed the Board Members traffic questions and concerns.

Mr. Tourkaman elaborated on Eisenhower staff schedules.

Chair O'Donnell asked about the day lighting sources.

Ms. Williams answered that they are providing daylight into multiple spaces.

Chair O'Donnell asked the applicant to make a quick presentation.

Vice Chair Patel, made a positive comment about the projects design.

<u>Public comment:</u> - None.

Board Member Milander expressed his concerns about the neighbors to the east and the lighting in the parking lot. He inquired if there was something that the applicant can do to improve the lighting for the neighbors to the east.

Mr. Torres answered Board Member Milander's questions. He added how staff will notify the neighbors making them aware of the project and giving them an opportunity to submit public comments or attend future public hearings.

Chair O'Donnell ask Board Member Doczi for his opinion on the landscape edge. He also questioned if covered parking with downward lighting should be encouraged.

Board Member Doczi went through several areas of the projects as part of the discussion.

Mr. Tourkaman addressed the lighting and the noise concerns.

Chair O'Donnell asked if engineering had taken a look at this project and made any proposing changing the median so that someone can make a u turn.

Mr. Torres mentioned engineering made recommendations/comments and staff provided this to the applicant. At that time the applicant wanted to move forward with their own driveway approach.

Ms. Dukic clarified that shared drive would require a consent from the property owner.

Chair O'Donnell inquired about the vacant property on the west and if there have been plans to acquire that property.

Mr. Tourkaman confirmed that they looked into that property and the property is not available.

Board Member Sanborn added his comments and questions.

Board Member Milander summarized his concerns about the parking lot lighting and would like to make it a condition that it operate until 6 pm and then minimal low site lighting for non-operational hours.

**MOVED/SECOND BY PATEL/SANDBORN TO RECOMMEND THE PROJECT TO THE PLANNING COMMISSION WITH THE LIGHTING CONDITION. MOTION CARRIED 4/1 WITH BOAD MEMBER GREENWOOD RECUSED.**

5. **Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21-0002, and Major Modification Case No. MOD21-0004 – The Ritz-Carlton Phase II Expansion.** Applicant: Kam Sang Company for Newage Rancho Mirage LLC/ Ritz Carlton. Consideration to construct the Ritz Carlton residences consisting of 106 units ranging in size from 1 to 3 bedrooms, 23,840 square feet of event space, 6,273 square feet of restaurant, 5,510 square feet for amenities, a 381-space subterranean parking structure, and other recreational amenities on a 35.01-acre project site which includes the existing hotel. A General Plan/Zoning Map Amendment is also proposed to amend the Mountain Reserve (MR) designation for the projects Sky Mesa Recreational area to Resort Hotel (Rs-H). Located at 69800 Frank Sinatra Drive. (APNs: 689-330-026; -028; -032; -034; 689-020-012; -014; 689-331-001; -018).

Ben Torres, Planning Manager, presented the staff report.

**MEMBER PATEL LEFT THE MEETING AT 3:25PM**

Chair O'Donnell opened the meeting to board questions for staff.

Board Member Milander inquired about the prior zoning of Sky Masa area.

Mr. Torres answered that a portion of the Sky Mesa area is currently zoned Mountain Reserve. He mentioned in order for this area to allow restaurant and other uses they are proposing a change of zone to Resort Hotel.

Board Member Milander expressed his comments and concerns.

Ms. Dukic clarified that the current owners purchased the property a few years ago prior to that, the project had other ownership.

Board Member Milander inquired about the City's rules about the retaining walls and the max heights.

Mr. Torres, answered we typically take into consideration the height from the highest adjacent grade.

Ms. Dukic added that our standard municipal code maximum is 6 ft, unless proposed with a Preliminary Development Plan.

Board Member Sanborn asked if the project would be seen from Highway 111.

Mr. Torres, answered that you shouldn't be able to see this from Highway 111. Overall, it is going to be a two story product but we have the existing hotel that will be more visible along Highway 111, the residence portion of the project will be at the back of property.

Ms. Dukic added that concern was a part of their initial design in our preliminary conversations, and they did pay attention to what would be visible from Highway 111 and that would be the Sky Mesa portion.

Board Member Greenwood asked if the applicant shared their goals for the development schedule.

Mr. Torres will defer that question to the applicant to answer.

Board Member Greenwood added his comments and questions.

Mr. Torres explained the project design and location where the services will be handled.

Board Member Milander inquired the grading numbers.

Mr. Torres referred the board to the Preliminary Grading Plan and asked the applicant to further elaborate.

Board Member Sanborn asked if there is a sheet that shows the retaining wall system.

Mr. Torres referred the board to the grading plan and exhibit sheet 15-15 that provided the information.

Chair O'Donnell asked what interactions the applicant had with the Mirada. He also inquired what was previously proposed on the site.

Mr. Torres explained that a project was proposed around 2007, but that project was never built.

Chair O'Donnell asked if this was a less intensive project then what was previously proposed.

Mr. Torres responded that the previous project prepared an Environmental Impact Report and for this project a Mitigated Negative Declaration has been prepared.

Ms. Dukic added the units counts might have been somewhat similar and the Sky Mesa portion is the one thing that is unique and new to this consideration.

Chair O'Donnell asked the applicant to make a brief presentation.

Everardo Garcia, project Architect presented the proposed project and addressed the concerns brought up.

John Hicks, applicant representative presented and further elaborated on the project. He addressed and discussed the landscaping and retaining wall concerns.

Chair O'Donnell asked the applicant to provide their project presentation. He would like to see more on operations of exiting hotel. Will the hotel continue to allow the residents of Mirada to utilize some of the amenities of the hotel.

Mr. Hicks explained the operation and services of the hotel and how they will still continue have amenities available for the residents.

Board Member Milander expressed his comments and concerns about the retaining walls and the disturbance of the landscape.

Mr. Hicks answered that rock formation will remain intact. That is a primary feature, and everyone agrees to that. He explained concept of the geo wall retaining system.

Board Member Milander expressed his concerned about the noise of the mechanical units.

Mr. Hicks discussed the mechanical equipment.

Ms. Dukic added that the applicant had a noise study conducted as part of the Mitigated Negative Declaration for this project.

Mr. Torres confirmed that a noise study had been conducted and noise level were determined to be less then significant.

Board Member Milander asked if an Environmental Impact Report was prepared on the previous development.

Ms. Dukic confirmed that the previous project did a full EIR. For this project we worked off analysis done there and expanded to adjust to the project as well.

Board Member Milander asked if the lawn area will be grass.

Mr. Hicks responded it will be synthetic turf and perimeter landscaping will be desert themed.

Board Member Greenwood asked if the Sky Mesa restaurant will replace the Edge.

Mr. Hicks responded that both restaurants would remain operational.

Chair O'Donnell asked the applicant questions about the roofs and the designs.

Board Member Greenwood added to the roof discussion.

Board Member Milander asked about the ramping walkway to the Sky Mesa restaurant.

Mr. Hicks responded they have conducted an extensive grading plan for the project as a part of this submittal. He stated that they worked with a civil engineer that has been involved through the entire time.

Board Member Milander would like to see more information to be able to vote for approval. He mentioned his concerns about grading and would like visuals.

Chair O'Donnell, asked about vehicle circulation.

Mr. Hicks explained the concern about vehicle circulation.

Board Members Milander and Greenwood added questions about the vehicle circulation.

Board Member Milander asked staff if there a point in the project where story poles are installed.

Ms. Dukic added that is not a standard requirement that is asked for all applicants. She mentioned if it was something that the board would like to see, the applicant can respond to the request.

Board Member Greenwood added his comments and questions.

Board Member Milander added his comments and questions.

Chair O'Donnell added his comments and questions.

Board Member Sanborn summarized his concerns regarding the hotel's landscape design.

Ms. Dukic clarified that the hotel requires a 50 ft setback due to the Resort Hotel zone and it is a greater setback then other zoning standards within the City.

Board Member Greenwood added his comments and questions.

Public comment: - None.

Chair O'Donnell add that it is a consensus that the board would like to see more information and asked for a motion. He directed staff to summarize the comments provided.

Mr. Torres summarized the boards comments:

1. Provide renderings and line of sight exhibits from viewpoints along Highway 111 and from Mirada to the project.
2. Provide a construction section of the walkway within Sky Mesa.
3. Provide more details and construction information on the geo-mesh retaining walls.
4. Provide more information on the Sky Mesa buildings, including mechanical equipment and how the building will be constructed into the mountain.
5. Look into the landscaping to see if fewer plantings are possible and scale the landscape symbols.
6. Provide cut/fill information on the grading plans.
7. Install story polls on the property for buildings B-5, B-6, B-7, B-9, B-12, & B-14.

**MOVED/SECONDED BY MILANDER/GREENWOOD TO RESTUDY THE PROJECT BASED ON THE BOARD COMMENTS. MOTION CARRIED 5/0**

## ADJOURNMENT

With no further business to consider the Architectural Review Board adjourned the meeting at 4:41 p.m.

**Prepared by:** Deanna Mendoza, Development Services Technician

**Date Approved by Architectural Review Board:** 3/27/2023

# CITY OF RANCHO MIRAGE

## ARCHITECTURAL REVIEW BOARD

**MONDAY, MARCH 27, 2023**

**12:30 P.M.**

# MINUTES

City of Rancho Mirage
City Hall – Council Chambers
69-825 Highway 111
Rancho Mirage, CA 92270

**CALL TO ORDER – 12:30 P.M.**

**Roll Call:** Doczi, Greenwood, Milander, O'Donnell, Patel, and Sanborn.

Greenwood, Milander, O'Donnell, Patel, and Sanborn **– Present**

Doczi**– Absent**

**MOVED/SECONDED BY O'DONNELL/GREENWOOD TO EXCUSE BOARD MEMBER DOCZI'S ABSENCE. MOTION CARRIED 5/0.**

**APPROVAL OF MINUTES** – FEBRUARY 27, 2023 & March 13, 2023

**MOVED/SECONDED BY MILANDER/GREENWOOD TO APPROVE THE FEBRUARY 27, 2023, AND THE MARCH 13, 2023, REGULAR MEETING MINUTES. MOTION CARRIED 5/0.**

**DISCUSSION ITEM**

1. **Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21-0002, and Major Modification Case No. MOD21-0004 – The Ritz-Carlton Phase II Expansion.** Applicant: Kam Sang Company for Newage Rancho Mirage LLC/ Ritz Carlton. Consideration to construct the Ritz Carlton residences consisting of 106 units ranging in size from 1 to 3 bedrooms, 23,843 square feet of event space, 6,273 square feet of restaurant, 5,513 square feet for amenities, a 381-space subterranean parking structure, and other recreational amenities on a 35.07-acre project site which includes the existing hotel. A General Plan/Zoning Map Amendment is also proposed to amend the Mountain Reserve (MR) designation for the projects Sky Mesa Recreational area to Resort Hotel (Rs-H). Located at 69800 Frank Sinatra Drive. (APNs: 689-330-026; -028; -031; -032; -034; 689-020-012; -014; 689-331-001; -018).

Ben Torres, Planning Manager, presented an overview of the project.

Chair O'Donnell opened the meeting to board questions for Staff.

Board Member Greenwood asked if a line-of-sight perspective was taken from Highway 111 and about the project's visibility.

Mr. Torres answered that the only line of sight perspective was the one that was provided from the Quick Quack Car Wash along Highway 111. He added that given the location of the project site the existing hotel would shield the new development from being visible along Highway 111.

Majna Dukic, Development Services Director added that a visual analysis was conducted as part of the projects Mitigated Negative Declaration, and no significant impacts are expected.

Board Member Milander asked about the amount of site grading.

Mr. Torres added that the applicant's team is working on the grading calculations.

Chair O'Donnell asked the applicant to make a quick presentation.

Everardo Garcia, project architect described the Sky Mesa walkway, detailed that it would be supported by columns, and elaborated on ADA access. He also described the geo-mesh retaining walls naturalistic appearance. Mr. Garcia also elaborated on the Sky Mesa restaurant design concept and provided details on the mechanical equipment. He also addressed the prior comments regarding the landscaping and explained their concept of making it more naturalistic, reducing the plantings and using appropriate sized plants.

Board Member Greenwood asked about the conceptual cut sections for the retaining wall on the grading plan. He mentioned that the plans are showing single line profiles and that only there doesn't appear to be a lot of space to create a tiered effect.

Mr. Garcia mentioned a couple of ways on how they can install the walls.

Board Member Greenwood added that he thinks the wall proposal makes sense. He brought up the benefits of adding scrubbers to the mechanical design of the restaurant.

Chair O'Donnell commented on the Sky Mesa walkway renderings regarding the number of columns and asked about the ability to pull it back 20 or 30 feet.

John Hicks, Applicant added there might be an opportunity to maybe change its orientation but mentioned the walkway was calculated on maximum ADA heights, slopes, and cross slopes.

Chair O'Donnell added this is a typical design challenge as the various design schemes are reviewed and try to make it accessible. He mentioned the walkway needs to be studied more in depth.

Vice Chair Patel commented that there is a potential for the Sky Mesa walkway supports to be an asset to the design.

Board Member Milander discussed the retaining walls and focused on the areas where there is a 20 foot vertical element and had questions regarding landscaping.

Mr. Hicks answered that vertical planting of materials grow up by a creeping and mentioned various types of landscaping that will grow out of the edge of the slope.

Board Member Milander, added that one of the things that he had been wondering about was the prior project didn't seem to have large retaining wall. He brought up the differences between having two access point or a looped road.

Mr. Hicks answered when this project was put together there were discussions as to what would be expanded, parking needs, and the buildings function.

Board Member Milander inquired about a split-level development and the projects cut and fill numbers.

Mr. Hicks added that the amount of earth movement would go up exponentially in a split level design. He mentioned the amount of effort that goes into doing a cut and fill diagram by summarizing the sets and mentioned it is in process.

Board Member Milander asked questions about the Sky Mesa area regarding slopes and ADA access.

Mr. Hicks explained the grade transition at the restaurant level, detailed the grade changes, and explained how they tried to minimize the projects footprint.

Public comment:

Omar Cobian, member and representative for the Southwest Regional Council of Carpenters Union, discussed the benefits of hiring local contractors and also utilizing apprenticeship from state certified apprenticeship program.

Chair O'Donnell opened the meeting to Board discussion.

Board Member Milander mentioned some of the project details could be further elaborated like the retaining wall height and the verticality of that next to adjacent residences.

Majna Dukic, Development Services Director, suggested that staff can bring up the wall issues as part of our Planning Commission agenda packet and review as well as City Council.

Board Member Milander provided comments on the Sky Mesa walkway ground disturbance. He mentioned removal of this feature from the project and the applicants can come back and present it again in another format or take it out completely in lieu of another type of ramp. He added that he it is just a massive grading project. Lastly, he mentioned that he would like to see the restaurant building developed and provided comments on the accordion door system.

Chair O'Donnell asked Board Member Sanborn about the project's grades.

Board Member Sanborn answered he agrees with the other Board Members with the comments brought up regarding the depth of the stepped wall. He mentioned grading calculations are very complex, and he agrees there's probably a little more elegant way to accommodate ADA access.

Board Member Greenwood mentioned he likes visiting the hotel and Ritz-Carlton is a first-class organization. He explained he understands what the applicant is trying to do with the retaining

walls to create depth and a more natural aesthetic but it requires further development in the form of a condition.

Mr. Torres elaborated on the entitlement process with the Planning Commission and City Council. He mentioned one of the standard project conditions is that projects must submit a Final Development Plan and this is when Planning Staff reviews compliance with conditions of approval. He also described that the project will also need a Grading Permit, so there's additional levels of review to ensure that the proposed conditions are complied with.

Board Member Greenwood asked if the City typically provides a condition that the final construction plans come back before this body for review.

Majna Dukic, Development Director added once the City Council approves the preliminary plans, the final plans are approved at Staff level if they are deemed to comply with the approvals.

Board Member Greenwood added with respect to the Sky Mesa restaurant he thinks it's going to be a nice amenity integrated into the mountain. Mr. Greenwood mentioned the design approach of the walkway leading up to this would benefit from additional study. He would lean towards finding an amenable condition here that can push this through into the next step and find a way if everyone would be open to this to find a way that either you know the walkway comes back in front of this body for review or whether we provide a condition to provide some better direction.

Vice Chair Patel strongly believes that the Sky Mesa walkway needs to be redesigned and then brought back to the Board for study and approval. He thinks this needs to be reviewed with stronger design, better aesthetics, and low impact to the to the surroundings.

Chair O'Donnell added that the general intent of the prior landscape comments were not so much to eliminate plant material, but to look at the plant material at some level of maturity so that plants could be placed in proper areas to thrive.

Chair O'Donnell asked for a motion.

Board Member Milander focused on the parking garage entry and how it looks like we're seeing almost 60- feet of building.

Mr. Torres answered that viewpoint is taken from the bottom at the ground level but from the surrounding it's going to look like a two-story product.

Board Member Greenwood made a motion for approval of the project with the following conditions that a detailed cut section of the retaining wall be provided for the engineering department's review and consideration. He elaborated with something that considers the actual system, its depth in relation to height, any tiering or step back, and its relation to its surroundings. He also conditioned that the walkway heading to the Sky Mesa area that that piece of the project brought back for ARB for review for further design and development.

Vice Chair Patel seconded the motion.

Board Member Milander requested clarification on the retaining wall condition.

Board Member Greenwood answered that in his opinion on this system has a direct impact to the guests and not the public. He would trust that this developer is not going to do anything that's going to speak negatively to the project. Ultimately, he cares that the system works but doesn't feel like we need to condition the height.

Ms. Dukic added they they'd be obligated to obtain the necessary engineering and grading permits for that as well.

Board Member Milander asked if the Sky Mesa walkway in a developer point of view was a required feature.

Mr. Hicks answered no, he mentioned they would be inclined to remove it from the project if the project could move forward.

Board Member Milander added that would be his recommendation.

Board Member Greenwood modified his motion to add if the developer wishes to maintain the elevated walkway that will come back to the Board for consideration. He also added if they can bring the access internal and the design is mitigated then there would be no need to bring this back before the ARB.

Vice Chair Patel agreed with the modifications to the motion.

Board Member Milander asked Staff if that would be considered a separate project if they submitted for instance one year or 6 months in the future.

Ms. Dukic explained if the applicant wishes to remove it and then bring it and bring in the future it would be considered a separate project at that point.

**MOVED/SECOND BY GREENWOOD/PATEL TO RECOMMEND THE PROJECT TO THE PLANNING COMMISSION WITH THE TWO CONDITIONS FOR THE SKY MESA WALKWAY AND THE RETAINING WALL. MOTION CARRIED 5/0.**

2. **Environmental Assessment Case No. EA22-0012, General Plan Zoning Map Amendment Case No. GPZMA22-0002, Specific Plan Amendment Case No. SPA22-0002, Tentative Parcel Map Case No. TPM22-0004, Development Agreement Case No. DA22-0003, and Preliminary Development Plan Case No. PDP22-0001 – Desert Island Hotel.** Applicant: FM 71777, LLC. The Desert Island Specific Plan Amendment will occupy 17.2 acres within the existing Desert Island development. A General Plan/Zoning Map Amendment is to amend the underlying designation of Private Open Space (OS/PV) to Resort Hotel (Rs-H) for 10.5 acres of the existing Desert Island golf course for the development of a new 34-key boutique hotel and 11 private hotel residences along with passive outdoor gathering areas, tennis, pool, café, and yoga amenities. A new golf training park and new maintenance building will be built to replace the existing driving range and old maintenance building being displaced by the hotel project. Located south of Frank Sinatra Drive and west of Island Drive on a portion of the Desert Island golf course (APNs:688-040-001; 688-050-002; -005; 688-060-008; - 023).

Pilar Lopez, Senior Planner, presented an overview of the project.

Chair O'Donnell opened the meeting to Board questions for Staff. He asked if due to the removal of the second-story element would the project be overparked.

Ms. Lopez answered yes, there's a surplus of 117 parking spaces. Within the Grand Aisle there are 93 parking spaces, which is 55 parking spaces over the required. Ms. Lopez explained that the applicant has said that the Grand Aisle is one of the main design features for the hotel project.

Vice Chair Patel asked about the purpose of removing the second-story element.

Ms. Lopez answered that the applicant can explain a little bit more elaborate on their motivations to remove the second story and for the staggering.

Board Member Greenwood asked was there any additional discussion between the applicant and Staff on the operation of the hotel as it related to mechanical equipment storage and back-of-house areas.

Ms. Lopez answered no.

Chair O'Donnell asked the applicant to make a quick presentation.

James Meyer, the project architect, summarized the changes that included breaking the hotel buildings' into four one-story buildings and the addition of an onsite housekeeping area, lobby area, and a manager's office. He also elaborated on the other changes where additional enclosed areas on the endcaps of the hotel buildings to accommodate mechanical equipment were added.

Chair O'Donnell opened the meeting to questions of the applicant.

Board Member Greenwood asked the if there would be double loaded parking spaces by the maintenance building and if that area is currently used as parking. He asked why the project was so overparked.

Mr. Meyer answered that there would be double loaded parking by the maintenance building that would be used by valet for clubhouse events. Mr. Meyer clarified that the area is currently used as overflow parking. The Grand Aisle is a key design feature, and the number of parking spaces is a byproduct of that design.

Chair O'Donnell asked for clarification on the Corten steel staircases on the north hotel buildings.

Mr. Meyer clarified that the Corten steel staircases are the entrances for the north hotel buildings.

Chair O'Donnell expressed his concerns about housekeeping and staff space in relation to the hotel room immediately across the breezeway.

Mr. Meyer clarified Chair O'Donnell's housekeeping and staff concerns.

Board Member Greenwood asked about access to the units on the north buildings. He asked if there are entrances on the north side of the buildings.

Mr. Meyer replied that access is limited to the south side that fronts the Grand Aisle. There is no access on the north side.

Board Member Greenwood asked where the center breezeway between the two buildings leads to.

Mr. Meyers answered to the golf training area.

Board Member Sanborn asked questions about the golf course.

Mr. Meyers answered that the reconfiguration of the golf course would be limited to two tees and the driving range.

Board Member Sanborn asked the applicant to elaborate on the changes to the current golf course configuration.

Board Member Doczi added his comments about the golf course configuration.

Board Member Milander stated his concerns about the mechanical plans and overall accessibility.

Mr. Myers explained the redesigned site plan provided accessibility to all rooms.

Board Member Greenwood asked about the lobby and housekeeping location and inquired on the potential impact to hotel guests.

Mr. Myers answered the back-of-house questions.

Board Member Greenwood expressed his concern with the project accessibility of the program non-scarce access.

Mr. Myers addressed the design concepts.

Board Member Milander added his comments about operational issues.

Mr. Myers added that the intention is to receive a recommendation from the ARB and then iron out the operational functions prior to Planning Commission consideration.

Ms. Dukic added that is very common to see minor changes throughout the project's building process as well.

Public comment:
Karolyn Lamson, resident of Desert Island community, asked for clarification on the HOA approval and inquired about the entitlement process.

Ms. Dukic gave Mrs. Lamson a business card and suggested she contact staff to go over the entitlement process.

Ms. Lopez confirmed that the original submittal of the project had an HOA approval letter and added that HOA Approval Letter was dated August 2022 and was signed by the HOA president. No other further communication had been received in writing as of the meeting date.

Board Member Milander asked if the applicant could explain the HOA's current position on the project.

Ms. Dukic suggested that is something that can be addressed by the Planning Commission or City Council.

Chair O'Donnell opened the discussion to Board comments.

Board Member Milander summarized his concerns on the overall operational functions and site layout.

Board Member Sanborn added his comments and suggestions about the golf course circulation.

Board Member Greenwood echoed Board Member Milander's comments and concerns.

Mr. Myers thanked the Board for their consideration and expressed his excitement of the project and overall design.

Ms. Dukic clarified that the ARB is a recommending body, not an approving body. The purview of the ARB, per the municipal code, is to consider the exterior appearance of the building's structure, signs, lighting, street furniture, landscape planting, and site development. Noticing of the entitlement project will occur for the Planning Commission and City Council, which are public hearings. Public Hearing Notices are mailed out to property owners within a 500-foot radius of the project site.

Board Member Milander asked Ms. Dukic to please clarify the Municipal Code again to the Board.

Ms. Dukic read Rancho Mirage Municipal Code Section 2.30.080 Elements of Design Consideration. The elements of design consideration shall include, but not necessarily be limited to, the exterior appearance of buildings, structures, signs, lighting, street furniture, landscape planting, site development and other outdoor appurtenances. The purpose of the ARB review is to obtain the best example of design presented.

Chair O' Donnell stated that the ARB is a recommending body and it is understood that there are other checks and balances in the form of the Planning Commission and City Council review.

Vice Chair Patel suggested that the ARB recommend approval of the architecture and leave the other issues to be addressed by the Planning Commission.

Board Member Milander made a motion to recommend the Planning Commission approve the architecture, landscape, and site development with the exemption of the site's circulation.

Board Member Greenwood asked for clarification on the recommendation.

Board Member Sanborn added that the ARB are a recommending body for the Planning Commission and can recommend certain elements while differing to the Planning Commission on issues.

Isaiah Hagerman, City Manager, stated that the project could go forth and have the current issues be further worked out by noting it for the Planning Commission review. He thanked the Board for their efforts and clarified that the next step would be the Planning Commission review, a public hearing, which would require notices to be sent out. This would allow the public to be notified instead of continuing with public meetings that do not require public notification and thus cause confusion in the community.

Chair O'Donnell restated the motion on the table. The motion is to recommend the project to the Planning Commission with the condition that the Planning Commission further review the site circulation for the project.

**MOVED/SECOND BY MILANDER/PATEL TO RECOMMEND THE PROJECT TO THE PLANNING COMMISSION WITH THE CONDITION THAT THE PLANNING COMMISSION FURTHER REVIEW THE SITE CIRCULATION. MOTION CARRIED 4/1 WITH BOARD MEMBER GREENWOOD VOTING NO TO THE VOTE.**

## ADJOURNMENT

With no further business to consider the Architectural Review Board adjourned the meeting at 2:51 p.m.

**Prepared by:** Deanna Mendoza, Development Services Technician
**Date Approved by Architectural Review Board:** 5/22/2023

**RECORDING REQUESTED BY**
**CITY OF RANCHO MIRAGE**

(Exempt from Recording Fees
Pursuant to Government Code
Section 27383 - Benefits City)

**AND WHEN RECORDED MAIL TO:**

CITY CLERK
CITY OF RANCHO MIRAGE
69-825 Highway 111
Rancho Mirage, CA 92270

SPACE ABOVE THIS LINE FOR RECORDERS USE

# 10TH AMENDMENT TO DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF RANCHO MIRAGE AND NEWAGE RANCHO MIRAGE, LLC

This 10th Amendment to the Development Agreement ("10th Amendment") is entered into this _____ day of _____, 2025, by and between the CITY OF RANCHO MIRAGE, a municipal corporation ("City"), and NEWAGE RANCHO MIRAGE, LLC, a California limited liability company ("Newage"), pursuant to the authority of Sections 65864 et seq. of the California Government Code and Chapter 17.56 of the Rancho Mirage Municipal Code.

## R E C I T A L S:

**WHEREAS**, the City of Rancho Mirage ("City") is recognized as a charter city and a political subdivision of the State of California for certain purposes; and

**WHEREAS**, to strengthen the public planning process, encourage private participation in comprehensive planning and reduce the economic risk of development, the Legislature of the State of California adopted Section 65864 et seq. of the California Government Code (the "Development Agreement Statute"); and

**WHEREAS**, the Development Agreement Statute and the Rancho Mirage Municipal Code authorizes the City to enter into a property development agreement with any person or entity having a legal or equitable interest in real property for the development of such real property in order to establish certain development rights in the real property; and

**WHEREAS**, on or about August 5, 1983, the City and Federated Development Company ("Federated") entered into a Development Agreement ("Original Development Agreement") under the provisions of the Development Agreement Statute pertaining to the property described therein and which was recorded on November 29, 1983, as Instrument No. 247445, with the Riverside County Recorder's Office and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS,** in connection with the Original Development Agreement, Federated applied for and received approvals from the City for General Plan Amendment No. 83-84, Zone Change No. 83-82, Tentative Tract Map ("TTM") No. 19397, and "Conceptual Land Use Approval" in Land Use Case No. 83-P-145; and

**WHEREAS**, on or about August 22, 1985, the City and Federated amended the Original Development Agreement ("1st Amendment") pursuant to the Development Agreement Statute, to revise TTM No. 19397 and make associated changes to the "Conceptual Land Use Approval" in Land Use Case No. 83-P-145, which was recorded on February 10, 1986, as Instrument No. 31768 with the Riverside County Recorder's Office and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about November 22, 1989, the City and Federated entered into a 2nd Amendment to the Original Development Agreement ("2nd Amendment") pursuant to the Development Agreement Statute, which was recorded on December 27, 1989, as Instrument No. 453119 with the Riverside County Recorder's Office and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS,** consistent with the 2nd Amendment, the City adopted a Specific Plan Overlay and amended the General Plan to permit property designated for general commercial use to be developed for "community centers, including specialty retail stores, offices and small high end department stores"; and

**WHEREAS**, portions of the Subject Property were acquired by MCO, with Federated retaining title to Lots 11, 12, 14, 48 and 50 of Tract Map No. 19397, and on or about June 6, 1991, the City consented to that certain Assignment and Assumption Agreement between Federated and MCO concerning certain rights and duties under the Original Development Agreement, the 1st Amendment and the 2nd Amendment and which is incorporated herein by this reference as though set forth at length; and

.

**WHEREAS**, on or about September 19, 1991, MCO, Federated and the City entered into a 3rd Amendment to the Original Development Agreement ("3rd Amendment") to substitute newly revised exhibits to the 2nd Amendment which was recorded on November 25, 1991, as Instrument No. 409130, with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about November 19, 1992, MCO, Federated and the City entered into a 4th Amendment to the Original Development Agreement ("4th Amendment") which was recorded on January 8, 1993, as Instrument No. 7776 with the Riverside County Recorder's Office and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, consistent with the 4th Amendment, MCO agreed to develop a certain portion of the Subject Property known as the "Villa Site" that would be operated under a condominium-hotel concept, whereby the units would be partially available for hotel rental, and the hotel facilities would be accessible to the condominium owners or users, in accordance with the zoning and development standards in effect City wide at the time of the issuance of the building permits for the Villa Site; and

**WHEREAS**, on or about November 30, 1995, certain property owned by MCO was transferred to FDC Real Estate ("FDC") pursuant to an Assignment of Rights under Development Agreement by Federated to FDC, with the City consenting to such assignment on December 7 1995, by approving a Consent to Assignment; and

**WHEREAS**, on or about June 19, 1997, MCO, FDC and the City entered into a 5th Amendment to Original Development Agreement ("5th Amendment"), which extended the Term of the Original Development Agreement to December 10, 2011, which was recorded on July 25, 1997, as Instrument No. 262788 with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, or about November 2, 2000, MCO and the City entered into a 6th Amendment to Original Development Agreement ("6th Amendment") which added Tentative Tract Map No. 28741, a revision of Tentative Tract Map No. 24857. which was recorded on April 24, 2001, as Instrument No. 2001-173795, with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about December 2, 2000, MCO and FDC (which soon thereafter divested itself of all rights title and interest in the Project Site) and the City entered into a 7th Amendment to the Original Development Agreement ("7th Amendment") whereby MCO was permitted to elect in its sole discretion to proceed with development of certain portions of the Amended Tentative Tract Map No. 29389 which was recorded on April 24, 2001, as Instrument No. 2001-173794 with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about March 19, 2005, MCO and the City entered into an 8th Amendment to the Original Development Agreement ("Eight Amendment") whereby

MCO was provided with the opportunity to construct 138 two-story hotel villa units on the Villa Site which MCO could either retain or sell, in whole or subdivided, subject to certain restrictions on use and occupancy set forth in the 8th Amendment which was recorded on January 25, 2006, as Instrument No. 2006-0058746 with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about July 28, 2005, GENLB-Rancho ("GENLB") acquired a portion of the Subject Property from VA Rancho Mirage, L.P. ("Vail") which included the current site of the Hotel ("Hotel Site") formerly known as the "Lodge at Rancho Mirage" site, along with a portion of the Subject Property commonly referred to as the "Tennis Site"; and

**WHEREAS**, on or about July 28, 2005, the City consented to that certain Assignment and Assumption Agreement between Vail and GENLB with respect to the Hotel Site and the Tennis Site and concerning certain rights and duties under the Original Development Agreement as amended to date and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about December 16, 2005, GENLB acquired the Villa Site from MCO; and

**WHEREAS**, on or about December 15, 2005, the City consented to that certain Assignment and Assumption Agreement between MCO and GENLB with respect to the Villa Site and concerning certain rights and duties under the Original Development Agreement as amended to date and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about September 30, 2006, GENLB and the City entered into a 9th Amendment to the Original Development Agreement ("9th Amendment") which was recorded on October 27, 2006, as Instrument No. 2006- 0790342 with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, Judi Bikulege, Vice President of GenLB, in a letter dated December 29, 2010, notified the City of GenLB's assignment of rights and obligations under the 9th Amendment to Rancho California Investments, LLC ("RCI"), an entity in which GenLB's principal shareholders retain a majority interest, and RCI's expressed assumption of the obligations of GenLB under the Ninth Amendment; and

**WHEREAS**, Sebastian Casano, Vice President of RCI, in a letter dated October 30, 2012, requested that the City consent to the assignment of the 9th Amendment to "Kam Sang Company Inc. or any of its affiliates, including Newage Rancho Mirage LLC

("Newage") conditioned upon the acquisition of the Project by Newage and the assumption by Newage of the obligations of RCI under the [Ninth Amendment]"; and

**WHEREAS**, pursuant to an Assignment and Assumption of Agreement GenLB had expressly assigned it rights and obligations under the Ninth Amendment to RCI and RCI has expressly assumed such rights and obligations; and

**WHEREAS**, on or around November 1, 2012, the City consented to that certain Consent to Assignment of 9th Amendment to Development Agreement, between RCI and Newage, concerning certain rights and duties under the Original Development Agreement, as amended to date, and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, Newage has proposed this 10th Amendment to the Original Development Agreement which includes the following: 1) Environmental Assessment Case Number EA21-0002 for the environmental review of the Project, which currently includes a proposed Mitigated Negative Declaration that includes Mitigation Measures for Biological Resources, Cultural Resources, Noise, Transportation, and Tribal Cultural Resources; 2) General Plan Zoning Map Amendment Case No. GPZMA21-0001 for a zone change from Mountain Reserve (MR) to Resort Hotel (Rs-H) for the Sky Mesa portion of the Project Site; 3) Development Agreement Case No. DA21-0002 for a 10th Amendment to the Original Development Agreement; 4) Tentative Parcel Map Case No. TPM23-0002 ("TPM38768") which is a parcel map for condominium purposes which establishes three parcels for the Hotel Site (excluding the Sky Mesa area) which include Parcel 1 (2.699 acres) for the existing Spa Suites Site, Parcel 2 (15.995 acres) for the Hotel Site, and Parcel 3 (11.873 acres) for an event space, parking structure, and 106 residential condominium units; and 5) Major Modification Case No. MOD21-0004 for the project entitlements which consist of 106 residential units that include 1 to 3 bedrooms, 23,843 square feet of event space, 6,273 square feet of restaurant, 5,513 square feet for amenities, a 381-space subterranean parking structure, and other recreational amenities; and

**WHEREAS**, based on the foregoing Recitals, the City has determined that this 10th Amendment is appropriate under the Development Agreement Statute and Chapter 17.56 of the Rancho Mirage Municipal Code; and

**WHEREAS**, this 10th Amendment is voluntarily entered into in consideration of the benefits to and the rights created in favor of each of the parties hereto and in reliance upon the various representations and warranties contained herein; and

**WHEREAS**, the application for this 10th Amendment was considered by the Planning Commission and the City Council at duly noticed public hearings in accordance with the Development Agreement Statute and Chapter 17.56 of the Rancho Mirage Municipal Code; and

**WHEREAS**, this 10th Amendment will eliminate uncertainty in planning for and securing orderly development of the Project and Project Site (as specifically described in this 10th Amendment below), assure progressive installation of necessary improvements, ensure attainment of the maximum effective utilization of resources within the City at the least economic cost to its citizens, and otherwise achieve the goals and purposes for which the Development Agreement Statute was enacted; and

**WHEREAS**, the City Council believes that such orderly development of the Project and Project Site will provide many public benefits to the City through the imposition of development standards and requirements under the provisions and conditions of this 10th Amendment, including, without limitation, the creation of job opportunities and additional tax revenue for the City's general fund; and

**WHEREAS**, it is the intent of the parties that all acts referred to in this 10th Amendment shall be accomplished in such a way as to fully comply with the California Environmental Quality Act (California Public Resources Code §21000 *et seq*.) ("CEQA") and the State CEQA Guidelines (California Code of Regulations, title 14, §15000 *et seq*.), as each is amended from time to time; and

**WHEREAS**, this 10th Amendment is made and entered into in consideration of the mutual covenants and in reliance upon the various representations and warranties contained herein.

**NOW, THEREFORE, in consideration of the mutual covenants and promises of the parties contained herein, the parties agree as follows:**

**A G R E E M E N T**:

**Section 1. Incorporation of Recitals.** The foregoing recitals are incorporated into this 10th Amendment by this reference as though fully set forth herein.

**Section 2. Effective Date.** This 10th Amendment shall be effective upon the effective date ("Effective Date") of the ordinance enacting this 10th Amendment ("Enacting Ordinance").

**Section 3. Project Site.** The "Project Site" consists of the Subject Property as more particularly described in the Legal Description attached hereto as Exhibit A for the Hotel Site which includes the existing Spa Suites, Exhibit B for the Villas Site which includes the T-Wing and Hotel Villas, Exhibit C for the Tennis Site, and Exhibit D for the Sky Mesa Site.

**Section 4. Project.** The "Project" includes the following:

a) Development Agreement (Case No. DA21-0002) – For a 10th Amendment to the Original Development Agreement;

b) General Plan Zoning Map Amendment (Case No. GPZMA21-0001) – For a zone change from Mountain Reserve (MR) to Resort Hotel (Rs-H) for the Sky Mesa Site;

c) Tentative Parcel Map (TPM 38768) (Case No. TPM23-0002) – For a parcel map for condominium purposes to establish three separate parcels for the Project Site (excluding the Sky Mesa area) that includes Parcel 1 (2.699 acres) for the Spa Suites Site which is not subject to future development and remains subject to the terms and conditions of the 9th Amendment, unless modified under this 10th Amendment, Parcel 2 (15.995 acres) for the Hotel Site which is not subject to any further development and remains subject to the terms and conditions of the 9th Amendment, unless modified under this 10th Amendment, and Parcel 3 (11.873 acres) for the Villas Site (that includes the T-Wing and Hotel Villas) for the development of an 106 residential condominium units, an events space, a restaurant, a subterranean parking structure, and various amenities including recreational amenities, which shall be subject to the conditions of approval and all rights and privileges afforded to NEWAGE as successor in interest under Tract Map No. 34640, unless otherwise provided by this Tentative Parcel Map; and

d) Major Modification (MOD21-0004) for the requisite entitlements to permit Parcel 3 (Villas Site) to be developed with 106 residential units ranging in size from 1 to 3 bedrooms, 23,843 square feet of event space, a 6,273 square foot restaurant, 5,513 square feet of amenities, a 381-space subterranean parking structure, and various recreational amenities.

e) The Parties hereto understand and agree that notwithstanding anything to the contrary herein or in the Original Development Agreement, as previously amended, the Project, as defined herein, and associated entitlements and City approvals, shall supersede Tentative Tract Map 34640, Preliminary Development Plan Case No. PDP06001, and all related prior City approvals, as approved by City on or around, or prior to, August 3, 2006, with the exception of the Tennis Villa Units.

**Section 5. Existing Hotel Units.** This Section 5 (Existing Hotel Units) shall apply to the Existing Hotel, which contains 244 traditional hotel rooms/suites, as depicted in the Site Plan, attached hereto as Exhibit F.

(1) Upgrades and Renovations. NEWAGE shall have the right to upgrade and renovate the Hotel's existing rooms/suites, which may include combining individual rooms/suites into larger rooms/suites in order to assure increased room rates and long-term viability.

(2) Lock-Off Configurations. The Existing Hotel Units which have legally approved separate entrance/exit doors may be constructed in a “lock off” configuration to permit the unit to be rented as two separate units.

(3) Condo-Hotel Units, Fractionals and Timeshares Prohibited. None of the 244 Existing Hotel Units shall be marketed, used or sold as condo-hotel units, fractionals or timeshares.

**Section 6. Condo-Hotel Units**. In consideration for the approval of this 10th Amendment, NEWAGE agrees that the Project and Project Site shall be subject to and comply with the City’s condo-hotel regulations as set forth in Ordinance No. 932, attached hereto as Exhibit E, unless specifically provided otherwise in this 10th Amendment. Should there be any inconsistency or conflict between the development standards and limitations and restrictions set forth in Section 17.30.095 of the Municipal Code with respect to development, ownership and operation of condo-hotel units and the provisions specifically set forth in this 10th Amendment, the provisions set forth in this 10th Amendment shall prevail and be applied to the Project and Project Site.

For purposes of this section, “owner occupation” shall include the person or entity listed as the record owner of the condo-hotel unit and the owner’s spouse, by marriage or otherwise, domestic partner, child or stepchild, by natural birth or adoption, parent, brother, sister, half-brother, half-sister, parent-in-law, brother-in-law, sister-in-law, nephew, niece, aunt, uncle, first cousin, or any person denoted by the prefix "grand" or "great," or the spouse of any of these persons.

**a) T-Wing Units**. This Section shall apply to the 48 T-Wing Units currently depicted in the attached Site Plan, attached hereto as Exhibit F, as the Building A-1 Units.

(1) Condo-Hotel Units. The 48 T-Wing Units may, at NEWAGE’s option, be developed as condo-hotel units.

(2) Fractionals and Timeshares Prohibited. None of the T-Wing Units shall be marketed, used or sold as fractionals or timeshares.

(3) Lock-Off Configurations. The T-Wing Units which have two legally approved separate entrance/exit doors may be constructed in a “lock-off” configuration to permit the unit to be rented as two separate units.

(4) Owner’s Allowable Occupancy Period. The period of time an owner of a condo-hotel unit amongst the T-Wing Units (“T-Wing Allowable Occupancy Period”) may occupy his or her unit shall not exceed six (6) months, whether consecutive or non-consecutive periods of occupancy, per calendar year. This provision

shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(5) Additional Owner Occupancy Beyond Owner's Allowable Occupancy Period. Any condo-hotel owner shall have a right to rent its unit for additional personal occupancy beyond the Allowable Occupancy Period as set forth herein, provided that the owner pays transient occupancy taxes for each day the owner occupies its condo-hotel unit beyond the Allowable Occupancy Period, even if the period of owner occupation beyond the owner's allowable occupancy period exceeds 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. This provision shall also replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(6) Rental Availability. When a condo-hotel unit amongst the T-Wing Units is not occupied by the owner, unless it is unoccupied for maintenance or repair purposes, the condo-hotel unit shall be made available for transient rentals to the general public pursuant to the City's condo-hotel regulations as set forth in Ordinance No. 932, attached hereto as Exhibit E, unless otherwise provided in this 10th Amendment.

(7) Transient Occupancy Tax. When a condo-hotel unit amongst the T-Wing Units is used as a transient rental, it shall be subject to the payment of transient occupancy taxes in accordance with the City's transient occupancy tax regulations in effect at the time the transient occupancy tax is due and payable, with the caveat that transient occupancy taxes shall also apply to condo-hotel unit rentals for more than 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. However, whenever any condo-hotel unit is occupied by a non-owner during the owner's occupancy period via a condominium, condo-hotel or any other share, trading or exchange system or program, whether formally established or operated as a "Club" or by any other method or means, the City shall be entitled to receive 100 percent of the applicable transient occupancy tax for each day of occupancy by the non-owner based on the fair market value of the room rate that would otherwise be charged for the subject unit.

**b) Hotel Villa Units**. This Section shall apply to the 58 Hotel Villa Units currently depicted in the Site Plan, attached hereto as Exhibit F, as the Building B1 through B15 Units.

(1) Condo-Hotel Units. The Hotel Villa Units may, at NEWAGE's option, convert the existing hotel rooms/suites into condo-hotel units.

(2) Fractionals and Timeshares Prohibited. None of the Hotel Villa Units shall be marketed, used or sold as fractionals or timeshares.

(3) Owner's Allowable Occupancy Period. The period of time an owner of a condo-hotel unit amongst the Hotel Villa Units ("Hotel Villa Allowable Occupancy Period") may occupy his or her unit shall not exceed six (6) months, whether consecutive or non-consecutive periods of occupancy, per calendar year. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(4) Additional Owner Occupancy Beyond Owner's Allowable Occupancy Period. Any condo-hotel owner shall have a right to rent its unit for additional personal occupancy beyond the Allowable Occupancy Period as set forth herein, provided that the owner pays transient occupancy taxes to the City for each day the owner occupies its condo-hotel unit beyond the Allowable Occupancy Period, even if the period of owner occupation beyond the owner's allowable occupancy period exceeds 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(5) Rental Availability. When a condo-hotel unit amongst the Hotel Villa Units is not occupied by the owner, unless it is unoccupied for maintenance or repair purposes, the condo-hotel unit shall be made available for transient rentals to the general public pursuant to the City's condo-hotel regulations as set forth in Ordinance No. 932, attached hereto as Exhibit E, unless otherwise provided in this 10th Amendment.

(6) Transient Occupancy Tax. When a condo-hotel unit amongst the Hotel Villa Units is used as a transient rental, it shall be subject to the payment of transient occupancy taxes in accordance with the City's transient occupancy tax regulations in effect at the time the transient occupancy tax is due and payable, with the caveat that transient occupancy taxes shall also apply to condo-hotel unit rentals for more than 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. However, whenever any condo-hotel unit is occupied by a non-owner during the owner's occupancy period via a condominium, condo-hotel or any other share, trading or exchange system or program, whether formally established or operated as a "Club" or by any other method or means, the City shall be entitled to receive 100 percent of the applicable transient occupancy tax for each day of

occupancy by the non-owner based on the fair market value of the room rate that would otherwise be charged for the subject unit.

**c) Tennis Villa Units.** This Section shall apply to the 25 Tennis Villa Units currently depicted in the Site Plan, attached hereto as Exhibit F.

(1) Condo-Hotel Units. The 25 Tennis Villa Units may, at NEWAGE's option, be developed as condo-hotel units.

(2) Lock-Off Configurations. The Tennis Villa Units which have two legally approved separate entrance/exit doors may be constructed in a "lock off" configuration to permit the unit to be rented as two separate units.

(3) Fractionals and Timeshares Prohibited. None of the 25 Tennis Villa Units shall be marketed, used or sold as fractionals or timeshares.

(4) Owner's Allowable Occupancy Period. The period of time an owner of a condo-hotel unit amongst the Tennis Villa Units ("Tennis Villa Allowable Occupancy Period") may occupy his or her unit shall be six (6) months, whether consecutive or non-consecutive periods of occupancy, per calendar year. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(5) Additional Owner Occupancy Beyond Owner's Allowable Occupancy Period. Any condo-hotel owner shall have a right to rent its unit for additional personal occupancy beyond the Allowable Occupancy Period as set forth herein, provided that the owner pays transient occupancy taxes to the City for each day the owner occupies its condo-hotel unit beyond the Allowable Occupancy Period, even if the period of owner occupation beyond the owner's allowable occupancy period exceeds 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(6) Rental Availability. When a condo-hotel unit amongst the Tennis Villa Units is not occupied by the owner, unless it is unoccupied for maintenance or repair purposes, the condo-hotel unit shall be made available for transient rentals to the general public pursuant to the City's condo-hotel regulations as set forth in Ordinance No. 932, attached hereto as Exhibit E, unless otherwise provided in this 10th Amendment.

(7) Transient Occupancy Taxes. When a condo-hotel unit amongst the Tennis Villa Units is used as a transient rental, it shall be subject to the payment of transient occupancy taxes in accordance with the City's transient occupancy tax regulations in effect at the time the transient occupancy tax is due and payable, with the caveat that transient occupancy taxes shall also apply to condo-hotel unit rentals for more than 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. However, whenever any condo-hotel unit is occupied by a non-owner during the owner's occupancy period via a condominium, condo-hotel or any other share, trading or exchange system or program, whether formally established or operated as a "Club" or by any other method or means, the City shall be entitled to receive 100 percent of the applicable transient occupancy tax for each day of occupancy by the non-owner based on the fair market value of the room rate that would otherwise be charged for the subject unit.

**d) Spa Suite Units.** This section shall apply to the existing 16 Spa Suite Units which were constructed 2015, as depicted in the Site Plan, attached hereto as Exhibit F, as the Spa Building.

(1) Condo-Hotel Units. The Spa Suite Units may, at NEWAGE's option, be converted into condo-hotel units.

(2) Lock-Off Configurations. The Spa Suite Units which have two legally approved separate entrance/exit doors may be constructed in a "lock off" configuration to permit the unit to be rented as two separate units.

(3) Fractionals and Timeshares Prohibited. None of the Spa Suite Units shall be marketed, used or sold as fractionals or timeshares.

(4) Owner's Allowable Occupancy Period. The period of time an owner, other than the Existing Hotel's professional management entity/company, of a condo-hotel unit amongst the Spa Suite Units ("Spa Suite Allowable Occupancy Period") may occupy his or her unit shall be six months, whether consecutive or non-consecutive periods of occupancy, per calendar year, as permitted under the December 31, 2015, Addendum to the 9th Amendment. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(5) Additional Owner Occupancy Beyond Owner's Allowable Occupancy Period. Any condo-hotel owner, other than the Existing Hotel's professional management entity/company, shall have a right to rent its unit for additional personal occupancy beyond the Allowable Occupancy Period as set forth herein, provided that the owner pays transient occupancy taxes to the City for each day the owner occupies

its condo-hotel unit beyond the Allowable Occupancy Period, even if the period of owner occupation beyond the owner's allowable occupancy period exceeds 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(6) Rental Availability. When a condo-hotel unit amongst the Spa Suite Units is not occupied by the owner, unless it is unoccupied for maintenance or repair purposes, the condo-hotel unit shall be made available for transient rentals to the general public pursuant to the City's condo-hotel regulations as set forth in Ordinance No. 932, attached hereto as Exhibit E, unless otherwise provided in this 10th Amendment. Any condo-hotel units owned, in whole or in part by the Existing Hotel's professional management entity/company shall be made available for rent for transient occupancy for no more than twenty-seven consecutive days by any given transient, at all times regardless of whether the Existing Hotel or management entity/company would otherwise have occupancy rights as an owner under this section.

(7) Transient Occupancy Tax. When a condo-hotel unit amongst the Spa Suite Units is used as a transient rental, it shall be subject to the payment of transient occupancy taxes in accordance with the City's transient occupancy tax regulations in effect at the time the transient occupancy tax is due and payable, unless otherwise provided below, and with the caveat that transient occupancy taxes shall also apply to rentals for more than 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. However, whenever any condo-hotel unit is occupied by a non-owner during the owner's occupancy period via a condominium, condo-hotel or any other share, trading or exchange system or program, whether formally established or operated as a "Club" or by any other method or means, the City shall be entitled to receive 100 percent of the applicable transient occupancy tax for each day of occupancy by the non-owner based on the fair market value of the room rate that would otherwise be charged for the subject unit.

**Section 7. Rental of Condo-Hotel Units.** The rental of any condo-hotel units pursuant to the terms and provisions of this 10th Amendment shall not be considered as "short-term rentals" which are prohibited in the City per Section 17.30.270 Short-Term Rentals of the Rancho Mirage Municipal Code since the rental of units located within City-approved hotels shall not be considered short-term rentals.

Considering the foregoing, as a condition to renting out a condo-hotel unit, the owner of the condo-hotel unit shall enter into an agreement with the Existing Hotel's management entity/company which, at a minimum, shall provide that the management

entity/company will collect all transient occupancy taxes required on rentals of that owner's condo-hotel unit and manage all permissible rental operations. The Existing Hotel's management entity/company shall then be responsible for forwarding transient occupancy taxes to the City in accordance with the City's transient occupancy tax regulations as set forth in the Rancho Mirage Municipal Code and any related procedures and regulations in effect at the time the transient occupancy taxes are due and payable to the City, unless otherwise provide in this 10th Amendment. In addition, under no circumstances shall any owner of a condo-hotel unit or any other unit described in this 10th Amendment advertise or cause to be advertised the availability of any such units for transient purposes for any period of time. All advertisements shall be handled, managed and facilitated solely by the Existing Hotel's management entity/company and any such advertisements shall not refer to the any condo-units or any other units covered by this 10th Amendment as "short-term rentals." NEWAGE shall submit documents for recordation which clearly demonstrate the forgoing advertisement restrictions and obligations, subject to the reasonable satisfaction of City Attorney and City Engineer.

**Section 8. Extension of Tentative Map.** In accordance with Government Code Section 66452(a)(1), TPM38768 shall be extended for the greater period of (a) the term of this Agreement or (b) such maximum total time as is permitted in accordance with the State Subdivision Map Act (Government Code Sections 66410 *et seq*.) or Applicable Law.

**Section 9. Operator.** NEWAGE agrees that the Project shall be operated during the life of the Project as an establishment that: (a) reflects the characteristics of the ultimate in luxury and sophistication with first class accommodations, and (b) maintains physical attributes that are extraordinary in every manner, and (c) provides a level of service that is meticulous and exceeds all guests' expectations while maintaining an impeccable standard of excellence.

**Section 10. Previous Amendments.** Except as herein modified and amended, provisions of the Original Development Agreement, the 1st Amendment, the 2nd Amendment, the 3rd Amendment, the 4th Amendment, the 5th Amendment, the 6th Amendment, the 7th Amendment, the 8th Amendment and 9th Amendment, and any addenda thereto, are ratified, confirmed and remain in full force and effect as if set forth and reiterated herein verbatim.

**Section 11. Term**. The parties agree that the Term of this 10th Amendment shall be ten (10) years commencing on the Effective Date subject to the extension and early termination provisions described in this 10th Amendment and this Term shall only apply to the Project Site. Upon termination of this 10th Amendment, this 10th Amendment shall be deemed terminated and of no further force and effect without the need of further documentation from the parties hereto, provided, however, that this termination shall not affect any right or duty arising from the entitlements or approvals

for the Project Site or the financial obligations of NEWAGE or its assignees and successors in interest agreed to by the parties or approved concurrently with, or subsequent to, the Effective Date or as otherwise provided in this 10th Amendment.

**Section 12. Cooperation by NEWAGE.** NEWAGE will, in a timely manner, provide the City with all documents, applications, plans and other information necessary for the City to carry out its obligations hereunder, and cause NEWAGE's planners, engineers, and all other consultants to submit in a timely manner all required materials and documents, therefore. NEWAGE also shall apply in a timely manner for such other permits and approvals from other governmental or quasi-governmental agencies having jurisdiction over the Project Site as may be required for the development of, or provision of services to, the Project Site.

**Section 13. Applicable Rules, Regulations and Policies.** Except as otherwise provided in this 10th Amendment, the rules, regulations, and policies governing the use, density, intensity, design, improvement, construction, building and occupancy standards and specifications of the Project and Project Site shall be those rules, regulations, and policies in place at the time of the Effective Date. The City, however, shall be permitted to apply certain rules, regulations and policies enacted after the Effective Date to discretionary actions which are not part of the Project.

**Section 14. Funding for Processing 10th Amendment and Entitlements Described Therein.** The actual costs for all services provided by the City and its consultants for processing of this 10th Amendment and the entitlements described herein shall be paid by NEWAGE. All such processing costs shall not be the obligations of the City or any of its departments and divisions, and the City shall not be liable for any such costs form its general fund or any other fund. In addition, to the extent that City, on behalf of NEWAGE, attempts to enter into binding agreements with other entities in order to assure the availability of certain permits and approvals or services necessary for development of the Project Site as described in this 10th Amendment, NEWAGE shall reimburse City for all costs and expenses incurred in connection with seeking and entering into any such agreements. Any fees, assessments, or other amounts payable by City pursuant to any such agreements described herein shall be borne by NEWAGE except where NEWAGE has notified City in writing, prior to City entering into any such agreement, that it does not desire for City to execute said agreement.

**Section 15. Processing Fees.** NEWAGE shall pay all land use approvals, building permits or other similar permits, licenses or entitlements which are in force and effect on a City-wide basis at the time application is made for such permits, licenses, or entitlements at the time such fees are due and payable during the development process.

**Section 16. Development Impact Fees.** NEWAGE shall pay all development

impact fees that are designed to pay for new or expanded public facilities needed to serve, or to mitigate the adverse effects of, a given development project (including any species protection or habitat preservation or conservation mitigation fees) that are in effect at the time such fees are due and payable during the development process.

**Section 17. Exactions.** NEWAGE shall pay or provide, as the case may be, all exactions, in-lieu fees or payments, dedication or reservation requirements, obligations for on-site or off-site improvements, construction requirements for public improvements, facilities, or services required of the Project or Project Site, whether such requirements constitute subdivision improvements, mitigation measures in connection with environmental review, or impositions made under any applicable ordinance or other applicable regulation.

**Section 18. Community Facilities District No. 1.** NEWAGE acknowledges the existence of "Community Facilities District No. 1" which was created pursuant to the Mello-Roos Community Facilities Act, as set forth in Government Code section 53311 et seq. for the purpose of funding certain public safety services. If the Project and Project Site are currently subject to the assessments of Community Services District No. 1, NEWAGE voluntarily consents that it will not vote or otherwise support the dissolution of said District. In the event said District formally dissolves, NEWAGE shall consent to paying an in-lieu assessment in a manner and form, deemed acceptable by the City, as though the District had never dissolved. If, however, the Project or Project Site, or any portions thereof, are not currently subject to the assessments of Community Facilities District No. 1, NEWAGE voluntarily consents to take whatever affirmative action it needs to take on its part to ensure that the Project and Project Site, and all portions thereof, are subject to the assessments of the Community Facilities District No. 1, which includes without limitation, voting to annex to said District.

**Section 19. Covenants Running With the Land and Constructive Notice.** All of the terms, provisions, and obligations contained in this 10th Amendment shall be binding upon NEWAGE and its heirs, successors, and assigns, and all other persons or entities acquiring all or any portion of the Project Site or Project, or any interest therein, whether by operation of law or in any manner whatsoever, and the rights thereof shall inure to the benefit of the City and its successors and assigns. As such, all of the provisions of this 10th Amendment shall be enforceable as equitable servitudes and constitute covenants running with the land pursuant to applicable law, including but not limited to, Section 1468 of the Civil Code of the State of California. Notwithstanding the above, every person who now or hereafter owns or acquires any right, title or interest in or to any portion of the Project Site or Project shall be deemed to have consented and agreed to every provision contained in this 10th Amendment, whether or not any reference to this 10th Amendment is contained in the instrument by which such person acquired an interest in the Project Site.

**Section 20. City's Obligations.** The City shall approve the permits, licenses and other entitlements as describe in this 10th Amendment pursuant to the provisions contained herein.

**Section 21. Periodic Review.** The City shall conduct a review of this 10th Amendment as set forth as follows:

**a) Annual Review.** The City will review the extent of good faith compliance by NEWAGE with the terms of this 10th Amendment annually commencing on the first anniversary of the Effective Date of this 10th Amendment.

**b) Notice.** The City shall notify NEWAGE in writing of the date of review at least thirty (30) days prior thereto.

**c) Good-faith Compliance.** During each annual review, NEWAGE is required to demonstrate good faith compliance with the terms of this 10th Amendment.

**d) Production of Documents and Other Evidence.** NEWAGE agrees to furnish such reasonable evidence and adequate documentation of good faith compliance as the City, in the exercise of its reasonable discretion, may require.

**e) Cost of Annual Review.** The costs incurred by City in connection with the annual review shall be borne by NEWAGE.

**Section 22. Relationship of Parties**. It is specifically understood and agreed by and between the parties hereto that the development of the Project Site is a private development and that neither party is acting as the agent of the other in any respect hereunder. The City and NEWAGE also hereby renounce the existence of any form of joint venture or partnership between them, and agree that nothing contained herein or in any document executed in connection herewith shall be construed as making the City and NEWAGE joint venturers or partners.

**Section 23. No Third Party Beneficiaries.** The only parties to this 10th Amendment are NEWAGE and the City. There are no third party beneficiaries and this 10th Amendment is not intended, and shall not be construed, to benefit, or be enforceable by any other person whatsoever.

**Section 24. Assignment.** NEWAGE shall have the right to assign its rights and obligations under this 10th Amendment, by giving prior written notice to the City, to any entity in which the NEWAGE, or its principal shareholders, retain a majority ownership interest so long as such assignee expressly assumes the obligations of NEWAGE hereunder. Otherwise, NEWAGE may not assign all or any portion of its rights hereunder nor delegate all or any portion of its duties and obligations hereunder without the prior written consent of the City, which consent shall not be unreasonably withheld.

**Section 25. Estoppel Certificate.** For and in consideration of entering into this 10th Amendment, the parties hereto acknowledge the receipt of good and valuable consideration. This paragraph shall constitute an Estoppel Certificate and shall be an independent agreement among the parties which is intended to and shall survive any subsequent determination that this 10th Amendment is invalid for any reason, by a final court decision, having jurisdiction thereof. NEWAGE represents to the City that it has no actual knowledge of any Claims, as herein below defined, against City specifically pertaining to the matters set forth in the Original Development Agreement, the 1st Amendment, the 2nd Amendment, the 3rd Amendment, the 4th Amendment, the 5th Amendment, the 6th Amendment, the 7th Amendment, the 8th Amendment and this 10th Amendment. For purposes of this Section, "claims" are defined as all known claims, fees, demands, costs, damages, obligations, expenditures, remedies, liens, rights or arbitration, rights of action and/or causes of action, whether compensatory or punitive, legal or equitable. This estoppel certificate legally bars NEWAGE from filing claims of which it had actual knowledge at the time of the approval by the City of this 10th Amendment.

**Section 26. Hold Harmless.** NEWAGE hereby agrees to, and shall defend, save and hold City and its elected and appointed boards, commissions, officers, agents, and employees harmless from, any and all claims, costs and liability for any damages, personal injury or death, which may arise, directly or indirectly, from NEWAGE's or NEWAGE's contractors', subcontractors', agents or employees' operations under this 10th Amendment, whether such negligent operations be by NEWAGE or by any of NEWAGE's contractors, subcontractors, agents or employees.

**Section 27. Indemnification.** NEWAGE shall defend, indemnify and hold harmless City and its agents, officers and employees against and from any and all liabilities, demands, claims, actions or proceedings and costs and expenses incidental thereto (including costs of defense, settlement and reasonable attorneys' fees), which any or all of them may suffer, incur, be responsible for or pay out as a result of or in connection with any challenge to the legality, validity or adequacy of any of the following: (i) any prior agreements by and between City and NEWAGE and/or its predecessor(s) in interest; (ii) this 10th Amendment and the concurrent and subsequent permits, licenses and entitlements approved for the Project or Project Site; (iii) the environmental impact report prepared in connection with the development of any environmental determinations made by the City in connection with this agreement, the Project and/or Project Site; and (iii) the proceedings undertaken in connection with the adoption or approval of any of the above. In the event of any legal or equitable action or other proceeding instituted by any third party (including a governmental entity or official) challenging the validity of any provision of this 10th Amendment or any portion thereof as set forth herein, the parties shall mutually cooperate with each other in defense of said action or proceeding. Notwithstanding the above, the City, at is sole option, may tender the complete defense of any third party challenge as described herein. In the

event, the City elects to contract with special counsel to provide for such a defense, the City shall meet and confer with NEWAGE regarding the selection of counsel, and NEWAGE shall pay all costs related to retention of such counsel.

**Section 28. Severability.** If any term, provision, covenant or condition of this 10th Amendment is repealed by referendum or is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions, if any, of this 10th Amendment shall continue in full force and effect, unless enforcement of this 10th Amendment as so invalidated would be unreasonable or grossly inequitable under all the circumstances or would frustrate the purposes of this 10th Amendment.

**Section 29. Singular and Plural; Gender; and Person.** Except where the context requires otherwise, the singular of any word shall include the plural and vice versa, and pronouns inferring the masculine gender shall include the feminine gender and neuter, and vice versa, and a reference to "person" shall include, in addition to a natural person, any governmental entity and any partnership, corporation, joint venture or any other form of business entity.

**Section 30. Time Is of the Essence.** Time is of the essence of this 10th Amendment and of each and every term and condition hereof.

**Section 31. Delays in Performance.** In addition to any other provisions of this 10th Amendment with respect to delay, NEWAGE and City shall be excused for performance of their obligations hereunder during any period of delay caused by acts of God or civil commotion, major acts of terrorism occurring in the United States of America, riots, strikes, picketing, or other labor disputes, shortage of materials or supplies, or damage to or prevention of work in process by reason of fire, floods, earthquake, or other casualties, litigation, acts or neglect of the other party, or restrictions imposed or mandated by governmental or quasi-governmental entities, enactment of conflicting provisions of the Constitution or laws of the United States of America or the State of California or any codes, statutes, regulations or executive mandates promulgated thereunder. If written notice of such delay is given to either party within (30) days of the commencement of such delay, an extension of time for such cause shall be granted in writing for the period of the delay, or longer as may be mutually agreed upon.

**Section 32. Events of Default.** Subject to any extensions of time by mutual consent in writing, and subject to the provisions of Section 31 "Delays in Performance", the failure or unreasonable delay by either party to perform any material term or provision of this 10th Amendment for a period of thirty (30) days after the dispatch of a written notice of default from the other party shall constitute a default under this 10th Amendment. If the nature of the alleged default is such that it cannot reasonably be cured within such 30-day period, the commencement of the cure within such time period and the diligent prosecution to completion of the cure shall be deemed a cure within

such period. Any Notice of Default give hereunder shall specify in detail the nature of the alleged Event of Default and the manner in which such Event of Default may be satisfactorily cured in accordance with the terms and conditions of this 10th Amendment. During the time periods herein specified for cure of an Event of Default, the party charged therewith shall not be considered to be in default for purposes of termination of this 10th Amendment, institution of legal proceedings with respect thereto, or whether any further building permits shall be issued with respect to the Project Site.

**Section 33. General Default Remedies.** After notice and expiration of the 30-day period without cure, the non-defaulting party shall have such rights and remedies against the defaulting party as it may have at law or in equity, including, but not limited to, the right to terminate this 10th Amendment pursuant to Government Code Section 65868 or seek mandamus, specific performance, injunctive or declaratory relief. Any rights or remedies available to non-defaulting party under this 10th Amendment and any other rights or remedies that such party may have at law or in equity upon a default by the other party under this 10th Amendment shall be distinct and separate, providing the non-defaulting party with cumulative rights and remedies. None of such rights or remedies, whether or not exercised by the non-defaulting party, shall be deemed to exclude any other rights or remedies available to the non-defaulting party. The non-defaulting party may, in its discretion, exercise any and all of its rights and remedies, at once or in succession, at such time or times as the non-defaulting party considers appropriate.

**Section 34. Legal Action; Attorneys' Fees.** Either party may, in addition to any other rights or remedies, institute legal action to cure, correct or remedy a default, enforce any covenant or agreement herein, enjoin any threatened or attempted violation hereof, or enforce by specific performance the obligations and rights of the parties hereto. The prevailing party in any such action shall be entitled to its reasonable attorneys' fees and costs to be paid by the losing party.

**Section 35. NEWAGE Default.** No building permit shall be issued or building permit application accepted for any structure on the Project Site after NEWAGE is determined by City to be in default of the terms and conditions of this 10th Amendment until such default thereafter is cured by the NEWAGE or is waived by the City. If the City terminates this 10th Amendment because of NEWAGE's default, then the City shall retain any and all benefits, including money or land received by the City hereunder.

**Section 36. Waiver.** All waivers must be in writing to be effective or binding upon the waiving party, and no waiver shall be implied from any omission by a party to take any action with respect to an Event of Default. Failure by a party to insist upon the strict performance of any of the provisions of this 10th Amendment by the other party shall not constitute waiver of such party's right to demand strict compliance by the other party in the future. In addition, no express written waiver of any Event of Default shall

affect any other Event of Default, or cover any other period of time specified in such express waiver.

**Section 37. Amendments.** This 10th Amendment may be amended from time to time by mutual consent of the original parties or their successors in interest, with the City's costs payable by amendment applicants, in accordance with the provisions of Government Code Section 65867 and 65868 and the City's adopted procedures and requirements for the consideration of development agreements.

**Section 38. Ambiguities or Uncertainties.** The parties hereto have mutually negotiated the terms and conditions of this Development Agreement and each party received independent legal advice from its attorneys with respect to the advisability of executing this 10th Amendment and the meaning of the provisions contained herein. As such, this 10th Amendment is a product of the joint drafting efforts of both parties and neither party shall be deemed to have solely or independently prepared or framed this 10th Amendment. Therefore, any ambiguities or uncertainties are not to be construed against or in favor of either party.

**Section 39. Applicable Law.** This 10th Amendment shall be construed and enforced in accordance with the laws of the State of California.

**Section 40. Nexus/Reasonable Relationship Challenges.** NEWAGE consents to, and waives any rights it may have now or in the future to challenge the legal validity of, the conditions, requirements, policies or programs set forth in this 10th Amendment including, without limitation, any claim that they constitute an abuse of the police power, violate substantive due process, deny equal protection of the laws, effect a taking of property without payment of just compensation, or impose an unlawful tax.

**Section 41. Civil Code Section 1542 Waiver**. NEWAGE hereby waives any and all rights they or their successors and assigns may have under Article XIIIC or Article XIIID of the California Constitution and any and all rights they or their successors and assigns may have under any other applicable law to contest the fees, exactions and assessments and/or their amounts payable to the City under this 10th Amendment as follows:

> **In furtherance of the intentions of the parties to this 10th Amendment, NEWAGE with and under advice of counsel, hereby expressly waives any and all right and benefit conferred upon said parties by the provisions of Civil Code Section 1542, which provides as follows:**
>
> > **"A general release does not extend to claims which a creditor or releasing party does not know or suspect to**

**exist in his or her favor at the time of executing the release and that, if known by him or her, would have materially affected his or her settlement with the debtor or released party."**

**NEWAGE further expressly waives any and all rights and benefits conferred upon NEWAGE by any provision of any other state, federal or local statute, code, ordinance or law similar to section 1542 of the Civil Code. NEWAGE expressly consents that the waiver of rights contained in the first paragraph shall be given full force and effect, according to the express terms and provisions of the instant waiver, to unknown and unsuspected claims, demands and causes of action, if any, arising out of or relating to the waiver of rights contained in this 10th Amendment.**

**Initials:**
**NEWAGE ____**

**Section 42. Venue.** In the event that suit is brought by either party to this 10th Amendment, the parties agree that venue shall be exclusively vested in the State courts of the County of Riverside, California or where appropriate, in the United States District Court, Southern District of California, Riverside, California.

**Section 43. No Damages Relief Against City.** The parties acknowledge that the City would not have entered into this 10th Amendment had it been exposed to damage claims from NEWAGE for any breach thereof. As such, the parties agree that in no event shall NEWAGE be entitled to recover damages against City for breach of this 10th Amendment.

**Section 44. Notices.** Any notice or communication required hereunder between City or NEWAGE shall be in writing, and may be given either personally or by registered mail, return-receipt requested. Notice, whether given by registered mail or personal delivery, shall be deemed to have been given and received on the actual receipt by any of the addresses designated below as the party to whom notices are to be sent. Any party hereto may at any time, upon written notice to the other party hereto, designate any other address in substitution of the address to which such notice or communication shall be given. Such notices or communications shall be given to the parties at their addresses set forth below:

To City:

City of Rancho Mirage
69-825 Highway 111
Rancho Mirage, CA 92270
Attention: City Manager

To NEWAGE:

Newage Rancho Mirage LLC
c/o Kam Sang Co., Inc.
411 E Huntington Drive, Ste 305
Arcadia, CA 91006
Attention: Ronnie Lam

**Section 45. Entire Agreement.** The Original Development Agreement, the 1st Amendment, the 2nd Amendment, the 3rd Amendment, the 4th Amendment, the 5th Amendment, the 6th Amendment, the 7th Amendment, the 8th Amendment, the 9th Amendment and this 10th Amendment and the Exhibits attached thereto contain all the representations and the entire agreement between the parties with respect to the subject matter hereof. Except as otherwise specified in this 10th Amendment and the Exhibits attached hereto, any prior correspondence, memoranda, agreements (other than the Original Development Agreement and all subsequent amendments), warranties or representations are superseded in total by this 10th Amendment and Exhibits hereto.

**Section 46. Recordation.** In order to comply with Section 65868.5 of the Development Agreement Statute, the parties do hereby direct the City Clerk to cause a copy of this 10th Amendment to be recorded with the Riverside County Recorder's Office within ten (10) days after the Enacting Ordinance takes effect.

**Section 47. Counterparts.** This 10th Amendment may be executed in duplicate counterpart originals, each of which is deemed to be an original, and all of which when taken together shall constitute one and the same instrument.

[THIS PORTION LEFT BLANK INTENTIONALLY]

DRAFT

IN WITNESS WHEREOF, the parties hereto have caused this 10th Amendment to be executed as of the dates written above.

**City of Rancho Mirage**

**By: _____**
**Lynn Mallotto**
**Mayor**

**ATTEST:**

**By: _____**
**Kristie Ramos**
**City Clerk**

**APPROVED AS TO FORM:**

**By: _____**
**Colin Kirkpatrick**
**City Attorney**

**NEWAGE-RANCHO, LLC., a Delaware limited liability company**

**By:_____**

**Its: _____**

**By:_____**

**Its: _____**
**Chief Financial Officer**

**APPROVED AS TO FORM:**

**By: _____**
**NEWAGE Attorney**

DRAFT

# EXHIBIT “A”

# HOTEL, SPA & SPA SUITES SITE
# LEGAL DESCRIPTION

LOTS 1 AND 2 OF TRACT MAP NO. 34640-1, AS SHOWN BY MAP ON FILE IN BOOK 443, PAGES 11 THROUGH 16, INCLUSIVE, OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY, CALIFORNIA.

APN: 689-330-031; 689-330-032; 689-330-034

DRAFT

# EXHIBIT “B”

# VILLA SITE
# LEGAL DESCRIPTION

LOTS 50 AND 51 OF TRACT MAP NO. 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY, CALIFORNIA.

APN: 689-330-026; 689-330-028

DRAFT

# EXHIBIT “C”

# TENNIS SITE
# LEGAL DESCRIPTION

LOT 48 OF TRACT MAP NO. 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGE 64, INCLUSIVE, OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY, CALIFORNIA.

APN: 689-330-011

DRAFT

# EXHIBIT “D”

## SKY MESA SITE
## LEGAL DESCRIPTION

Parcel No. 4, of Parcel Map No. 11913, in the County of Riverside, State of California, as per Map recorded in Book 53 of Parcel Maps, Pages 18 and 19, Records of said County.

Excepting therefrom any portion thereof lying within Tract No. 19397 as shown by Map on file in Book 160, Pages 64 through 77 of Maps, Records of Riverside County, California.

Also excepting therefrom any portion thereof lying within Parcel Map No. 24865 on file in Book 182, Pages 35 through 37 of Parcel Maps, Records of Riverside County, California.

Also excepting therefrom any portion thereof lying within Tract No. 2864 as shown by Map on file in Book 51, Pages 82 through 86 of Maps, Records of Riverside County, California.

Also excepting therefrom that portion conveyed to the City of Rancho Mirage, a Municipal Corporation by Documents recorded July 23, 1986 as Instrument Nos. 172881 and 172882 and recorded December 27, 1989 as Instrument Nos. 453114, 453116 and 453118, all Official Records of Riverside County, California.

Also excepting therefrom that portion conveyed to the Coachella Valley County Water District by Instrument recorded April 22, 1975 as Instrument No. 1975-45742 of Official Records of Riverside County, California.

Also excepting therefrom that portion conveyed to the City of Rancho Mirage, a Municipal corporation by Deed recorded October 28, 1976 as Instrument No. 165432 Official Records of Riverside County, California.

APN: 689-020-012; 689-020-014

DRAFT

# EXHIBIT “E”

# CONDO-HOTEL
# ORDINANCE NO. 932

DRAFT

# ORDINANCE NO. 932

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE AMENDING RANCHO MIRAGE MUNICIPAL CODE TO INCLUDE DEVELOPMENT AND USE REGULATIONS REGARDING CONDO-HOTEL PROJECTS**

**WHEREAS,** there has been a recent increase in the popularity of the development of and/or use of condo-hotel projects among individual and business investors, national and international hotel corporations, business travelers, members of the vacationing public and developers; and

**WHEREAS,** this increase in popularity has created a need for specific regulations to govern the development and operation of condo-hotel projects to ensure that such projects are developed and operated in a manner that not only effectively mitigate the impacts such projects will have on surrounding land uses and traffic circulation, but also enhances the City's ability to adequately provide for the public service needs of the owners and guests of condo-hotel units and the general public; and

**WHEREAS,** the potential conversion of existing revenue-producing lodging establishments in the City to condo-hotel projects may result in diminished revenue to the City's general fund that is used to pay for many general municipal services demanded of the City's residents, businesses, and transient guests of the City's many lodging establishments unless the City adopts development and operational standards regulating condo-hotel projects that are necessary for ensuring that such projects enhance rather than diminish the City's ability to continue providing optimal municipal services; and

**WHEREAS,** the City desires to enhance rather than diminish the provision of general municipal services to its residents, businesses and transient guests of the City's many lodging establishments now and in the future while promoting development that will result in attracting and encouraging the development of additional revenue-producing business activities to the City; and

**WHEREAS,** the changing hotel market throughout the country has created a demand for condo-hotel projects; and

**WHEREAS,** the City desires to enhance its opportunities in attracting new resort hotel development to meet the demands of the changing tourist trade while at the same time increasing revenue for general municipal services.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES ORDAIN AS FOLLOWS:**

**Section 1. TITLE**

This ordinance shall be known as the "Condo-Hotel Ordinance."

**Section 2. PURPOSE AND INTENT**

The purpose and intent of this Ordinance is to ensure that the development of condo-hotel projects in the City does not detrimentally impact surrounding uses and that such development provides opportunities for the City to enhance its abilities to provide optimal municipal services not only to the prospective owners and users of condo-hotel units, but also to the general public.

**Section 3. AMENDMENT TO SECTION 17.90.020" DEFINITIONS OF SPECIALIZED TERMS AND PHRASES"**

Section 17.90.020 of Chapter 17.90 "Definitions" of Title 17 "Zoning" is hereby amended as follows:

***"Condo-hotel project" shall mean a project which is operated to meet the definition of a hotel, containing condominiums, ownership of which may be structured as whole ownership condominiums, fractional ownership with no more than 12 fractional shares per unit, or other ownership/financing arrangement deemed by the City Council to be similar in function and/or operation, but shall not include timeshares.***

**Section 4. AMENDMENT TO SECTION 17.10.010 "PURPOSE"**

Paragraph B "Individual Zoning Districts" of Section 17.10.010 of Chapter 17.10 "Commercial and Industrial Districts" of Title 17 "Zoning" is hereby amended as follows:

6. Rs-H (Resort Hotel) Zone. The Rs-H zoning district is applied to areas appropriate for hotels and destination resorts, ***including condo-hotel projects,*** with limited ancillary commercial uses, including restaurants and health spas that directly support the primary use. The Rs-H zoning district is consistent with the resort hotel land use designation of the general plan; and

**Section 5.** **AMENDMENT TO SECTION 17.10.012 "ALLOWABLE COMMERCIAL AND INDUSTRIAL ZONE USES, PERMIT REQUIREMENTS AND PROJECT REVIEW AUTHORITY"**

Table 2-4 "Allowable Uses and Permit Requirements for Commercial and Industrial Zoning Districts" of Section 17.10.012 of Chapter 17.10 "Commercial and Industrial Districts" shall be amended to reflect that condo-hotel projects shall only be permitted in the Resort Hotel "Rs-H" District by a Development Permit Plan and a Development Agreement, when one is required, which shall all be subject to the final review authority of the City Council.

**Section 6.** **AMENDMENT TO SECTION 16.06.010 "DEFINITIONS"**

Section 16.06.010 of Chapter 16.06 "Definitions" of Title 16 "Subdivisions" shall be amended as follows:

9. "Condominium" means an estate in real property consisting of an undivided interest in common in a portion of a parcel together with a separate interest in space in a residential or commercial building on the real property, such as an apartment, residence, office, ***condo-hotel unit*** or store. Furthermore, a condominium may include a separate interest in other portions of the real property.

**Section 7.** **AMENDMENT TO CHAPTER 17.30 "STANDARDS FOR SPECIFIC LAND USES"**

Chapter 17.30 "Standard for Specific Land Uses" shall be amended as follows:

***17.30.095 Condo-Hotel projects.***

***A. Development Standards. The development standards applicable to Resort Hotels shall apply to all condo-hotel projects, unless otherwise provided***

*in this chapter or pursuant to a development agreement.*

B. *Conversions. No existing hotel room or existing hotel facility or structure shall be converted to condo-hotel status unless otherwise permitted pursuant to a development agreement.*

C. *Owner and Occupancy Restrictions. The following occupancy restrictions shall apply to all condo-hotel projects:*

1. *The number of units of a condo-hotel project that may be condo-hotel units shall be limited to no more than ten (10)percent of the project's total sum of condo-hotel units and hotel rooms combined unless otherwise permitted pursuant to a development agreement.*

2. *Each owner of a condo-hotel unit and each individual fractional owner of a condo-hotel unit shall be limited to using or occupying any given unit owned by said owner for no more than twenty-seven (27) days per calendar year unless otherwise permitted pursuant to a development agreement. Owners may assign their use and occupancy rights to a third party subject to the City's transient occupancy tax regulations unless otherwise provided pursuant to a development agreement.*

3. *Outside the owner occupancy periods, a condo-hotel unit shall be made available for transient occupancy purposes for no more than 27 consecutive days by any given transient.*

D. *Collection of Transient Occupancy Taxes. The following provisions shall apply to all condo-hotel projects:*

1. *Each owner of a condo-hotel unit shall enter into an agreement with a professional hotel management entity/company which, at a minimum, provides that the management*

*entity/company will collect all transient occupancy taxes required on rentals of that owner's unit, outside the owner occupancy periods, whether or not such rentals are handled by said management entity/company. The management entity/company shall then be responsible for forwarding transient occupancy taxes to the City in accordance with the City's transient occupancy tax regulations.*

*(a) Any condo-hotel units owned, in whole or in part by the parent hotel or professional management entity/company shall be made available for rent for transient occupancy for no more than 27 consecutive days by any given transient, at all times regardless of whether the hotel or management entity/company would otherwise have occupancy rights as an owner under this section.*

*2. The professional management entity/company designated to collect transient occupancy taxes pursuant to this section must have at least five (5) consecutive years of experience, meeting the First Class Hotel Standards and have no fewer than ten (10) other properties (each in separate cities, or distinct and separate projects in any given city, nationally or internationally) under current management unless otherwise provided pursuant to a development agreement.*

**Section 8. EFFECTIVE DATE**

This ordinance shall take effect thirty (30) days after its second reading.

**Section 9. CERTIFICATION**

The City Clerk shall certify to the passage of this ordinance and shall cause the same to be published according to law.

**PASSED AND ADOPTED THIS** 20TH day of July, 2006.

CITY OF RANCHO MIRAGE
CITY COUNCIL

Richard W. Kite
Mayor

ATTEST:

Elena Keeran
City Clerk

APPROVED AS TO FORM:

Steven Quintanilla
City Attorney

## ORDINANCE CERTIFICATION

***I, Elena Keeran, City Clerk of the City of Rancho Mirage, California, do hereby certify under penalty of perjury, that the foregoing Ordinance No. 932 was introduced by first reading at a meeting of the City Council held July 6, 2006, by the following vote:***

**AYES:** MEEPOS, MOLLER, SEMAN, HOBART, KITE
**NOES:** NONE
**ABSENT:** NONE
**ABSTAIN:** NONE

Ordinance No. 932 was adopted at a regular meeting of the City Council held on July 20, 2006 by the following vote:

**AYES:** MEEPOS, MOLLER, SEMAN, HOBART, KITE
**NOES:** NONE
**ABSENT:** NONE
**ABSTAIN:** NONE

I further certify that I have caused the Ordinance to be posted and/or published as required by law (GC Sect. 36933).

Elena Keeran

ELENA KEERAN, CMC
CITY CLERK

# EXHIBIT F

# SITE PLAN

# (TO BE ATTACHED)

DRAFT

STATE OF CALIFORNIA )
) ss.
COUNTY OF RIVERSIDE )

On _____ before me, _____, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under Penalty of Perjury under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal. (Seal)

Signature_____.

DRAFT

STATE OF CALIFORNIA )
) ss.
COUNTY OF RIVERSIDE )

On _____ before me, _____, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under Penalty of Perjury under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal. (Seal)

Signature_____.

DRAFT

# RESOLUTION NO. 2025-PC-02

**A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, RECOMMENDING THAT THE CITY COUNCIL: 1) ADOPT RESOLUTION [NEXT IN LINE] APPROVING THE MITIGATION MONITORING AND REPORTING PROGRAM AND MITIGATED NEGATIVE DECLARATION; AND 2) ADOPT RESOLUTION [NEXT IN LINE] APPROVING GENERAL PLAN ZONING MAP AMENDMENT GPZMA 21-0001, DEVELOPMENT AGREEMENT AMENDMENT DA21-0002, MAJOR MODIFICATION MOD21-0004 TO PRELIMINARY DEVELOPMENT PLAN, AND TENTATIVE PARCEL MAP TPM23-0002**

---

**WHEREAS**, the City of Rancho Mirage is a charter city and a municipal corporation of the State of California, and recognized as a political subdivision of the State of California for certain purpose; and

**WHEREAS**, the City previously approved on August 3, 2006, an Environmental Impact Report Case No. EIR06001, Tentative Tract Map No. 34640, and Preliminary Development Plan Case No. PDP06001. This project consisted of renovating the existing three story Ritz Carlton hotel and adding four additional guest rooms (244 total rooms), a 50,647 Spa Building with additional Spa Suites, T-Wing Building with 54 units ranging in size from 1 to 3 bedrooms (location of current Building A-1), Hotel Villas 57 two story units ranging in size from 2 to 4 bedrooms (location of current Buildings B-1 to B-15), and 25 (with a total of 49 keys) one and two story Hotel Villas on the former tennis site (located west of the existing Ritz Carlton Hotel). The hotel renovations and Spa Building (constructed in 2015) were completed as part of the 2006 entitlements. Although the 14 tennis courts, basketball court, sand volleyball court, small building, and associated improvements on the 7.96-acre Tennis Villas site were demolished, construction of the Tennis Villas never occurred but the entitlements remain valid. No modifications are proposed to the Tennis Villas, and they are not part of the current Major Modification application. The project site for the T-Wing Building and Hotel Villas (111 units in total as approved with 2006 entitlements) was partially graded but construction never occurred, this portion of the project site is part of the subject Major Modification (which now includes 106 units, event space, and subterranean parking); and

**WHEREAS**, Kam Sang Company on behalf of Newage Rancho Mirage LLC/Ritz Carlton ("Developer"), submitted applications for the "Proposed Project", which proposes the construction of the Ritz Carlton Residences, including but not limited to amenities and subterranean parking structure; and a Sky Mesa recreation area including but not limited to restaurant and restroom facility, lawn event space and pool area; a General Plan Zoning Map Amendment to amend the Mountain Reserve (MR) designation for the Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.86 acres (GPZMA 21-0001) (as described in more detail on Exhibit "C", attached hereto and incorporated herein by reference); a Tentative Parcel Map (TPM23-0002) establishing three parcels, with Parcel 3 containing 106 condo units (as described in more detail on Exhibit "C", attached hereto and incorporated herein by reference); a Major Modification to existing Preliminary

Development Plan PDP06001 (MOD21-0004) (as described in more detail on Exhibit "C", attached hereto and incorporated herein by reference); and a 10th Amendment to existing Development Agreement with Newage Rancho Mirage, LLC (DA 21-0002) (the "Development Agreement Amendment") (as described in more detail in Exhibit "D", attached hereto and incorporated herein by reference); affecting the real property generally located along Frank Sinatra Drive, approximately 0.85 miles southwest of the intersection with Highway 111, within the City of Rancho Mirage, having Assessor Parcel Numbers 689-330-026, 028, -031, -032, and -034; 689-020-012, -014; and 689-331-001, and -018 (the "Subject Property) (as depicted in Exhibit "A", attached hereto); and

**WHEREAS,** the Project (excluding the Sky Mesa portion, as identified in the January 9, 2025, Planning Commission staff report), is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums. The Tennis Villas project site (7.96 acres on APN: 689-330-011) located west of the existing Ritz Carlton Hotel, which was previously analyzed as part of a 2006 Environmental Impact Report, incorporated herein by reference, was also a part of the 2006 entitlements and is included in the 10th Amendment to the Project's Development Agreement. The Tennis Villas portion of the original entitlements is not being altered or modified from its original entitlements, and no new information relating to significant effects and means of reducing or avoiding any effects, which was not known and could have been known at the time the previous 2006 EIR was certified, has become available; and

**WHEREAS**, the MND was circulated for a 30-day public review period from March 11, 2024, through April 9, 2024. In response to comments received, the City revised the MND to clarify, correct, or supplement the information presented. The City recirculated the MND in accordance with Sections 15070(a) and 15073.5 of the CEQA Guidelines. The City has reviewed and considered the proposed Project and has determined that no significant impacts will occur with the implementation of mitigation measures. The recirculated MND was circulated for another 30-day public review period commencing July 22, 2024, through August 20, 2024; and

**WHEREAS,** the Planning Commission recommends the City Council approve and adopt a Mitigated Negative Declaration ("MND") and mitigation monitoring and reporting program ("MMRP"), attached hereto and incorporated herein in the proposed City Council Resolution as set forth in Exhibit "B", based upon its determination that there is no substantial evidence in the whole record before it that the Proposed Project will have a significant effect on the environment that has not been mitigated to a level of less than significant, and that the MND reflects the City's independent judgment and analysis of the Proposed Project and its potential impacts on the environment consistent with the provisions of the California Environmental Quality Act and CEQA Guidelines, as described in more detail in the draft Resolution attached to the January 9, 2025, Planning Commission staff report, regarding City Council's adoption and approval of the MND and MMRP.

**NOW, THEREFORE, THE PLANNING COMMISSION OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, DOES HEREBY RESOLVES AS FOLLOWS:**

**SECTION 1. RECITALS AND EXHIBITS.**

That the foregoing Recitals and attached Exhibits are true and correct and are hereby incorporated by this reference.

**SECTION 2. EVIDENCE AND ADMINISTRATIVE RECORD.**

That the Planning Commission conducted a noticed Public Hearing on January 9, 2025, and considered all of the evidence submitted into the administrative record for the Proposed Project, including, but not limited to, the following, which are all hereby incorporated herein by reference:

(a) Rancho Mirage Municipal Code;
(b) Rancho Mirage General Plan and Titles 16 (Subdivisions) & 17 (Zoning) of the Rancho Mirage Municipal Code and all relevant provisions contained therein;
(c) Tentative Parcel Map (TPM23-0002);
(d) General Plan Zoning Map Amendment GPZMA 21-0001 (the "GPZMA");
(e) Major Modification to Preliminary Development Plan, Case No. MOD21-0004;
(f) Development Agreement Amendment Case No. DA21-0002;
(g) The Original Development Agreement, as defined in the draft Ordinance attached to the January 9th, 2025, Planning Commission staff report, and all amendments thereto, all incorporated herein by this reference;
(h) The 2006 Environmental Impact Report (EIR06001) and
(i) Initial Study;
(j) Notice of Intent to adopt MND;
(k) MND and MMRP;
(l) Notice of Planning Commission Public Hearing scheduled for January 9, 2025, at 2:00 p.m. in the Council Chamber, located at City Hall at 69-825 Highway 111, Rancho Mirage, California;
(m) Planning Commission Staff Report, attachments and Staff presentation for the Proposed Project, and all public documents, records and references related thereto submitted or provided at or prior to the January 9, 2025, Planning Commission Public Hearing;
(n) Testimony and/or comments from Developer and its representatives submitted or provided at, or prior to, the January 9, 2025, Planning Commission Public Hearing; and
(o) Testimony and/or comments from all persons that were provided in written format or correspondence, at, or prior to, the January 9, 2025, Planning Commission Public Hearing.

**SECTION 3. FINDINGS.**

That the Planning Commission finds as follows:

a) That the proposed subdivision, together with the provisions for its design and improvements, are consistent with all applicable provisions of the municipal code;
b) That the proposed parcel map (TPM23-0002) is consistent with applicable general and specific plans as specified in California Government Code Section 65451;
c) That the design or improvement of the proposed subdivision is consistent with applicable general and specific plans;
d) That the site is physically suitable for the type of development;
e) That the site is physically suitable for the proposed density of development;
f) That the design of the subdivision or the proposed improvements is not likely to cause substantial environmental damage or substantially and avoidably injure fish or wildlife or their habitat;
g) That the design of the subdivision or type of improvements is not likely to cause serious public health problems;
h) That the design of the subdivision or the type of improvements will not conflict with easements, acquired by the public at large, for access through or use of, property within the proposed subdivision;
i) That the Proposed Project, and the GPZMA and Development Agreement Amendment specifically, are consistent with the General Plan, upon consideration of all of its aspects, including without limitation that the proposed amendment further the objectives and policies of the General Plan and do not obstruct their attainment;
j) That proposed development under a Major Modification is allowed withing the respective zoning district as permitted under the General Plan and applicable Specific Plan;
k) That Major Modification is generally in compliance with all of the applicable provisions of Title 17 that are necessary to carry out the purpose and requirements of the respective zoning district, including prescribed development standards and applicable design guidelines;
l) That Major Modification is consistent with the General Plan and applicable Specific Plan; and
m) The proposed project produces a comprehensive development incorporating a more enhanced environment and architectural excellence (e.g., appropriate variety of structure placement and orientation opportunities, appropriate mix of structure sizes, high quality architectural design, increased amounts of landscaping and open space, improved solutions to the design and placement of parking facilities, etc.) than would normally be possible under more standard district development requirements;
n) The design, location, shape, size, operating characteristics, and the provision of public and emergency vehicle access and public services and utilities (e.g., drainage, fire protection, sewers, water, etc.), ensure that the proposed development would not endanger, jeopardize, or otherwise constitute a hazard to the public convenience, health, interest, safety, or welfare, or injurious to the property or improvements in the vicinity and the respective zoning district;

o) The design, location, and proposed uses is compatible with the character of existing development in the surrounding neighborhood;
p) The subject site is physically suitable for the type and density/intensity of development being proposed;
q) That the Proposed Project have been reviewed in compliance with the provisions of the California Environmental Quality Act (CEQA) and CEQA Guidelines; and

**SECTION 4. RECOMMENDATIONS.**

That based on the foregoing Recitals and the Evidence contained in the Administrative Record for the Proposed Project, the Planning Commission Findings, as set forth and described herein, and the findings and determinations set forth in the January 9, 2025, Planning Commission Staff Report and the attached resolutions, the Planning Commission recommends that the City Council take the following actions:

a) Approve and Adopt the attached Resolution set forth in Exhibit "B", adopting the MND and MMRP; and

b) Adopt the attached Resolution set forth in Exhibit "C" approving Tentative Parcel Map (TPM23-0002), GPZMA (GPZMA 21-0001), Major Modification Case No. MOD21-0004, and 10th Amendment to Development Agreement (DA21-0002).

**SECTION 5. EFFECTIVE DATE.**

That this Resolution shall take effect immediately upon its adoption.

**SECTION 6. SEVERABILITY.**

That if any provision, section, paragraph, sentence or word of this Resolution or any portion of the Administrative Record for the Proposed Project be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words as hereby adopted shall remain in full force and effect.

**SECTION 7. CERTIFICATION.**

That the Secretary to the Planning Commission shall certify as to the adoption of this Resolution and shall cause the same to be processed in the manner required by law.

**SECTION 8. REPEAL OF CONFLICTING PROVISIONS.**

That all provisions of any resolution in effect prior to the effective date of this Resolution as adopted by the Planning Commission that are in conflict with the provisions of this Resolution, are hereby repealed.

**PASSED AND ADOPTED on this 9th day of January, 2025.**

Jassen Agostini, Chair

**ATTEST:**

Kristie Ramos, Secretary

**APPROVED AS TO FORM:**

Colin D. Kirkpatrick, City Attorney

**EXHIBIT "A"**

**SUBJECT PROPERTY**

**(SEE ATTACHED)**

# Aerial

## Ritz Carlton Rancho Mirage

Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21 0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case Number TPM23-0002 (TPM38768)



**EXHIBIT "B"**

**CITY COUNCIL RESOLUTION APPROVING AND ADOPTING MITIGATED NEGATIVE DECLARATION AND MITIGATION MONITORING AND REPORTING PROGRAM - EA21-0002**

**(SEE ATTACHED)**

**RESOLUTION NO. _____**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, ADOPTING AND APPROVING A MITIGATED NEGATIVE DECLARATION AND A MITIGATION MONITORING AND REPORTING PROGRAM REGARDING GENERAL PLAN ZONING MAP AMENDMENT GPZMA 21-0001, MAJOR MODIFICATION MOD21-0004, TENTATIVE PARCEL MAP (TPM23-0002) AND 10TH AMENDMENT TO DEVELOPMENT AGREEMENT WITH NEWAGE RANCHO MIRAGE, LLC (DA21-0002)**

**WHEREAS**, the City of Rancho Mirage is a charter city and a municipal corporation of the State of California, and recognized as a political subdivision of the State of California for certain purpose; and

**WHEREAS**, the "Proposed Project" proposes the construction of the Ritz Carlton Residences, including but not limited to amenities and subterranean parking structure; and a Sky Mesa recreation area including but not limited to restaurant and restroom facility, lawn event space and pool area; a General Plan Zoning Map Amendment to amend the Mountain Reserve (MR) designation for the Sky Mesa recreational area to Resort Hotel (Rs-H) on approximately 3.86 acres (GPZMA 21-0002); a Tentative Parcel Map (TPM23-0002) establishing three parcels, with Parcel 3 containing 106 condo units; a Major Modification to existing Preliminary Development Plan PDP06001 (MOD21-0004); and a 10th Amendment to existing Development Agreement with Newage Rancho Mirage, LLC (DA 21-0002) (the "Development Agreement Amendment"); affecting the real property generally located along Frank Sinatra Drive, approximately 0.85 miles southwest of the intersection with Highway 111, within the City of Rancho Mirage, having Assessor Parcel Numbers 689-330-026, -028, -031, -032, and -034; 689-020-012, -014; and 689-331-001, and -018 (the "Subject Property); and

**WHEREAS,** the Project (excluding the Sky Mesa portion, as identified in the January 9, 2025, Planning Commission staff report), is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums. The Tennis Villas project site (7.96 acres on APN: 689-330-011) located west of the existing Ritz Carlton Hotel, which was previously analyzed as part of a 2006 Environmental Impact Report, incorporated herein by reference, was also a part of the 2006 entitlements and is included in the 10th Amendment to the Project's Development Agreement. The Tennis Villas portion of the original entitlements is not being altered or modified from its original entitlements, and no new information relating to significant effects and means of reducing or avoiding any effects, which was not known and could have been known at the time the previous 2006 EIR was certified, has become available; and

**WHEREAS**, the MND was circulated for a 30-day public review period from March 11, 2024, through April 9, 2024. In response to comments received, the City revised the

MND to clarify, correct, or supplement the information presented. The City recirculated the MND in accordance with Sections 15070(a) and 15073.5 of the CEQA Guidelines. The City has reviewed and considered the proposed Project and has determined that no significant impacts will occur with the implementation of mitigation measures. The recirculated MND was circulated for another 30-day public review period commencing July 22, 2024, through August 20, 2024.

**WHEREAS**, on January 9, 2025, the Rancho Mirage Planning Commission adopted Resolution [TO BE INSERTED], incorporated herein by this reference, recommending, in part, the City Council approve and adopt this Resolution, adopting the Mitigated Negative Declaration ("MND") and Mitigation Monitoring and Reporting Program ("MMRP") based upon its determination that there is no substantial evidence in the whole record before it that the Proposed Project will have a significant effect on the environment that has not been mitigated to a level of less than significant, and that the MND reflects the City's independent judgment and analysis of the Proposed Project and its potential impacts on the environment consistent with the provisions of the California Environmental Quality Act and CEQA Guidelines; and

**WHEREAS**, the City Council has reviewed the draft Mitigation Monitoring and Reporting Program and proposed Mitigated Negative Declaration regarding the Proposed Project, attached hereto and incorporated herein by this reference as Exhibit "A".

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, DOES HEREBY RESOLVE AS FOLLOWS:**

**SECTION 1. RECITALS AND EXHIBITS**

That the foregoing Recitals and attached Exhibits are true and correct and are hereby incorporated by this reference.

**SECTION 2. EVIDENCE AND ADMINISTRATIVE RECORD**

That the City Council has considered all of the evidence ("Evidence") submitted into the administrative record ("Administrative Record") for the Proposed Project, including, but not limited to, the following, which are all hereby incorporated herein by reference:

(a) Rancho Mirage Municipal Code;
(b) Rancho Mirage General Plan and Title 16 (Subdivisions) & 17 (Zoning) of the Rancho Mirage Municipal Code and all relevant provisions contained therein;
(c) Tentative Parcel Map (TPM23-0002);
(d) General Plan Zoning Map Amendment GPZMA 21-0001 (the "GPZMA");
(e) Major Modification to Preliminary Development Plan, Case No. MOD21-0004;
(f) Development Agreement Amendment Case No. DA21-0002;

(g) The Original Development Agreement, as defined in the Ordinance attached to the January 9th, 2025, Planning Commission staff report, and all amendments thereto, all incorporated herein by this reference;
(h) The 2006 Environmental Impact Report (EIR06001) and
(i) Initial Study,
(j) Notice of Intent to adopt MND;
(k) MND and MMRP;
(l) Notice of Planning Commission Public Hearing scheduled for January 9, 2025, at 2:00 p.m. in the Council Chamber, located at City Hall at 69-825 Highway 111, Rancho Mirage, California;
(m) Planning Commission Staff Report, attachments and Staff presentation for the Proposed Project, and all public documents, records and references related thereto submitted or provided at or prior to the January 9, 2025, Planning Commission Public Hearing;
(n) Testimony and/or comments from Developer and its representatives submitted or provided at, or prior to, the January 9, 2025, Planning Commission Public Hearing;
(o) Testimony and/or comments from all persons that were provided in written format or correspondence, at, or prior to, the January 9, 2025, Planning Commission Public Hearing;
(p) Notice of City Council Public Hearing scheduled for [INSERT], 2025, at 1:00 p.m. in the Council Chamber, located at City Hall at 69-825 Highway 111, Rancho Mirage, California;
(q) Planning Commission Staff Report, attachments and Staff presentation for the Proposed Project, and all public documents, records and references related thereto submitted or provided at or prior to the [INSERT], 2025, City Council Public Hearing;
(r) Testimony and/or comments from Developer and its representatives submitted or provided at, or prior to, the [INSERT], 2025, City Council Public Hearing; and
(s) Testimony and/or comments from all persons that were provided in written format or correspondence, at, or prior to, the [INSERT], 2025, City Council Public Hearing.

**SECTION 3. FINDINGS AND DETERMINATIONS**

That based on the foregoing Recitals and the Evidence contained in the Administrative Record for the Proposed Project, as set forth and described herein, the City Council acknowledges, accepts, and approves, and makes the following Findings and Determinations:

(a) That the City has independently reviewed, analyzed, and considered the Mitigated Negative Declaration and Mitigation Monitoring Plan, and the whole record before it (including, the Initial Study and comments received) and, based on the foregoing, the City Council hereby finds that all environmental impacts of the proposed Project, with mitigation measures,

are below a level of significance and there is no substantial evidence supporting a fair argument that the proposed Project will have a significant effect on the environment.

(b) That the Mitigated Negative Declaration and Mitigation Monitoring Plan have been completed in compliance with CEQA and CEQA Guidelines.

(c) That the Mitigated Negative Declaration and Mitigation Monitoring Plan represent the independent judgment and analysis of the Planning Commission and City Council as lead agency for the proposed Project.

(d) That the Mitigated Negative Declaration and Mitigation Monitoring Plan are adequate to serve as the required CEQA environmental documentation for the proposed Project.

(e) That CEQA Guidelines provide that once an EIR has been certified, the basis for an agency's determination a further EIR is not required may be included in the agency's findings on the project or elsewhere in the record (14 Cal Code Regs Section 15164(e); however, adoption of a subsequent mitigated negative declaration is appropriate because potentially significant impacts not addressed in the underlying EIR can be substantially reduced or avoided by adopting additional mitigation measures, which the City has done via the Mitigated Negative Declaration and Mitigation Monitoring Plan. In other words, the City has evaluated changed made to the project and concluded that significant impacts have been avoided or substantially reduced through the adoption of mitigation measures, as set forth herein.

**SECTION 4. ADOPT THE MITIGATION MONITORING AND REPORTING PROGRAM AND APPROVAL OF MITIGATED NEGATIVE DECLARATION**

That based on the Findings and Determinations set forth herein and the substantial evidence included in the Recitals, Exhibits and Evidence contained in Administrative Record, the City Council hereby adopts the Mitigation Monitoring and Reporting Program and approves the Mitigated Negative Declaration, including the findings set forth therein which support a determination that all potentially significant environmental impacts from implementation of the proposed Project have been identified and, with the implementation of the mitigation measures defined and set forth in the Mitigation Monitoring and Reporting Program, will be mitigated to a less-than-significant level.

**SECTION 5. NOTICE OF DETERMINATION**

That the City Council authorizes and directs the Planning Division to prepare, execute, and file a Notice of Determination in accordance with Public Resource Code Section 21152.

**SECTION 6. EFFECTIVE DATE**

That this Resolution shall take effect immediately upon its adoption.

**SECTION 7. SEVERABILITY**

That if any provision, section, paragraph, sentence or word of Resolution or any portion of the Administrative Record for the Proposed Project be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words as hereby adopted shall remain in full force and effect.

**SECTION 8. CERTIFICATION.**

That the City Clerk shall certify as to the adoption of this Resolution and shall cause the same to be processed in the manner required by law.

**SECTION 9. REPEAL OF CONFLICTING PROVISIONS.**

That all provisions of any resolution in effect prior to the effective date of this Resolution as adopted by the City Council that are in conflict with the provisions of this Resolution, are hereby repealed.

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**PASSED AND ADOPTED** on this ___ day of ____, 2025.

_____
Ted Weill, Mayor

**ATTEST:**

_____
Kristie Ramos, City Clerk

**APPROVED AS TO FORM:**

_____
Colin Kirkpatrick, City Attorney

**EXHIBIT "A"**

**MITIGATED NEGATIVE DECLARATION & MITIGATION MONITORING AND REPORTING PROGRAM (EA21-0002)**

**(TO BE ATTACHED)**

**EXHIBIT "C"**

**CITY COUNCIL RESOLUTION APPROVING TENTATIVE PARCEL MAP, GENERAL PLAN ZONING MAP AMENDMENT, AND MAJOR MODIFICATION - TPM23-0002, GPZMA 21-0001, AND MOD21-0004**

**(SEE ATTACHED)**

**RESOLUTION NO. _____**

**A RESOLUTION OF THE CITY COUNCIL OF RANCHO MIRAGE, CALIFORNIA, APPROVING GENERAL PLAN ZONING MAP AMENDMENT CASE NO. GPZMA 21-0001, APPROVING TENTATIVE PARCEL MAP TPM 23-0002, AND MAJOR MODIFICATION MOD21-0004, REGARDING THE RITZ CARLTON RANCHO MIRAGE**

**WHEREAS**, the City of Rancho Mirage is a charter city and a municipal corporation of the State of California, and recognized as a political subdivision of State of California for certain purpose; and

**WHEREAS**, on January 9, 2025, the Planning Commission recommended the City Council approve and adopt a Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program regarding the Proposed Project, and approve the "Proposed Project", which proposes the construction of the Ritz Carlton Residences, including but not limited to amenities and subterranean parking structure; and a Sky Mesa recreation area including but not limited to restaurant and restroom facility, lawn event space and pool area; a General Plan Zoning Map Amendment to amend the Mountain Reserve (MR) designation for the Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (GPZMA 21-0002); a Tentative Parcel Map (TPM23-0002) establishing three parcels, with Parcel 3 containing 106 condo units; a Major Modification to existing Preliminary Development Plan PDP06001 (MOD21-0004); and a 10th Amendment to existing Development Agreement with Newage Rancho Mirage, LLC (DA 21-0002) (the "Development Agreement Amendment"); affecting the real property generally located along Frank Sinatra Drive, approximately 0.85 miles southwest of the intersection with Highway 111, within the City of Rancho Mirage, having Assessor Parcel Numbers 689-330-026, 028, -031, -032, and -034; 689-020-012, -014; and 689-331-001, and -018 (the "Subject Property); and

**WHEREAS**, the City Council desires to adopt the General Plan Zoning Map Amendment (GPZMA21-0001) (the "GPZMA"), Tentative Parcel Map TPM 23-0002, and Major Modification (MOD21-0004) (the "Major Mod"); and

**WHEREAS**, on [INSERT DATE], 2025, the City Council adopted Resolution No. [TO BE INSERTED] approving and adopting a Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program for the Proposed Project.

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, DOES HEREBY RESOLVE AS FOLLOWS:**

**SECTION 1. RECITALS AND EXHIBITS**

That the foregoing Recitals and attached Exhibits are true and correct and are hereby incorporated by this reference.

**SECTION 2. EVIDENCE AND ADMINISTRATIVE RECORD.**

That the City Council conducted a noticed Public Hearing on [INSERT], 2025, and considered all of the evidence submitted into the administrative record for the Proposed Project, including, but not limited to, the following, which are all hereby incorporated herein by reference:

(a) Rancho Mirage Municipal Code;
(b) Rancho Mirage General Plan and Titles 16 (Subdivisions) & 17 (Zoning) of the Rancho Mirage Municipal Code and all relevant provisions contained therein;
(c) Tentative Parcel Map (TPM23-0002);
(d) General Plan Zoning Map Amendment GPZMA 21-0001;
(e) Major Modification to Preliminary Development Plan, Case No. MOD21-0004;
(f) Development Agreement Amendment Case No. DA21-0002;
(g) Initial Study,
(h) Notice of Intent to adopt MND;
(i) MND and MMRP;
(j) Notice of Planning Commission Public Hearing scheduled for January 9, 2025, at 2:00 p.m. in the Council Chamber, located at City Hall at 69-825 Highway 111, Rancho Mirage, California;
(k) Planning Commission Staff Report, attachments and Staff presentation for the Proposed Project, and all public documents, records and references related thereto submitted or provided at or prior to the January 9, 2025, Planning Commission Public Hearing;
(l) Testimony and/or comments from Developer and its representatives submitted or provided at, or prior to, the January 9, 2025, Planning Commission Public Hearing;
(m) Testimony and/or comments from all persons that were provided in written format or correspondence, at, or prior to, the January 9, 2025, Planning Commission Public Hearing;
(n) Notice of City Council Public Hearing scheduled for [INSERT], 2025, at 1:00 p.m. in the Council Chamber, located at City Hall at 69-825 Highway 111, Rancho Mirage, California;
(o) Planning Commission Staff Report, attachments and Staff presentation for the Proposed Project, and all public documents, records and references related thereto submitted or provided at or prior to the [INSERT], 2025, City Council Public Hearing;
(p) Testimony and/or comments from Developer and its representatives submitted or provided at, or prior to, the [INSERT], 2025, City Council Public Hearing; and
(q) Testimony and/or comments from all persons that were provided in written format or correspondence, at, or prior to, the [INSERT], 2025, City Council Public Hearing.

**SECTION 3. GPZMA FINDINGS**

That the City Council finds the GPZMA is consistent with the General Plan, upon consideration of all of its aspects, including without limitation that the proposed amendment further the objectives and policies of the General Plan and do not obstruct their attainment.

**SECTION 3. ADOPT GENERAL PLAN ZONING MAP AMENDMENT**

That the City Council hereby amends the General Plan Zoning Map, changing the existing designation from Mountain Reserve (MR) to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014), as identified in more detail in Exhibit "A".

**SECTION 4. FINDINGS**

That the City Council finds as follows:

a) That the proposed subdivision, together with the provisions for its design and improvements, are consistent with all applicable provisions of the municipal code;
b) That the proposed Tentative Parcel Map (TPM23-0002) is consistent with applicable general and specific plans as specified in California Government Code Section 65451;
c) That the design or improvement of the proposed subdivision is consistent with applicable general and specific plans;
d) That the site is physically suitable for the type of development;
e) That the site is physically suitable for the proposed density of development;
f) That the design of the subdivision or the proposed improvements is not likely to cause substantial environmental damage or substantially and avoidably injure fish or wildlife or their habitat;
g) That the design of the subdivision or type of improvements is not likely to cause serious public health problems; and
h) That the design of the subdivision or the type of improvements will not conflict with easements, acquired by the public at large, for access through or use of, property within the proposed subdivision;
j) That proposed development under the Major Modification is allowed within the respective zoning district as permitted under the General Plan and applicable Specific Plan;
k) That Major Mod is generally in compliance with all of the applicable provisions of Title 17 that are necessary to carry out the purpose and requirements of the respective zoning district, including prescribed development standards and applicable design guidelines;
l) That Major Mod is consistent with the General Plan and applicable Specific Plan; and
m) The proposed project produces a comprehensive development incorporating a more enhanced environment and architectural excellence (e.g., appropriate variety

of structure placement and orientation opportunities, appropriate mix of structure sizes, high quality architectural design, increased amounts of landscaping and open space, improved solutions to the design and placement of parking facilities, etc.) than would normally be possible under more standard district development requirements;

n) The design, location, shape, size, operating characteristics, and the provision of public and emergency vehicle access and public services and utilities (e.g., drainage, fire protection, sewers, water, etc.), ensure that the proposed development would not endanger, jeopardize, or otherwise constitute a hazard to the public convenience, health, interest, safety, or welfare, or injurious to the property or improvements in the vicinity and the respective zoning district;
o) The design, location, and proposed uses is compatible with the character of existing development in the surrounding neighborhood;
p) The subject site is physically suitable for the type and density/intensity of development being proposed; and
q) That the Proposed Project have been reviewed in compliance with the provisions of the California Environmental Quality Act (CEQA) and CEQA Guidelines.

**SECTION 5. PROJECT APPROVAL**

That based on the foregoing Recitals and the Evidence contained in the Administrative Record for the Proposed Project, the City Council Findings, as set forth and described herein, and the findings and determinations set forth in the January 9, 2025, Planning Commission Staff Report and the resolutions, the City Council hereby approves the Tentative Parcel Map Case No. TPM23-0002, Major Modification Case No. MOD21-0004, and General Plan Zoning Map Amendment Case No. GPZMA21-0001.

**SECTION 6. EFFECTIVE DATE**

That this Resolution shall take effect immediately upon its adoption.

**SECTION 7. GOVERNMENT CODE 66020 NOTICE**

That pursuant to Government Code section 66020(d)(1), notice is hereby given that the Proposed Project is subject to certain fees, dedications, reservations and other exactions as provided herein, in the staff report and conditions of approval (collectively, "Conditions"); and these Conditions constitute written notice of a statement of the amount of such fees, and a description of the dedications, reservations, and other exactions, and that the applicant is hereby notified that the ninety-day approval period in which the applicant may protest these fees, dedications, reservations, and other exactions, pursuant to Government Code Section 66020(a), has commenced upon the date of adoption of this Resolution.

**SECTION 8. SEVERABILITY**

That if any provision, section, paragraph, sentence or word of this Resolution be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words as hereby adopted shall remain in full force and effect.

**SECTION 9. CERTIFICATION**

That the City Clerk shall certify as to the adoption of this Resolution and shall cause the same to be processed in the manner required by law.

**SECTION 10. REPEAL OF CONFLICTING PROVISIONS**

That all provisions of any resolution and/or General Plan Zoning Map, in effect prior to the effective date of this Resolution as adopted by the City Council that are in conflict with the provisions of this Resolution, are hereby repealed.

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The foregoing Resolution was approved and adopted at a meeting of the City Council held on _____ by the following vote:

**CITY OF RANCHO MIRAGE:**

_____
Ted Weill, Mayor

**ATTEST:**

_____
Kristie Ramos, City Clerk

**APPROVED AS TO FORM:**

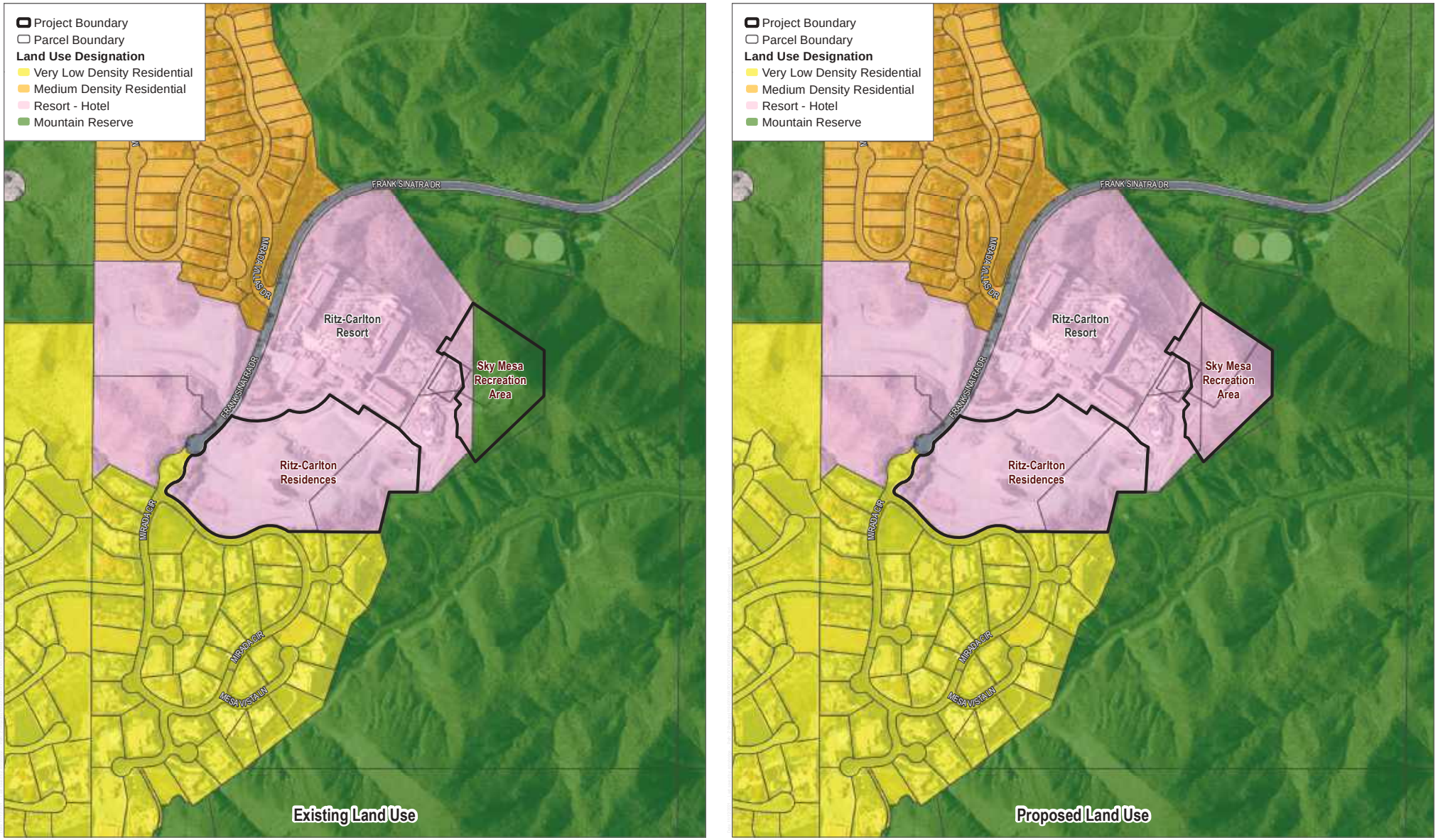
_____
Colin D. Kirkpatrick, City Attorney

**EXHIBIT "A"**

**GENERAL PLAN ZONING MAP**
**AMENDMENT CASE NO. GPZMA24-0001**

**(SEE ATTACHED)**

# General Plan Zoning Map Amendment (GPZMA21-0001) Exhibit




SOURCE: ESRI Clarity Imagery 2019

DUDEK

0 200 400 Feet

**FIGURE 1-12**

Existing and Proposed Land Use Designations

Ritz-Carlton Rancho Mirage Initial Study

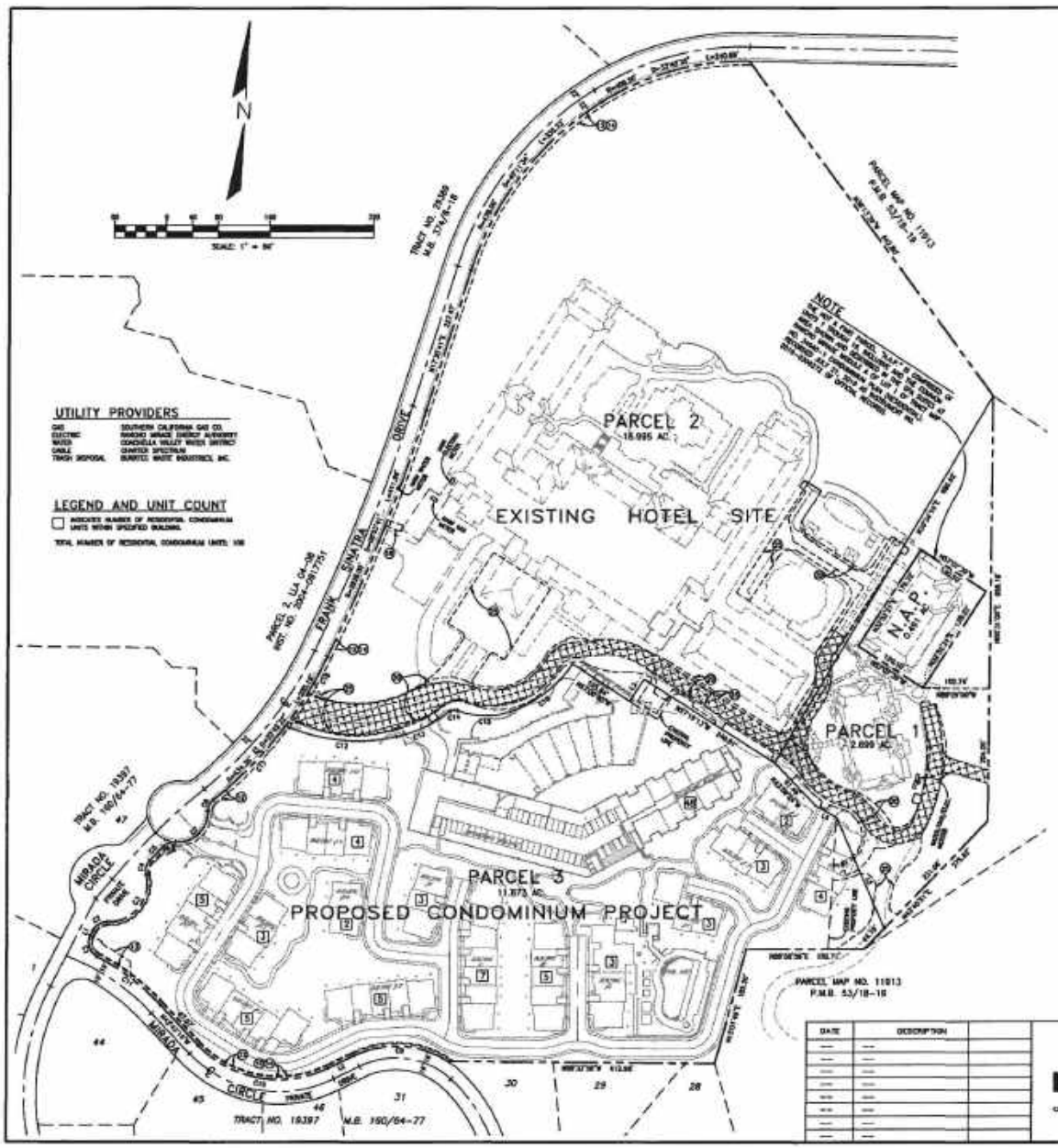
## EXHIBIT "B"

## TENTATIVE PARCEL MAP TPM23-0002 (TPM38768)

## (SEE ATTACHED)

# TENTATIVE PARCEL MAP NO. 38768

IN THE CITY OF RANCHO MIRAGE
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA
FOR CONDOMINIUM PURPOSES




| LINE DATA | | |
|---|---|---|
| NO. | BEARING | DISTANCE |
| L1 | N28°54'41"E | 8.23' |
| L2 | N63°05'19"W | 44.58' |
| L3 | S27°05'30"E | 46.78' |
| L4 | N61°51'18"W | 27.28' |
| L5 | N53°19'58"W | 102.21' |

| CURVE DATA | | | |
|---|---|---|---|
| NO. | RADIUS | DELTA | ARC |
| C1 | 25.00' | 89°55'40" | 39.24' |
| C2 | 25.00' | 89°55'21" | 39.24' |
| C3 | 55.00' | 120°16'28" | 115.46' |
| C4 | 25.00' | 90°47'06" | 39.62' |
| C5 | 100.21' | 31°46'30" | 55.57' |
| C6 | 25.00' | 89°51'38" | 39.24' |
| C7 | 45.00' | 89°55'06" | 70.63' |
| C8 | 25.00' | 89°51'38" | 39.24' |
| C9 | 25.00' | 23°31'02" | 10.26' |
| C10 | 1141.00' | 28°47'43" | 573.58' |
| C11 | 1255.00' | 11°00'48" | 241.18' |
| C12 | 1255.00' | 19°24'23" | 425.08' |
| C13 | 1255.00' | 28°06'46" | 615.68' |
| C14 | 1255.00' | 29°51'26" | 653.97' |
| C15 | 11.00' | 90°28'04" | 17.37' |
| C16 | 1141.00' | 28°47'43" | 573.58' |
| C17 | 1141.00' | 28°47'43" | 573.58' |
| C18 | 1255.00' | 29°51'26" | 653.97' |
| C19 | 1141.00' | 28°47'43" | 573.58' |
| C20 | 1255.00' | 29°51'26" | 653.97' |
| C21 | 1255.00' | 29°51'26" | 653.97' |
| C22 | 1141.00' | 28°47'43" | 573.58' |
| C23 | 1255.00' | 29°51'26" | 653.97' |
| C24 | 11.00' | 90°28'04" | 17.37' |
| C25 | 1141.00' | 28°47'43" | 573.58' |
| C26 | 1255.00' | 29°51'26" | 653.97' |
| C27 | 11.00' | 90°28'04" | 17.37' |
| C28 | 1141.00' | 28°47'43" | 573.58' |
| C29 | 1255.00' | 29°51'26" | 653.97' |
| C30 | 11.00' | 90°28'04" | 17.37' |
|

# TENTATIVE PARCEL MAP NO. 38768

IN THE CITY OF RANCHO MIRAGE
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA
FOR CONDOMINIUM PURPOSES

## LEGAL DESCRIPTION

PARCEL 1

REAL PROPERTY IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

LOTS 1 AND 2 OF TRACT NO. 34840-1, AS PER MAP RECORDED IN BOOK 443 PAGES 11 THROUGH 18 INCLUSIVE OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT FROM LOT 1, UNITS 1 THROUGH 18, INCLUSIVE AND COMMON AREA SHOWN AND DESCRIBED IN THE SITA SUITES AT RANCHO MIRAGE MIDDLE A OF LOT 1 OF TRACT MAP NO. 34840-1 CONDOMINIUM PLAN (RESTRICTION), RECORDED JULY 21, 2016 AS INSTRUMENT NO. 2016-0282272 OF OFFICIAL RECORDS.

APNs: 689-330-021 (LOT 2), 689-330-032 (PORTION OF LOT 1) AND 689-330-034 (PORTION OF LOT 1)

PARCEL 2

REAL PROPERTY IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

THOSE PORTIONS OF LOTS 30 AND 31 OF TRACT MAP NO. 15381, AS SHOWN BY MAP ON FILE IN BOOK 186 PAGES 84 THROUGH 91, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS, BEING LOCATED IN THE NORTHWEST QUARTER OF SECTION 2, TOWNSHIP 5 SOUTH, RANGE 5 EAST, S.B.M., MORE PARTICULARLY DESCRIBED AS A WHOLE AS FOLLOWS:

BEGINNING AT THE MOST EASTERLY NORTHEAST CORNER OF SAID LOT 30; THENCE SOUTH 39°24'18" WEST, A DISTANCE OF 846.85 FEET; THENCE NORTH 57°35'30" WEST, A DISTANCE OF 228.38 FEET; THENCE SOUTH 32°00'00" WEST, A DISTANCE OF 54.00 FEET; THENCE NORTH 57°00'00" WEST, A DISTANCE OF 175.00 FEET TO THE BEGINNING OF A NON-TANGENT CURVE, CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 83.00 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 73°28'51" EAST; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 27°55'05", AN ARC DISTANCE OF 40.47 FEET TO THE BEGINNING OF A COMPOUND CURVE, CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 185.00 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 45°13'56" EAST; THENCE SOUTHEASTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 23°03'36", AN ARC DISTANCE OF 78.40 FEET TO THE BEGINNING OF A COMPOUND CURVE, CONCAVE NORTHERLY, AND HAVING A RADIUS OF 115.00 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 19°11'33" EAST; THENCE WESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 87°30'06", AN ARC DISTANCE OF 13.11 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 205.00 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 22°00'28" EAST; THENCE WESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 11°16'30", AN ARC DISTANCE OF 40.32 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE SOUTHERLY, AND HAVING A RADIUS OF 11.00 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 33°06'28" EAST; THENCE WESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 87°30'06", AN ARC DISTANCE OF 13.11 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 205.00 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 36°14'34" EAST; THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 27°51'28", AN ARC DISTANCE OF 99.52 FEET TO THE BEGINNING OF A COMPOUND CURVE, CONCAVE NORTHERLY, AND HAVING A RADIUS OF 379.00 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 12°22'59" EAST; THENCE WESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 34°52'31", AN ARC DISTANCE OF 170.12 FEET TO A POINT ON THE WESTERLY LINE OF SAID LOT 30, OF TRACT MAP NO. 15307 AND THE BEGINNING OF A NON-TANGENT CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 834.50 FEET, A RADIAL LINE FROM LAST SAID NON-TANGENT CURVE TO SAID POINT BEARS SOUTH 52°08'31" EAST; THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE AND ALONG THE WESTERLY LINES OF SAID LOTS 30 AND 31, THROUGH A CENTRAL ANGLE OF 14°28'34", AN ARC DISTANCE OF 140.97 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE SOUTHEASTERLY AND HAVING A RADIUS OF 21.00 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 28°49'18" WEST; THENCE CONTINUING SOUTHERLY ALONG THE WESTERLY LINES OF SAID LOT 31 THROUGH THE FOLLOWING FOUR (4) COURSES:

1. THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 53°22'36", AN ARC DISTANCE OF 19.35 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 47.00 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 84°51'53" EAST;

2. THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 159°49'22", AN ARC DISTANCE OF 80.06 FEET TO THE BEGINNING OF A NON-TANGENT CURVE, CONCAVE SOUTHEASTERLY AND HAVING A RADIUS OF 21.00 FEET, A RADIAL LINE FROM LAST SAID NON-TANGENT CURVE TO SAID POINT BEARS NORTH 21°58'24" WEST;

3. THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 23°38'08", AN ARC DISTANCE OF 8.82 FEET TO THE BEGINNING OF A COMPOUND CURVE, CONCAVE SOUTHEASTERLY AND HAVING A RADIUS OF 855.31 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 44°44'32" WEST;

4. THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 00°45'34", AN ARC DISTANCE OF 11.31 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE EASTERLY AND HAVING A RADIUS OF 84.50 FEET, A RADIAL LINE FROM LAST SAID NON- TANGENT CURVE TO SAID POINT BEARS NORTH 35°59'17" WEST, SAID POINT ALSO BEING THE MOST NORTHERLY CORNER OF PORTION C, AS DESCRIBED IN CITY OF RANCHO MIRAGE LOT LINE ADJUSTMENT NO. 00-03, RECORDED OCTOBER 19, 2001 AS INSTRUMENT NO. 2001-501076 OF OFFICIAL RECORDS; THENCE SOUTHERLY ALONG THE EASTERLY LINE OF SAID PORTION C, AND THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 38°58'34", AN ARC DISTANCE OF 54.38 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 83.00 FEET, A RADIAL LINE FROM LAST SAID NON-TANGENT CURVE TO SAID POINT BEARS NORTH 87°18'53" EAST, ALSO BEING A POINT ON SAID WESTERLY LINE OF LOT 31; THENCE SOUTHWESTERLY ALONG SAID WESTERLY LINE AND THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 79°09'58", AN ARC DISTANCE OF 61.84 FEET TO THE BEGINNING OF A NON- TANGENT CURVE, CONCAVE SOUTHEASTERLY AND HAVING A RADIUS OF 78.50 FEET, A RADIAL LINE FROM LAST SAID NON-TANGENT CURVE TO SAID POINT BEARS NORTH 28°32'09" WEST, SAID POINT BEING THE NORTHWESTERLY CORNER OF PORTION B AS DESCRIBED IN CITY OF RANCHO MIRAGE LOT LINE ADJUSTMENT NO. 00-03, RECORDED OCTOBER 19, 2001 AS INSTRUMENT NO. 01-501076 OF OFFICIAL RECORDS; THENCE SOUTHWESTERLY ALONG THE EASTERLY LINE OF SAID PORTION B AND THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 37°05'08", AN ARC DISTANCE OF 48.57 FEET TO THE BEGINNING OF A COMPOUND CURVE, CONCAVE DISTERLY AND HAVING A RADIUS OF 15.50 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 30°23'51" WEST; THENCE CONTINUING SOUTHERLY ALONG SAID EASTERLY LINE OF PORTION B AND THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 49°51'23", AN ARC DISTANCE OF 10.68 FEET TO THE BEGINNING OF A NON-TANGENT CURVE, CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 21.00 FEET, A RADIAL LINE FROM LAST SAID NON-TANGENT CURVE TO SAID POINT BEARS SOUTH 87°36'25" WEST, SAID POINT BEING ON THE SOUTHERLY LINE OF SAID LOT 31 OF TRACT MAP NO. 15307; THENCE ALONG THE SOUTHERLY, SOUTHEASTERLY AND EASTERLY LINES OF SAID LOT 31, THROUGH THE FOLLOWING TEN (10) COURSES:

1. THENCE SOUTHEASTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 39°20'15", AN ARC DISTANCE OF 10.38 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 308.00 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 28°31'37" EAST;

2. THENCE SOUTHEASTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 18°49'32", AN ARC DISTANCE OF 121.54 FEET;

3. THENCE TANGENT TO SAID CURVE SOUTH 42°43'19" EAST, A DISTANCE OF 87.87 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHERLY AND HAVING A RADIUS OF 159.00 FEET;

04. THENCE EASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 74°39'51", AN ARC DISTANCE OF 206.81 FEET;

5. THENCE TANGENT TO SAID CURVE NORTH 62°36'51" EAST, A DISTANCE OF 44.58 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHERLY AND HAVING A RADIUS OF 144.00 FEET;

6. THENCE EASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 60°45'41", AN ARC DISTANCE OF 152.68 FEET;

7. THENCE NON-TANGENT TO SAID CURVE SOUTH 89°30'00" EAST, A DISTANCE OF 413.17 FEET;

8. THENCE NORTH 13°00'00" EAST, A DISTANCE OF 180.00 FEET;

9. THENCE NORTH 88°30'00" EAST, A DISTANCE OF 183.85 FEET;

10. THENCE NORTH 43°49'00" EAST, A DISTANCE OF 275.95 FEET;

THENCE CONTINUING ALONG THE EASTERLY LINE OF SAID LOT 31 AND ALONG THE EASTERLY LINE OF SAID LOT 30 NORTH 00°31'00" EAST, A DISTANCE OF 858.00 FEET TO THE POINT OF BEGINNING.

SAID LAND IS ALSO SHOWN AS PARCEL 2, AS SHOWN ON A MAP MARKED EXHIBIT "B" ATTACHED TO LOT LINE ADJUSTMENT NO. 06-07 CERTIFICATE OF COMPLIANCE, RECORDED JULY 20, 2007 AS INSTRUMENT NO. 2007-0460880 OF OFFICIAL RECORDS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPTING THEREFROM:

ALL OF LOT 1 OF TRACT NO. 34840-1, AS PER MAP RECORDED IN BOOK 443 PAGES 11 THROUGH 18 INCLUSIVE OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

APN: 689-330-028 and 689-330-033

| DATE | DESCRIPTION | |
|---|---|---|
| --- | --- | |
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| --- | --- | |
| --- | --- | |
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| --- | --- | |
| --- | --- | |

raSmith
CREATIVITY BEYOND ENGINEERING
8917 Research Drive
Irvine, CA 92618-4237
(949) 872-2378
rasmith.com

TENTATIVE
PARCEL MAP NO. 38768

68900 FRANK SINATRA DR.
A.P.N.'s 689-330-026, 028, 031, 032, 034
RANCHO MIRAGE, CA

DATE: 7/06/23
SCALE: NONE
JOB NO. _____
PROJECT MANAGER: CHRIS BRATTY
DESIGNED BY: TTW
CHECKED BY: KEC
SHEET 2 OF 2

**EXHIBIT "C"**

**MAJOR MODIFICATION MOD21-0004**

**(SEE ATTACHED)**

**PROJECT CASE NUMBERS: EA21-0002, GPZMA21-0001, MOD21-0004, DA21-0002**



# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

# SHEET INDEX


**COVER**

| | |
|---|---|
| A-0.1 | SHEET INDEX & PROJECT DATA |
| A-0.2 | OVERALL SITE PLAN |
| A-0.3 | PARTIAL SITE PLAN |
| A-R.1 | SITE ENTRY RENDERING |
| A-R.2 | THE VENUE RENDERING |
| A-R.3 | THE LOUNGE RENDERING |
| A-R.4 | BUILDING A-1 RENDERING |

**BUILDING A-1**

| | |
|---|---|
| C-1.0 | PARKING LEVEL P3 |
| C-1.1 | PARKING LEVEL P2 |
| C-1.2 | PARKING LEVEL P1 / GROUND FLOOR |
| C-1.3 | FIRST FLOOR PLAN |
| C-1.4 | SECOND FLOOR PLAN |
| C-1.5 | ROOF PLAN |
| C-2.0 | ELEVATIONS - THE VENUE |
| C-2.1 | ELEVATIONS - THE VENUE |
| C-2.2 | ELEVATIONS - RESIDENTIAL UNITS |
| C-2.3 | ELEVATIONS - RESIDENTIAL UNITS |
| C-2.4 | SITE SECTION |
| C-2.5 | LINE-OF-SIGHT STUDY |
| C-3.0 | THE VENUE PLAN |
| C-3.1 | RESIDENTIAL UNIT PLANS |

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|---|---|
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| V-1.1 | TYP. FOURPLEX FLOOR PLANS |
| V-1.2 | TYP. FIVEPLEX FLOOR PLANS |
| V-1.3 | BUILDING B-5 FLOOR PLANS |
| V-1.4 | BUILDING B-9 FLOOR PLANS |
| V-1.5 | BUILDING B-11 FLOOR PLANS |
| V-1.6 | BUILDING B-12 FLOOR PLANS |
| V-1.7 | TYPICAL ROOF PLANS |
| V-1.8 | BUILDING B-5 & B-9 ROOF PLANS |
| V-1.9 | BUILDING B-11 & B-12 ROOF PLANS |
| V-2.0 | DUPLEX ELEVATIONS |
| V-2.1 | TRIPLEX ELEVATIONS |
| V-2.2 | FOURPLEX ELEVATIONS |
| V-2.3 | FIVEPLEX ELEVATIONS |
| V-2.4 | BUILDING B-9 ELEVATIONS |
| V-2.5 | BUILDING B-11 ELEVATIONS |
| V-2.6 | SITE SECTION |
| V-3.0 | UNIT FLOOR PLANS |
| V-3.1 | UNIT FLOOR PLANS |
| V-3.2 | THE LOUNGE ENLARGED PLANS |
| V-3.3 | THE LOUNGE ENLARGED PLANS |
| V-3.4 | THE LOUNGE ENLARGED PLANS |

**SKY MESA AREA**

| | |
|---|---|
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| R-1.0 | SKY MESA ENLARGED SITEPLAN |
| R-1.1 | SKY MESA FLOOR PLAN |
| R-1.2 | SKY MESA ELEVATIONS |
| R-1.3 | SKY MESA ELEVATION & SECTION |
| R-1.4 | SKY MESA ROOF PLAN |
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| R-2.2 | SKY MESA RESTROOM SECTIONS |

**RETAINING WALL LOCATIONS**

| | |
|---|---|
| AL.0.00 | SITE PLAN |
| AL.0.01 | ENHANCED RETAINING WALL PLAN VIEW |
| AL.0.02 | ENHANCED RETAINING OVERALL ELEVATION A&B |
| AL.0.01 | ENHANCED RETAINING WALL ELEVATION DETAIL A&B |
| AL.0.01 | ENHANCED RETAINING WALL AXONOMETRIC VIEW |

**COLOR & MATERIALS**

| | |
|---|---|
| CM-1.0 | PHASE II EXPANSION |
| CM-1.1 | SKY MESA |

**LANDSCAPE**

| | |
|---|---|
| LR-0 | SHEET INDEX - ILLUSTRATIVE REF. PLAN |
| LR-01 | SHEET ORGANIZATION MATER & MASTER PLANT PALETTE - RESIDENTIAL |
| LR-02 | SHEET ORGANIZATION MATER & MASTER PLANT PALETTE - SKY MESA |
| LS-01 | SHRUB PLAN |
| LS-02 | SHRUB PLAN |
| LS-03 | SHRUB PLAN |
| LS-04 | SHRUB PLAN |
| LS-05 | SHRUB PLAN |
| LS-06 | SHRUB PLAN |
| LS-07 | SHRUB PLAN |
| LS-08 | SHRUB PLAN |
| LS-09 | SHRUB PLAN |
| LS-10 | SHRUB PLAN |
| LS-11 | SHRUB PLAN |
| LS-12 | SHRUB PLAN |
| LT-01 | TREE PLAN |
| LT-02 | TREE PLAN |
| LT-03 | TREE PLAN |
| LT-04 | TREE PLAN |
| LT-05 | TREE PLAN |
| LT-06 | TREE PLAN |
| LT-07 | TREE PLAN |
| LT-08 | TREE PLAN |
| LT-09 | TREE PLAN |
| LT-10 | TREE PLAN |
| LT-11 | TREE PLAN |
| LT-12 | TREE PLAN |
| LN-01 | LANDSCAPE NOTES |
| LF-01 | LANDSCAPE FEATURES PLAN - RESIDENTIAL |
| LF-02 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-03 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-04 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-05 | LANDSCAPE FEATURES PLAN - SKY MESA |

**CIVIL**

| | |
|---|---|
| C-1 | TITLE SHEET |
| C-2 | DETAILS & TYPICAL SECTIONS |
| C-3 | SITE GRADING - GROUND LEVEL |
| C-4 | SITE GRADING - P2 LEVEL |
| C-5 | SITE GRADING - P3 LEVEL |
| C-6 | SITE GRADING - SKY MESA |
| C-7 | YARD DRAIN-GROUND LEVEL-NW CORNER |
| C-8 | YARD DRAIN-GROUND LEVEL-NE CORNER |
| C-9 | YARD DRAIN-GROUND LEVEL-SW CORNER |
| C-10 | YARD DRAIN-GROUND LEVEL-SE CORNER |
| C-11 | YARD DRAIN-GROUND LEVEL-WESERTLY SITE |
| C-12 | YARD DRAIN-GROUND LEVEL-EASTERTLY SITE |
| C-13 | RETAINING WALL LOCATION & SECTIONS PLAN WALL NO. A & B |
| C-14 | RETAINING WALL LOCATION & SECTIONS PLAN WALL NO. C, D, & E |
| C-15 | RETAINING WALL PALN & PROFILE WALL - F |


## PROJECT CASE NUMBERS:

**EA21-0002, GPZMA21-0001, MOD21-0004, DA21-0002**

## ARCHITECTURAL STYLE NARRATIVE:

THE PROJECT'S ARCHITECTURAL STYLE IS CONTEMPORARY DESERT ARCHITECTURE COMPATIBLE WITH THE EXISTING RITZ-CARLTON ARCHITECTURAL STYLE. COLORS AND MATERIALS RELATE BACK TO THE EXISTING HOTEL AND ARE INFLUENCED BY THE SURROUNDING NATURAL DESERT TO GROUND IT ONTO THE SITE.

# AREA BREAKDOWN

## BUILDING A-1

| **THE VENUE** | **NET AREA** |
|---|---|
| PRE-FUNCTION SPACE | 5,600 SF |
| MAIN EVENT SPACE | 11,135 SF |
| AUXILIARY SPACES | 7,108 SF |
| **VENUE TOTAL** | **23,843 SF** |
| **EXTENSION COMMON SPACE** | **3,960 SF** |

**RESIDENTIAL UNITS**

| **PLAN TYPE** | **COUNT** | **UNIT AREA** | **NET AREA** |
|---|---|---|---|
| PLAN A - 1BR/1BA | 26 | 1063 | 27,638 SF |
| PLAN B - 2BR/2BA LOCK-OFF | 12 | 1645 | 19,740 SF |
| PLAN C - 2BR/3BA LOCK-OFF | 10 | 1918 | 19,180 SF |
| **RESIDENTIAL UNITS TOTAL** | **48** | | **66,558 SF** |

**BUILDING A-1 TOTAL** **90,401 SF**

## BUILDING B-1 to B-15

| **RESIDENTIAL UNIT TYPE** | **COUNT** | **UNIT AREA** | **SUBTOTAL** |
|---|---|---|---|
| PLAN 1 - 2BR/2BA | 15 | 2131 | 31,965 SF |
| PLAN 1X - 2BR/2BA | 14 | 2117 | 29,638 SF |
| PLAN 2 - 3BR/3BA | 15 | 2461 | 36,915 SF |
| PLAN 2X - 3BR/3BA | 14 | 2525 | 35,350 SF |
| **RESIDENTIAL UNIT TOTAL** | **58** | | **133,868 SF** |

| **THE LOUNGE** | |
|---|---|
| ENTRY LEVEL | 2,444 SF |
| LOWER LEVEL | 3,069 SF |
| **THE LOUNGE TOTAL** | **5,513 SF** |

**BUILDING B-1 TO B-15** **139,381 SF**

| **SKY MESA** | **AREA** |
|---|---|
| RESTAURANT | 6,273 SF |
| RESTROOMS | 693 SF |
| **SKY MESA TOTAL** | **6,966 SF** |

**TOTAL PROJECT** **236,748 SF**

# PARKING BREAKDOWN

| **PARKING PROPOSED/PROVIDED** | |
|---|---|
| THE VENUE (1 SPACE PER 50 SF)* | 223 SPACES |
| RESIDENTIAL UNITS (1.1 SPACES PER GUEST RM) | 53 SPACES |
| RESIDENTIAL UNITS (2 SPACES PER UNIT)** | 116 SPACES |
| RESIDENTIALGUEST SPACE (1 SPACE PER 2 UNITS) | 29 SPACES |
| SKY MESA RESTAURANT (1 SPACE PER 80 SF) | 78 SPACES |
| **TOTAL PARKING PROPOSED/PROVIDED*** ** | **499 SPACES** |

*BASED ON EVENT SPACE AREA
**58 SPACES PROVIDED IN 2-CAR GARAGES, 58 SPACES PROVIDED AS A COMBINATION OF 1-CAR GARAGE PLUS DRIVEWAY SPACE
***381 SPACES PROVIDED IN SUBTERRANEAN PARKING STRUCTURE

| **SUBTERRANEAN PARKING AREA (BUILDING A-1)** | |
|---|---|
| P1 LEVEL | 26,783 SF |
| P2 LEVEL | 50,853 SF |
| P3 LEVEL | 91,596 SF |
| **TOTAL** | **169,232 SF** |

# PROJECT TEAM


**OWNER:**
KAM SANG COMPANY, INC.
411 E HUNTINGTON DRIVE, STE 305
ARCADIA, CA 91006
(626) 446-2988

**ARCHITECT:**
LCRA
CONTACT: EVERARDO GARCIA
35 HUGUS ALLEY, STE 220
PASADENA, CA 91103
(626) 449-9698

**CIVIL:**
FOCUS ENGINEERING, INC.
CONTACT: CHARLIE LIU
25 MAUCHLY #317, IRVINE, CA 92618
(949) 450-0590

**LANDSCAPE:**
DESIGN STUDIO OF MICHAEL MCKAY
CONTACT: MICHAEL MCKAY
246 FLOWER ST., COSTA MESA, CA 92627
(949) 378-3238


# PROJECT DATA

**PROJECT ADDRESS:** 68900 FRANK SINATRA DRIVE

**GENERAL PLAN LAND DESIGNATION:** RANCHO MIRAGE GENERAL PLAN RS-H (RESORT HOTEL)

**LOT SIZE:**

| ASSESSOR PARCEL NUMBER | AREA |
|---|---|
| 689330031 | 698,827 SF |
| 689330026 & 689330028 | 505,497 SF |
| 689020012 & 689020014 | 174,653 SF |
| 689330032, 689330034, 689331001 & 689331018 | 148,565 SF |
| TOTAL LOT AREA | 1,553,500 SF / 35.07 AC |

| **TOTAL LOT COVERAGE:** | | |
|---|---|---|
| | EXISTING HOTEL | 167,635 SF |
| | BUILDING A-1 | 76,161 SF |
| | BUILDING B-1 TO B-15 | 109,244 SF |
| | SKY MESA | 6,966 SF |
| | TOTAL COVERAGE | 360,006 SF |
| | (DIVIDE BY TOTAL LOT AREA) | (23.17%) |

# PROJECT DESCRIPTION

THE PROJECT CONSISTS OF THREE DIFFERENT BUILDING(S) HEREBY REFERRED TO AS "BUILDING A-1", "BUILDING B-1 TO B-15" & "SKY MESA".

**BUILDING A1**

CONSTRUCTION OF NEW TWO-STORY BUILDING INCLUDING:
1) HOTEL EVENT SPACE & ANCILLARY SERVICE AREAS
2) 48 RESIDENTIAL UNITS (KEYS)
3) 2.5 LEVELS OF UNDERGROUND PARKING

| **OCCUPANCY TYPE:** | | **CONSTRUCTION TYPE:** |
|---|---|---|
| A | EVENT SPACE | TYPE IIIB |
| R-2 | RESIDENTIAL | TYPE VB |
| S-2 | PARKING | TYPE IA |

**BUILDING STORIES:** 2-STORIES

**BUILDING B1 - B15**

CONSTRUCTION OF NEW RESIDENTIAL UNITS & THE LOUNGE INCLUDING:
1) 58 TWO-STORY ATTACHED TOWN-HOME RESIDENTIAL UNITS WITH ATTACHED GARAGE WITHIN 15 SEPARATE BUILDINGS
2) TWO-STORY LOUNGE
3) POOL TERRACE & SECONDARY POOL AREA
4) SURFACE GUEST PARKING

| **OCCUPANCY TYPE:** | | **CONSTRUCTION TYPE:** |
|---|---|---|
| A | LOUNGE | TYPE VB |
| R-2 | RESIDENTIAL | TYPE VB |

**BUILDING STORIES:** 2-STORIES

**TOTAL PROJECT KEYS:** 106

**SKY MESA**

CONSTRUCTION OF NEW HOTEL AMENITY SPACE INCLUDING:
1) POOL TERRACE & BATHROOMS
2) OUTDOOR EVENT SPACE
3) DINING AREA

| **OCCUPANCY TYPE:** | | **CONSTRUCTION TYPE:** |
|---|---|---|
| A | DINING AREA | TYPE I |

**BUILDING STORIES:** 1-STORY







# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

## OVERALL SITE PLAN A-0.2

NOT TO SCALE

LCRA




| LEGEND | |
|---|---|
| NO. | BUILDING TYPE |
| A-1 | RESIDENTIAL UNITS W/ ATTACHED EVENT SPACE |
| B-1 | (4) FOURPLEX |
| B-2 | (4) FOURPLEX |
| B-3 | (5) FIVEPLEX |
| B-4 | (3) TRIPLEX |
| B-5 | (5) FIVEPLEX |
| B-6 | (2) DUPLEX |
| B-7 | (3) TRIPLEX |
| B-8 | (5) FIVEPLEX |
| B-9 | (7) SEVENPLEX |
| B-10 | (5) FIVEPLEX |
| B-11 | (3) TRIPLEX W/ ATTACHED LOUNGE |
| B-12 | (3) TRIPLEX |
| B-13 | (3) TRIPLEX |
| B-14 | (2) DUPLEX |
| B-15 | (4) FOURPLEX |

# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## PARTIAL SITE PLAN A-0.3

SCALE: 1/32" = 1'

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February 15, 2023

LCRA




# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SITE ENTRY RENDERING A-R.1

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# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

THE VENUE RENDERING A-R.2

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February 15, 2023

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# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

THE LOUNGE RENDERING A-R.3

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LCRA



# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

BUILDING A1 RENDERING A-R.4

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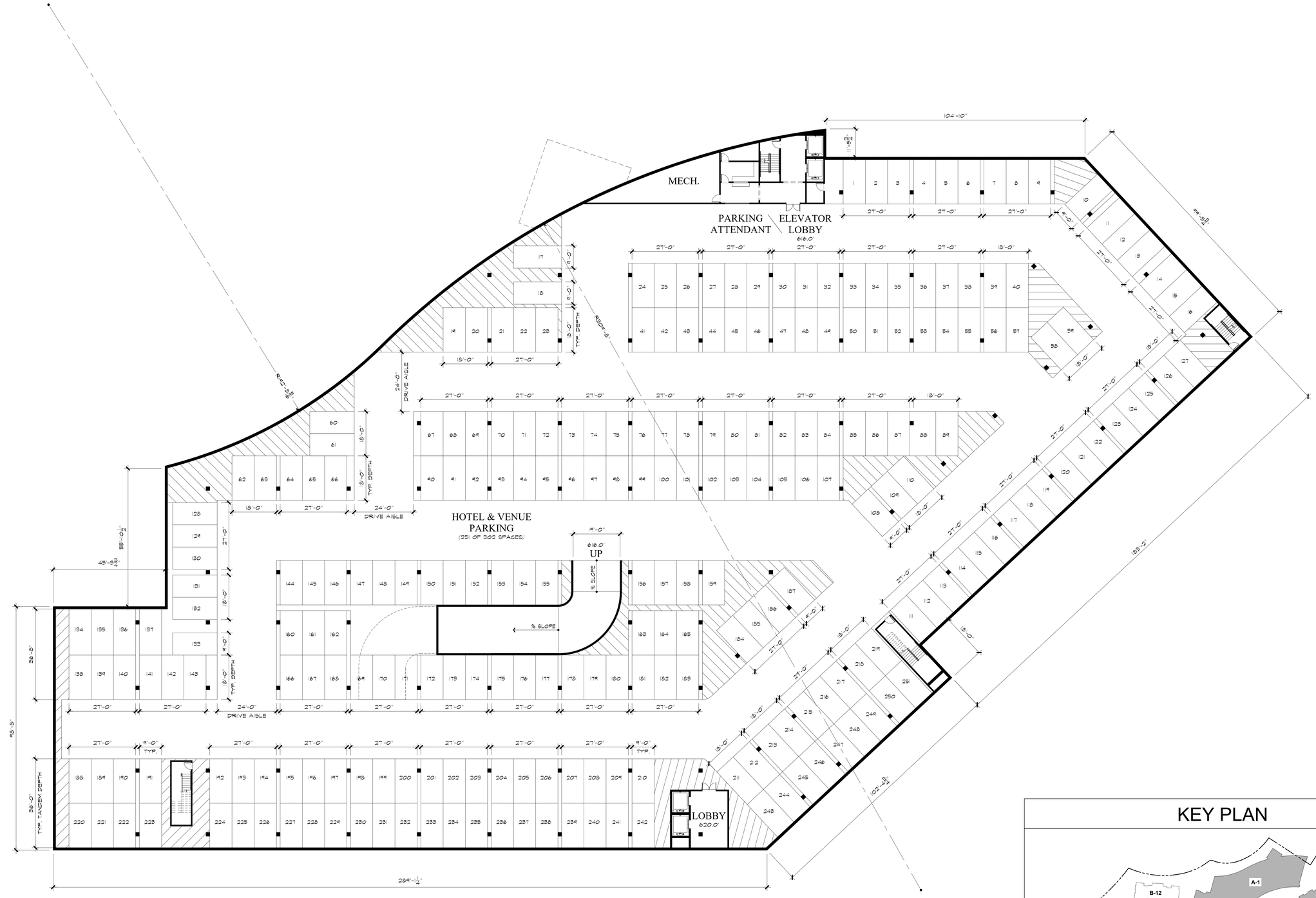
February 15, 2023

LCRA

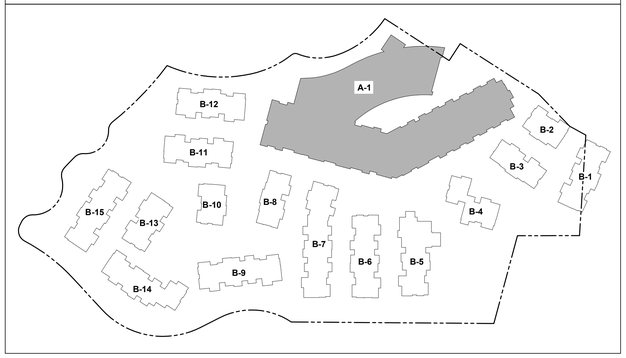


# BUILDING A-1

## THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE




## KEY PLAN



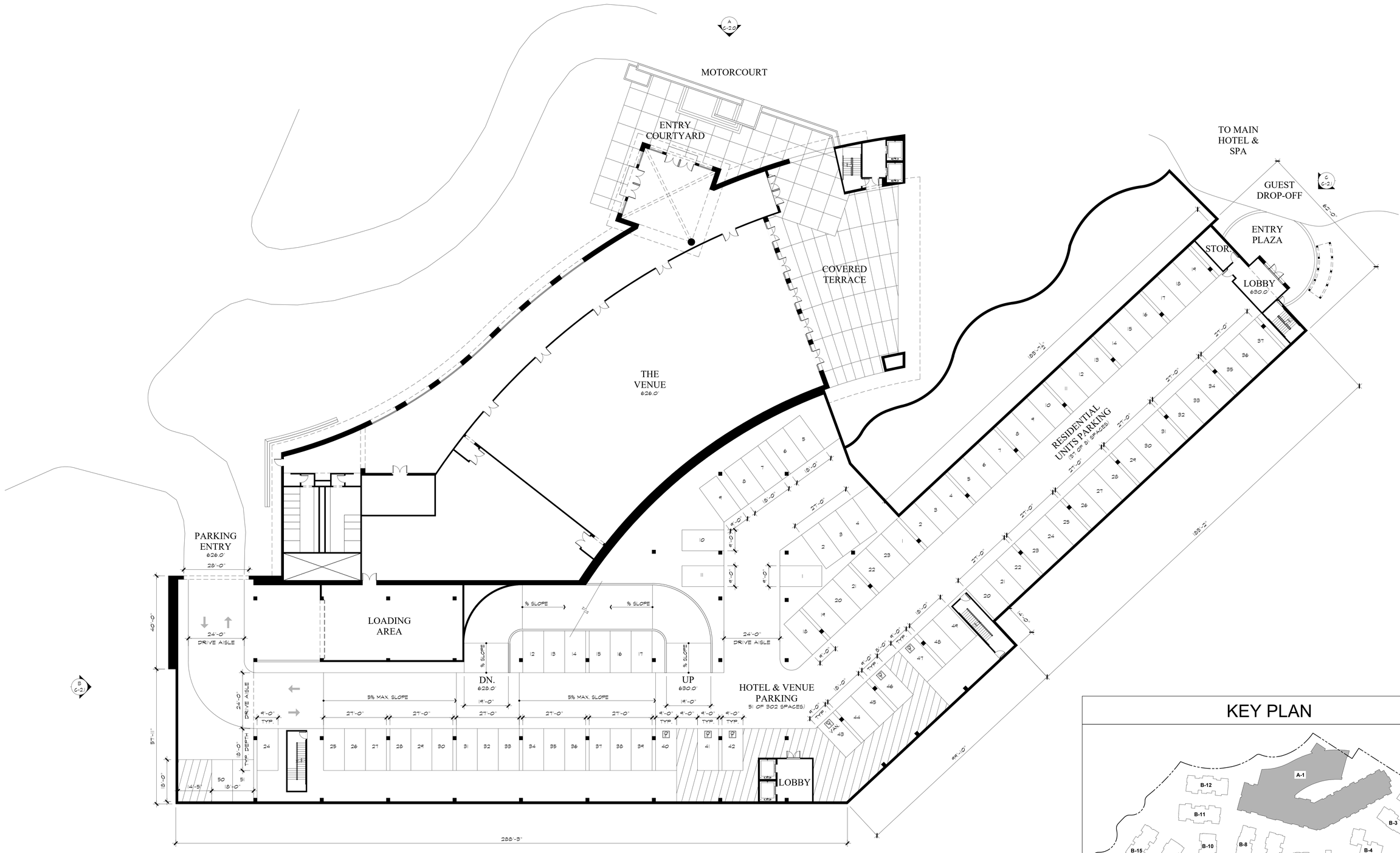

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

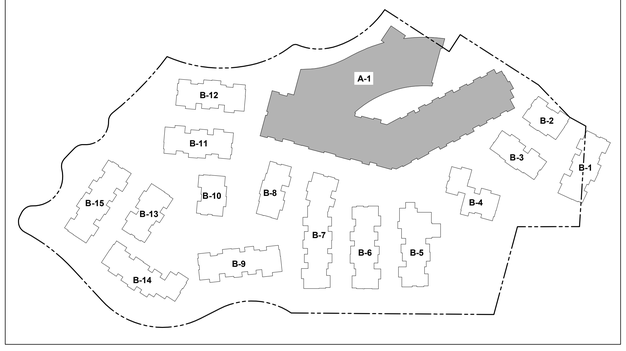
## PARKING LEVEL P3 C-1.0

SCALE: 1/16" = 1'-0"

LCRA




## KEY PLAN



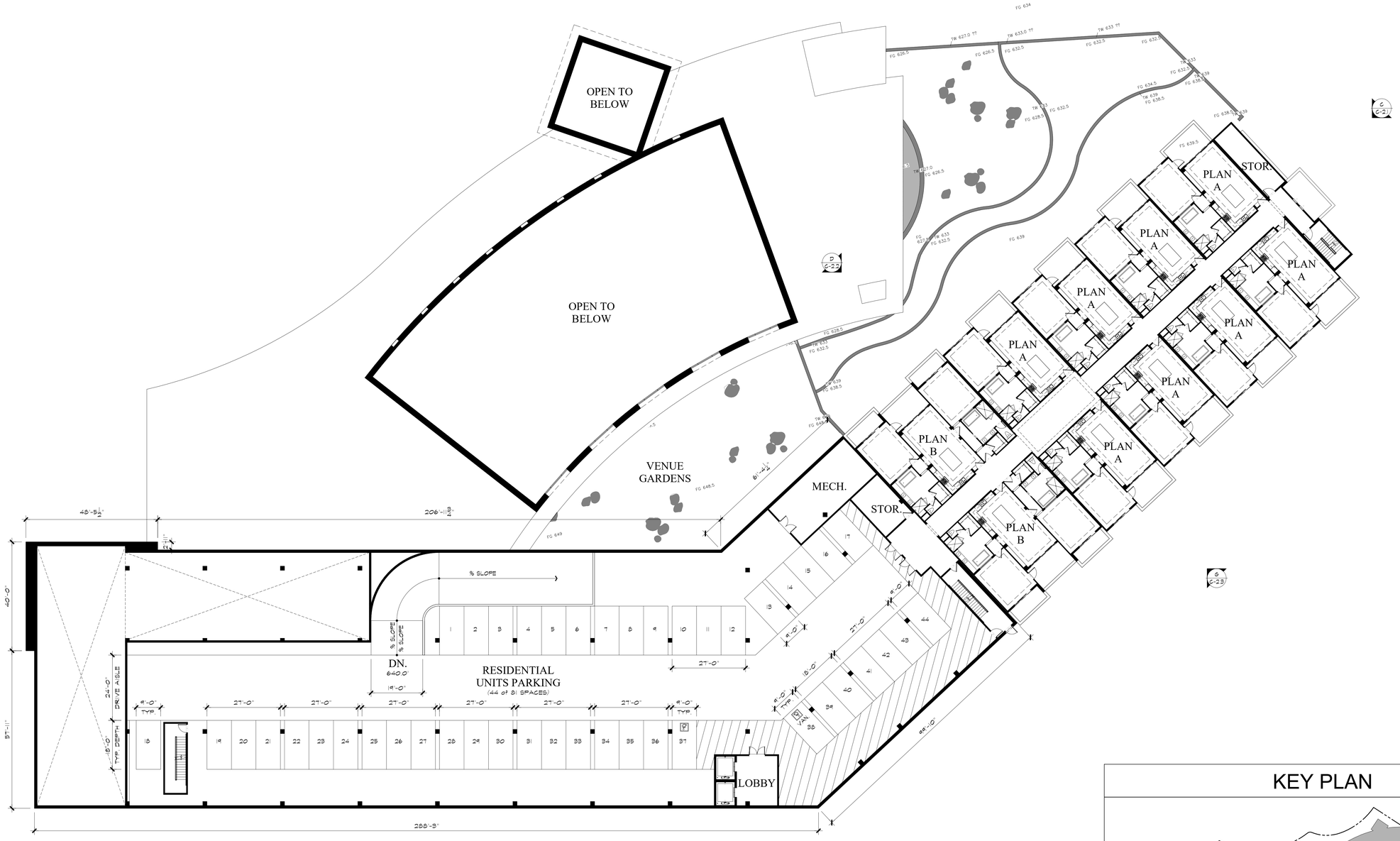

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## PARKING LEVEL P2 C-1.1

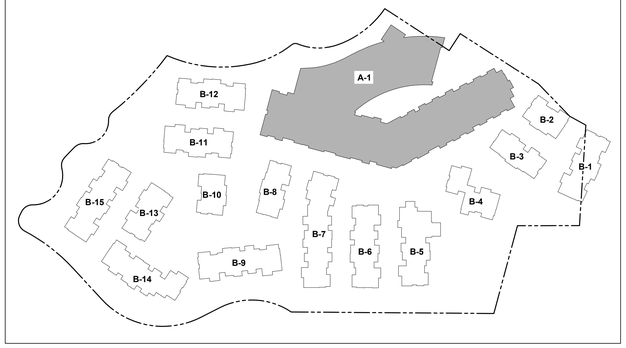
SCALE: 1/16" = 1'-0"

Ritz Carlton
February 15, 2023

LCRA




KEY PLAN




**RESIDENTIAL UNITS: PLAN A, PLAN B, & PLAN C**
**(UNIT PLANS REFER TO SHEET C-3.1)**

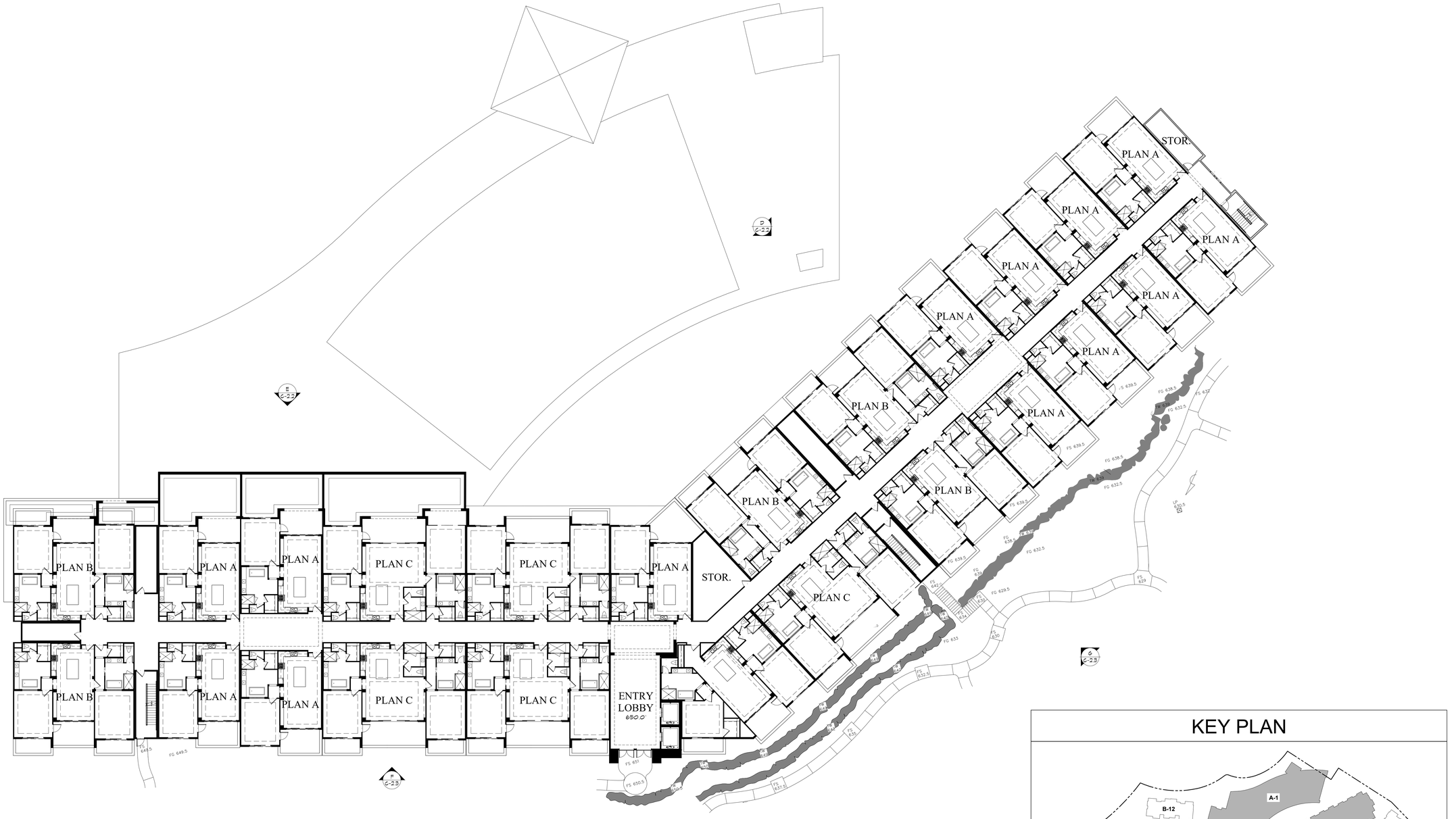
# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## PARKING LEVEL P1 C-1.2

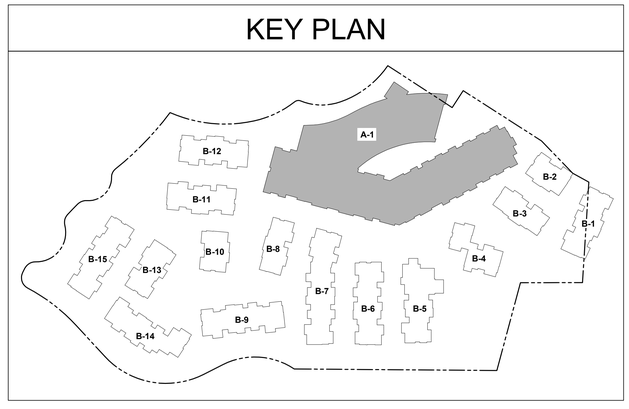
SCALE: 1/16" = 1'-0"

Ritz Carlton
February 15, 2023

LCRA




**RESIDENTIAL UNITS: PLAN A, PLAN B, & PLAN C**
**(UNIT PLANS REFER TO SHEET C-3.1)**



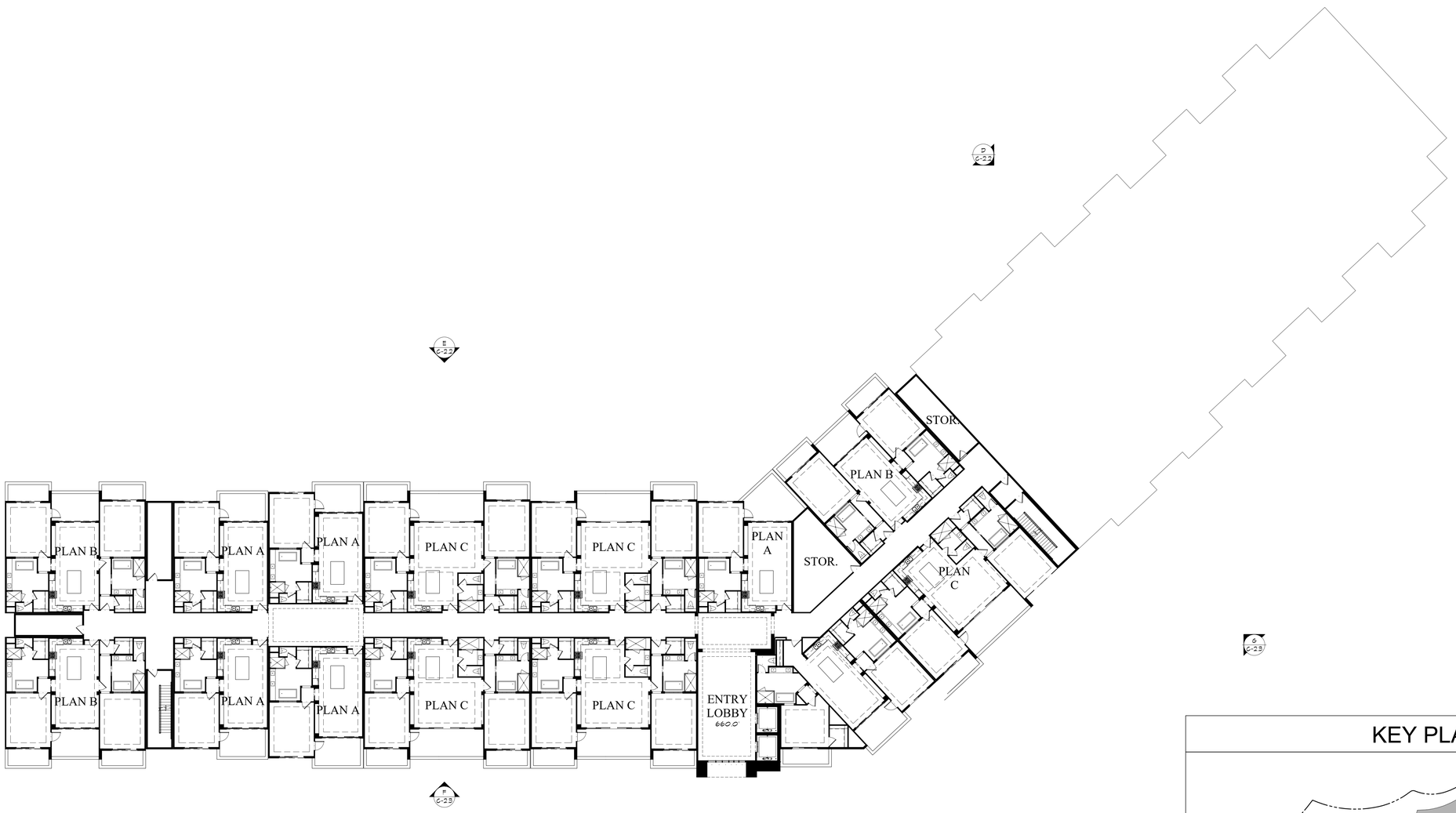

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## FIRST FLOOR PLAN C-1.3

SCALE: 1/16" = 1'-0"

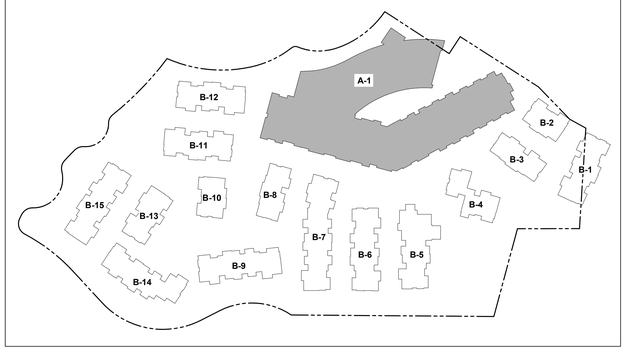
Ritz Carlton
February 15, 2023

LCRA




**RESIDENTIAL UNITS: PLAN A, PLAN B, & PLAN C**
**(UNIT PLANS REFER TO SHEET C-3.1)**

KEY PLAN



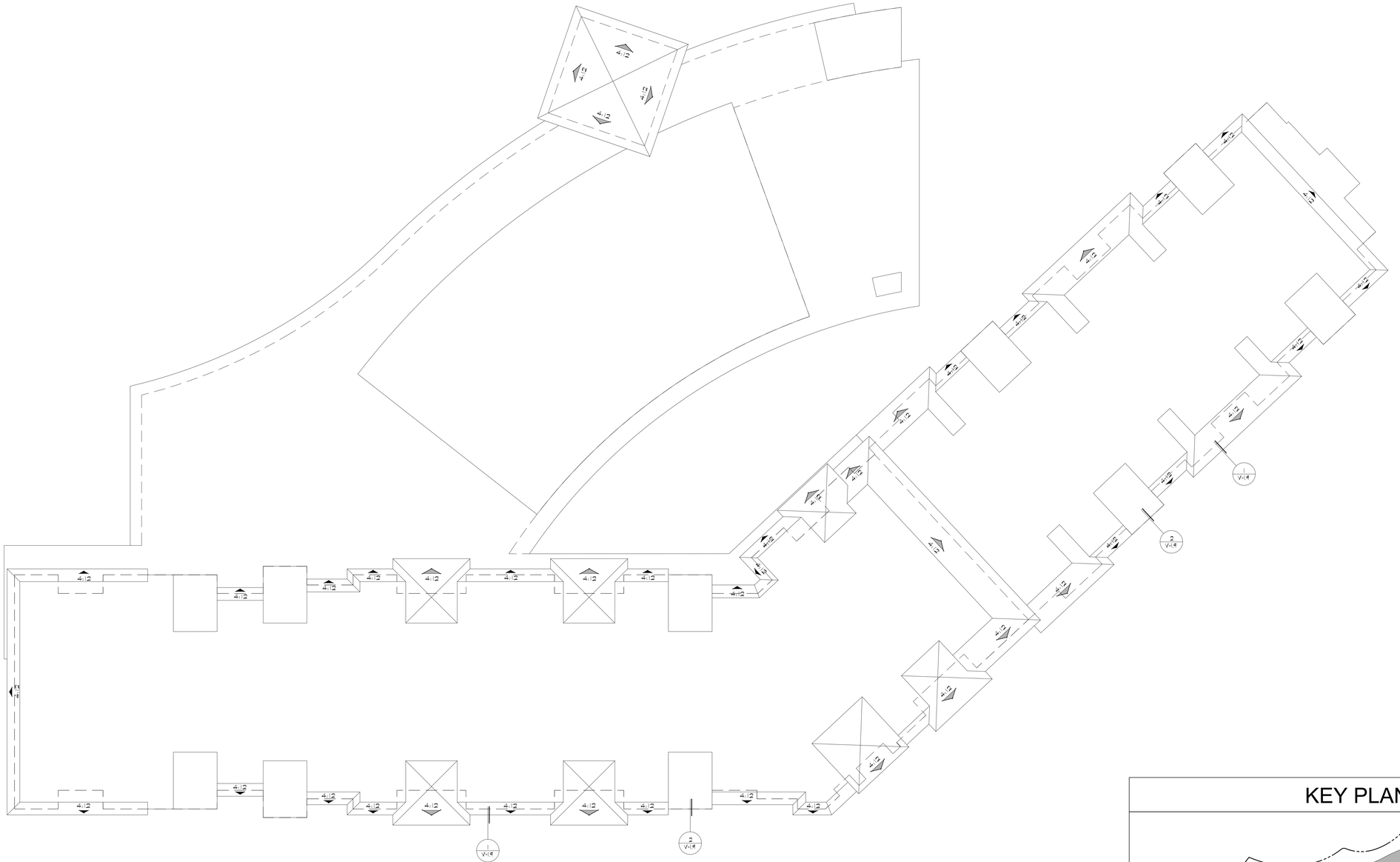

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

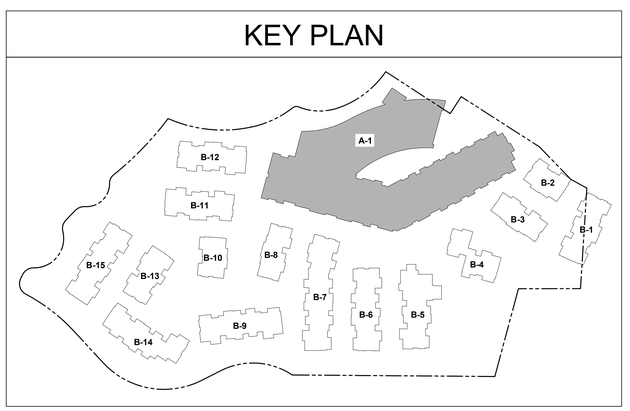
Ritz Carlton
February 15, 2023

## SECOND FLOOR PLAN C-1.4

SCALE: 1/16" = 1'-0"

LCRA




# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

ROOF PLAN C-1.5
SCALE: 1/16" = 1'-0"

LCRA







FRONT ELEVATION

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

ELEVATIONS - THE VENUE C-2.0
SCALE: 1/8" = 1'-0"

LCRA




WEST ELEVATION




EAST ELEVATION

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

ELEVATIONS - THE VENUE C-2.1
SCALE: 1/8" = 1'-0"

LCRA







NORTH ELEVATION

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

ELEVATIONS - RESIDENTIAL UNITS C-2.2

SCALE: 1/8" = 1'-0"

Ritz Carlton

February 15, 2023

LCRA







SOUTH ELEVATION

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

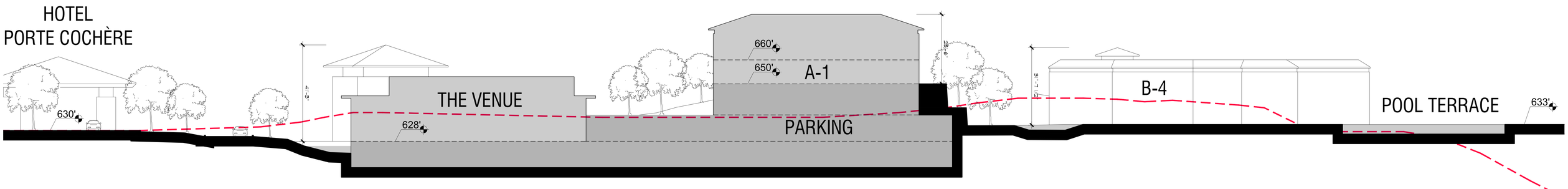
ELEVATIONS - RESIDENTIAL UNITS C-2.3

SCALE: 1/8" = 1'-0"

Ritz Carlton

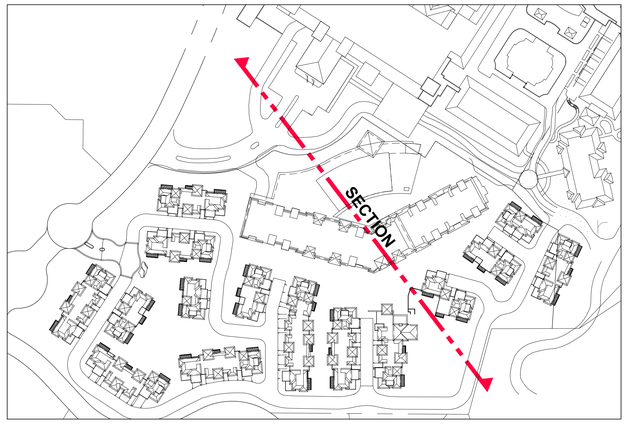
February 15, 2023

LCRA




**LEGEND**

EXISTING NATURAL GRADE

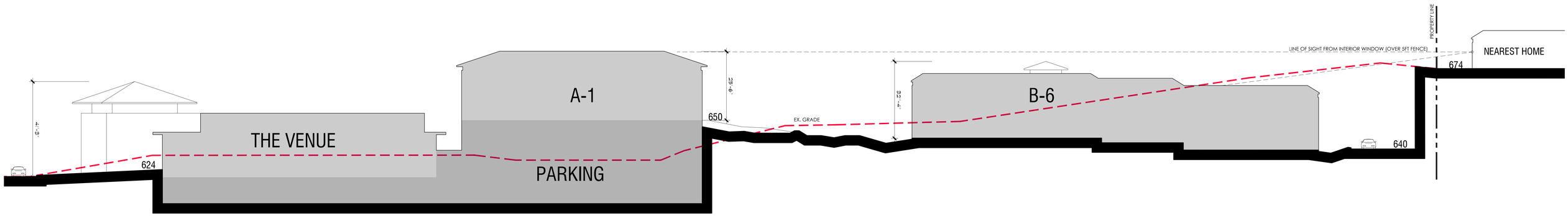



# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

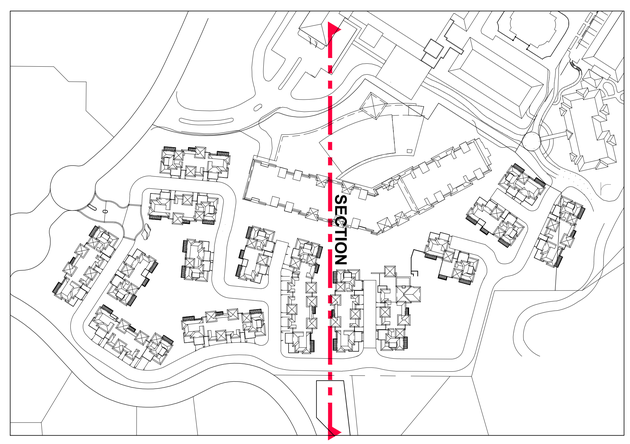
SITE SECTION C-2.4
SCALE: 1/16" = 1'-0"

LCRA




**LEGEND**

EXISTING NATURAL GRADE



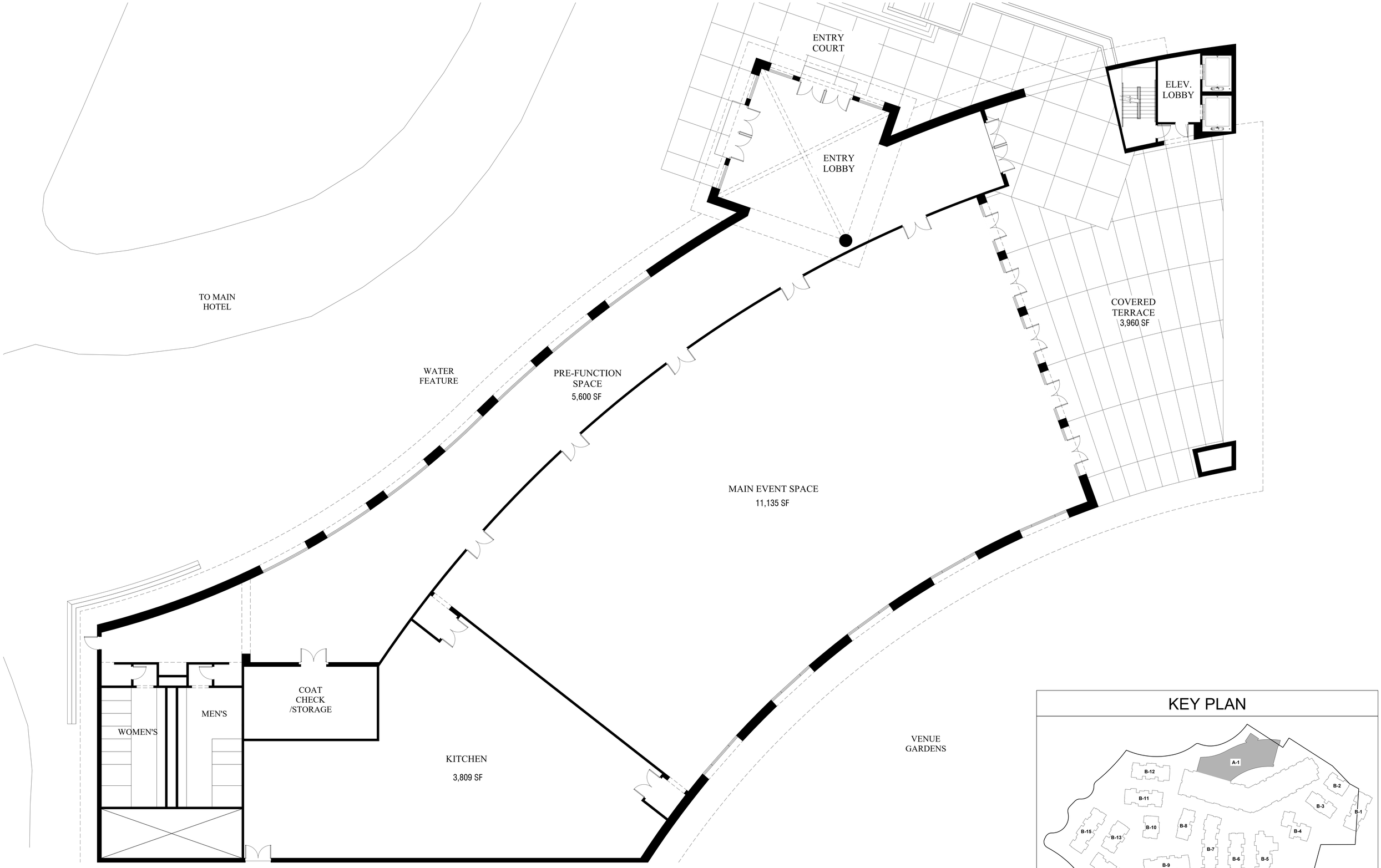

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

LINE-OF-SIGHT STUDY C-2.5

SCALE: 1/16" = 1'-0"

LCRA




KEY PLAN




# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

THE VENUE PLAN C-3.0

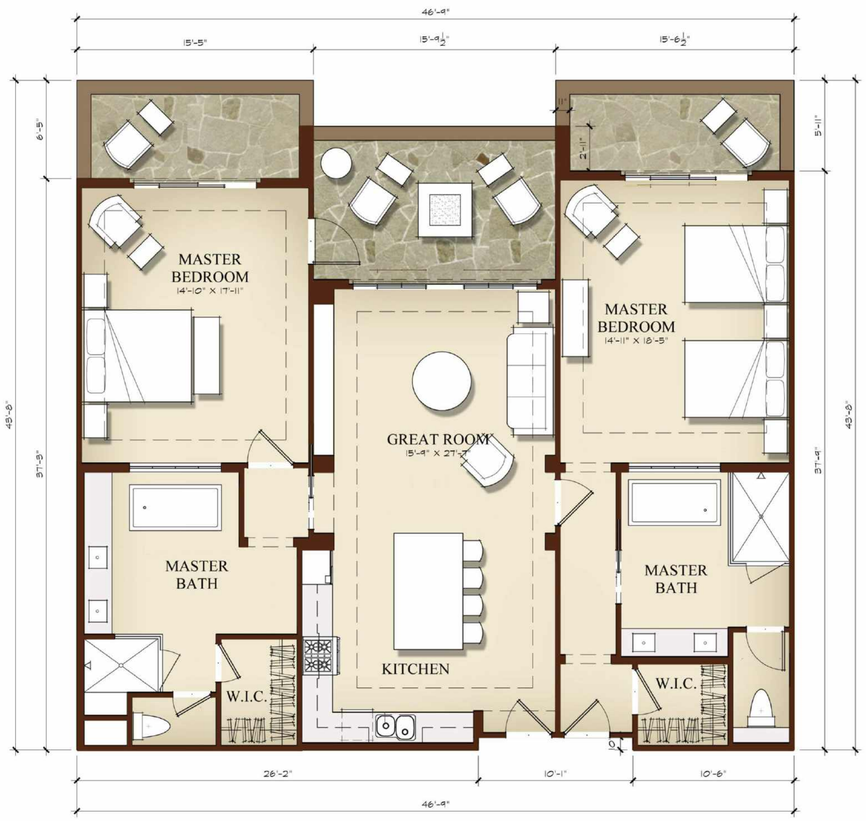
SCALE: 1/8" = 1'-0"

Ritz Carlton
February 15, 2023

LCRA




FLOOR PLAN — PLAN A
1,063 SF

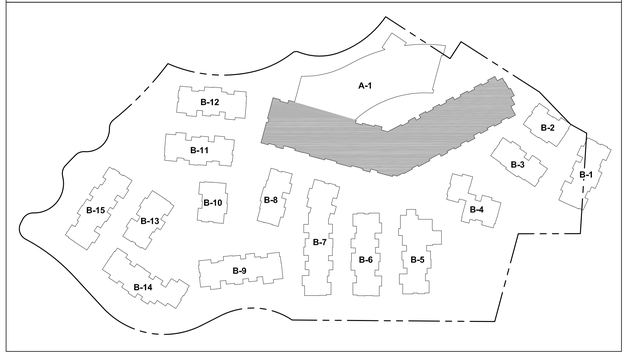



FLOOR PLAN — PLAN B
1,637 SF




FLOOR PLAN — PLAN C
1,902 SF

KEY PLAN




# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

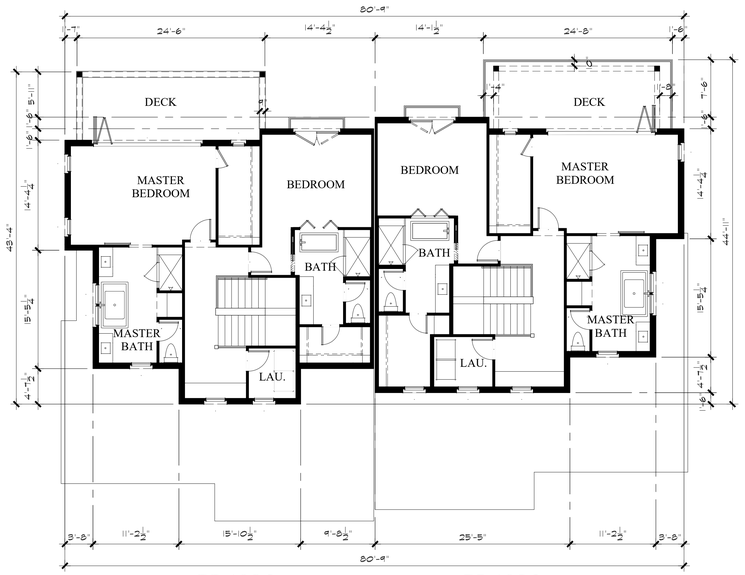
RESIDENTIAL UNIT PLANS C-3.1
SCALE: 1/4" = 1'-0"

LCRA



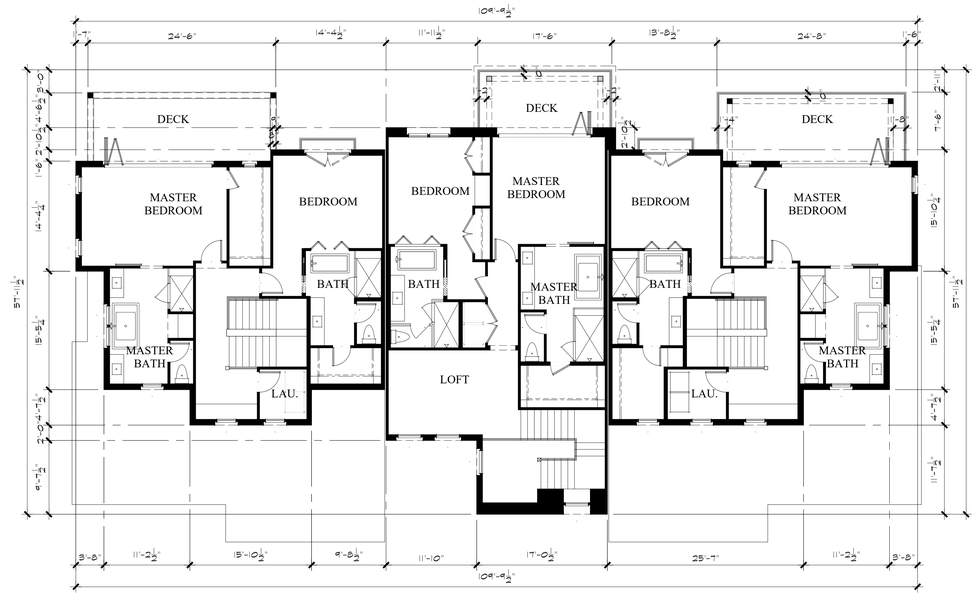
# BUILDING B-1 TO B-15

## THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE



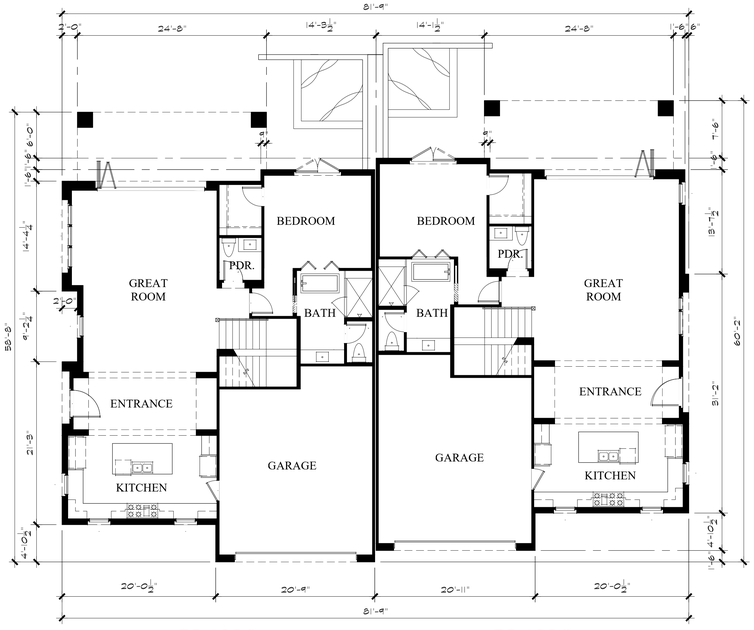

PLAN 2 PLAN 2x

## UPPER LEVEL DUPLEX (B-10 & B-2)




PLAN 2 PLAN 1 PLAN 2x

## UPPER LEVEL TRIPLEX (B-13, B-8 & B-3)




PLAN 2 PLAN 2x

## ENTRY LEVEL DUPLEX (B-10 & B-2)

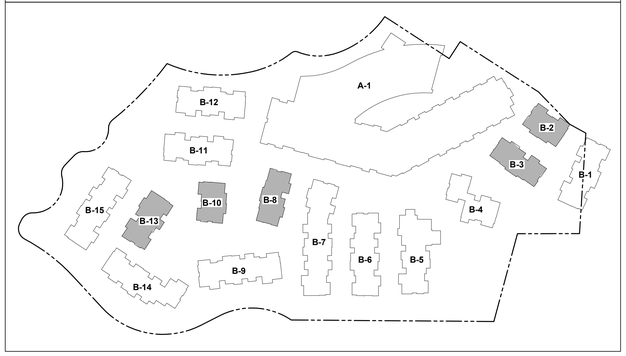



PLAN 2 PLAN 1 PLAN 2x

## ENTRY LEVEL TRIPLEX (B-13, B-8 & B-3)

**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN



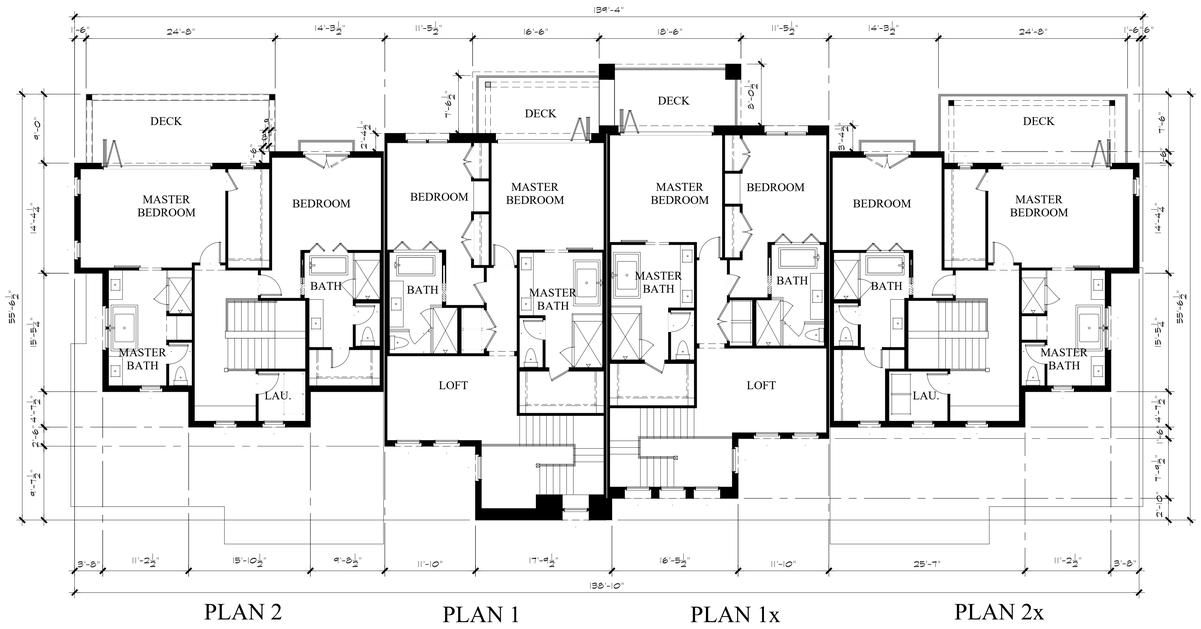

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

TYP. DUPLEX/TRIPLEX FLOOR PLANS V-1.0

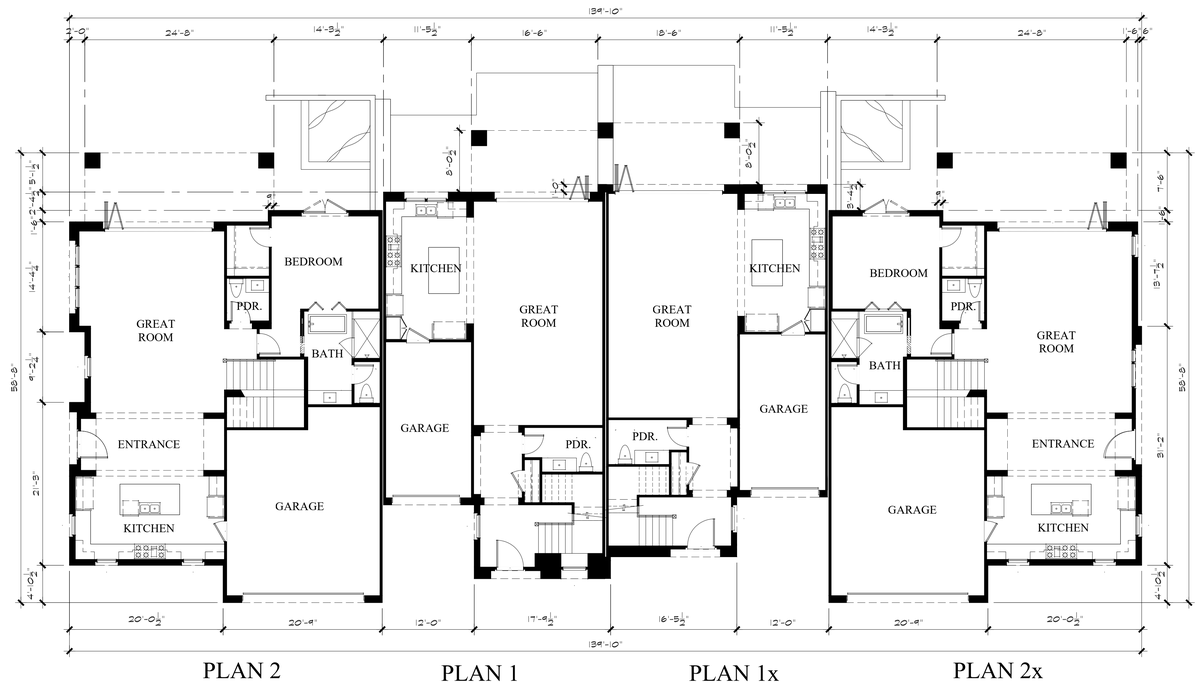
SCALE: 1/8" = 1'-0"

Ritz Carlton
December 20, 2022

LCRA



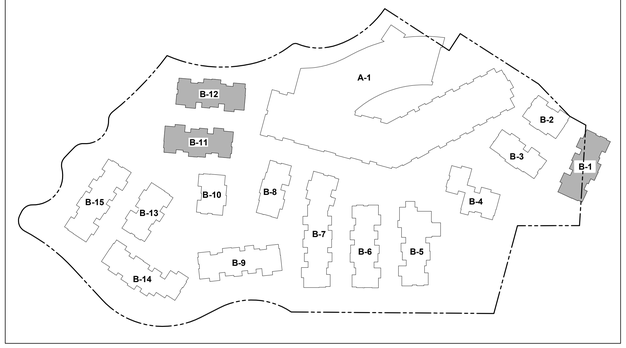

UPPER LEVEL — FOURPLEX (B-12, B-11 & B-1)




ENTRY LEVEL — FOURPLEX (B-12, B-11 & B-1)

**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN



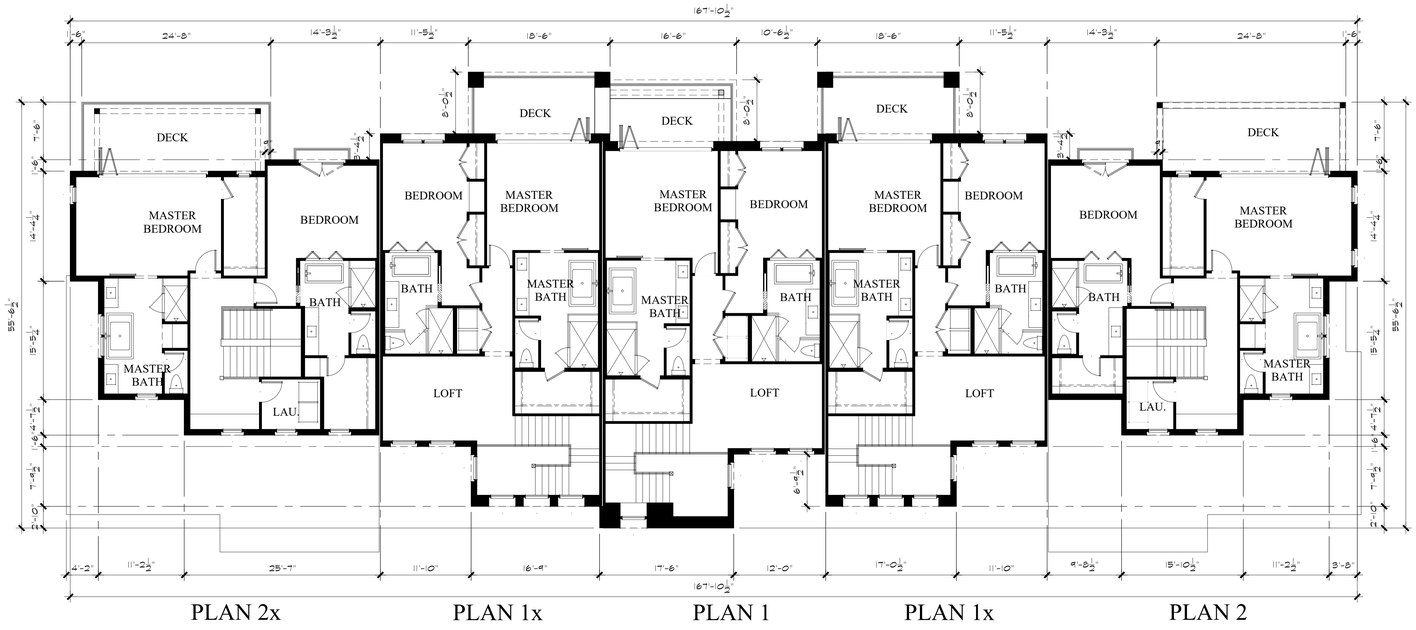

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## TYPICAL FOURPLEX FLOOR PLANS V-1.1

SCALE: 1/8" = 1'-0"

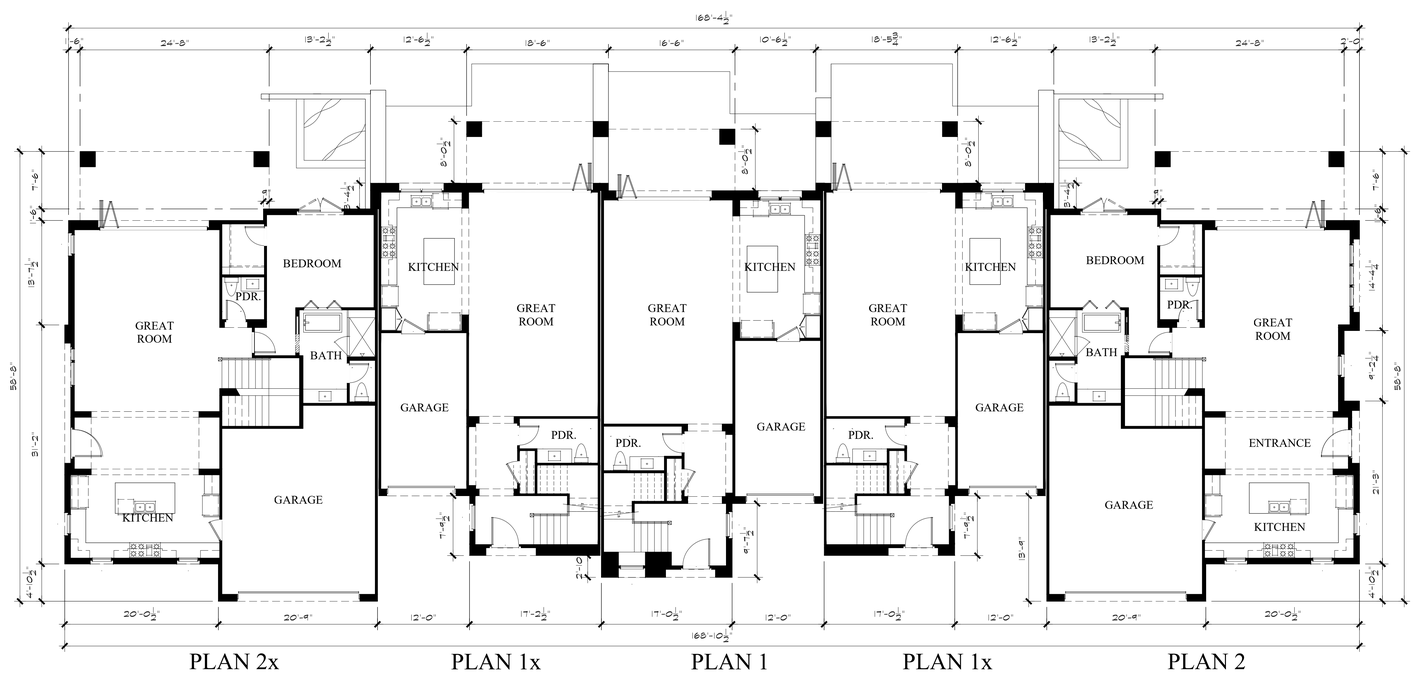
Ritz Carlton
December 20, 2022

LCRA




UPPER LEVEL

FIVEPLEX (B-15, B-9 & B-6)

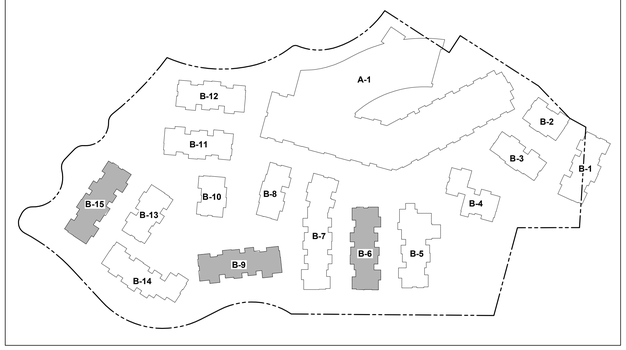



ENTRY LEVEL

FIVEPLEX (B-15, B-9 & B-6)

**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

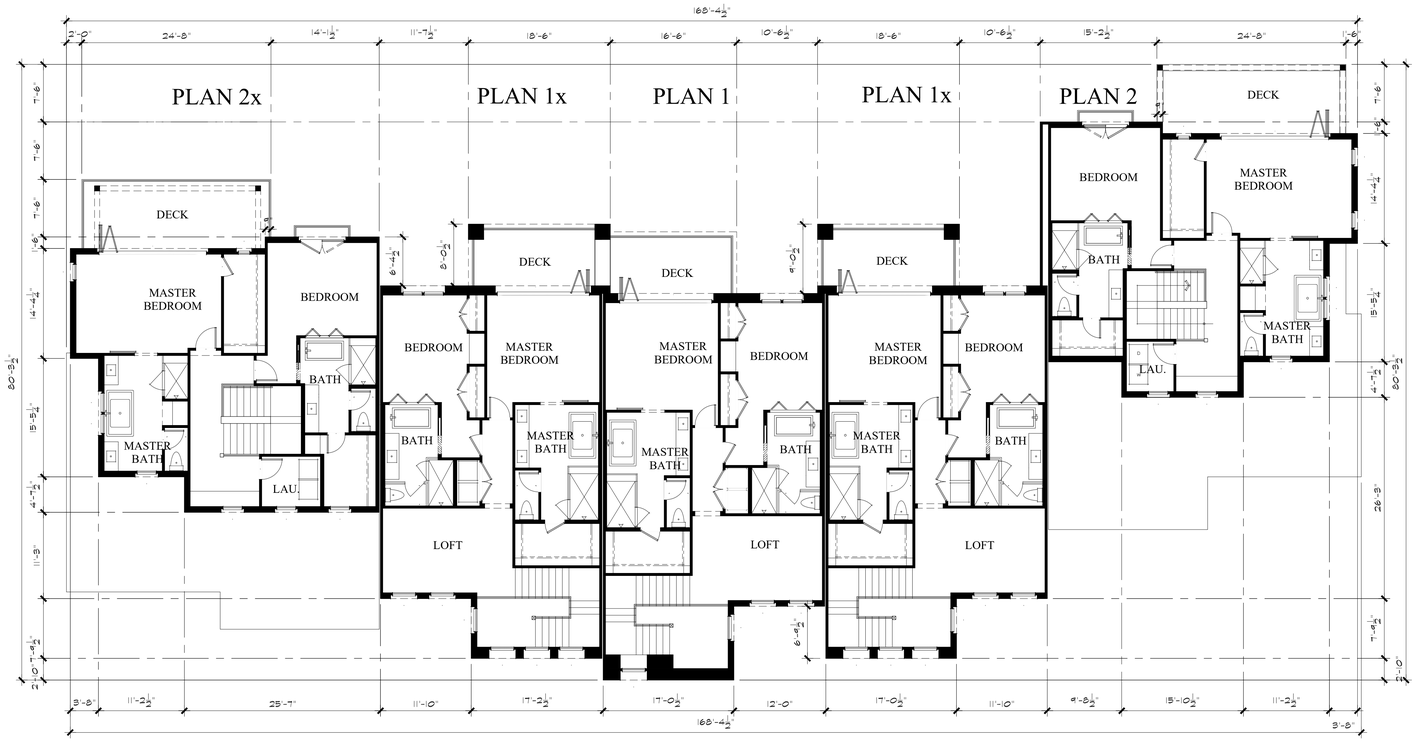
TYPICAL FIVEPLEX FLOOR PLANS V-1.2

SCALE: 1/8" = 1'-0"

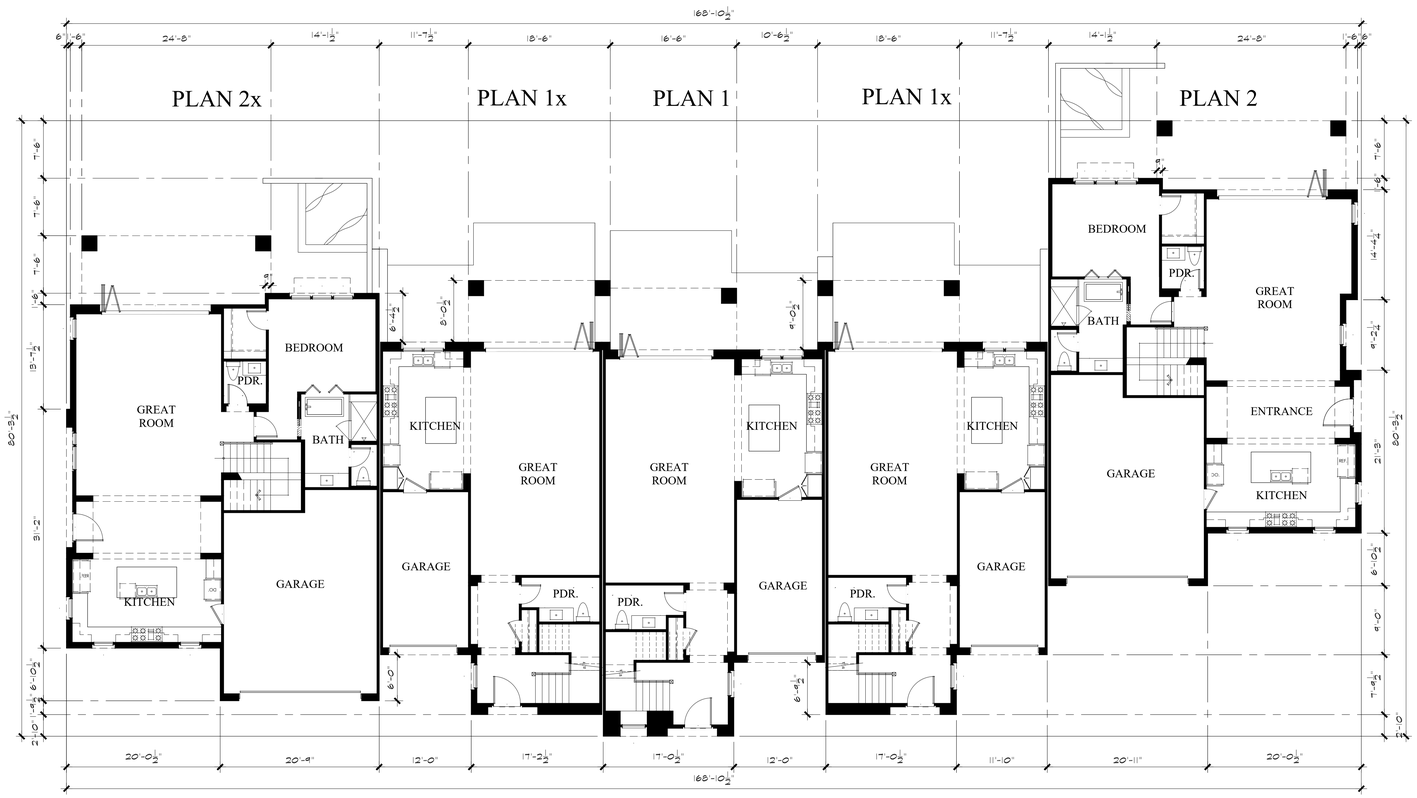
Ritz Carlton

December 20, 2022

LCRA



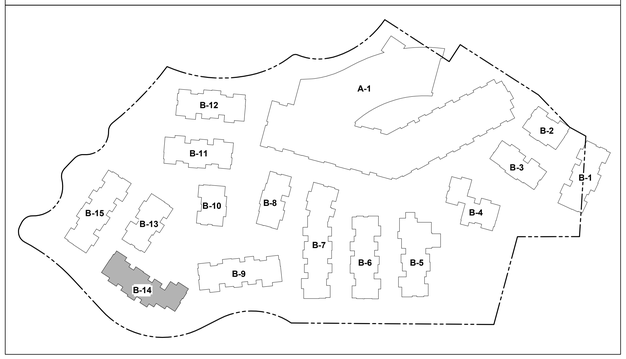

UPPER LEVEL — FIVEPLEX (B-14)




ENTRY LEVEL — FIVEPLEX (B-14)

**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN



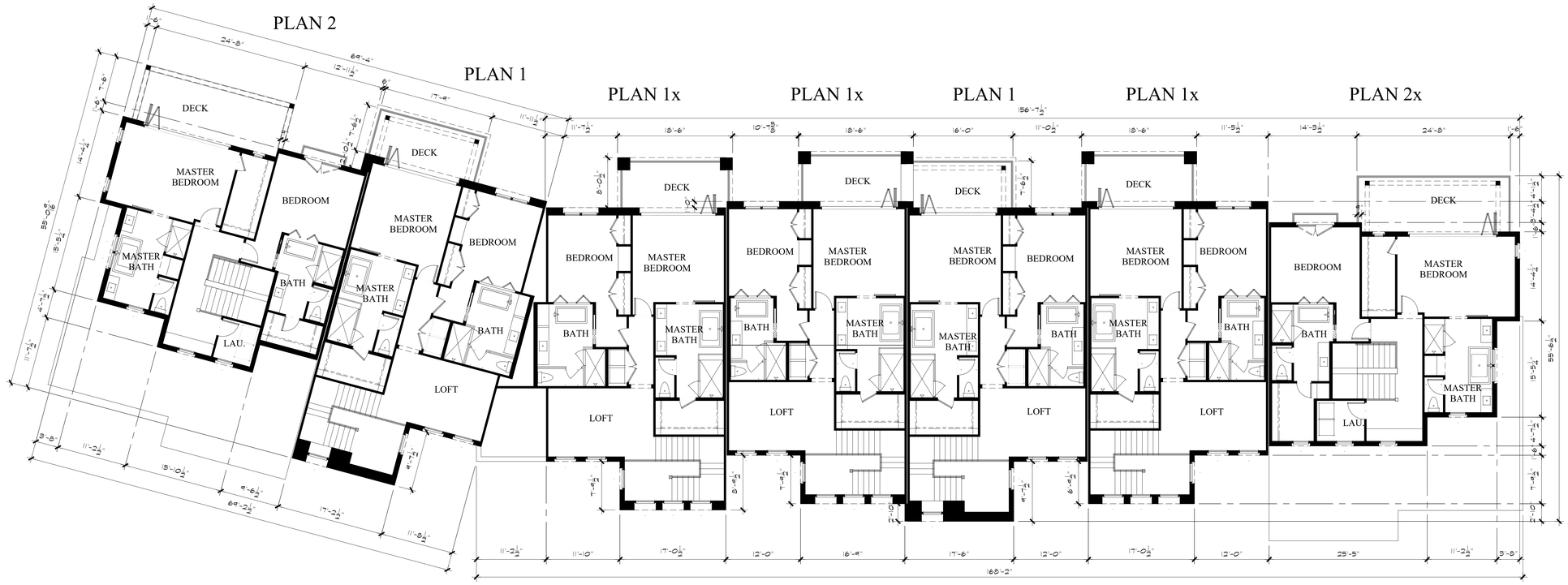

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## BUILDING B-14 FLOOR PLANS V-1.3

SCALE: 1/8" = 1'-0"

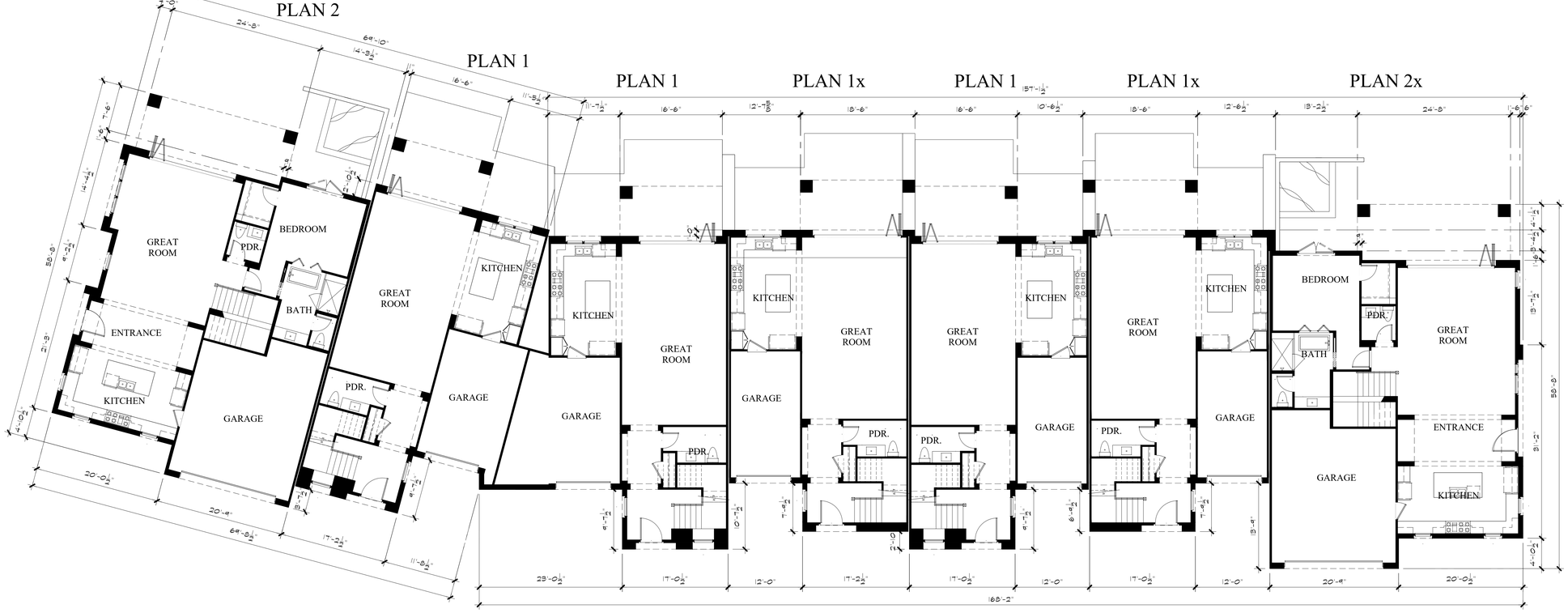
Ritz Carlton
December 20, 2022

LCRA




UPPER LEVEL

SEVENPLEX (B-7)




LOWER LEVEL

SEVENPLEX (B-7)

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

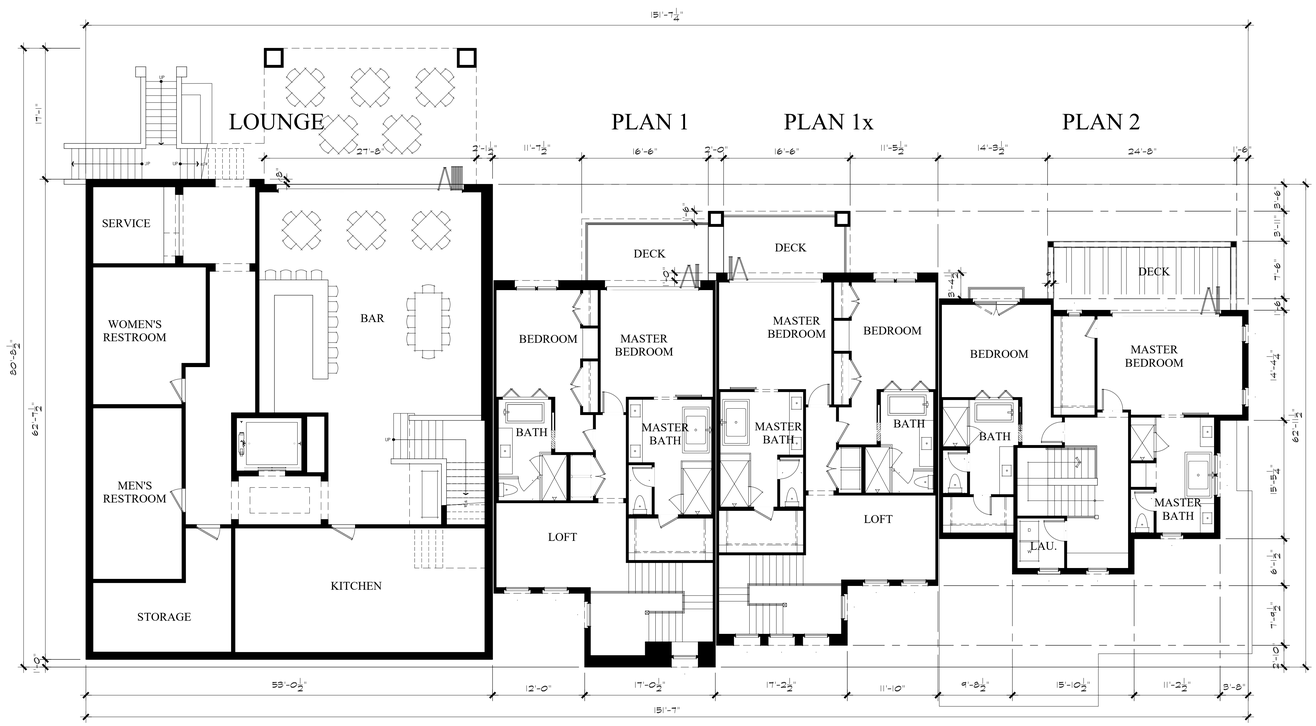
NOTE: SEE SHEET V-1.5 FOR KEY PLAN
UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.

## BUILDING B-7 FLOOR PLANS V-1.4

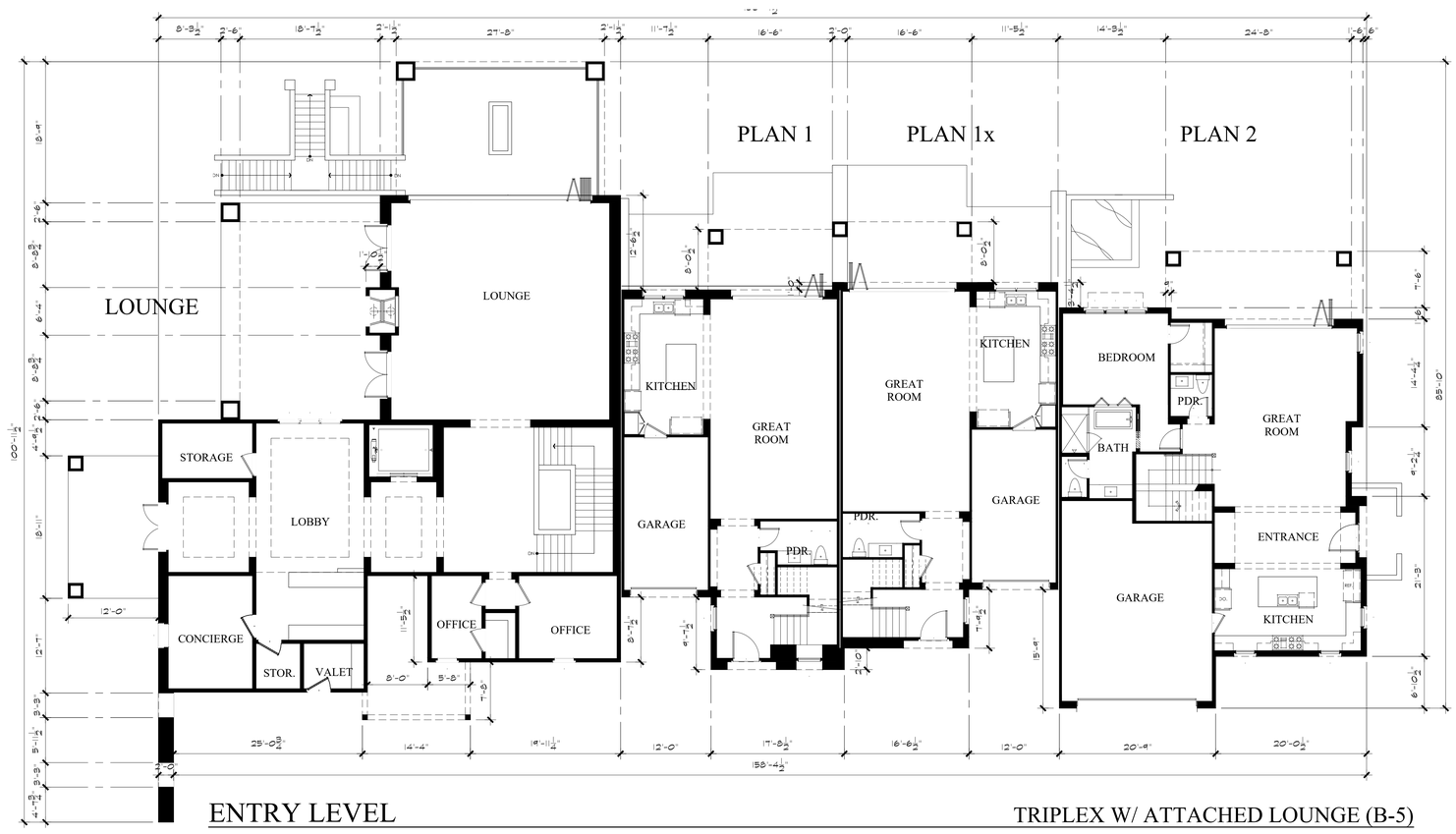
SCALE: 1/8" = 1'-0"

Ritz Carlton
December 20, 2022

LCRA



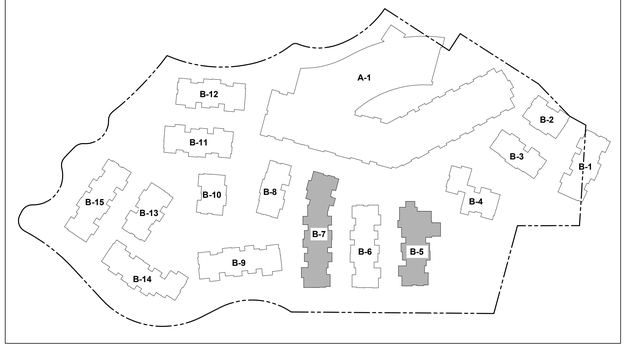

UPPER LEVEL — TRIPLEX W/ ATTACHED LOUNGE (B-5)




ENTRY LEVEL — TRIPLEX W/ ATTACHED LOUNGE (B-5)

**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN




NOTE: SEE SHEET V-1.4 FOR BUILDING B-7 FLOOR PLAN

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## BUILDING B-5 FLOOR PLANS V-1.5

SCALE: 1/8" = 1'-0"

Ritz Carlton
December 20, 2022

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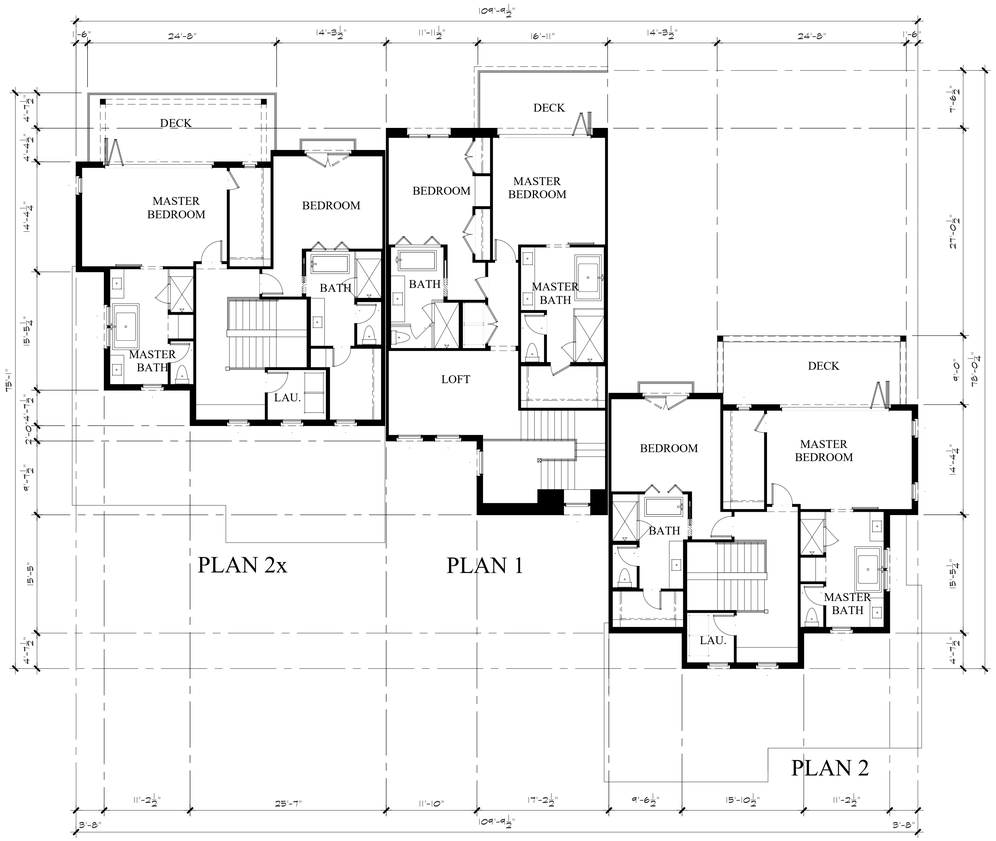
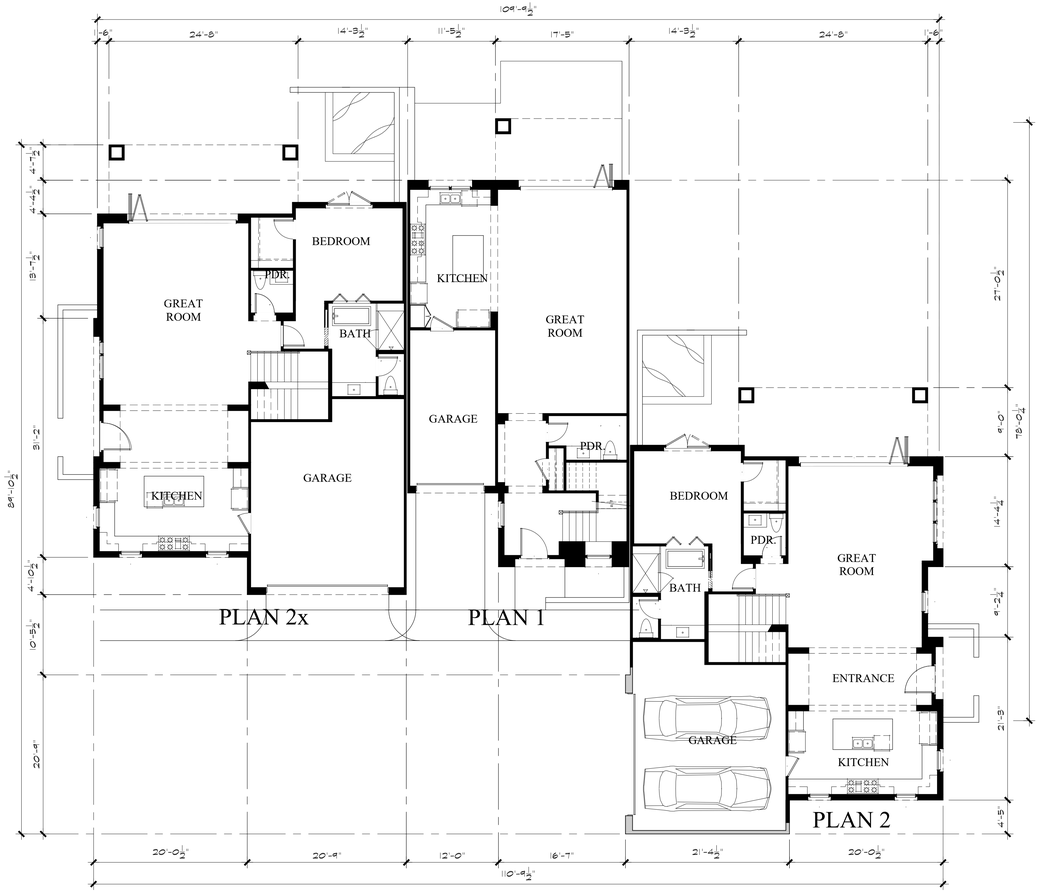
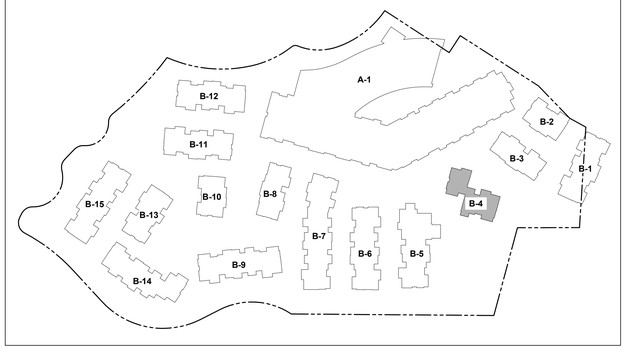



**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

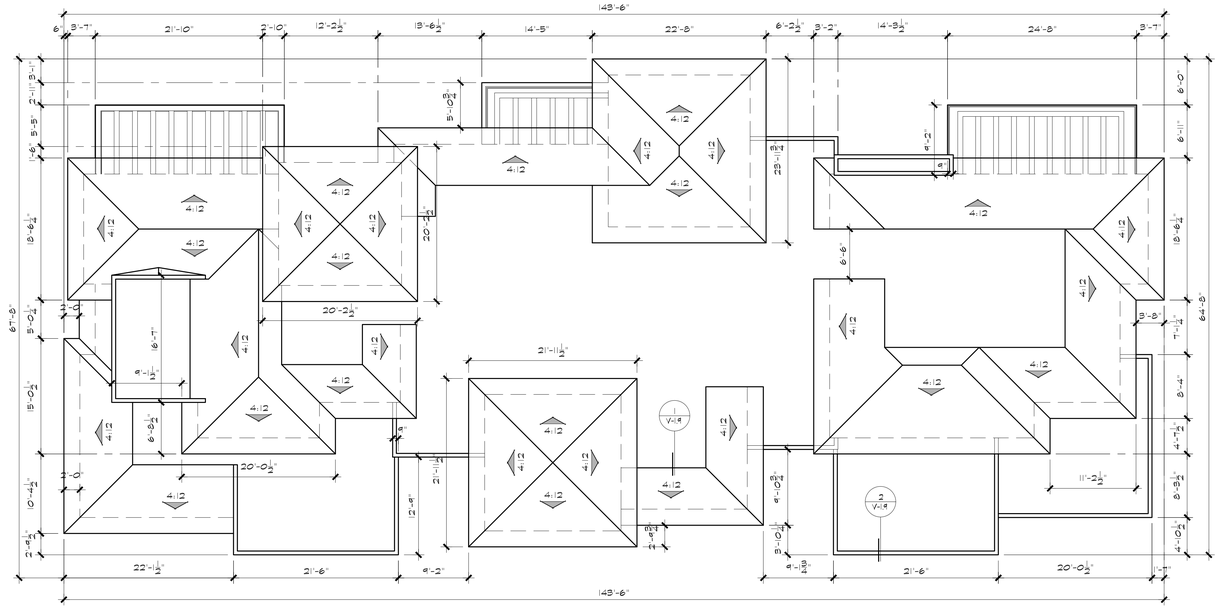
## BUILDING B-4 FLOOR PLANS V-1.6

SCALE: 1/8" = 1'-0"

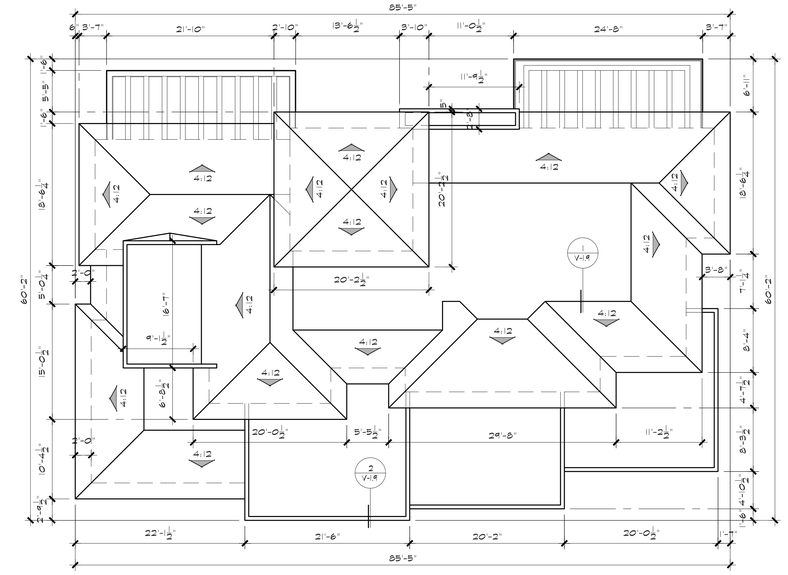
Ritz Carlton

December 20, 2022

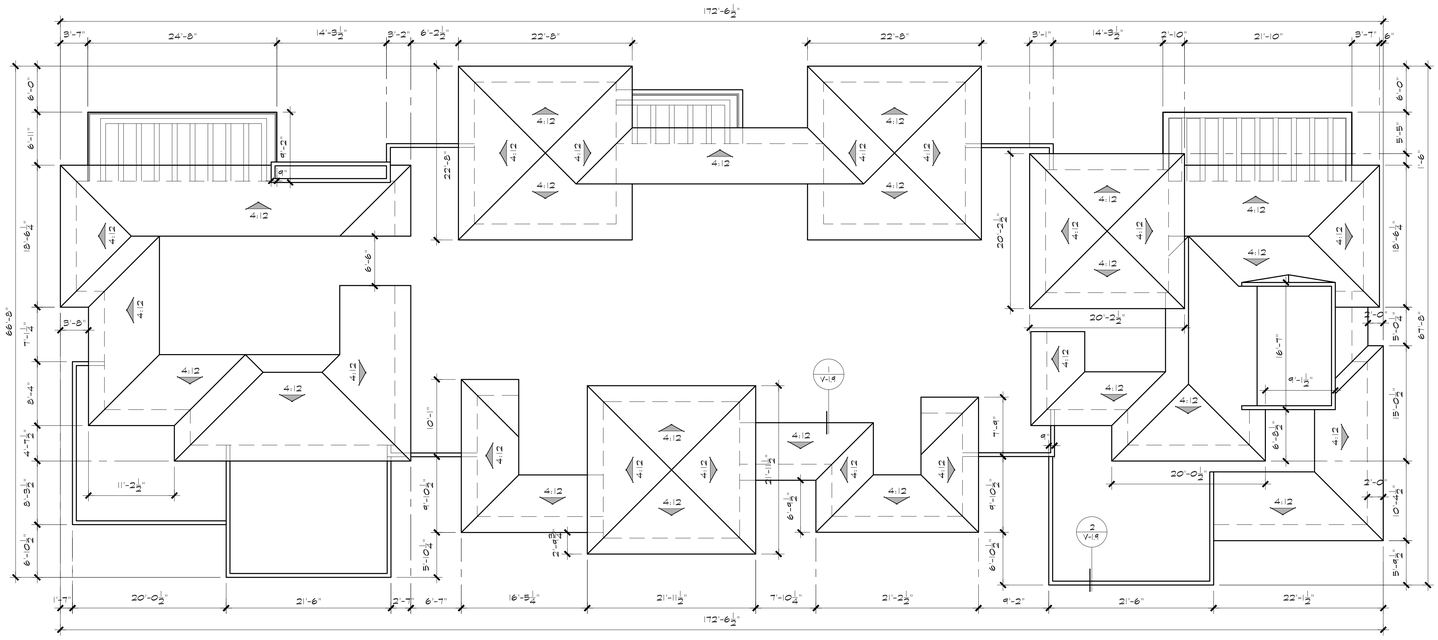
LCRA



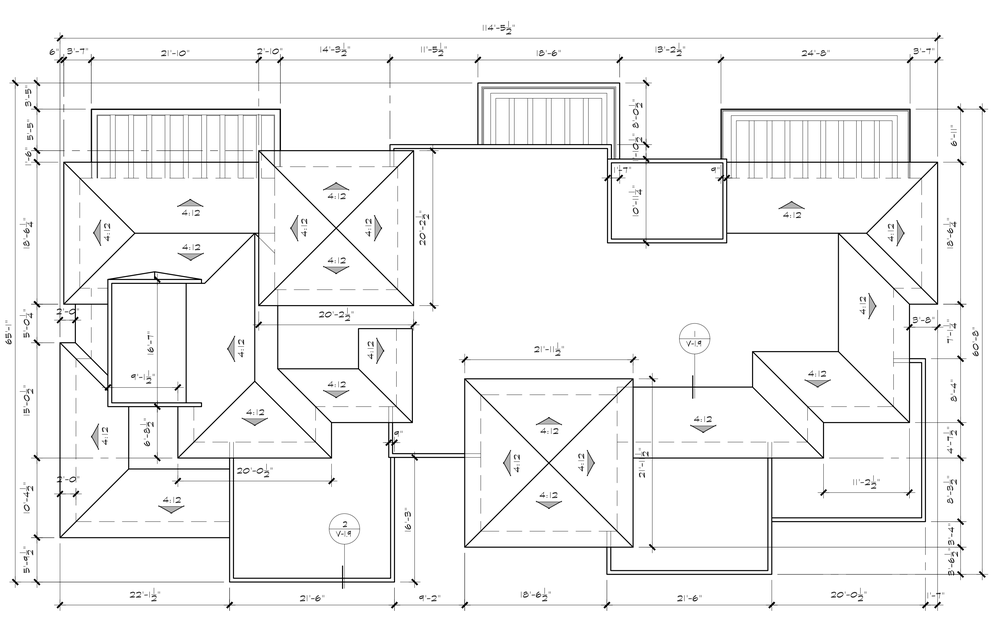
ROOF PLAN — FOURPLEX (B-12, B-11 & B-1)



ROOF PLAN — DUPLEX (B-10 & B-2)



ROOF PLAN — FIVEPLEX (B-15, B-9 & B-6)



ROOF PLAN — TRIPLEX (B-13, B-8 & B-3)

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## TYPICAL ROOF PLANS V-1.7

SCALE: 1/8" = 1'-0"

Ritz Carlton

December 20, 2022

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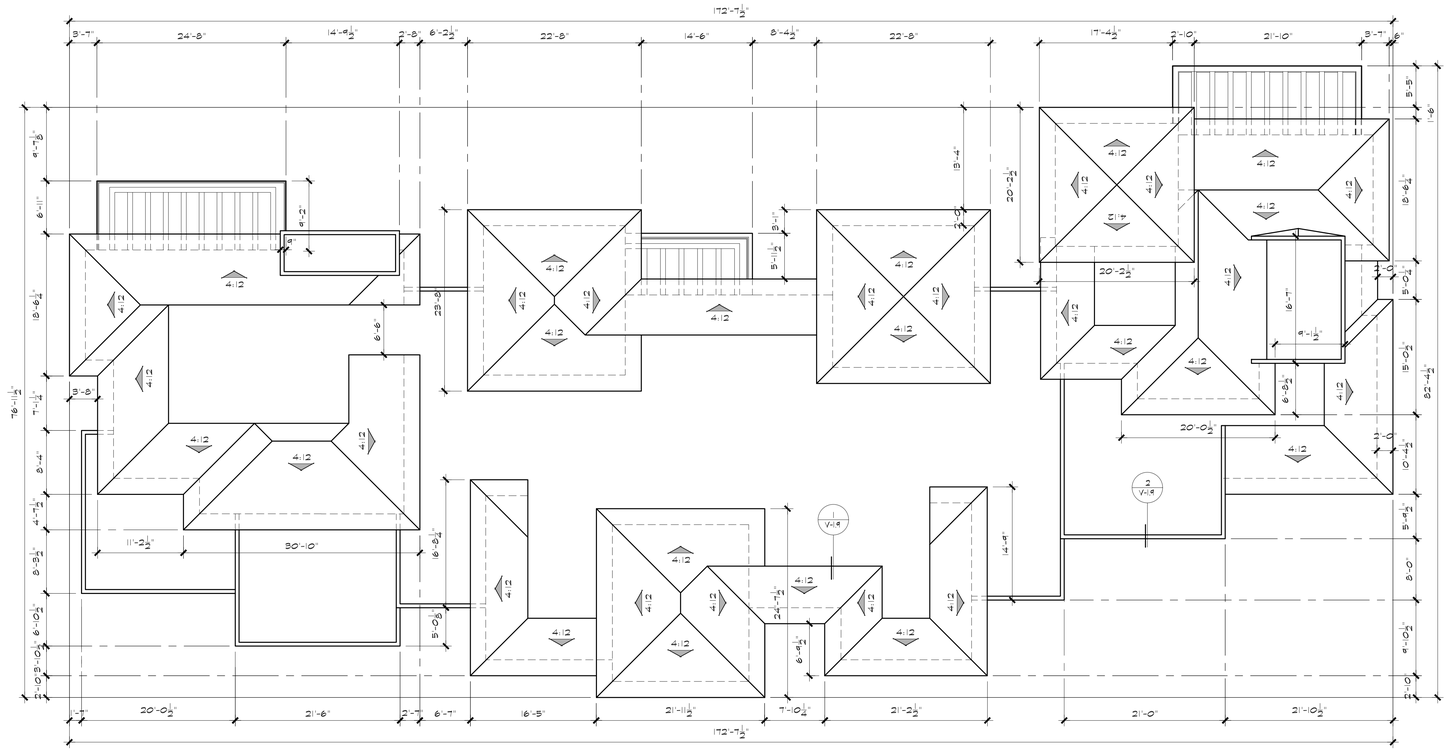
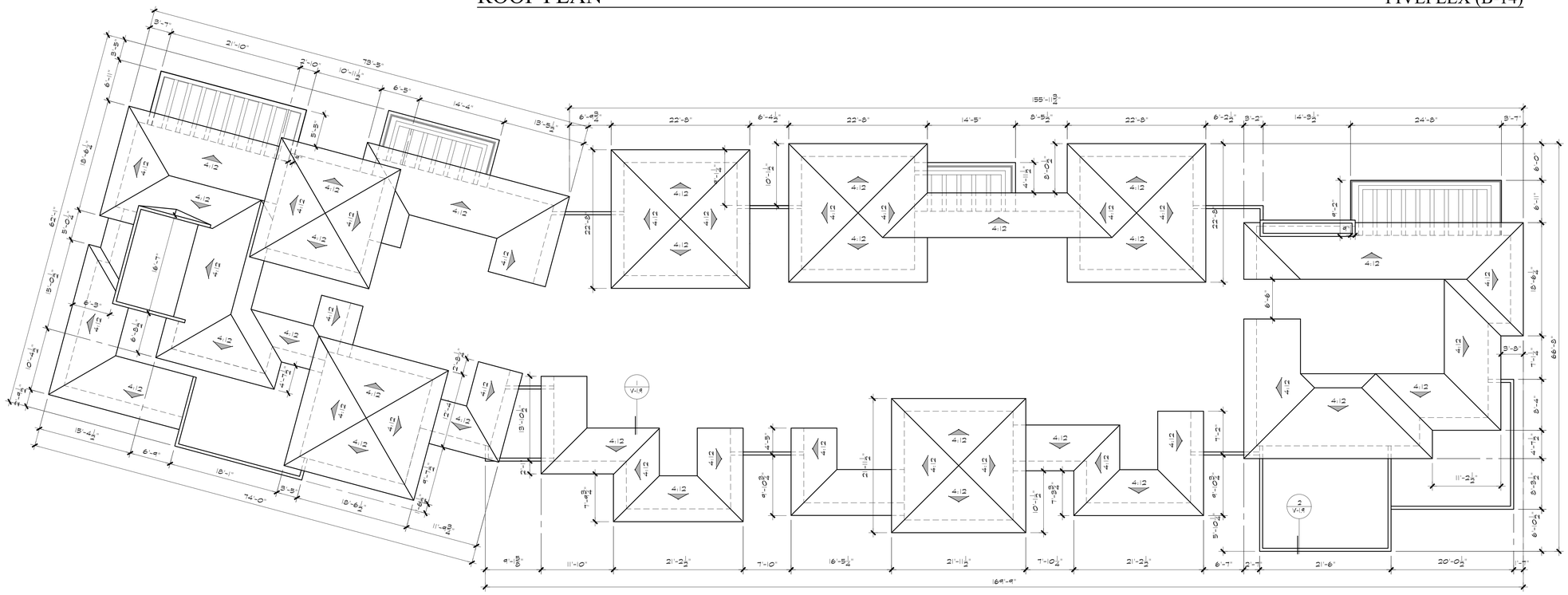


ROOF PLAN — FIVEPLEX (B-14)



ROOF PLAN — SEVENPLEX (B-7)

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

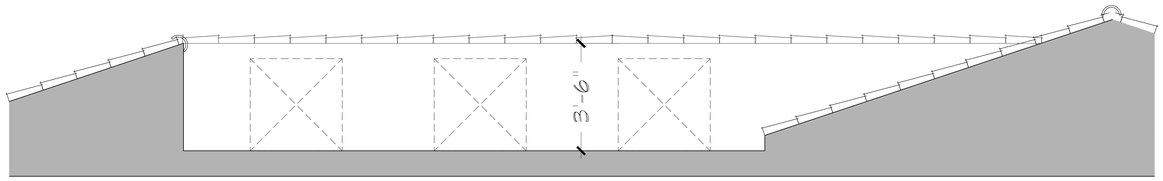
BUILDING B-14 & B-7 ROOF PLANS V-1.8

SCALE: 1/8" = 1'-0"

Ritz Carlton

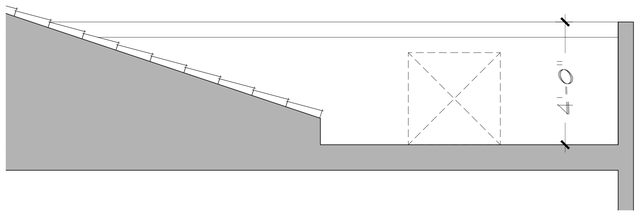
December 20, 2022

LCRA



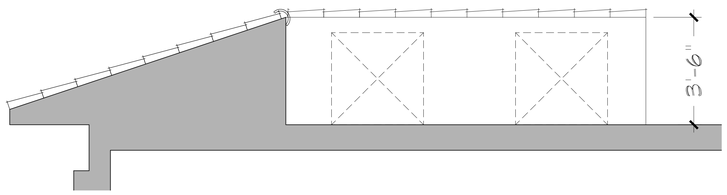

TYP. MECHANICAL WELL A2

1/2" = 1'-0"



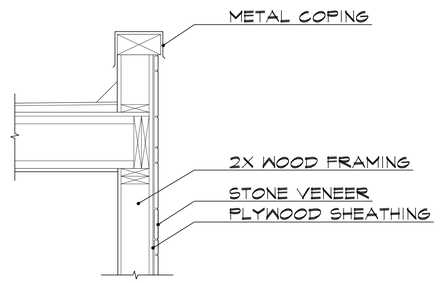

TYP. MECHANICAL WELL A3

1/2" = 1'-0"



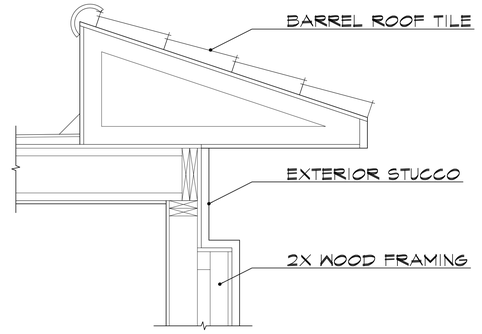

TYP. MECHANICAL WELL A1

1/2" = 1'-0"



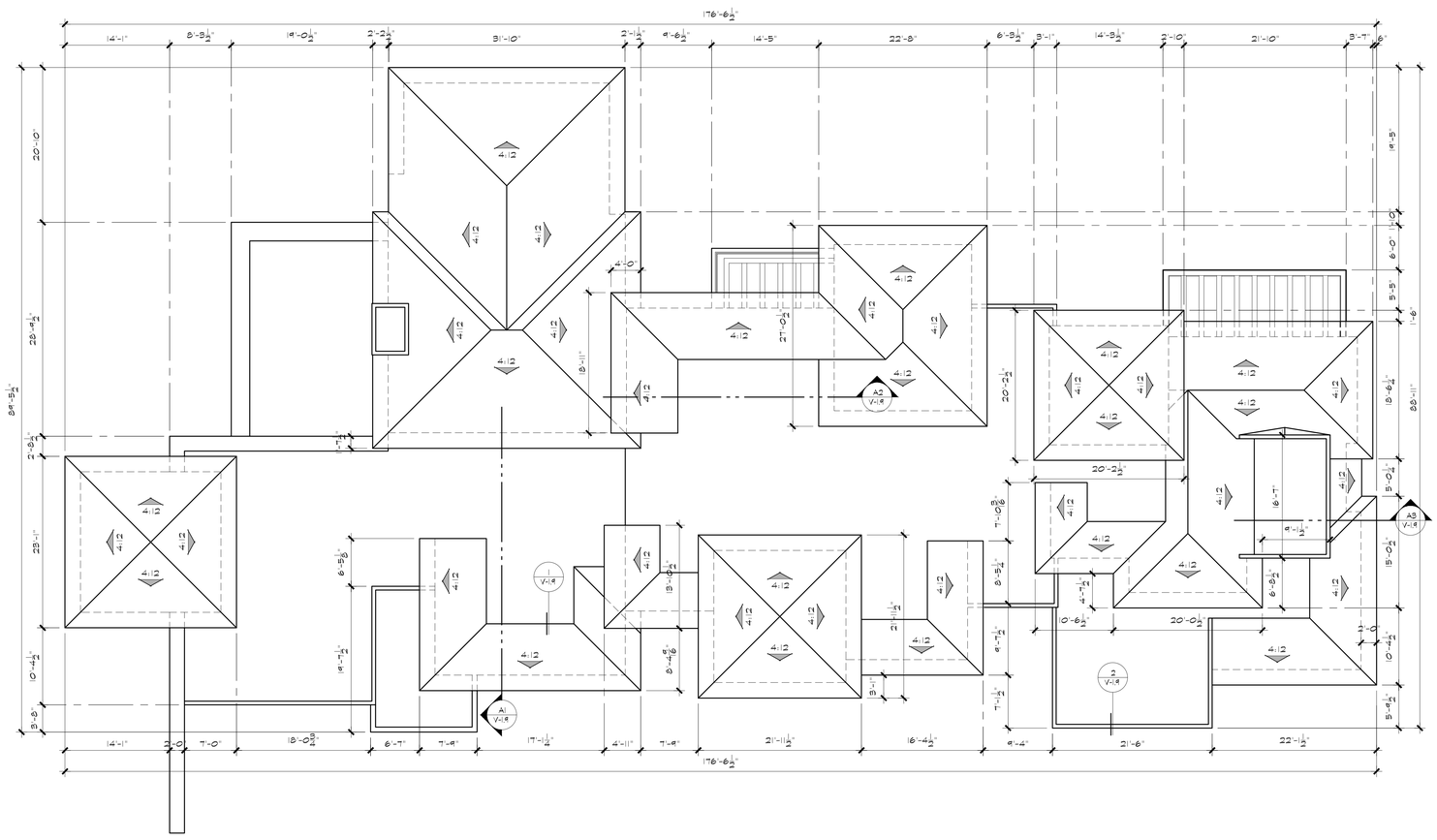

PARAPET DETAIL #2

1" = 1'-0"

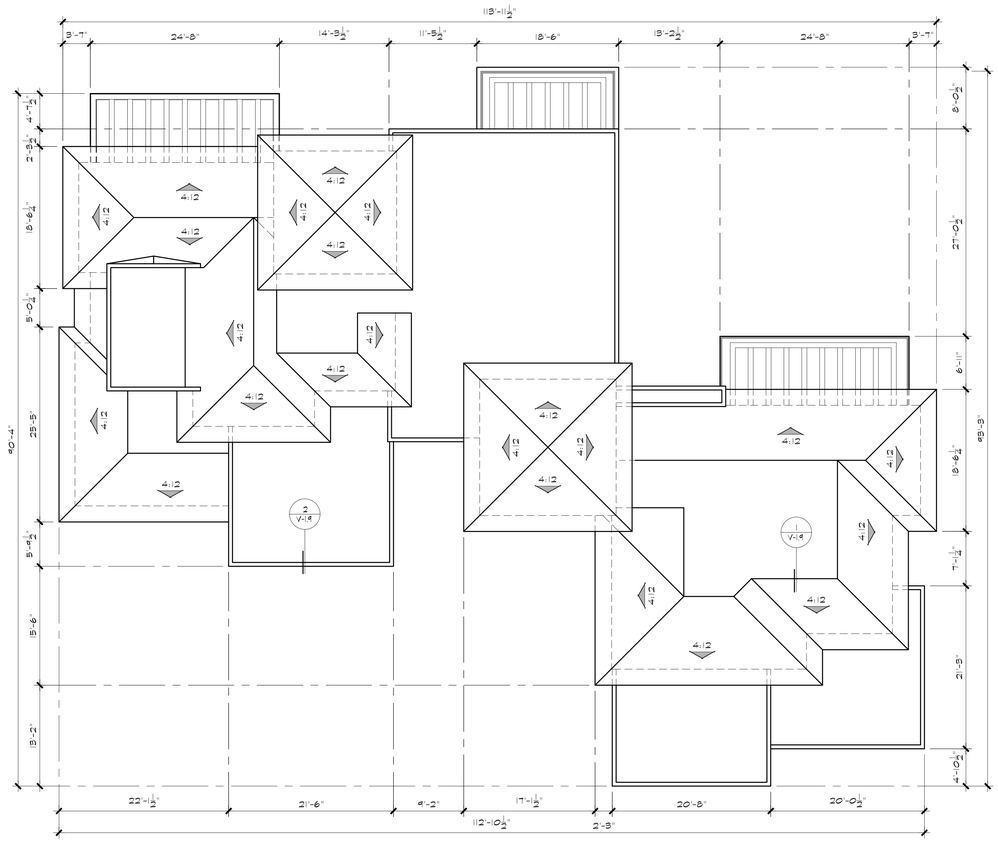



SLOPED ROOF DETAIL #1

1" = 1'-0"



ROOF PLAN TRIPLEX W/ ATTACHED LOUNGE (B-5)



ROOF PLAN TRIPLEX (B-4)

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
December 20, 2022

## BUILDING B-5 & B-4 ROOF PLANS V-1.9

SCALE: 1/8" = 1'-0"

LCRA




FRONT ELEVATION - STREETSIDE




REAR ELEVATION

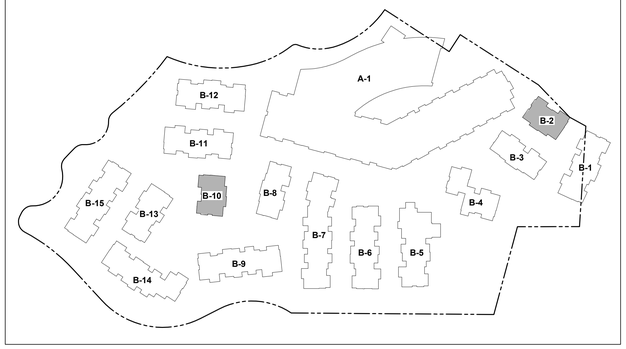



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

## DUPLEX ELEVATIONS V-2.0

SCALE: 1/8" = 1'-0"

LCRA




FRONT ELEVATION - STREETSIDE




FRONT ELEVATION (B-13)




REAR ELEVATION




REAR ELEVATION (B-13)

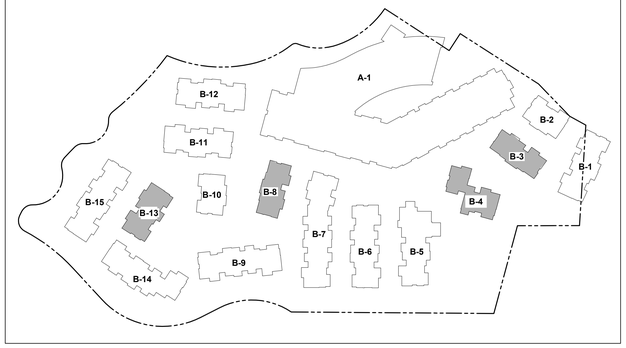



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

## TRIPLEX ELEVATIONS V-2.1

SCALE: 1/8" = 1'-0"

LCRA




FRONT ELEVATION - STREETSIDE




FRONT ELEVATION (B-1)




REAR ELEVATION



REAR ELEVATION (B-1)

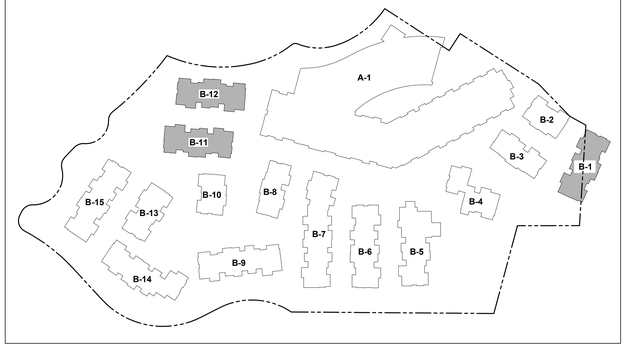



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## FOURPLEX ELEVATIONS V-2.2

SCALE: 1/8" = 1'-0"

Ritz Carlton

February 15, 2023

LCRA



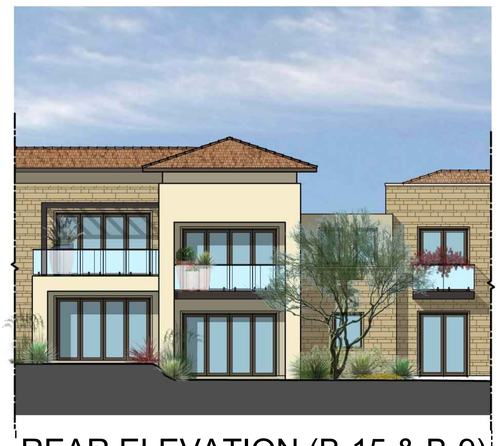

FRONT ELEVATION - STREETSIDE




FRONT ELEVATION (B-15 & B-9)




REAR ELEVATION



REAR ELEVATION (B-15 & B-9)

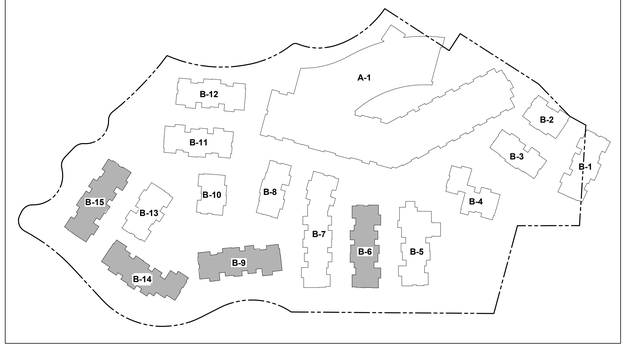



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

FIVEPLEX ELEVATIONS V-2.3
SCALE: 1/8" = 1'-0"

LCRA




FRONT ELEVATION - STREETSIDE




REAR ELEVATION

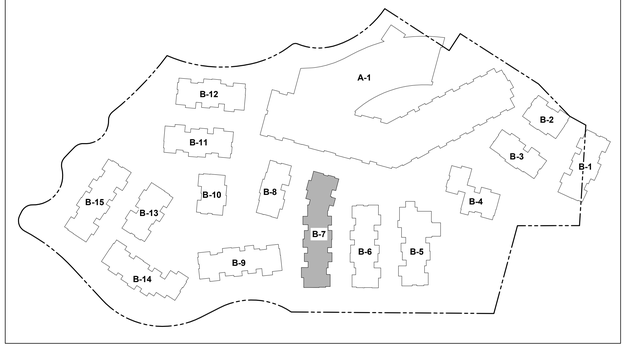



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

BUILDING B-7 ELEVATIONS V-2.4
SCALE: 1/8" = 1'-0"

LCRA




FRONT ELEVATION - STREETSIDE




REAR ELEVATION

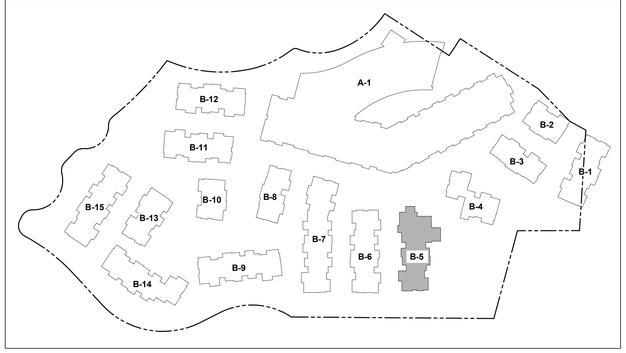



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN

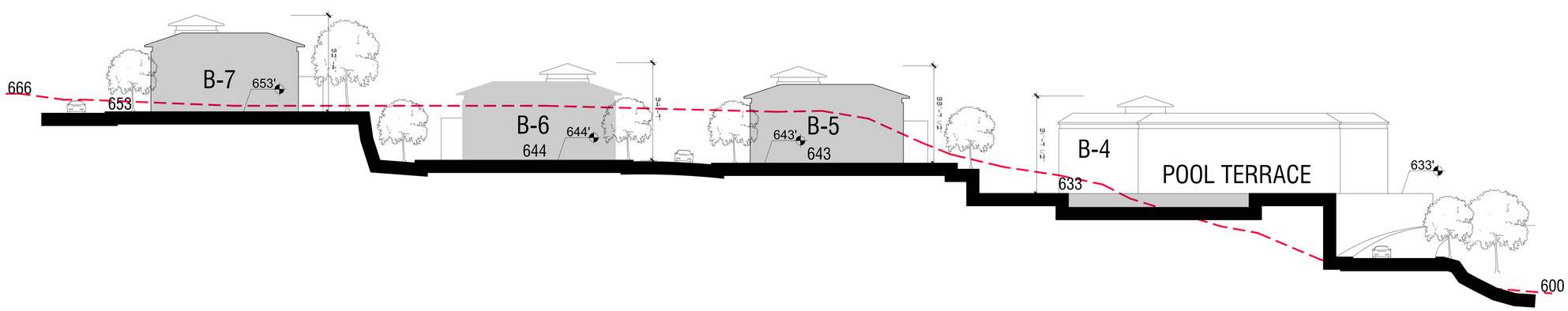


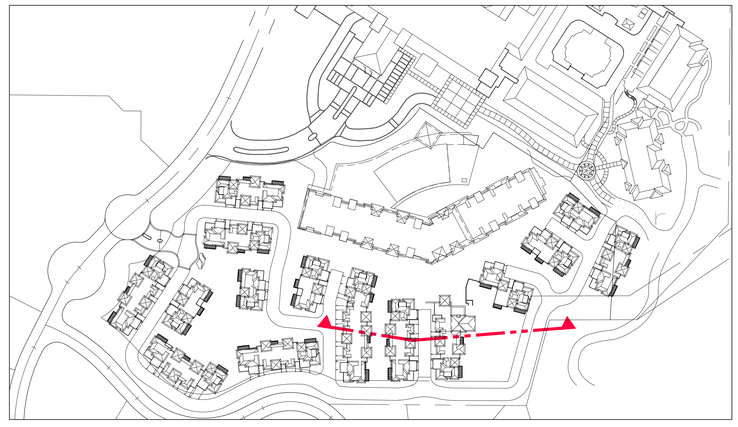

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

BUILDING B-5 ELEVATIONS V-2.5
SCALE: 1/8" = 1'-0"

LCRA



# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## SITE SECTION V-2.6

SCALE: 1/16" = 1'-0"

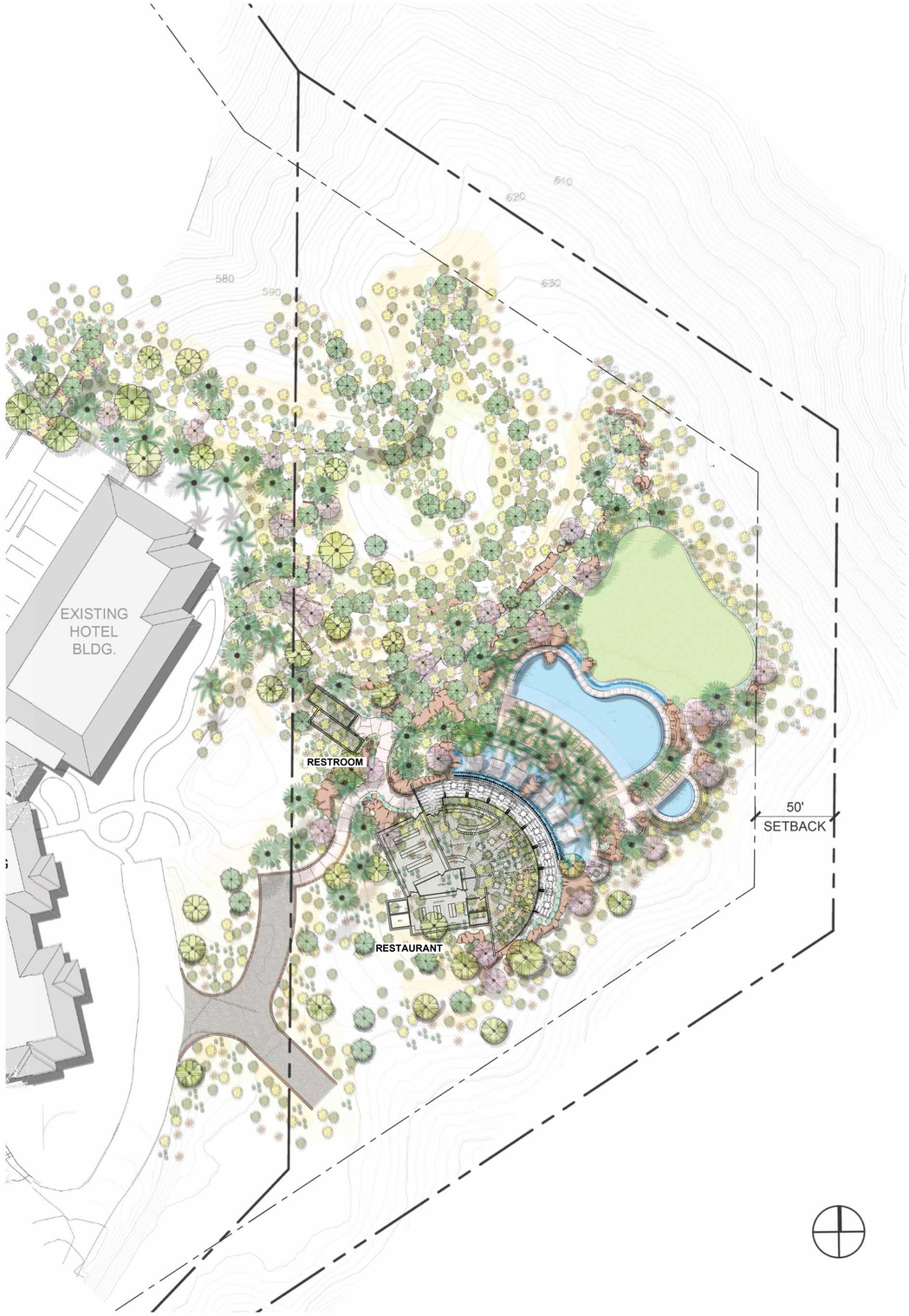
Ritz Carlton
February 15, 2023

LCRA

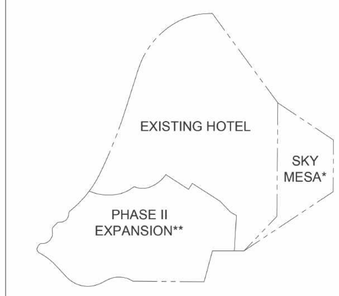


# SKY MESA

## THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE




KEY PLAN




*SEE SHEET R-0.1 FOR MORE SITE INFO
**SEE SHEET C-0.1 FOR MORE SITE INFO

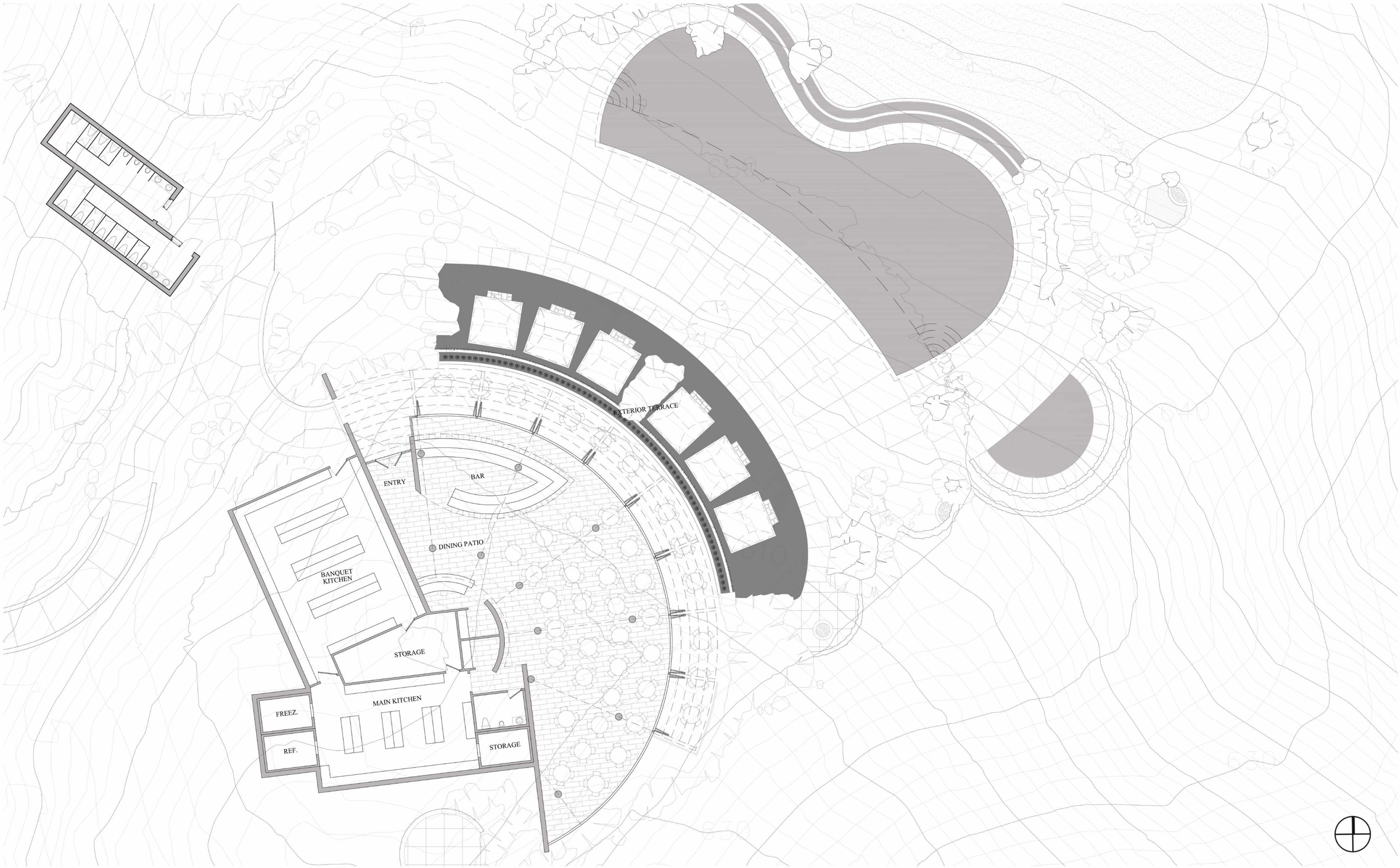
# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA COLORED SITE PLAN R-1.0A

SCALE: 1/32" = 1'-0"

Ritz Carlton
February 15, 2022

LCRA



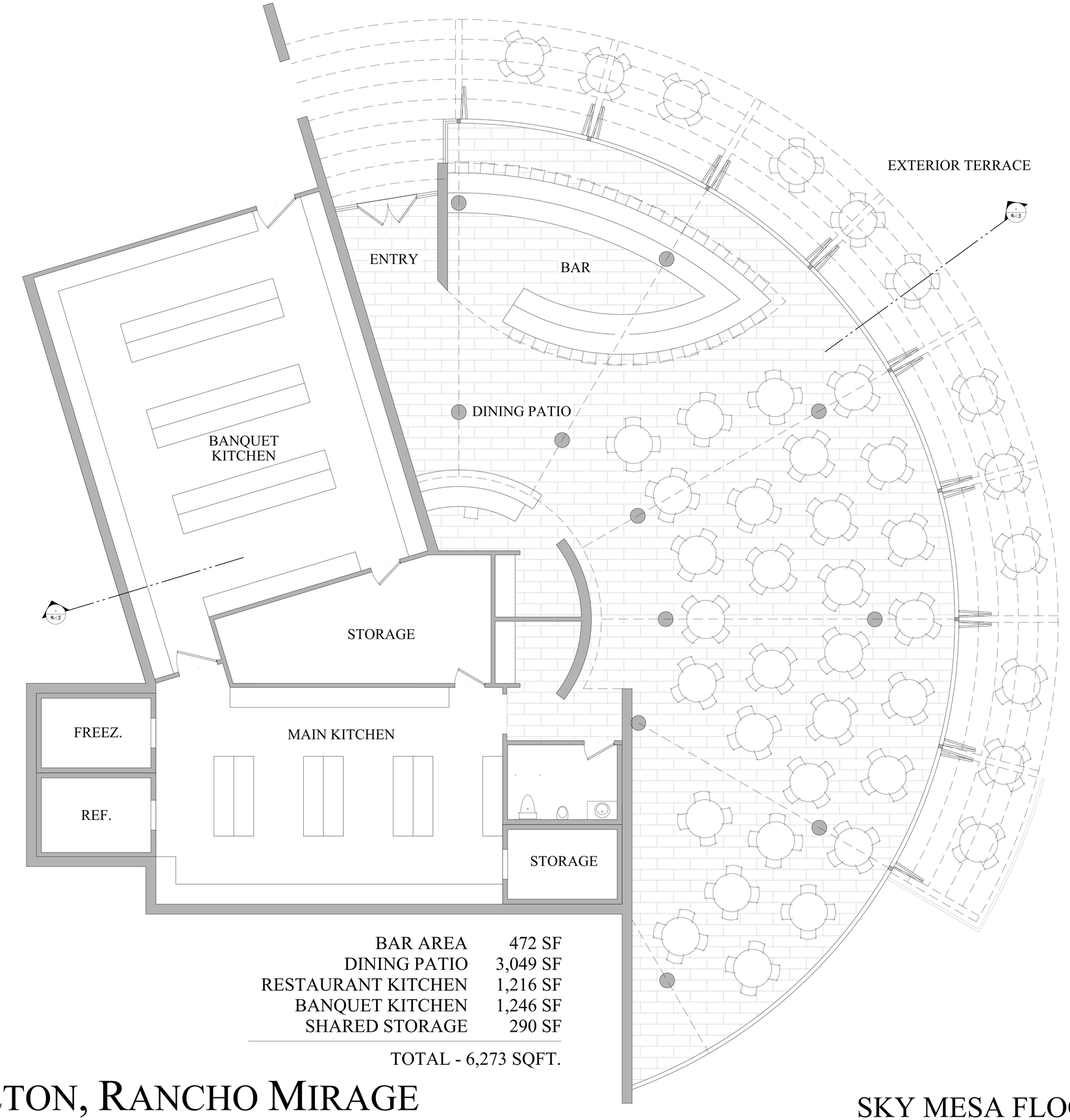

# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA ENLARGED SITE PLAN R-1.0

SCALE: 1/8" = 1'-0"

Ritz Carlton
February 15, 2022

LCRA




| | |
|---|---|
| BAR AREA | 472 SF |
| DINING PATIO | 3,049 SF |
| RESTAURANT KITCHEN | 1,216 SF |
| BANQUET KITCHEN | 1,246 SF |
| SHARED STORAGE | 290 SF |
| TOTAL - 6,273 SQFT. | |

# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA FLOOR PLAN R-1.1

SCALE: 1/4" = 1'-0"

Ritz Carlton

February 15, 2022

LCRA




NORTH ELEVATION



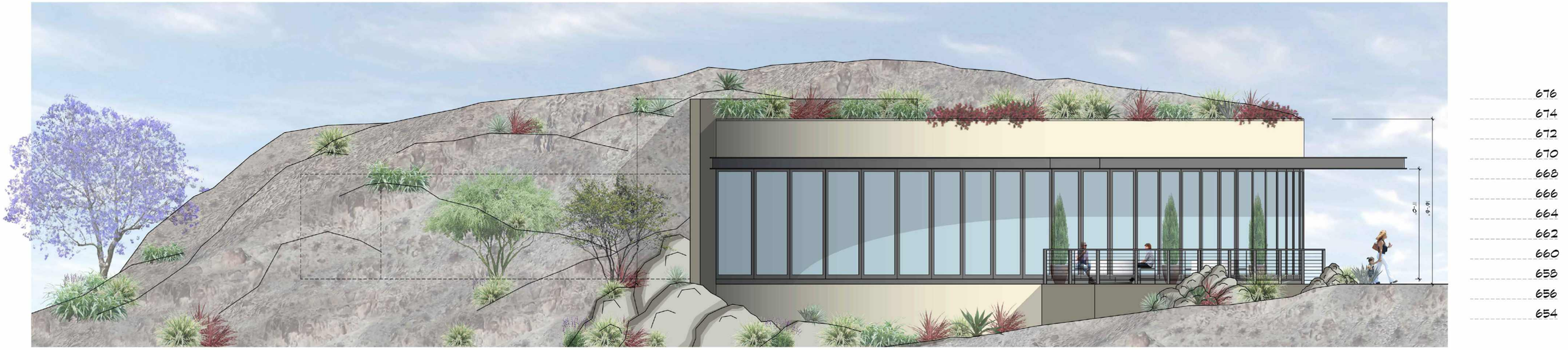

EAST ELEVATION

# THE RITZ-CARLTON, RANCHO MIRAGE

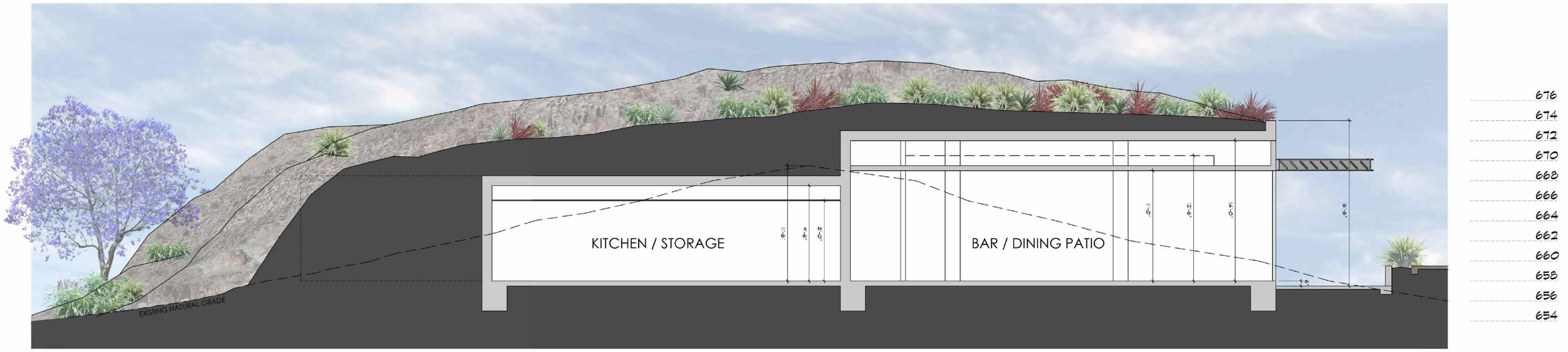
Ritz Carlton
February 15, 2022

SKY MESA ELEVATIONS R-1.2
SCALE: 1/4" = 1'-0"

LCRA




SOUTH ELEVATION




SECTION

# THE RITZ-CARLTON, RANCHO MIRAGE

Ritz Carlton
February 15, 2022

## SKY MESA ELEVATION & SECTION R-1.3

SCALE: 1/4" = 1'-0"

LCRA




Total Minimum Plumbing Fixtures:
Men: 4 Water Closets, 3 Urinal, 2 Lavatory
Women: 7 Water Closets, 3 Lavatory

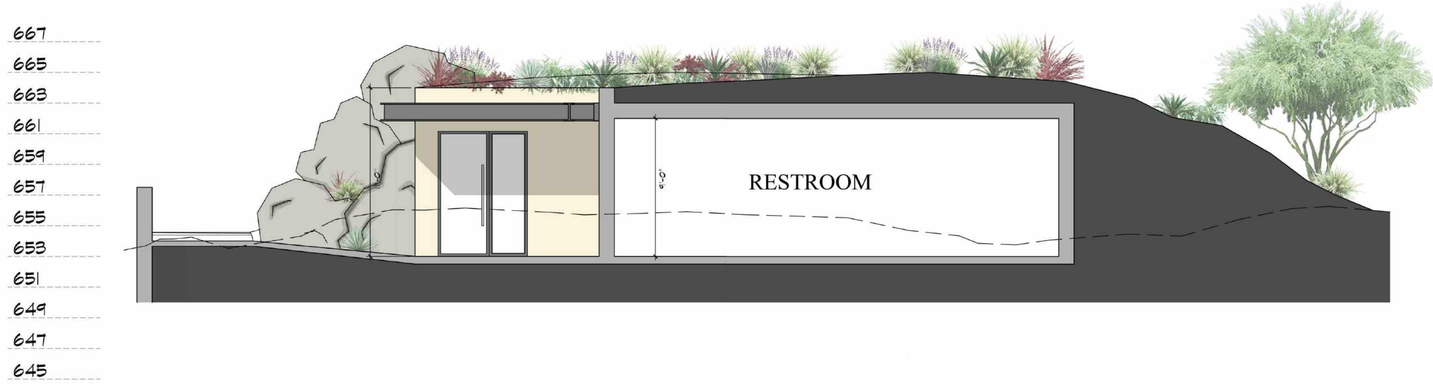
# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA RESTROOM PLAN R-2.1

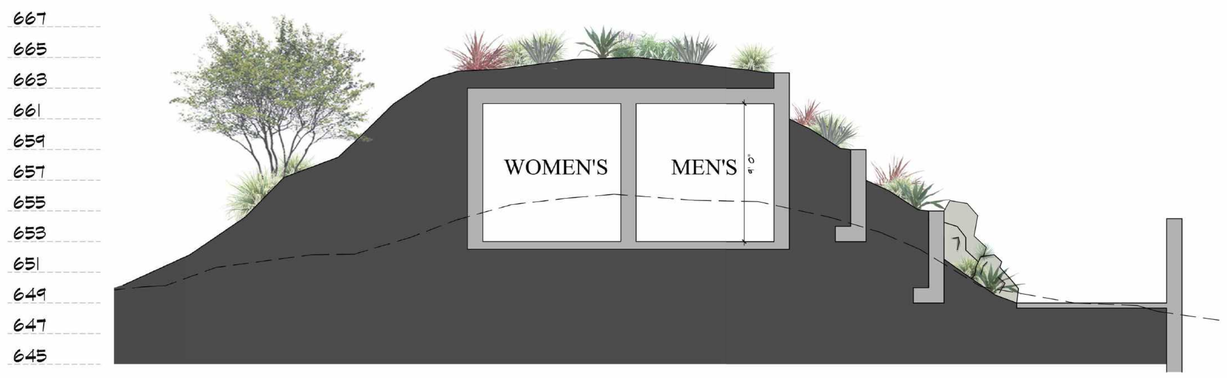
SCALE: 1/4" = 1'-0"

Ritz Carlton
February 15, 2022

LCRA




SECTION A




SECTION B

# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA RESTROOM SECTIONS R-2.2

SCALE: 1/4" = 1'-0"

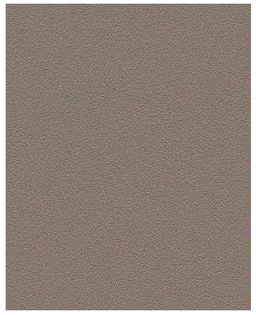
Ritz Carlton

February 15, 2022

LCRA



1



2



3



4



5



6



7



8



9



10



11



12



13




TYPICAL FRONT ELEVATION - STREETSIDE




TYPICAL REAR ELEVATION

| NO. | MATERIAL |
|---|---|
| 1 | MAIN STUCCO: BENJAMIN MOORE HC-80 BLEEKER BEIGE INTEGRAL COLOR STUCCO WITH SMOOTH FINISH |
| 2 | ACCENT STUCCO: SHERWIN WILLIAMS - SW7025 BACKDROP INTEGRAL COLOR STUCCO WITH SMOOTH FINISH |
| 3 | MASONRY VENEER: CREATIVE MINES - CUSTOM BLEND OF CRAFT SPLIT MODULAR AND URBAN RECTANGLE IN TIMBERWOLF COLOR. |
| 4 | ROOFING: NEWPOINT CONCRETE ROOF TILE - DURALITE SAXONY SLATE IN CALIFORNIA MISSION BLEND |
| 5 | FASCIA: BENJAMIN MOORE - 2112-30 STONE BROWN |
| 6 | GUARDRAILS: CRL GLASS WINDSCREEN CLAMP SYSTEM AND CRL-BLUMCRAFT 337 SERIES RAILING CAP IN DARK BRONZE ANODIZED FINISH |
| 7 | WINDOWS: SOUTHLAND WINDOWS AND DOORS - CLAD CASEMENT WINDOWS IN DARK BRONZE FINISH |
| 8 | DOORS: SOUTHLAND WINDOWS AND DOORS - CLAD FRENCH DOORS AND BI-FOLD DOORS IN DARK BRONZE FINISH |
| 9 | ENTRY DOORS: ETO DOORS - FORTIS FIBERGLASS MULTI-HORIZONTAL PLANK DOOR W/HORIZONTAL TEXTURED GRAIN IN STAIN FINISH TO MATCH TRELLIS |
| 10 | GARAGE DOOR: CLOPAY GARAGE DOORS - CANYON RIDGE MODERN "PLANK" DOOR IN BENJAMIN MOORE 2112-30 STONE BROWN |
| 11 | ENTRY LIGHTING: QUOIZEL - BEACON LED OUTDOOR WALL FIXTURE IN BLACK FINISH |
| 12 | METAL TRIM/TRELLIS STRUCTURE: BENJAMIN MOORE - 2118-20 TOUCAN BLACK |
| 13 | WOOD TRELLIS INSERTS/PRIVACY SCREENS: RESYSTA - CLADDING IN 614 SIAM COLOR (BEHIND MATERIAL 12) |

# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

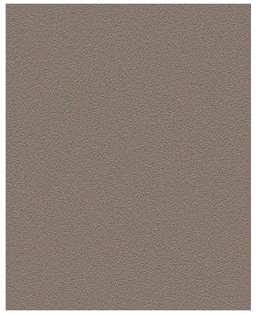
## VENUE, BUILDING A-1, & B1 TO B15
## TYPICAL COLOR & MATERIALS - CM-1.0

Ritz Carlton
February 15, 2023

LCRA



1



2



3



4



5



6



7




SKY MESA - PARTIAL FRONT ELEVATION - NORTH




SKY MESA - SIDE ELEVATION - EAST

| NO. | MATERIAL |
|---|---|
| 1 | MAIN STUCCO: BENJAMIN MOORE HC-80 BLEEKER BEIGE INTEGRAL COLOR STUCCO WITH SMOOTH FINISH |
| 2 | ACCENT STUCCO: SHERWIN WILLIAMS - SW7025 BACKDROP INTEGRAL COLOR STUCCO WITH SMOOTH FINISH |
| 3 | CONCRETE WALL: BOARD FORMED CONCRETE WITH SMOOTH FINISH |
| 4 | GUARDRAILS: VIEARAIL CABLE RAIL SYSTEM AND LED-ENHANCED HANDRAIL IN DARK BRONZE ANODIZED FINISH |
| 5 | DOORS: SOUTHLAND WINDOWS AND DOORS - BI-FOLD DOORS IN DARK BRONZE FINISH |
| 6 | METAL TRIM/TRELLIS STRUCTURE: BENJAMIN MOORE - 2118-20 TOUCAN BLACK |
| 7 | WOOD TRELLIS INSERTS/PRIVACY SCREENS: RESYSTA - CLADDING IN 614 SIAM COLOR (BEHIND MATERIAL 6) |

# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SKY MESA AREA
TYPICAL COLOR & MATERIALS - CM-1.1

Ritz Carlton
February 15, 2023

LCRA




RESIDENCES



SKY MESA

**LANDSCAPE**
**REFERENCE ONLY**

SEE SUBMITTAL SHEET INDEX FOR SPECIFIC SUBMITTAL EXHIBITS

RITZ CARLTON EXPANSION PROJECT

**LANDSCAPE SUBMITTAL SHEET INDEX**
CONCEPTUAL PLAN SUBMITTAL

SHEET INDEX

| SHEET | DESCRIPTION |
|---|---|
| LR-0 | SHEET INDEX - ILLUSTRATIVE REFERENCE PLANS |
| LR-01 | SHEET ORGANIZATION MASTER & MASTER PLANT PALETTE - RESIDENTIAL |
| LR-02 | SHEET ORGANIZATION MASTER & MASTER PLANT PALETTE - SKY MESA |
| LS-01 | SHRUB PLAN |
| LS-02 | SHRUB PLAN |
| LS-03 | SHRUB PLAN |
| LS-04 | SHRUB PLAN |
| LS-05 | SHRUB PLAN |
| LS-06 | SHRUB PLAN |
| LS-07 | SHRUB PLAN |
| LS-08 | SHRUB PLAN |
| LS-09 | SHRUB PLAN |
| LS-10 | SHRUB PLAN |
| LS-11 | SHRUB PLAN |
| LS-12 | SHRUB PLAN |
| LT-01 | TREE PLAN |
| LT-02 | TREE PLAN |
| LT-03 | TREE PLAN |
| LT-04 | TREE PLAN |
| LT-05 | TREE PLAN |
| LT-06 | TREE PLAN |
| LT-07 | TREE PLAN |
| LT-08 | TREE PLAN |
| LT-09 | TREE PLAN |
| LT-10 | TREE PLAN |
| LT-11 | TREE PLAN |
| LT-12 | TREE PLAN |
| LN-01 | LANDSCAPE NOTES |
| LF-01 | LANDSCAPE FEATURES PLAN - RESIDENTIAL |
| LF-02 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-03 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-04 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-05 | LANDSCAPE FEATURES PLAN - SKY MESA |

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Design Studio of Michael McKay
Landscape Architecture, Planning & Consultants

Architect:

LCRA ARCHITECTS

Sheet Title:
SHEET INDEX - ILLUSTRATIVE REFERENCE PLAN
CONCEPT PLAN SUBMITTAL

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Viscinity Map:




Typical Revisions:

| △ | Date: | Description: |
|---|---|---|
| | | |

Sheet Title:
SHEET INDEX

Sheet Reference:
LR-0

C:\Users\vmily\Documents\1_Projects\Ritz\2022 Final Landscape Package\171201-Siteplan - Landscape Submittal - Standard\Ritz - Landscape Plans - Current.dwg

## PLANTING LEGEND

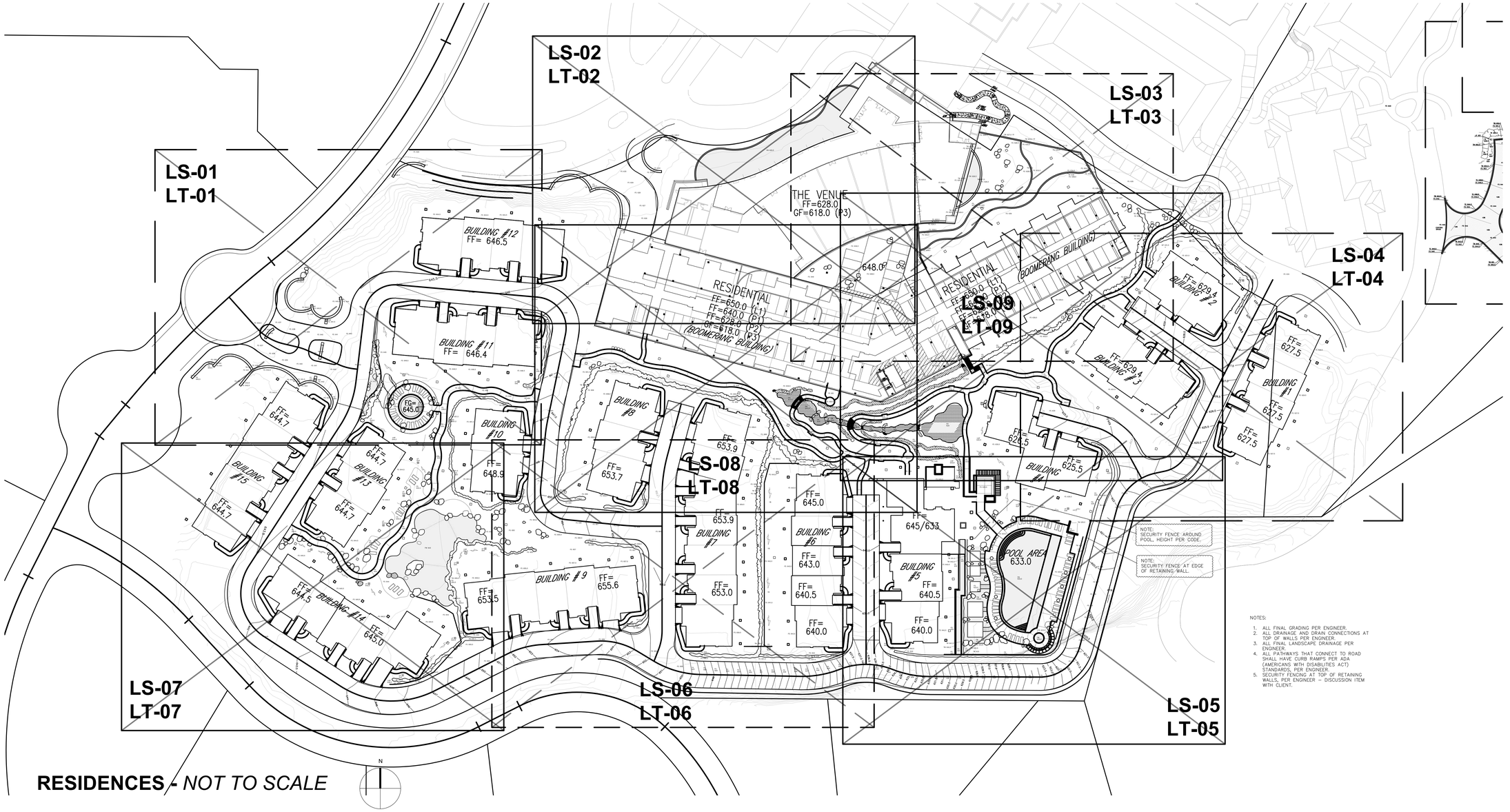
| SYMBOL | PLANT NAME | QTY. | SIZE | WUCOLS |
|---|---|---|---|---|
| TREES: | | | | |
| | ACACIA ANEURA<br>MULGA | 22 | 36" BOX | LOW |
| | ACACIA FARNESIANA<br>SWEET ACACIA | 16 | 36" BOX<br>MULTI-TRUNK | LOW |
| | CHILOPSIS LINEARIS<br>DESERT WILLOW | 74 | 36" BOX | MODERATE/<br>MEDIUM |
| | X CHITALPA TASHKENTENSIS<br>PINK DAWN | 107 | 36" BOX | LOW |
| | PARKINSONIA FLORIDA<br>BLUE PALO VERDE | 24 | 36" BOX | LOW |
| | PARKINSONIA X 'DESERT MUSEUM'<br>DESERT MUSEUM PALO VERDE | 197 | 36" BOX | LOW |
| | PROSOPIS CHILENSIS 'THORNLESS'<br>CHILEAN MESQUITE | 107 | 36" BOX | LOW |
| | VITEX AGNUS-CASTUS<br>CHASTE TREE | 17 | 36" BOX | LOW |
| PALMS: | | | | |
| | BRAHEA ARMATA<br>BLUE HESPER PALM | 5 | 6' BTH | MODERATE/<br>MEDIUM |
| | PHOENIX DACTYLIFERA 'MEDJOOL'<br>MEDJOOL DATE PALM | 34 | 15' BTH | MODERATE/<br>MEDIUM |
| | WASHINGTONIA FILIFERA<br>CALIFORNUA FAN PALM | 143 | 10'-15' BTH<br>SKINNED<br>40% AT 15'<br>20% AT 13'<br>40% AT 10' | MODERATE/<br>MEDIUM |

| SHRUBS - SMALL: | | QTY: | SIZE: | WUCOLS: |
|---|---|---|---|---|
| S2 | ASCLEPIAS SUBULATA<br>DESERT MILKWEED | 500 | 5 GAL. | LOW |
| S3 | BACCHARIS X 'CENTENNIAL'<br>CENTENNIAL DESERT BROOM | 230 | 5 GAL. | LOW |
| S5 | DALEA FRUTESCENS<br>BLACK DALEA | 620 | 1 GAL. | LOW |
| S6 | ENCELIA FARINOSA<br>BRITTLE BUSH | 215 | 5 GAL. | VERY LOW |
| S7 | ERIOGONUM FASCICULATUM<br>'THEODORE PAYNE' | 185 | 1 GAL. | VERY LOW |
| S8 | GAURA LINDHEIMERI | 95 | 1 GAL. | MODERATE/<br>MEDIUM |
| S9 | LOBELIA LAXIFLORA<br>MEXICAN BUSH LOBELIA | 435 | 5 GAL. | MODERATE/<br>MEDIUM |
| S10 | SALVIA GREGGII<br>AUTUMN SAGE | 400 | 5 GAL. | MODERATE/<br>MEDIUM |
| SHRUBS - MEDIUM: | | | | |
| M1 | ABUTILON PALMERI<br>INDIAN MALLOW | 30 | 5 GAL. | MODERATE/<br>MEDIUM |
| M2 | CALLIANDRA CALIFORNICA<br>BAJA FAIRY DUSTER | 150 | 5 GAL. | LOW |
| M3 | FALLUGIA PARADOXA<br>APACHE PLUME | 60 | 5 GAL. | LOW |
| M5 | JUSTICIA CALIFORNICA<br>CHUPAROSA | 230 | 5 GAL. | VERY LOW |
| M6 | LEUCOPHYLLUM CANDIDUM<br>'SILVER CLOUD' | 65 | 5 GAL. | LOW |
| M7 | LEUCOPHYLLUM FRUTESCENS<br>'GREEN CLOUD' | 205 | 5 GAL. | LOW |
| M8 | LEUCOPHYLLUM FRUTESCENS<br>'THUNDER CLOUD' | 270 | 5 GAL. | LOW |
| M9 | SENNA ARTEMISIOIDES<br>FEATHERY CASSIA | 1725 | 5 GAL. | LOW |
| M10 | SPHAERALCEA AMBIGUA<br>APRICOT MALLOW | 100 | 5 GAL. | VERY LOW |

| SHRUBS - LARGE: | | | | |
|---|---|---|---|---|
| L1 | CAESALPINIA PULCHERRIMA<br>RED BIRD OF PARADISE | 135 | 5 GAL. | LOW |
| L2 | CHAMELAUCIUM UNCINATUM<br>'PURPLE PRIDE'<br>GERARLDTON WAX FLOWER | 4 | 5 GAL. | MODERATE/<br>MEDIUM |
| L3 | CORDIA BOISSIERI<br>WILD OLIVE | 9 | 5 GAL. | LOW |
| L4 | CORDIA PARVIFOLIA<br>LITTLE-LEAF CORDIA | 80 | 5 GAL. | LOW |
| L5 | DODONAEA VISCOSA 'PURPUREA'<br>PURPLE HOSEED BUSH | 30 | 5 GAL. | MODERATE/<br>MEDIUM |

| ACCENTS - CACTUS / SUCCULENTS | | | | |
|---|---|---|---|---|
| A1 | AGAVE AMERICANA<br>CENTURY PLANT | 290 | 5 GAL. | VERY LOW |
| A2 | AGAVE ATTENUATA 'BOUTIN BLUE'<br>BLUE FOX TAIL AGAVE | 240 | 5 GAL. | LOW |
| A3 | AGAVE 'BLUE GLOW'<br>BLUE GLOW AGAVE | 140 | 5 GAL. | LOW |
| A4 | AGAVE DESMETTIANA 'VARIEGATA'<br>VARIEGATED SMOOTH AGAVE | 695 | 5 GAL. | LOW |
| A8 | AGAVE VICTORIAE-REGINAE<br>QUEEN VICTORIA AGAVE | 55 | 5 GAL. | LOW |
| A9 | AGAVE VILMORINIANA<br>OCTOPUS AGAVE | 200 | 5 GAL. | LOW |
| A11 | ALOE 'BLUE ELF'<br>BLUE ELF ALOE | 385 | 5 GAL. | LOW |
| A12 | ALOE STRIATA<br>CORAL ALOE | 350 | 5 GAL. | LOW |
| A13 | ALOE VERA<br>MEDICINAL ALOE | 260 | 5 GAL. | LOW |
| A15 | CEREUS PERUVIANUS<br>APPLE CACTUS | 17 | 5 GAL. | LOW |
| A16 | CISTANTHE GRANDIFLORA<br>ROCK PURSLANE | 320 | 5 GAL. | LOW/MEDIUM |
| A17 | DASYLIRION WHEELERI<br>DESERT SPOON | 295 | 5 GAL. | LOW |
| A18 | ECHINOCACTUS GRUSONII<br>GOLDEN BARREL CACTUS | 160 | 5 GAL. | LOW |
| A19 | FOUQUIERIA SPLENDENS<br>OCOTILLO | 475 | 5 GAL. | VERY LOW |
| A20 | HESPERALOE 'BRAKELIGHTS'<br>RED YUCCA | 2220 | 5 GAL. | LOW |
| A21 | OPUNTIA MOLACEA VAR. SANTA RITA<br>PURPLE PRICKLY PEAR | 50 | 5 GAL. | VERY LOW |
| A22 | YUCCA ROSTRATA<br>BEAKED YUCCA | 105 | 15 GAL. | LOW |

| GROUNDCOVER: | | | | |
|---|---|---|---|---|
| | DALEA GREGGII<br>TRAILING INDIGO BUSH | 7000 S.F. | FLATTED<br>12" O.C. | LOW |
| | MYOPORUM PARVIFOLIUM<br>CREEPING MYOPORUM | 900 S.F. | FLATTED<br>12" O.C. | MODERATE/<br>MEDIUM |
| VINES: | | | | |
| | BOUGAINVILLEA SPP.<br>BOUGAINVILLEA | 160 | 5 GAL. | MODERATE/<br>MEDIUM |
| GRASSES: | | | | |
| | BOUTELOUA GRACILIS<br>BLUE GRAMA | 4800 S.F. | SEEDED | LOW |
| G3 | MUHLENBERGIA CAPILLARIS 'REGAL MIST'<br>PINK MUHLY | 1730 | 5 GAL. | MODERATE/<br>MEDIUM |
| G4 | MUHLENBERGIA RIGENS<br>DEER GRASS | 1650 | 5 GAL. | MODERATE/<br>MEDIUM |
| | ARTIFICIAL TURF | 2700 S.F. | INSTALLED<br>PER MANUF.<br>RECOMMENDATIONS | |




**RESIDENCES** - *NOT TO SCALE*

NOTES:

1. ALL FINAL GRADING PER ENGINEER.
2. ALL DRAINAGE AND DRAIN CONNECTIONS AT TOP OF WALLS PER ENGINEER.
3. ALL FINAL LANDSCAPE DRAINAGE PER ENGINEER.
4. ALL PATHWAYS THAT CONNECT TO ROAD SHALL HAVE CURB RAMPS PER ADA (AMERICANS WITH DISABILITIES ACT) STANDARDS, PER ENGINEER.
5. SECURITY FENCING AT TOP OF RETAINING WALLS, PER ENGINEER - DISCUSSION ITEM WITH CLIENT.

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Landscape Architecture, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:
SHEET ORGANIZATION MASTER & MASTER PLANT PALETTES
CONCEPT PLAN SUBMITTAL
RESIDENCES

Viscinity Map:




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| Date: | Description: |
|---|---|
| | |

Sheet Title:
SHEET ORGANIZATION & PLANT PALETTES

Sheet Reference:
LR-01

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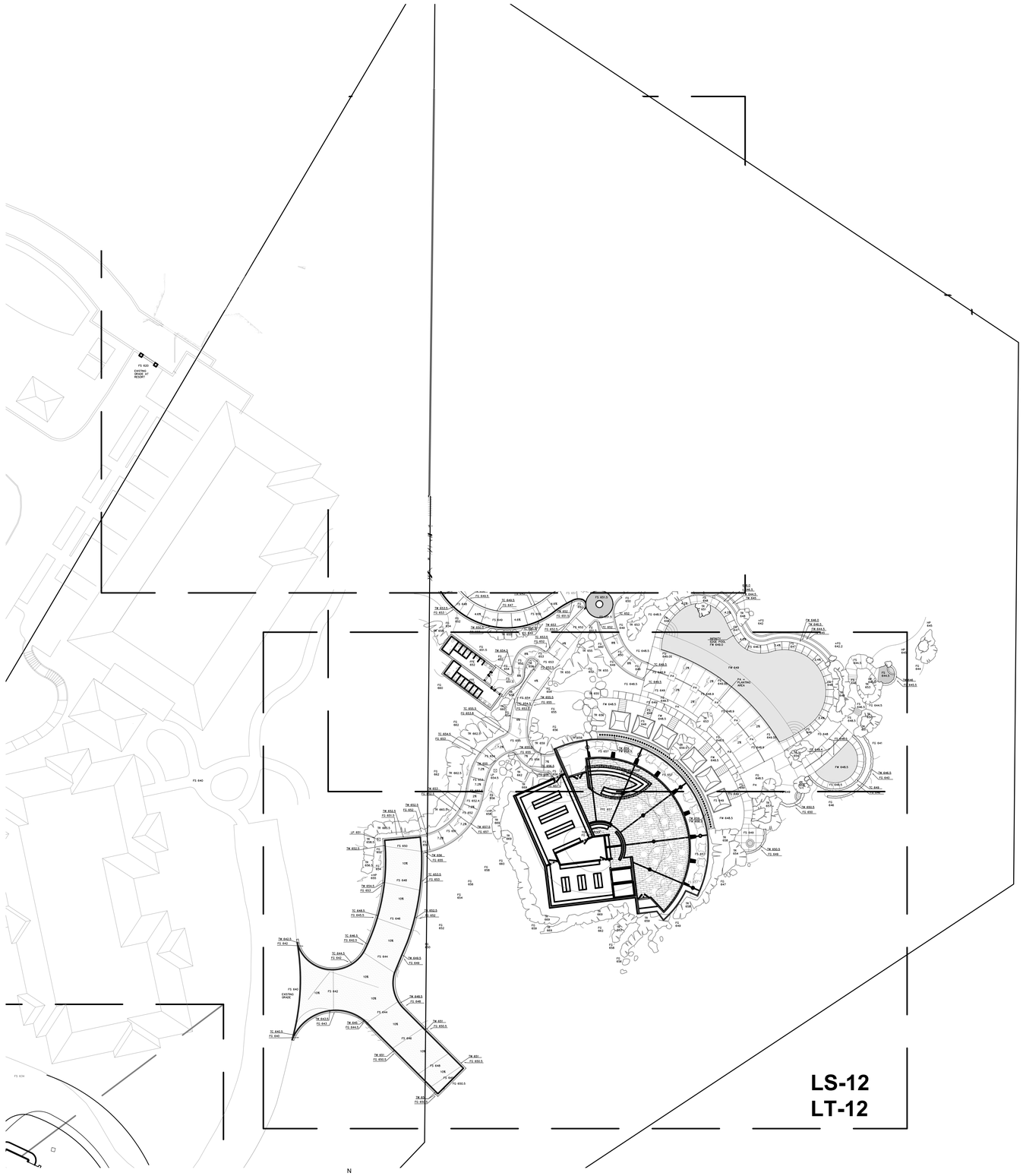


**SKY MESA -** *NOT TO SCALE*

## PLANTING LEGEND

| SYMBOL | PLANT NAME | QTY. | SIZE | WUCOLS |
|---|---|---|---|---|
| TREES: | | | | |
| | ACACIA ANEURA<br>MULGA | 0 | 36" BOX | LOW |
| | ACACIA FARNESIANA<br>SWEET ACACIA | 0 | 36" BOX MULTI-TRUNK | LOW |
| | CHILOPSIS LINEARIS<br>DESERT WILLOW | 30 | 36" BOX | MODERATE/ MEDIUM |
| | X CHITALPA TASHKENTENSIS<br>PINK DAWN | 0 | 36" BOX | LOW |
| | PARKINSONIA FLORIDA<br>BLUE PALO VERDE | 0 | 36" BOX | LOW |
| | PARKINSONIA X 'DESERT MUSEUM'<br>DESERT MUSEUM PALO VERDE | 35 | 36" BOX | LOW |
| | PROSOPIS CHILENSIS 'THORNLESS'<br>CHILEAN MESQUITE | 40 | 36" BOX | LOW |
| | VITEX AGNUS-CASTUS<br>CHASTE TREE | 0 | 36" BOX | LOW |
| PALMS: | | | | |
| | BRAHEA ARMATA<br>BLUE HESPER PALM | 0 | 6' BTH | MODERATE/ MEDIUM |
| | PHOENIX DACTYLIFERA 'MEDJOOL'<br>MEDJOOL DATE PALM | 5 | 15' BTH | MODERATE/ MEDIUM |
| | WASHINGTONIA FILIFERA<br>CALIFORNUA FAN PALM | 9 | 10'-15' BTH SKINNED | MODERATE/ MEDIUM |
| SHRUBS - SMALL: | | QTY: | SIZE: | WUCOLS: |
| S2 | ASCLEPIAS SUBULATA<br>DESERT MILKWEED | 105 | 5 GAL. | LOW |
| S3 | BACCHARIS X 'CENTENNIAL'<br>CENTENNIAL DESERT BROOM | 80 | 5 GAL. | LOW |
| S5 | DALEA FRUTESCENS<br>BLACK DALEA | 25 | 1 GAL. | LOW |
| S6 | ENCELIA FARINOSA<br>BRITTLE BUSH | 100 | 5 GAL. | VERY LOW |
| S7 | ERIOGONUM FASCICULATUM<br>'THEODORE PAYNE' | 360 | 1 GAL. | VERY LOW |
| S8 | GAURA LINDHEIMERI | 0 | 1 GAL. | MODERATE/ MEDIUM |
| S9 | LOBELIA LAXIFLORA<br>MEXICAN BUSH LOBELIA | 25 | 5 GAL. | MODERATE/ MEDIUM |
| S10 | SALVIA GREGGII<br>AUTUMN SAGE | 40 | 5 GAL. | MODERATE/ MEDIUM |
| SHRUBS - MEDIUM: | | | | |
| M1 | ABUTILON PALMERI<br>INDIAN MALLOW | 25 | 5 GAL. | MODERATE/ MEDIUM |
| M2 | CALLIANDRA CALIFORNICA<br>BAJA FAIRY DUSTER | 0 | 5 GAL. | LOW |
| M3 | FALLUGIA PARADOXA<br>APACHE PLUME | 0 | 5 GAL. | LOW |
| M4 | JUSTICIA CALIFORNICA<br>CHUPAROSA | 20 | 5 GAL. | VERY LOW |
| M6 | LEUCOPHYLLUM CANDIDUM<br>'SILVER CLOUD' | 10 | 5 GAL. | LOW |
| M7 | LEUCOPHYLLUM FRUTESCENS<br>'GREEN CLOUD' | 10 | 5 GAL. | LOW |
| M8 | LEUCOPHYLLUM FRUTESCENS<br>'THUNDER CLOUD' | 0 | 5 GAL. | LOW |
| M9 | SENNA ARTEMISIOIDES<br>FEATHERY CASSIA | 130 | 5 GAL. | LOW |
| M10 | SPHAERALCEA AMBIGUA<br>APRICOT MALLOW | 90 | 5 GAL. | VERY LOW |
| SHRUBS - LARGE: | | | | |
| L1 | CAESALPINIA PULCHERRIMA<br>RED BIRD OF PARADISE | 50 | 5 GAL. | LOW |
| L2 | CHAMELAUCIUM UNCINATUM<br>'PURPLE PRIDE'<br>GERARLDTON WAX FLOWER | 0 | 5 GAL. | MODERATE/ MEDIUM |
| L3 | CORDIA BOISSIERI<br>WILD OLIVE | 0 | 5 GAL. | LOW |
| L4 | CORDIA PARVIFOLIA<br>LITTLE-LEAF CORDIA | 20 | 5 GAL. | LOW |
| L5 | DODONAEA VISCOSA 'PURPUREA'<br>PURPLE HOSEED BUSH | 0 | 5 GAL. | MODERATE/ MEDIUM |
| ACCENTS - CACTUS / SUCCULENTS | | | | |
| | AGAVE AMERICANA<br>CENTURY PLANT | 15 | 5 GAL. | VERY LOW |
| | AGAVE ATTENUATA 'BOUTIN BLUE'<br>BLUE FOX TAIL AGAVE | 20 | 5 GAL. | LOW |
| AG3 | AGAVE 'BLUE GLOW'<br>BLUE GLOW AGAVE | 0 | 5 GAL. | LOW |
| | AGAVE DESMETTIANA 'VARIEGATA'<br>VARIEGATED SMOOTH AGAVE | 70 | 5 GAL. | LOW |
| AG5 | AGAVE VICTORIAE-REGINAE<br>QUEEN VICTORIA AGAVE | 0 | 5 GAL. | LOW |
| | AGAVE VILMORINIANA<br>OCTOPUS AGAVE | 20 | 5 GAL. | LOW |
| | ALOE 'BLUE ELF'<br>BLUE ELF ALOE | 110 | 5 GAL. | LOW |
| | ALOE STRIATA<br>CORAL ALOE | 80 | 5 GAL. | LOW |
| | ALOE VERA<br>MEDICINAL ALOE | 55 | 5 GAL. | LOW |
| AV3 | CEREUS PERUVIANUS<br>APPLE CACTUS | 14 | 15 GAL. | LOW |
| CR1 | CISTANTHE GRANDIFLORA<br>ROCK PURSLANE | 100 | 5 GAL. | LOW/MEDIUM |
| | DASYLIRION WHEELERI<br>DESERT SPOON | 55 | 5 GAL. | LOW |
| EN | ECHINOCACTUS GRUSONII<br>GOLDEN BARREL CACTUS | 0 | 5 GAL. | LOW |
| | FOUQUIERIA SPLENDENS<br>OCOTILLO | 30 | 5 GAL. | VERY LOW |
| HA | HESPERALOE 'BRAKELIGHTS'<br>RED YUCCA | 0 | 5 GAL. | LOW |
| | OPUNTIA VIOLACEA VAR. SANTA RITA<br>PURPLE PRICKLY PEAR | 0 | 5 GAL. | VERY LOW |
| | YUCCA ROSTRATA<br>BEAKED YUCCA | 20 | 5 GAL. | LOW |

| | | | | |
|---|---|---|---|---|
| GROUNDCOVER: | | | | |
| | DALEA GREGGII<br>TRAILING INDIGO BUSH | 3,000 S.F. | FLATTED 12" O.C. | LOW |
| | MYOPORUM PARVIFOLIUM<br>CREEPING MYOPORUM | 80 S.F. | FLATTED 12" O.C. | MODERATE/ MEDIUM |
| | REVEGETATION AREA - ASCLEPIAS SUBULATA, ENCELIA FARINOSA, ERIOGONUM FASCICULATUM, HESPEROYUCCA WHIPPLEI, LARREA TRIDENTATA, SALVIA APIANA, SPHAERALCEA AMBIGUA | 21,300 S.F. | PLANTED 3-4' APART IN A RANDOM MIX | LOW |
| GRASSES: | | | | |
| | BOUTELOUA GRACILIS<br>BLUE GRAMA | 700 S.F. | SEEDED | LOW |
| G3 | MUHLENBERGIA CAPILLARIS 'REGAL MIST'<br>PINK MUHLY | 90 | 5 GAL. | MODERATE/ MEDIUM |
| G4 | MUHLENBERGIA RIGENS<br>DEER GRASS | 130 | 5 GAL. | MODERATE/ MEDIUM |
| | ARTIFICIAL TURF | 7200 S.F. | INSTALLED PER MANUF. RECOMMENDATIONS | |

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Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

# SHEET ORGANIZATION MASTER & MASTER PLANT PALETTES
## CONCEPT PLAN SUBMITTAL
## SKY MESA

Sheet Title:

Viscinity Map:




Typical Revisions:

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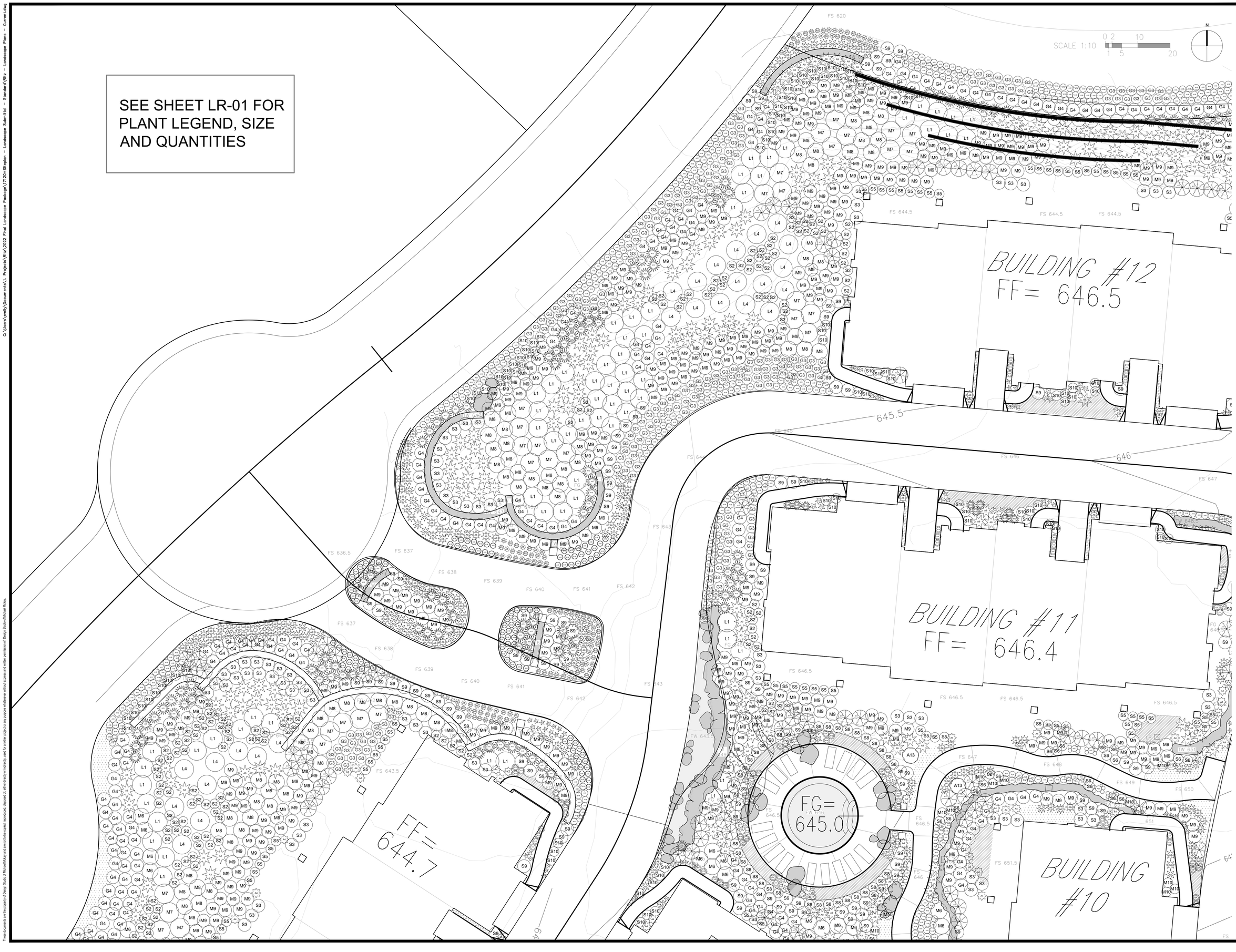
Sheet Title:
SHEET ORGANIZATION & PLANT PALETTES

Sheet Reference:
LR-02

SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

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Architect:

LCRA ARCHITECTS

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CASE NUMBERS EA21-0002, GPZ-MA21-0001
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Sheet Title:

# SHRUB PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

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Sheet Title:

SHRUB PLAN

Sheet Reference:

LS-01

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SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

SCALE 1:10 0 2 10 1 5 20

N

THE VENUE
FF=628.0
GF=618.0 (P3)

RESIDENTIAL
FF=650.0 (L1)
FF=640.0 (P1)
GF=628.0 (P3)

FW 625.5

FS 630 FS 629 FS 628 FS 627 FS 626 FS 644.5 FS 647 FS 648 FS 649.5

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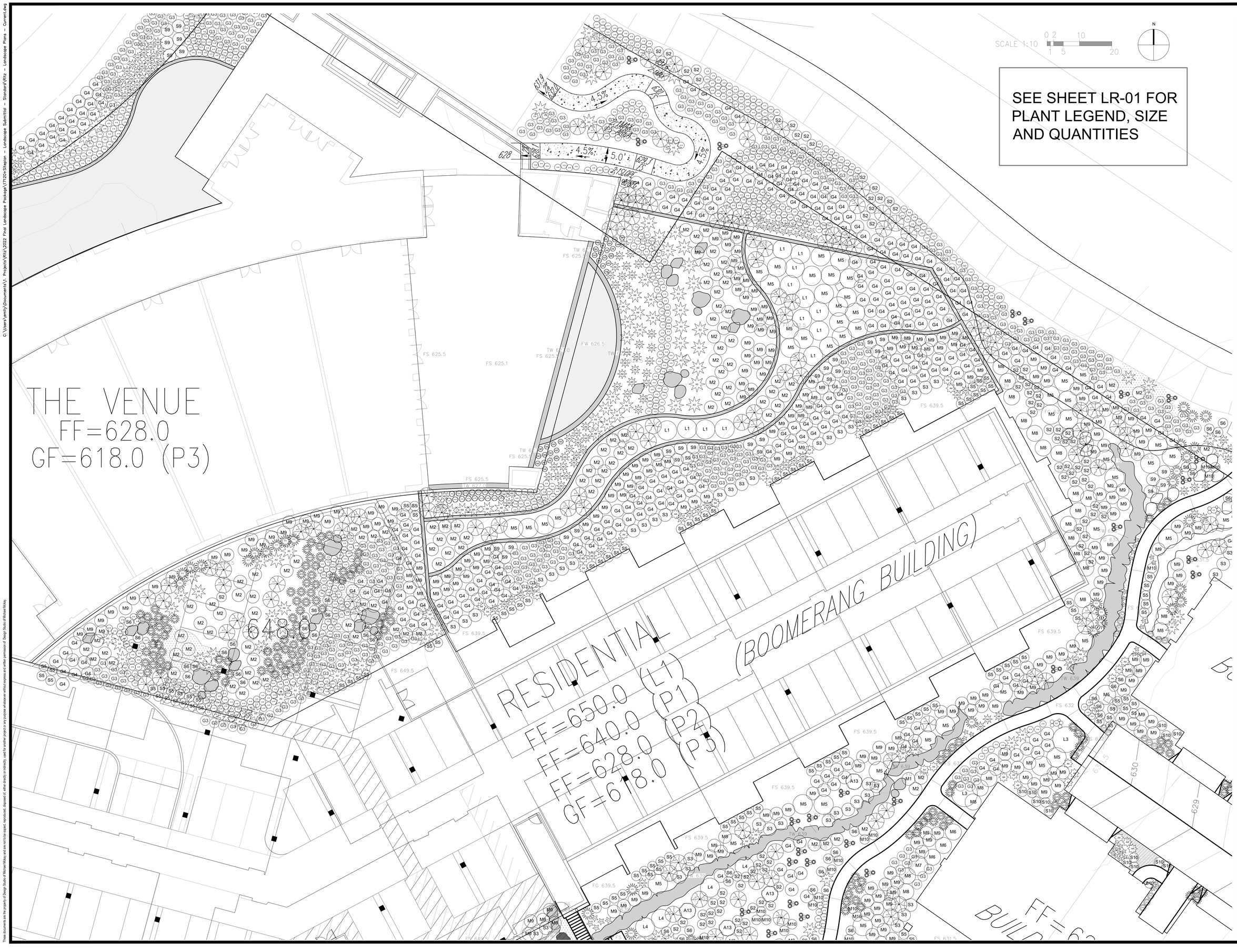


SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

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Architect:

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PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

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[redacted]

SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

FF=629.4
BUILDING #2

FF=629.4
BUILDING #3

FF=625.5
BUILDING #4

FF=627.5
BUILDING #1

FF=627.5

SCALE 1:10
0 2 10
1 5 20

N

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Landscape Architecture & Planning Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
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Sheet Title:
SHRUB PLAN

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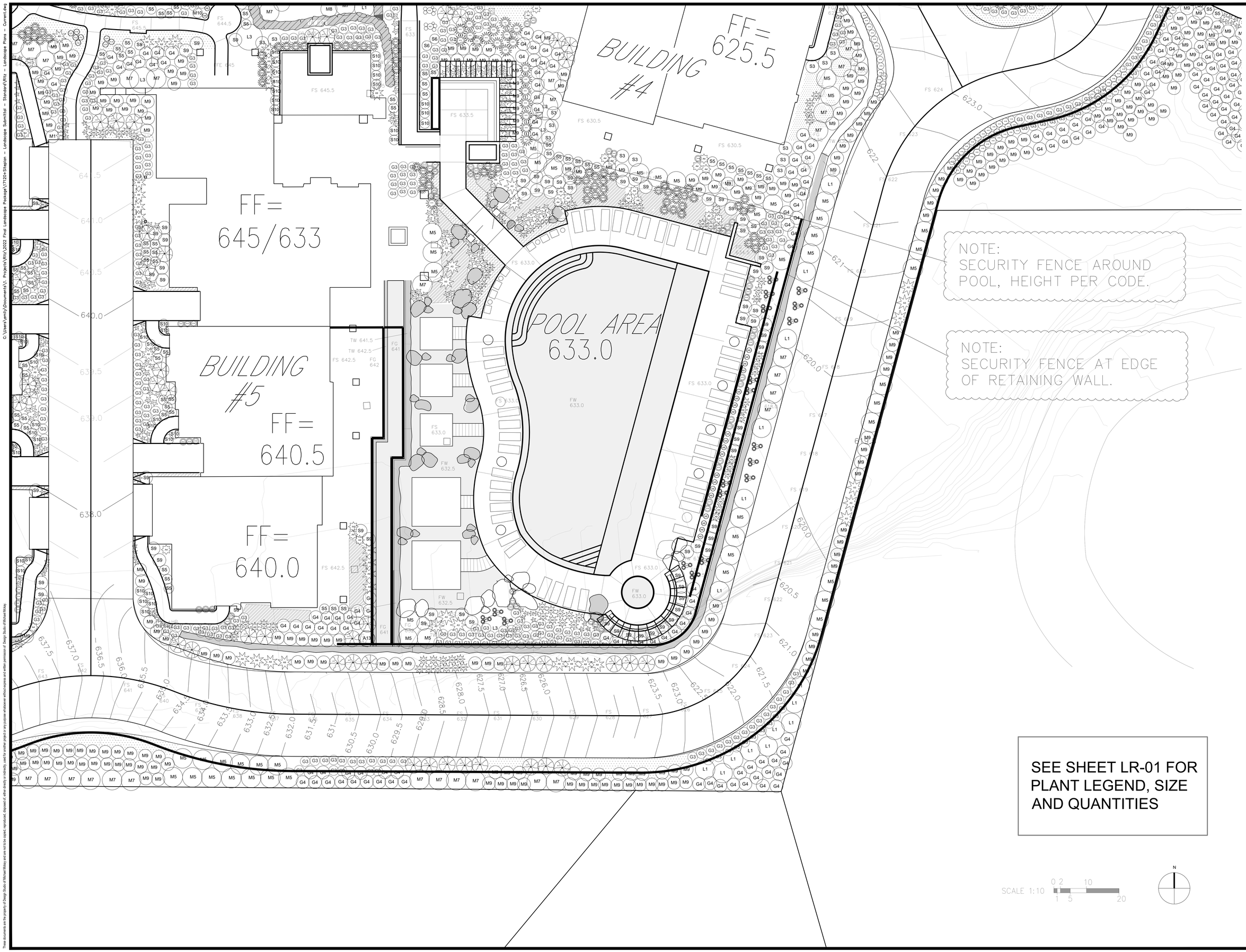


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Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
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# SHRUB PLAN - RESIDENCES
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Sheet Title:

SHRUB PLAN

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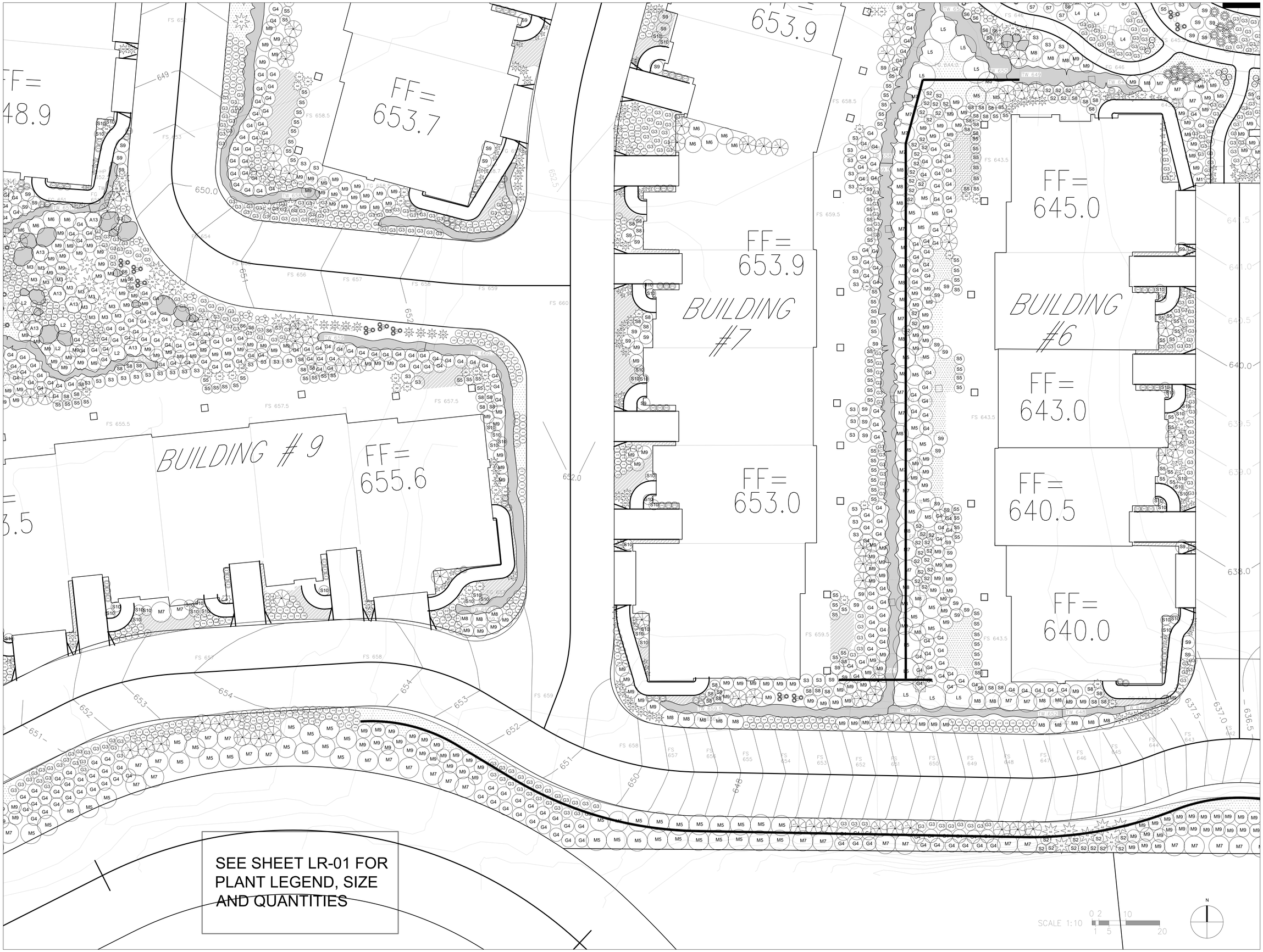
LS-05




SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

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Architect:

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PROJECT: RITZ CARLTON EXPANSION
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68900 FRANK SINATRA DRIVE,
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Sheet Title:

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BUILDING #15
FF= 644.7

BUILDING #13
FF= 644.7

BUILDING #14
FF= 645.0

FF= 644.5

FF= 648.9

FF= 653.5

SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

SCALE 1:10 0 2 10 1 5 20

N

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Architect:

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Sheet Title:

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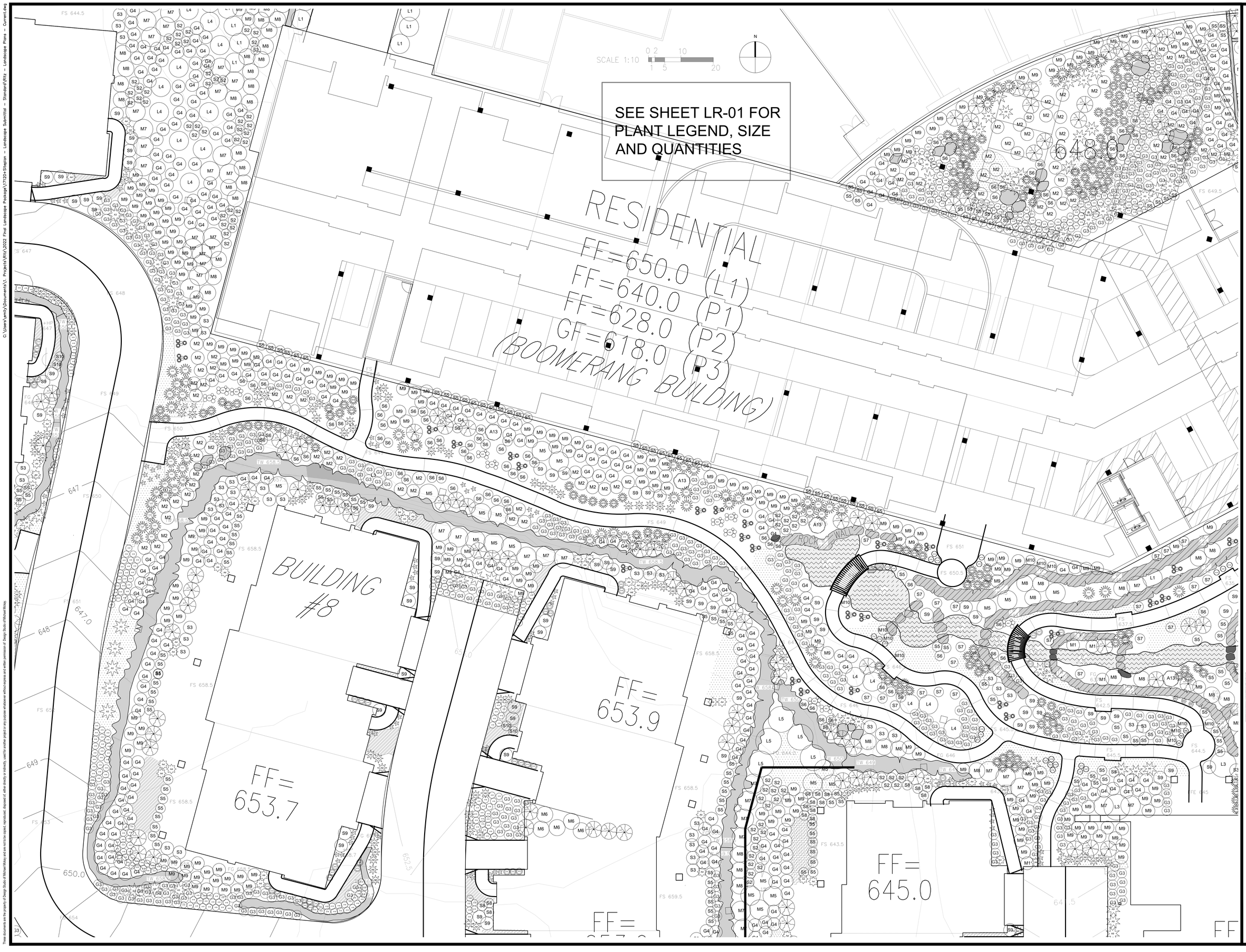
LS-07

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SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

RESIDENTIAL (BOOMERANG BUILDING)
FF=650.0 (L1)
FF=640.0 (P1)
FF=628.0 (P2)
GF=618.0 (P3)

FF=629.4
BUILDING #2

FF=629.4
BUILDING #3

FF=626.5

FF=625.5
BUILDING #4

SCALE 1:10
0 2 5 10 15 20

N


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Architect:

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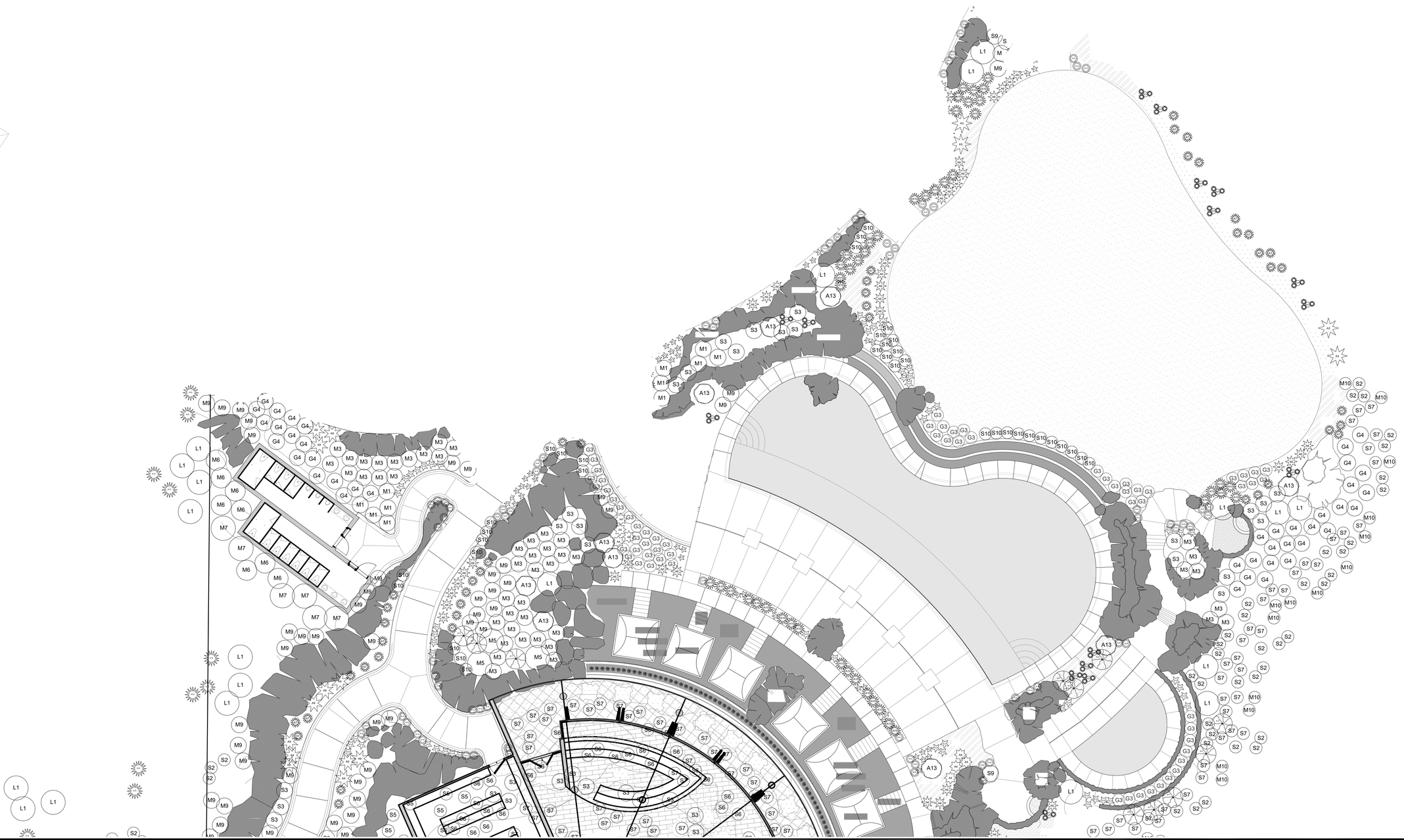
N

SCALE 1:10 0 5 10 1 5 20

SEE SHEET LR-02 FOR PLANT LEGEND, SIZE AND QUANTITIES

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LCRA ARCHITECTS

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Sheet Title:

# SHRUB PLAN - SKY MESA
## CONCEPT PLAN SUBMITTAL

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LS-11

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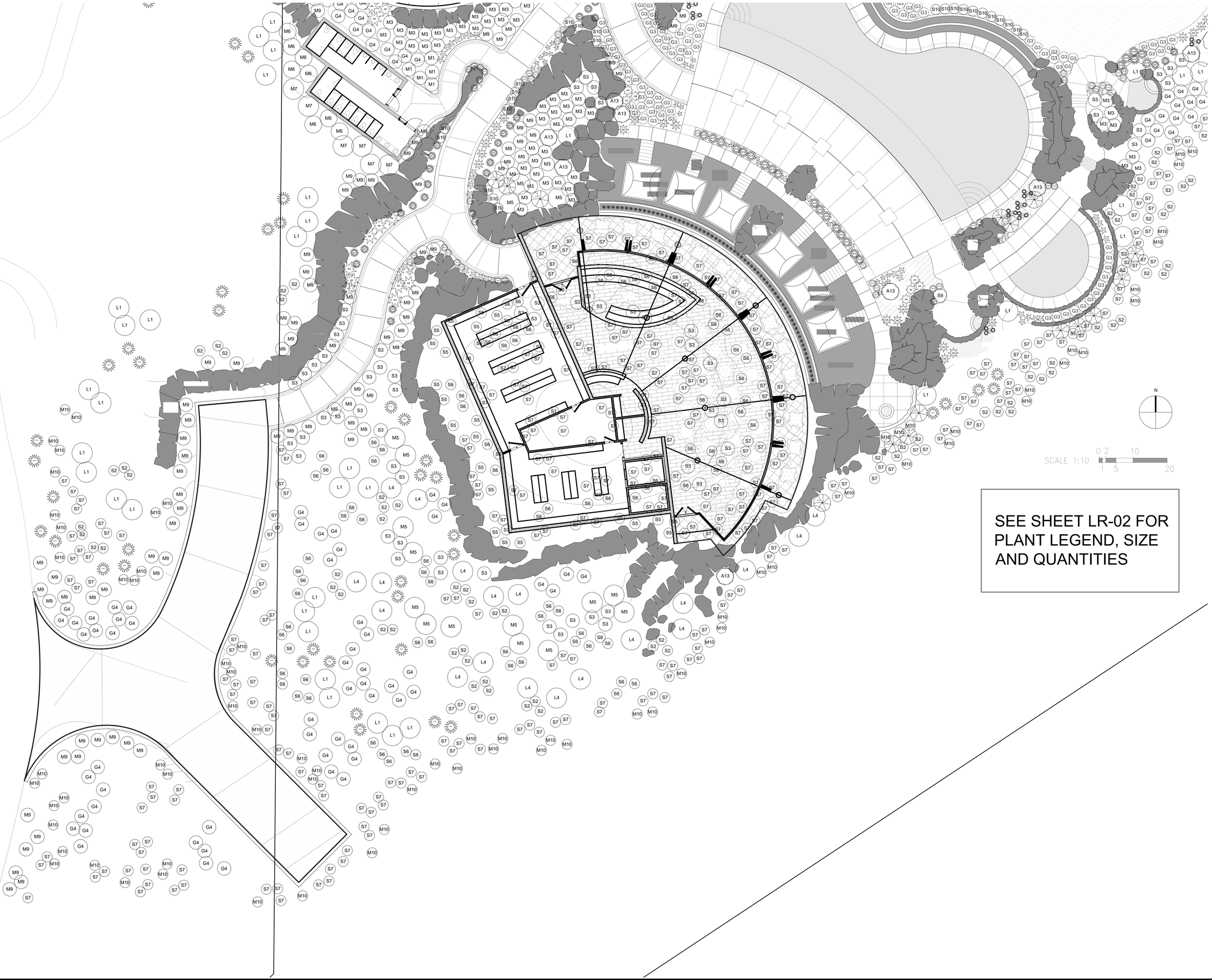


SEE SHEET LR-02 FOR PLANT LEGEND, SIZE AND QUANTITIES

Design Studio of Michael McKay
Landscape Architecture & Planning Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# SHRUB PLAN - SKY MESA
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|
| | |

Sheet Title:

SHRUB PLAN

Sheet Reference:

LS-12

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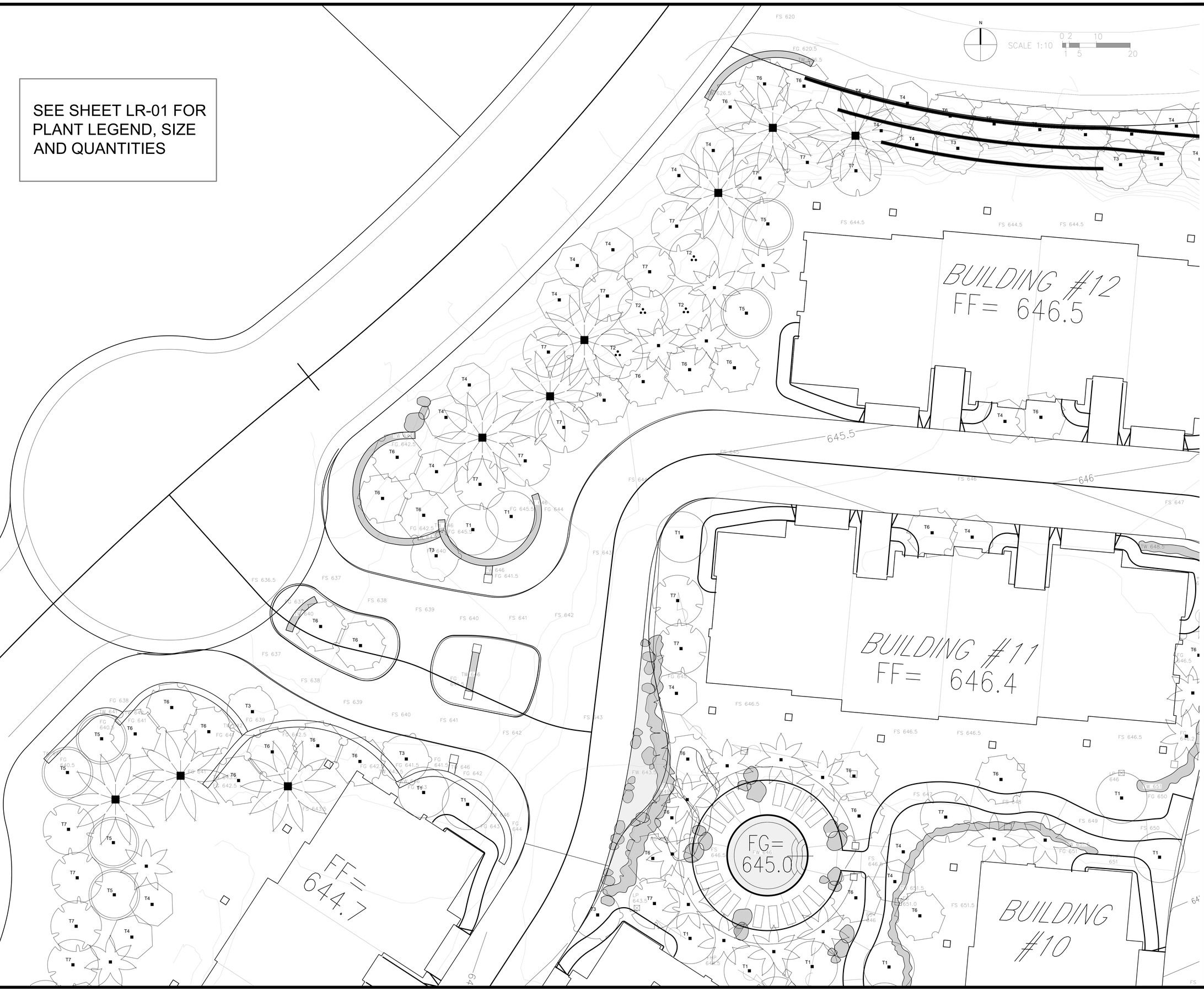
SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

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Design Studio of Michael McKay
Landscape Architecture, Planning & Consultation

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|
| | |

Sheet Title:

TREE PLAN

Sheet Reference:

LT-01

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SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

N

SCALE 1:10 0 2 10 / 1 5 20

THE VENUE
FF=628.0
GF=618.0 (P3)

RESIDENTIAL
FF=650.0 (L1)
FF=640.0 (P1)
FF=628.0 (P2)
GF=

648.0

FW 625.5
FG 628.5
FG 633
FG 630.5
FG 626.5
FG 635
FG 649.5
FG 648.5
FS 630
FS 629
FS 628
FS 627
FS 626
FS 644.5
FS 647
FS 648
FS 649.5

T2 T3 T4 T5 T6 T7

Design Studio of Michael Mckay
Landscape Architecture, Urban Design & Planning

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:
TREE PLAN - RESIDENCES
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:
TREE PLAN

Sheet Reference:
LT-02

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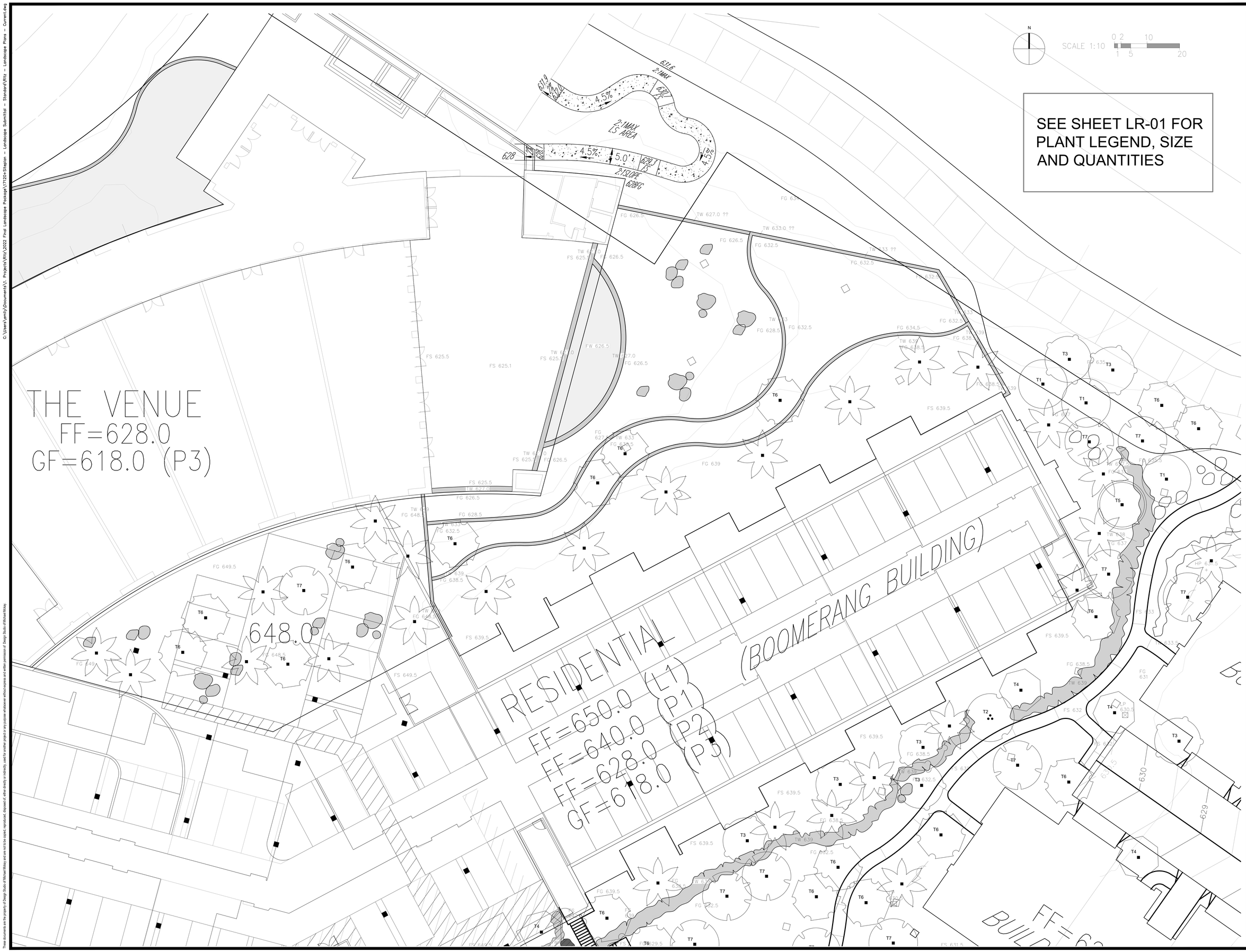


SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

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Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:



Project Site

Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:

TREE PLAN

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LT-03

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Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:

TREE PLAN

Sheet Reference:

LT-04

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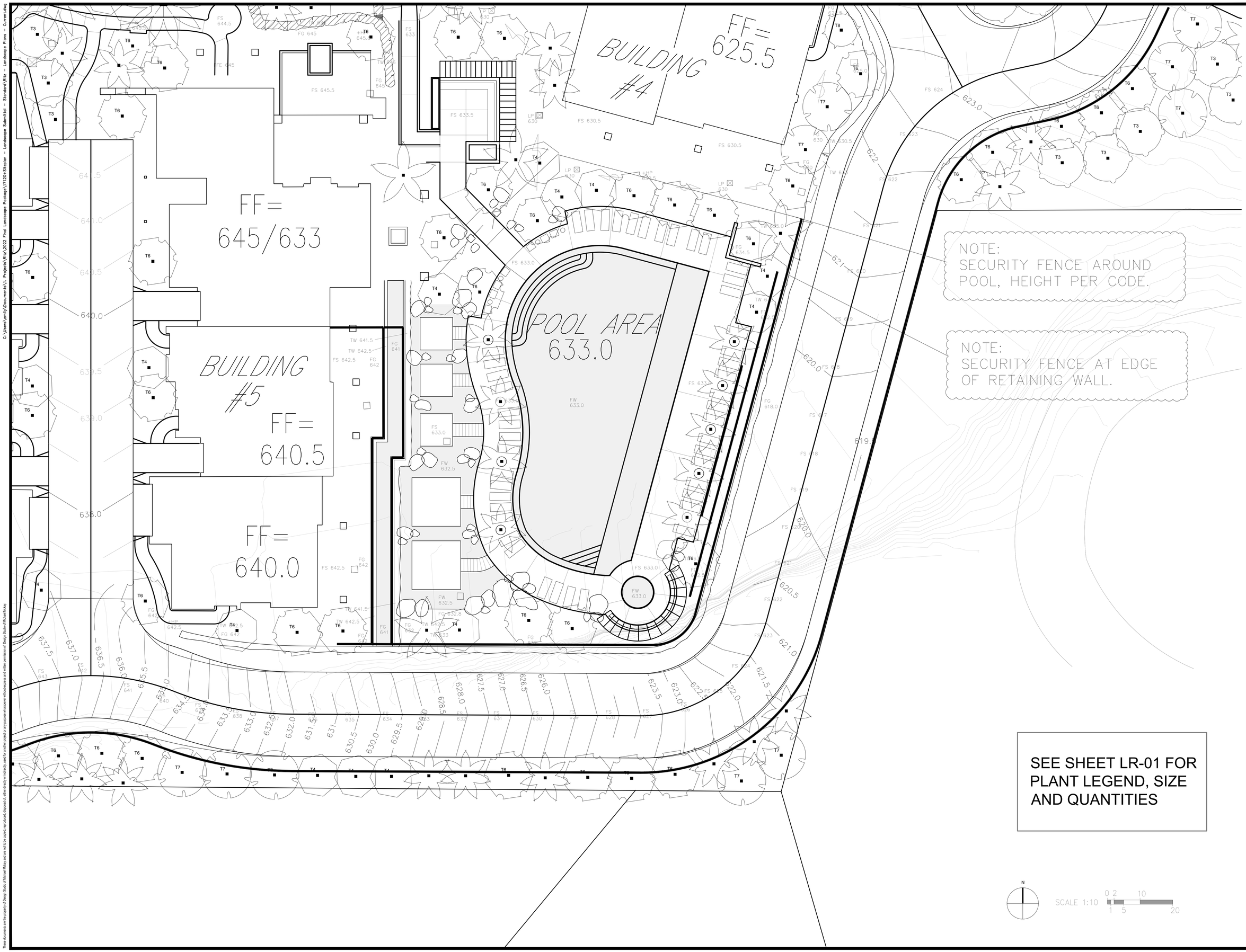


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Landscape Architecture & Planning Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS: EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:
TREE PLAN - RESIDENCES
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:
TREE PLAN

Sheet Reference:
LT-05

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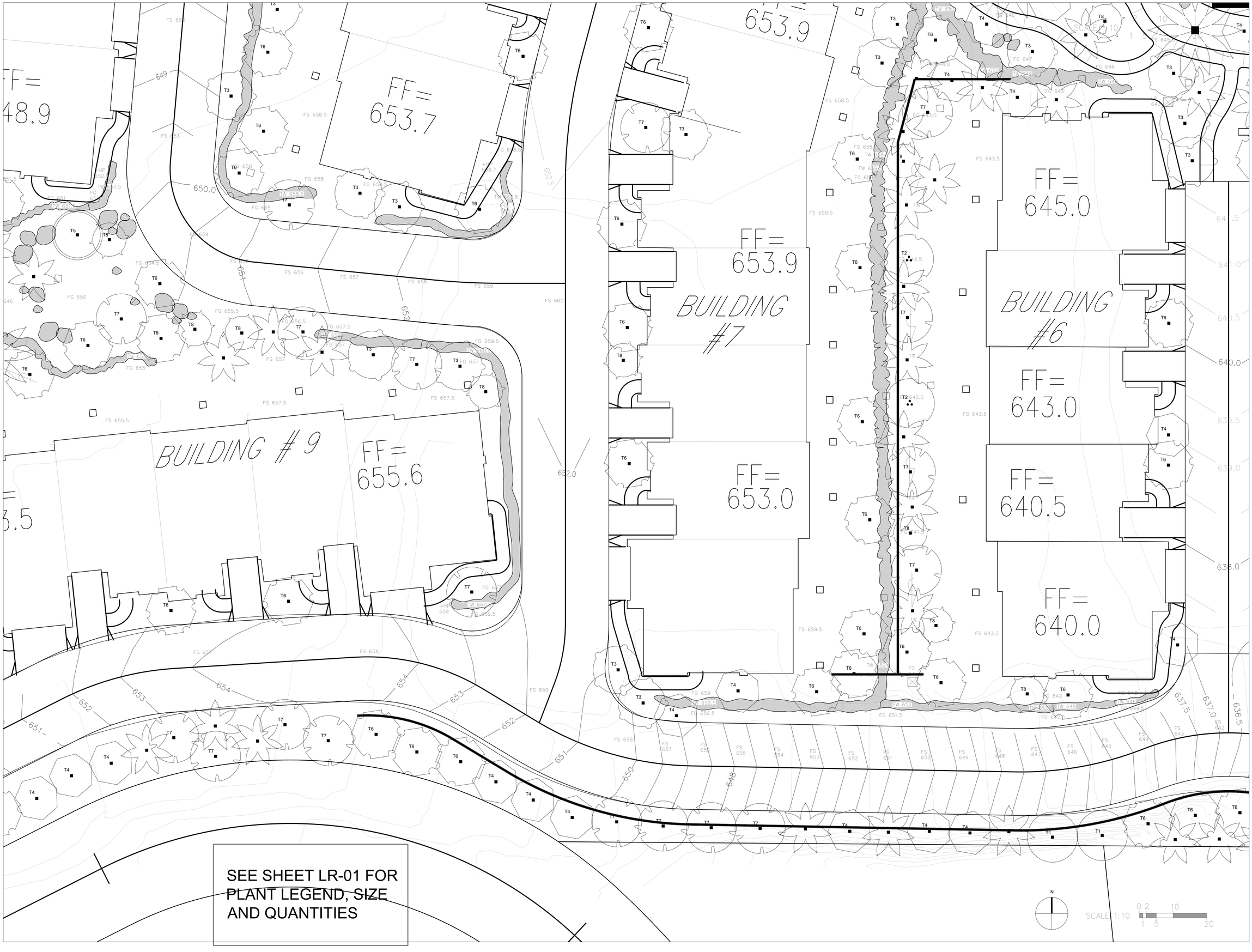


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Design Studio of Michael McKay
Landscape Architecture & Environmental Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
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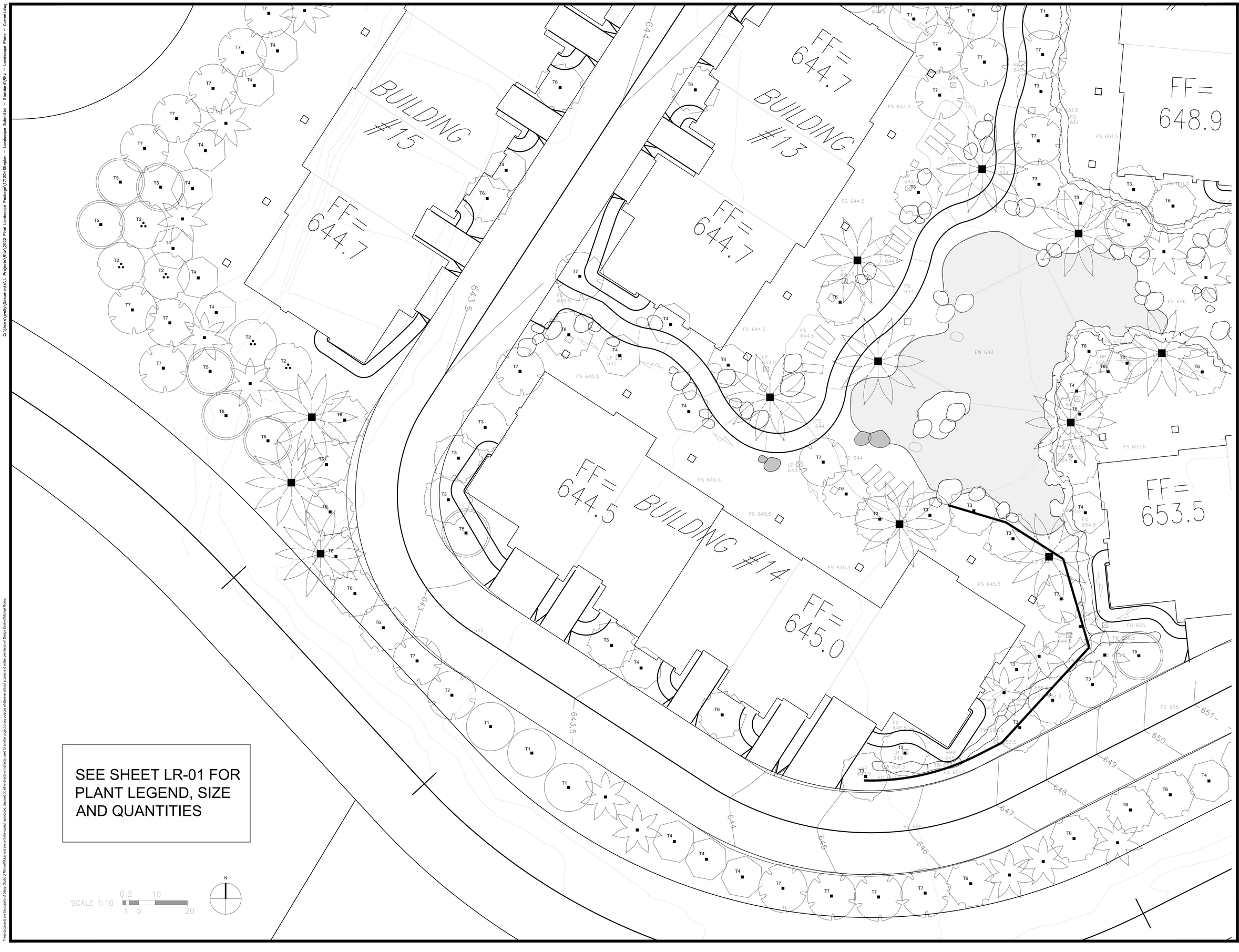
Sheet Title:

TREE PLAN

Sheet Reference:

LT-06




SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

Design Studio of Michael McKay
Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

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Sheet Title:

TREE PLAN

Sheet Reference:

LT-07

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SCALE 1:10 0 2 10 / 1 5 20

N

SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

RESIDENTIAL
FF=650.0 (L1)
FF=640.0 (P1)
FF=628.0 (P2)
GF=618.0 (P3)
(BOOMERANG BUILDING)

BUILDING #8

FF= 653.7

FF= 653.9

FF= 645.0

648.0

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Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title: TREE PLAN - RESIDENCES
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title: TREE PLAN

Sheet Reference: LT-08

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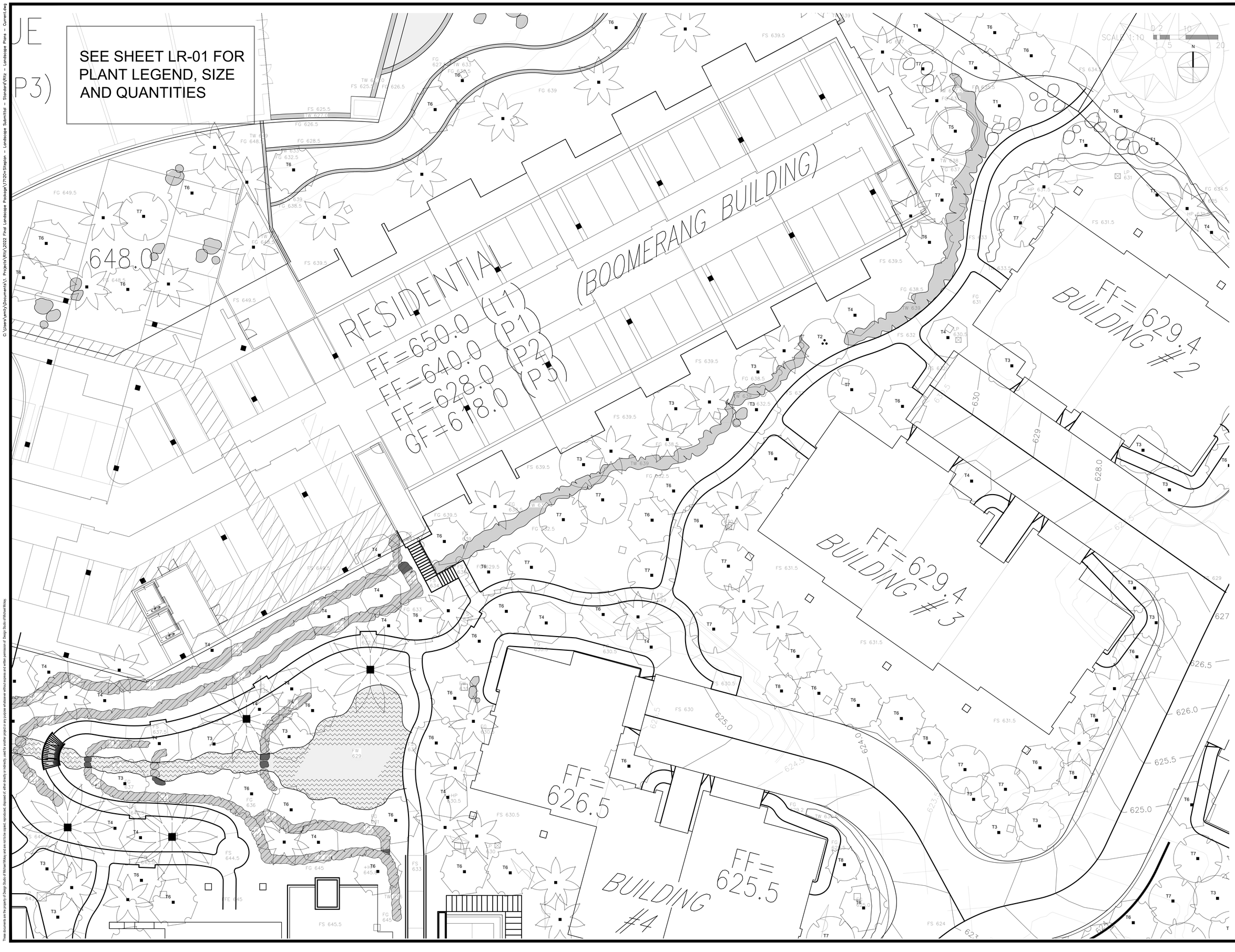


Design Studio of Michael McKay
Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

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|---|---|

Sheet Title:

TREE PLAN

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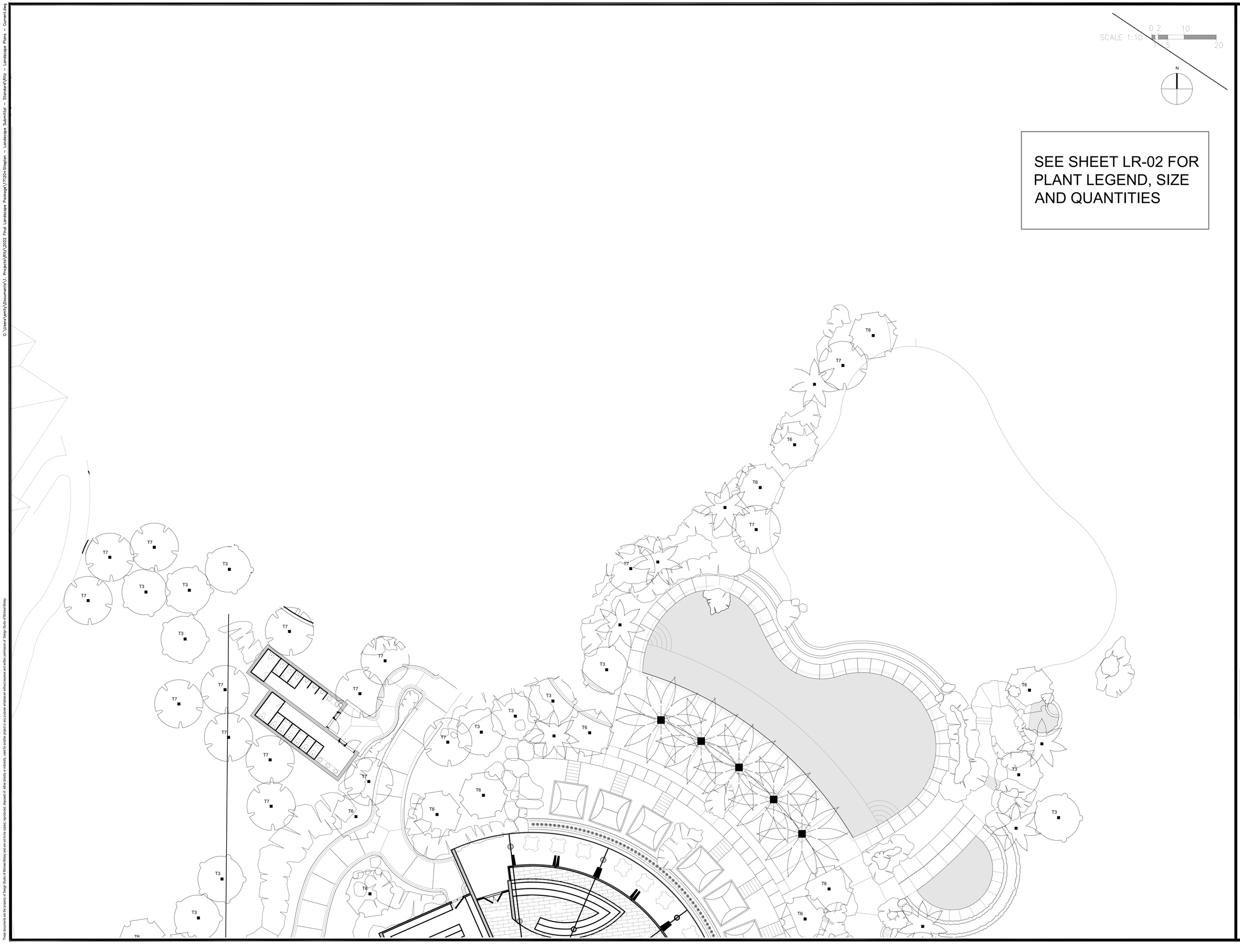


SEE SHEET LR-02 FOR PLANT LEGEND, SIZE AND QUANTITIES

Design Studio of Michael McKay
Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - SKY MESA
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:

TREE PLAN

Sheet Reference:

LT-11

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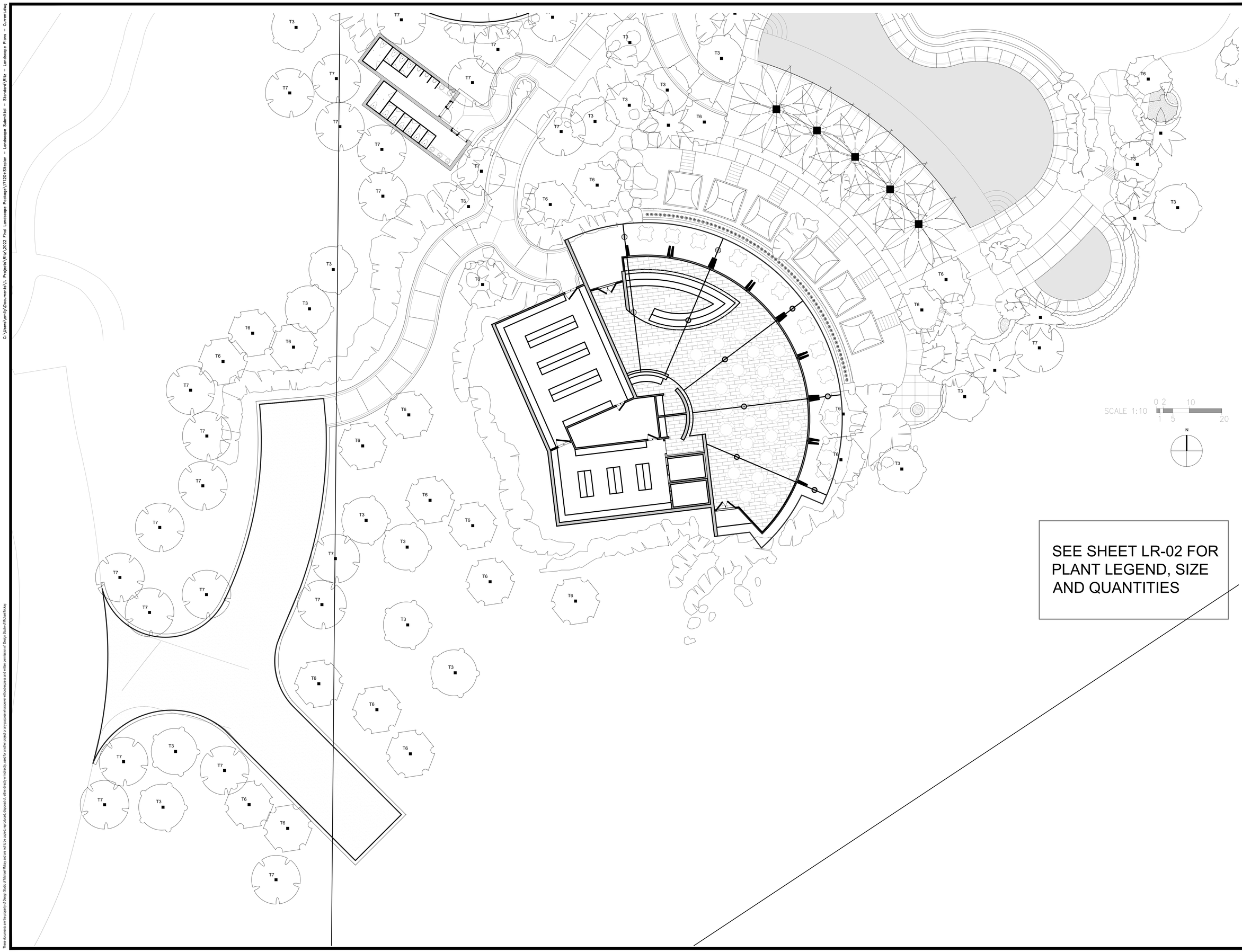


SEE SHEET LR-02 FOR PLANT LEGEND, SIZE AND QUANTITIES

Design Studio of Michael McKay
Landscape Architecture & Planning Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GP2-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:
# TREE PLAN - SKY MESA
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
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| | |

Sheet Title:
TREE PLAN

Sheet Reference:
LT-12

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# CONCEPTUAL PLANTING NOTES

1. All landscape areas shall have positive drainage (minimum 2% grade in planting areas) away from all structures and terminating in an approved drainage system.
2. All plantings at entries, along roadways, driveways, and pedestrian crossings shall be installed and maintained to avoid obstructing motorists' views per City standards.
3. All trees located within five (5) feet of public sidewalk or other hardscape to have root barriers installed per City standards.
4. No trees will be located within a public utility easement, above or near utilities, per City standards.
5. All species listed on the plant legend are drought tolerant and listed in the CVWD Recommended Plant List and Robert Perry's Landscape Plants for California Gardens book of recommended desert species.
6. No plant substitutions shall be made without written authorization of the project landscape architect.
7. All plants shall be delivered to the site and inspected by project landscape for approval and acceptance prior to installation.
8. All plants shall be placed on site per the plans and adjusted in the field by the project landscape architect prior to installation.
9. A 3" layer of crushed rock mulch shall be applied on all exposed soil surfaces per City standards.
10. Irrigation shall be designed for mature plants, comprised of drip systems, grouped into proper hydrozones, and segregated into separate systems for trees, palms, shrubs, and ground cover areas. Turf shall be artificial.

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Design Studio of Michael McKay
Landscape Architecture, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title: LANDSCAPE NOTES
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:
LANDSCAPE
NOTES

Sheet Reference:
LN-01

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LANDSCAPE ILLUSTRATIVE PLAN - REFERENCE ONLY
SEE SUBMITTAL SHEET INDEX FOR SPECIFIC SUBMITTAL EXHIBITS

## LANDSCAPE FEATURES NOTES

1. Entry monumentation walls with gated entry and key activated sliding gates.
2. All hardscape areas within the project limits are concrete surfaces with light broom finish and Scofield integral color - Sand Buff. Hardscape includes the common walkways, patios and terrace areas around pools and under shade structures.
3. Water features provide aesthetic, visual and auditory complements to the landscape areas.
4. Community Clubhouse - with main pool and spa recreation area, sunning terraces, cabanas, pool enclosure security fencing (see example below), and seating areas
4B. Cabanas and pool furniture of a neutral color, are to be selected and coordinated with interior design consultant
5. Secondary recreation area - large spa dipping pool with surrounding terraces and pool enclosure security fencing.
6. Central Canyon Oasis water cascade and Desert Garden - terracing rock cascades. Re-circulating water feature - with subterranean mechanical equipment room.
7. Neighborhood pond and water cascade over artificial rockwork to accommodate grade transition from upper Villas to lower pond area.
8. Venue arrival water feature with bubbling jets at arrival drive and internal venue water feature.
9. Terracing walls to transition from Villas to lower venue terraces - see Engineers grading plans.
10. Drought tolerant landscape gardens with rock mulch throughout development, see planting plans.
11. Desert Garden walkways with adjacent rockwork features, matching local rock, to create natural appearing retaining wall transitions from higher Villas to lower areas. See Engineers grading plans.
12. See Engineers plans for all grading and drainage.

## CONCEPTUAL LANDSCAPE LIGHTING

NOTES:

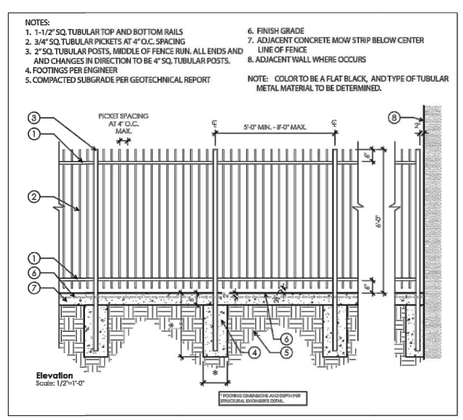
LANDSCAPE LIGHTING WILL BE CAREFULLY SELECTED TO MEET DARK SKY CRITERIA, PROVIDING COMFORTABLE DOWNWARD ORIENTED LIGHTING ALONG WALKWAYS AND RAMPS TO FACILITATE PEDESTRIAN ACCESS THROUGHOUT THE SITE.

THERE WILL NOT BE ANY LANDSCAPE UPLIGHTS INTO TREES. LIGHTS IN PALMS IN POOL AREAS WILL BE MOUNTED ON THE TRUNKS WITH LOW VOLTAGE LED UPWARD LIGHTING TO THE CLOSE ADJACENT FRONTS AND DOWNLIGHTS CASTING LIGHT TO THE TERRACES AND PATIOS BELOW.

CONCEPT WALKWAY-ADJACENT FIXTURE SELECTION WILL BE A BRONZE FINISH, PROVIDED BY SPJ LIGTING, SEE BELOW FOR EXAMPLE.

NOTES:
1. 1-1/2" SQ. TUBULAR TOP AND BOTTOM RAILS
2. 3/4" SQ. TUBULAR PICKETS AT 4" O.C. SPACING
3. 2" SQ. TUBULAR POSTS, MIDDLE OF FENCE RUN. ALL ENDS AND AND CHANGES IN DIRECTION TO BE 4" SQ. TUBULAR POSTS.
4. FOOTINGS PER ENGINEER
5. COMPACTED SUBGRADE PER GEOTECHNICAL REPORT
6. FINISH GRADE
7. ADJACENT CONCRETE MOW STRIP BELOW CENTER LINE OF FENCE
8. ADJACENT WALL WHERE OCCURS

NOTE: COLOR TO BE A FLAT BLACK, AND TYPE OF TUBULAR METAL MATERIAL TO BE DETERMINED.




**POOL FENCE ENCLOSURE - TYP DETAIL**

SPJ LIGHTING Inc.
ARCHITECTURAL LANDSCAPE & OUTDOOR LIGHTING



Model: **SPJ402**
Finish: Matte Bronze

**SPJ402**

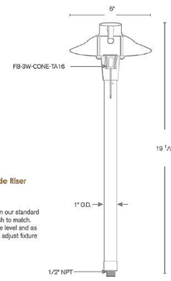
**SPECIFICATION FEATURES**

| | |
|---|---|
| **Finish:** | Our naturally etched finishes will withstand the test of time. All finishes are individually treated insuring consistency. Our meticulous application results in a fixture that truly becomes "a one of a kind". |
| **Electrical:** | Available in 8-15V |
| **Labels:** | ETL Standard Wet Label<br>C-ETL |

**Path / Area Light**

**DESCRIPTION**

| | |
|---|---|
| **Model#:** | SPJ402 |
| **Material:** | Solid Brass |
| **Electrical:** | 8-15V |
| **Engine:** | FB-3W-Cone-TA16 |
| **Lumens:** | 200 |
| **Color Temp:** | 2700k |
| **Options:** | 2700-FL, RGBW, 2000K-6500K |
| **Mounting:** | 1/2" NPT, Dual Fin Spike Incl. |
| **LED:** | Nichia |




**Option:**

Extends up to 19" above grade

1" Dia. Riser

3 Set Screws

**Adjustable Below Grade Riser**

Model#: SPJ19-03-RBBG
Shown: Matte Bronze
Desc: Solid brass top fits on our standard perma-post with finish to match. Install fixture at grade level and as the landscape grows adjust fixture height as needed.

**Wet Listed**

| SPJ Approval | Customer Approval |
|---|---|
| | |

**ORDERING INFORMATION**

| Model# | Finishes | Wattage | Lumens | Color Temp. | Electrical |
|---|---|---|---|---|---|
| SPJ402 | MBR | 3W | 200 | 2700K | 8-15V |

V = Verde GM = Gun Metal
M = Moss B = Black
AG = Aged Brass R = Rusty
MBR = Matte Bronze PVDP = PVD Polished
RC = Raw Copper PVDS = PVD Satin

3W
200
3000K
2700K
4000K
5000K
6500K
RGBW
8-15V

www.spjlighting.com

**CONCEPT WALKWAY LIGHT FIXTURE**

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Design Studio of Michael McKay
Landscape Architecture, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title: LANDSCAPE FEATURES PLAN - RESIDENCES
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|
| | |

Sheet Title:
CONCEPTUAL LANDSCAPE FEATURES PLAN

Sheet Reference:
LF-01




LANDSCAPE ILLUSTRATIVE PLAN - REFERENCE ONLY

SEE SUBMITTAL SHEET INDEX FOR SPECIFIC SUBMITTAL EXHIBITS

## LANDSCAPE FEATURES NOTES

1. Five Star Restaurant by Architects - built into natural hillside, with rooftop desert garden. Curving dining terrace overlooking gardens, oasis pool and the distant desert views.
2. Restroom Facility by Architects - built into natural hillside with rooftop desert garden.
3. Curving resort oasis pool with infinity edge, and shallow sunning ledge in pool.
4. Spa with infinity edge overlooking the desert views.
5. Cabanas at pool level, set in shallow water pond with water cascading from 10' high rocks. Cabanas and pool furniture of a neutral color, are to be selected and coordinated with interior design consultant
6. Large event lawn on lower level.
7. Fire lane access, 10% slope, 120' in length and 20' wide with 70' back up area. Hydrant located at top of fire lane.
8. Sunning terraces.
9. Cascading fountain feature from pool level to event lawn level.
10. Natural rock and constructed rock outcrops to enhance natural setting and surroundings.
11. Lush desert landscape adjacent to activity areas.
12. Natural desert areas surrounding site.
13. Existing Ritz Carlton Hotel.

## CONCEPTUAL LANDSCAPE LIGHTING

NOTES:

LANDSCAPE LIGHTING WILL BE CAREFULLY SELECTED TO MEET DARK SKY CRITERIA, PROVIDING COMFORTABLE DOWNWARD ORIENTED LIGHTING ALONG WALKWAYS AND RAMPS TO FACILITATE PEDESTRIAN ACCESS THROUGHOUT THE SITE.

THERE WILL NOT BE ANY LANDSCAPE UPLIGHTS INTO TREES. LIGHTS IN PALMS IN POOL AREAS WILL BE MOUNTED ON THE TRUNKS WITH LOW VOLTAGE LED UPWARD LIGHTING TO THE CLOSE ADJACENT FRONTS AND DOWNLIGHTS CASTING LIGHT TO THE TERRACES AND PATIOS BELOW.

CONCEPT WALKWAY-ADJACENT FIXTURE SELECTION WILL BE A BRONZE FINISH, PROVIDED BY SPJ LIGTING, SEE BELOW FOR EXAMPLE.



Model: **SPJ402**
Finish: Matte Bronze

**SPJ** LIGHTING Inc.
ARCHITECTURAL LANDSCAPE & OUTDOOR LIGHTING

**SPJ402**

**SPECIFICATION FEATURES**

**Finish:** Our naturally etched finishes will withstand the test of time. All finishes are individually treated insuring consistency. Our meticulous application results in a fixture that truly becomes "a one of a kind".

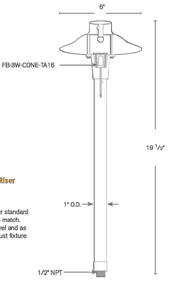
**Electrical:** Available in 8-15V

**Labels:** ETL Standard Wet Label
C-ETL

**Path / Area Light**

**DESCRIPTION**

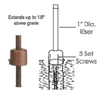
**Model#:** SPJ402
**Material:** Solid Brass
**Electrical:** 8-15V
**Engine:** FB-3W-Cone-TA16
**Lumens:** 200
**Color Temp:** 2700k
**Options:** 2700-FL, RGBW, 2000K-6500K
**Mounting:** 1/2" NPT. Dual Fin Spike Incl.
**LED:** Nichia




**Option:**

**Adjustable Below Grade Riser**

Model: SRJ19-03-RBBG
Shown: Matte Bronze
Desc: Solid brass top fits on our standard perma-post with finish to match. Install fixture at grade level and as the landscape grows adjust fixture height as needed.




**Wet Listed**

| SPJ Approval | Customer Approval |
|---|---|
| | |

**ORDERING INFORMATION**

| Model# | Finishes | Wattage | Lumens | Color Temp. | Electrical |
|---|---|---|---|---|---|
| SPJ402 | MBR | 3W | 200 | 2700K | 8-15V |

V = Verde, M = Moss, AG = Aged Brass, MBR = Matte Bronze, RC = Raw Copper, GM = Gun Metal, B = Black, R = Rusty, PVD*= PVD Polished, PVDS = PVD Satin

2000K, 2700K, 4000K, 5000K, 6500K, RGBW

www.spjlighting.com

## CONCEPT WALKWAY LIGHT FIXTURE

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Design Studio of Michael McKay
Landscape Architect, Planners + Consultants

Architect:

LCRA ARCHITECTS

Sheet Title: LANDSCAPE FEATURES PLAN - SKY MESA
CONCEPT PLAN SUBMITTAL

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Viscinity Map:

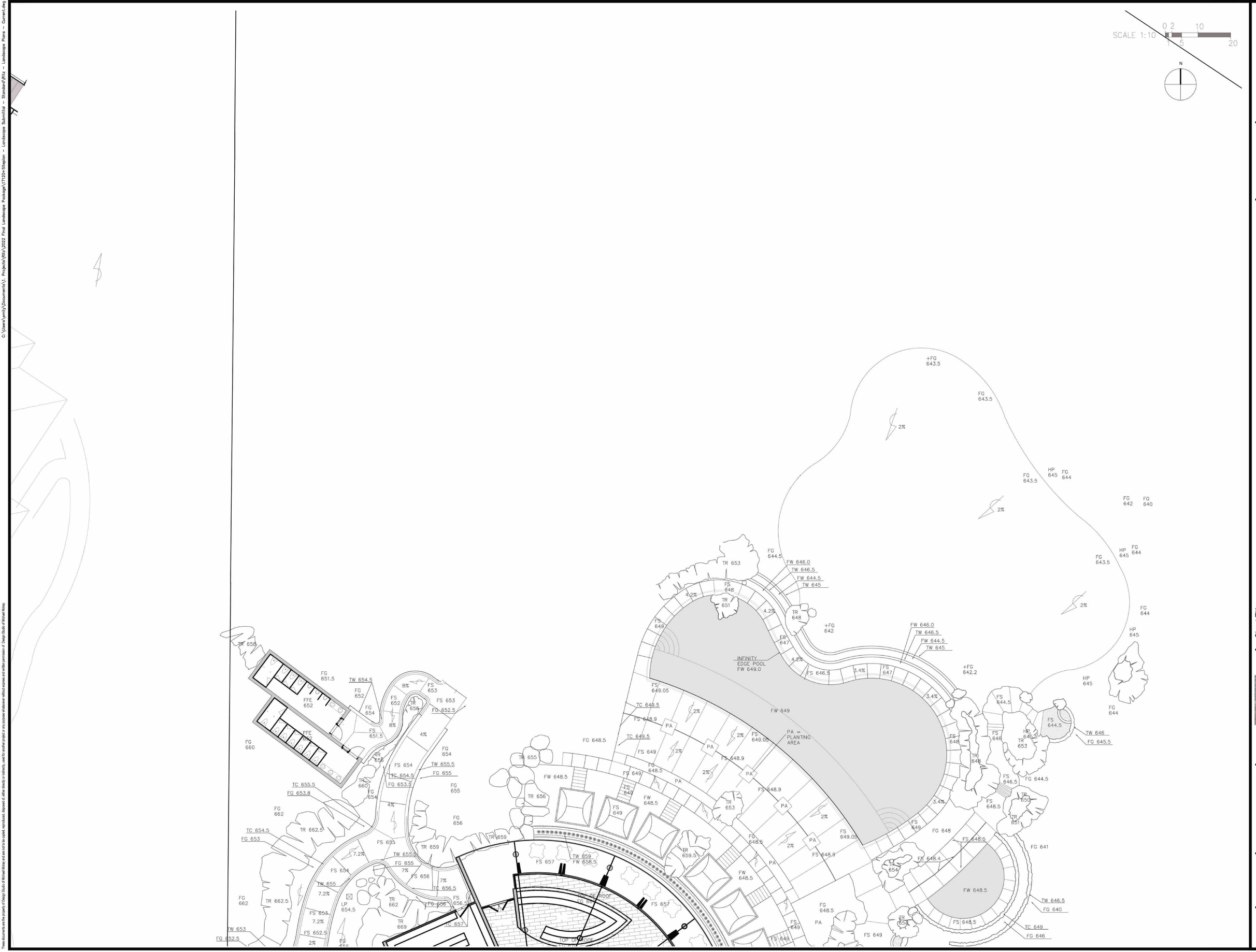



Typical Revisions:

| Date: | Description: |
|---|---|
| | |

Sheet Title:
CONCEPTUAL LANDSCAPE FEATURES PLAN

Sheet Reference:
LF-02




Design Studio of Michael McKay
Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

Sheet Title:

# LANDSCAPE FEATURES PLAN - SKY MESA

## CONCEPT PLAN SUBMITTAL

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:

CONCEPTUAL LANDSCAPE FEATURES PLAN

Sheet Reference:

LF-04

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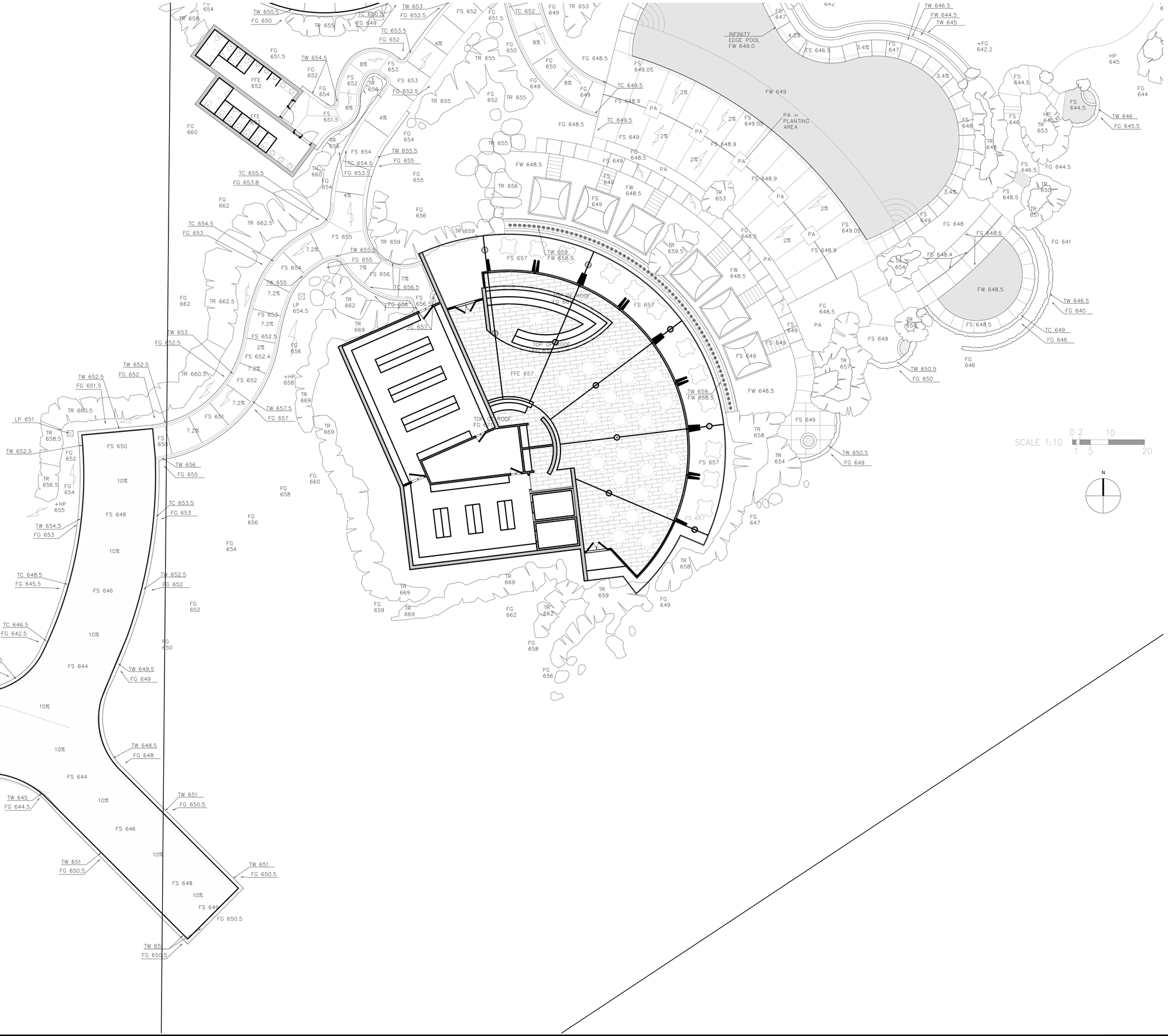
C:\Users\emily\Documents\1. Projects\Ritz\2022 Final Landscape Package\17120+Siteplan – Landscape Submittal – Standard\Ritz – Landscape Plans – Current.dwg

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Design Studio of Michael McKay
Landscape Architecture & Planning Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

# LANDSCAPE FEATURES PLAN - SKY MESA
## CONCEPT PLAN SUBMITTAL

Sheet Title:

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|
| | |

Sheet Title:

CONCEPTUAL LANDSCAPE FEATURES PLAN

Sheet Reference:

LF-05

# CONCEPTUAL GRADING PLAN
## RITZ VARLTON RANCHO MIRAGE
## CITY OF RANCHO MIRAGE, STATE OF CALIFORNIA

## GENERAL NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD PLANS OF THE CITY OF RANCHO MIRAGE AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION, AND OTHER STANDARD PLANS AS SPECIFIED IN THE PLANS.
2. NOTHING IN THESE PLANS SHALL RELIEVE THE CONTRACTOR FROM OBTAINING PERMITS AS REQUIRED BY THE CITY OF RANCHO MIRAGE MUNICIPAL CODE.
3. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO LOCATED AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL, REPLACEMENT, PROTECTION, OR RELOCATION OF ALL REGULATORY, WARNING,A AND GUIDE SIGNS STRIPPING AND PAVEMENT LEGENDS.
5. STREET NAME SIGNS AND TRAFFIC CONTROL SIGNS, TYPE AND LOCATION SHALL BE APPROVED BY THE CITY ENGINEER, TRAFFIC STRIPING, LEGENDS AND PAVEMENT MARKERS, TYPE AND LOCATIONS SHALL BE APPROVED BY THE CITY ENGINEER.
6. PRIOR TO GRADING OPERATIONS ALL PROPERTY BOUNDARIES SHALL BE VISIBLY MARKED BY SETTING WITNESS STAKES AT FOUND PROPERTY MONUMENTS. FOUND MONUMENTS SHALL BE NOTED OF THE PLANS. RESETTING OF MISSING MONUMENTS OF ANY REMOVAL / REPLACEMENT OF EXISTING MONUMENTS SHALL BE DONE BY AN R.C.E. BELOW 33985 OF L.S. ONLY. THE CONTRACTOR SHALL NOT DISTURB EXISTING MONUMENTS NOTED ON PLANS OR FOUND DURING CONSTRUCTION.
7. ALL STREET SECTIONS ARE TENTATIVE. THE MINIMUM SECTION IS 3" A.C / 4" A.B. ADDITIONAL SOIL TEST MAY BE TAKEN AFTER ROUGH GRADING TO DETERMINE EXACT SECTION REQUIREMENTS.
8. LOCATIONS OF FIELD DENSITY TEST SHALL BE DETERMINED BY THE CITY OF APPROVED TESTING AGENCY AND SHALL BE SUFFICIENT IN BOTH HORIZONTAL AND VERTICAL PLACEMENT TO PROVIDE REPRESENTATIVE TESTING OF ALL FILL PLACED. TESTING IN AREAS OF A CRITICAL NATURE OR SPECIAL. EMPHASES SHALL BE IN ADDITION TO THE NORMAL REPRESENTATIVE SAMPLINGS.
9. ALL UNDERGROUND FACILITIES, WITH LATERALS, SHALL BE IN PLACE AND INSPECTED PRIOR TO PAVING. INCLUDING, BUT NOT LIMITED TO THE FOLLOWING: SEWER, WATER, ELECTRIC, GAS, TELEPHONE AND DRAINAGE.
10. THE DESIGN CIVIL ENGINEER SHALL EXERCISE SUFFICIENT CONTROL OF THE CONSTRUCTION TO ENSURE COMPLIANCE WITH PLANS, SPECIFICATIONS AND CITY CODES.
11. THE FINAL UTILITY LINE BACKFILL REPORT FROM THE PROJECT SOIL ENGINEER SHALL INCLUDE AN APPROVAL STATEMENT THAT THE BACKFILL IS SUITABLE FOR THE INTENDED USE.
12. THE FINAL COMPACTION REPORT AND APPROVAL FROM THE SOILS ENGINEER SHALL CONTAIN THE TYPE OF FIELD TESTING PERFORMED. EACH TEST SHALL BE IDENTIFIED WITH THE METHOD OF OBTAINING THE IN-PLACE DENSITY, WHETHER SAND CONE OR DRIVE RING AND SHALL BE PERFORMED TO VERIFY THE ACCURACY OF THE MAXIMUM DENSITY CURVES B THE FIELD TECHNICIAN.
13. ALL CONSTRUCTION AREAS SHALL BE PROPERLY POSTED AND LIGHTED IN CONFORMANCE WITH THE STATE MANUAL OF WARNING SIGNS, LIGHTS AND DEVICES FOR USE IN THE PERFORMANCE OF WORK UPON HIGHWAYS, IN ORDER TO ELIMINATE ANY HAZARDS.
14. AT NO TIME WILL PRIVATE PROPERTY BE USED IN CONJUNCTION WITH THE PROJECT UNLESS PROPERTY OWNER APPROVAL IS OBTAINED IN WRITING AND GIVEN TO THE CITY FOR APPROVAL.
15. ANY CHANGES CONTEMPLATED IN: DRAINAGE, ELEVATIONS OR STRUCTURES SHOWN ON THESE PLANS MUCH BE REVIEWED BY THE CITY TO DETERMINE IF REVISED PLANS SHOULD BY SUBMITTED. NONCOMPLYING CONSTRUCTION MAY BE SUBJECT TO PENALTIES AND/OR REMOVAL. "AS-BUILT" PLANS MUST BE SUBMITTED PRIOR TO ANY RELEASE OF SECURITIES AND / OR ISSUANCE OF CERTIFICATE OF USE.

## PAVING NOTES:

1. ALL UNDERGROUND FACILITIES, INCLUDING LATERALS, SHALL BE IN PLACE, AND ALL TRENCHS COMPACTED AND TESTED PRIOR TO PAVING.
2. ALL EXISTING OR NEW IMPROVEMENTS, INCLUDING CURB AND GUTTERS, SIDEWALKS, ASPHALT CONCRETE OR P.C.C. PAVING, WHICH ARE BEING JOINED OR MATCHED IN CONNECTION WITH THIS PROJECT SHALL BE JOINED OR MATCHED IN A MANNER SATISFACTORY TO THE CITY ENGINEER, INCLUDING NECESSARY SAW CUTTING, REMOVAL, REPLACEMENT AND CAPPING.
3. NEW CURB AND GUTTER SHALL BE MARKED AT EVERY 10-FEET WITH A SCORE LINE AND EXPANSION JOINS AS REQUIRED.
4. NEW OR EXISTING CURB AND GUTTER SHALL BE JOINED, MATCHED, OR REPLACED IF DAMAGED, TO S SAW CUT LINE SUCH THAT A MINIMUM LENGTH OF 7-FEET OF CURB AND GUTTER REMAINS IN PLACE AT ALL LOCATIONS.
5. A "TACK COAT" SHALL BE APPLIED BETWEEN PAVEMENT LAYERS, CONCRETE SURFACES AND ON EXISTING PAVEMENT TO BE RESURFACED AT THE RATE OF 0.10 GAL/YD. THE TACK COAT SHALL BE TYPE SS1 ASPHALTIC EMULSION WITH A 6-=70 GRADE LIQUID ASPHALT.
6. THE VISCOSITY GRADE OF PAVING ASPHALT SHALL BE PG 70-10 OR AS DETERMINED BY THE CITY ENGINEER AT THE TIME OF PAVING.
7. THE FINAL OR SURFACE LAYER OF ASPHALT CONCRETE SHALL BE BE PLACED UNTIL ALL ON-SITE IMPROVEMENTS HAVE BEEN COMPLETED , INCLUDING ALL EARTHWORK GRADING.
8. MANHOLES AND VALVE BOX FRAMES SHALL BE ADJUSTED TO FINISHED GRADES AFTER COMPLETION OF CONSTRUCTION TO THE STANDARDS OF THE FACILITY OWNER.
9. ALL EXISTING PAVEMENT WITHIN AND ADJOINING THIS PROJECT SHALL BE EITHER REMOVED OR STRUCTURALLY TESTED TO VERIFY THAT THE STRUCTURAL CAPABILITIES ARE ACCEPTABLE. ALL RESULTS SHALL BE APPROVED BY THE CITY ENGINEER.
10. THE CURB SHALL BE "ETCHED" SHOWN LATERAL LOCATION: "S" FOR SEWER, "G" FOR GAS, AND "E" FOR ELECTRICAL.
11. ALL PERMANENT ROADWAY TRAFFIC STRIPING, LEGENDS AND PAVEMENT MARKERS SHALL BE INSTALLED AFTER PERMANENT PAVING. THE TYPE AND LOCATIONS SHALL BE INSTALLED PER PLAN OR AS DIRECTED BY THE CITY ENGINEER.
12. TEMPORARY ROADWAY STRIPING SHALL BE INSTALLED ON ALL UNFINISHED ROADWAY SURFACES AS DIRECTED BY THE CITY ENGINEER.
13. THE AGGREGATE BASE MATERIAL SPECIFIED IN THE PLANS SHALL BE COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION WITH THE TOP FOOT OF MATERIAL UNDER PAVING. THE DEEPER SUBGRADE MUST BE COMPACTED TO AT LEAST 90% OF MAXIMUM RELATIVE DENSITY. TESTING WILL BE REQUIRED BY A SOIL ENGINEER.
14. JUST BEFORE PAVING, A SOIL STERILANT SHALL BE APPLIED TO THE COMPACTED BASE MATERIAL FOR ALL ASPHALT PAVING SEE THE CITY'S STANDARD "SPECIAL PROVISIONS TO THE STANDARD SPECIFICATIONS" FOR THE SOIL STERILENT REQUIREMENTS

## GRADING NOTES:

1. ALL WORK SHALL CONFORM TO CITY OF RANCHO MIRAGE GRADING ORDINANCE NO. 398, THE CITY ENGINEER, AND ANY SPECIAL PROVISIONS OF THE PERMIT.
2. GRADING SHALL BE IN ACCORDANCE WITH THE ENGINEERED GRADING REQUIREMENTS OF A SOIL REPORT PREPARED BY _____ NO. _____ DATED _____ TELEPHONE # _____
3. THE CONTRACTOR SHALL NOTIFY THE CITY PUBLIC WORKS INSPECTION LINE (760-324-8271) 24 HOURS PRIOR TO ANY GRADING, BRUSHING OR CLEARING, EACH PHASE OF CONSTRUCTION, AND ANY OTHER WORK REQUIRING INSPECTION.
4. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURE, TEMPORARY DRAINAGE CONTROL SHALL BE PROVIDED TO PREVENT PONDING WATER, EROSION AND DAMAGE TO ADJACENT PROPERTY.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN EFFECTIVE MEANS OF DUST CONTROL WHICH SHALL INCLUDE PREVISIONS FOR ADEQUATE WATERING DURING THE GRADING PROCESS AND PROVISIONS FOR CONTINUANCE OF DUST CONTROL AFTER THE GRADING. DUST CONTROL SHALL CONTINUE UNTIL SUCH TIME THAT THE GRADED SURFACE PRESENTS SUFFICIENT PROTECTIVE COVER AGAINST WIND OR WATER EROSION AS DETERMINED BY THE CITY ENGINEER. SEE THE ATTACHED LOCAL AIR QUALITY MANAGEMENT PLAN FOR DETAILS OF EXPECTED DUST CONTROL METHODS.
6. AREAS OF FUTURE CONSTRUCTION AND ALL CUT AND FILL SLOPE FACES SHALL BE PLANTED WITH A CITY APPROVED LANDSCAPE MATERIAL.
7. GRADING OPERATIONS AND MAINTENANCE OF EQUIPMENT WITHIN ONE HALF MILE OF HUMAN OCCUPANCY SALL NOT BE CONDUCTED BETWEEN THE HOUR OF 5"00 P.M. AND 8:00 A.M. OR ANYTIME ON A SUNDAY OF FEDERAL HOLIDAY PER CITY CODE: 15.04.020 (A).
8. PRIOR TO ANY GRADING OPERATIONS, ALL FILL AREAS SHALL BE CLEARED OF ORGANIC MATERIAL AND THE EXISTING GROUND SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 12" OR AS RECOMMENDED BY THE SOIL REPORT.
9. MAXIMUM CUT AND FILL SLOPES SHALL BE NO STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL.
10. ALL BUILDING PADS SHALL BE COMPACTED TO A MINIMUM OF 90% RELATIVE DENSITY IN ACCORDANCE WITH CITY ORDINANCE NO. 398 AND ABOVE MENTIONED SOIL REPORT.
11. ALL FILLS SHALL BE COMPACTED TO A MINIMUM OF 90% RELATIVE DENSITY IN ACCORDANCE WITH CITY ORDINANCE NO. 398. FIELD DENSITY SHALL BE DETERMINED IN ACCORDANCE WITH CITY GRADING ORDINANCE NO. 398.
12. MINIMUM BUILDING PAD AND DRAINAGE SLOPE=0.50%. DRAINAGE SWALES SHALL BE A MINIMUM OF 0.5 FEE DEEP, 5 FEET WIDE, AND BE CONSTRUCTED A MINIMUM OF 2 FEET FROM THE TOP OF CUT OR FILL SLOPE. A 1-FOOT HIGH BERM SHALL BE PLACED AT THE TOP OF ALL SLOPES WHICH EXCEED 5:1 UNLESS PROTECTED WITH APPROVED EROSION CONTROL.
13. ALL TRAVELED WAYS MUCH BE CLEANED DAILY OF ALL DIRT, MUD AND DEBRIS DEPOSITED ON THEM AS A RESULT OF THE GRADING OPERATION. CLEANING IS TO BE DONE TO THE SATISFACTION OF THE CITY ENGINEER.
14. BLOCK WALLS ARE NOT PART OF THE GRADING PERMIT. SUBMIT FOR SEPARATE BUILDING PERMIT.
15. THE SOILS ENGINEER, ENGINEERING GEOLOGIST AND DESIGN CIVIL ENGINEER SHALL, DURING GRADING, ENSURE COMPLIANCE WITH THE PLANS, SPECIFICATIONS AND CODES WITHIN THEIR PURVIEW.
16. PRIOR TO FINAL ACCEPTANCE OF GRADING, THE SOILS ENGINEER AND DESIGN ENGINEER SHALL SUBMIT (ON CITY FORMS) VERIFICATION THAT ALL WORK HAS CONFORMED TO THE GRADING PLAN, CITY STANDARD AND THE RECOMMENDATIONS OF THE SOILS REPORT.
17. ANY PUBLIC ROADWAY WHICH IS INTENDED TO BE USED TO CONDUCT ANY ASPECT OF THE GRADING FOR THE PROJECT SHALL BE COVERED BY A CITY ENCROACHMENT PERMIT AND SUBJECT TO PERMIT CONDITIONS.
18. THE CITY OF RANCHO MIRAGE IS IN A QUARANTINE AREA FOR THE RED IMPORTED FIRE ANT. PRIOR TO ANY MOMENT OF SOIL WITHIN THE SITE, OR FORM THE SITE, YOU MUST SCHEDULE AN INSPECTION AT 760-776-8208 WITH THE R.I.F.A. INSPECTOR AT LEAST 24 HOURS IN ADVANCE AND SUBMIT CERTIFICATION OF CLEARANCE TO THE CITY.

## CITY OF RANCHO MIRAGE-UTILITIES NOTIFICATION LIST

CITY OF RANCHO MIRAGE
69-825 HIGHWAY 111
RANCHO MIRAGE, CA 92270
PHONE: (760) 324-8830

WATER AND SEWER:
COACHELLA VALLEY WATER DISTRICT
P O BOX 1058
COACHELLA, CA 92236
PHONE: (760) 398-2651

ELECTRIC:
EDISON INTERNATIONAL
PHONE: (760) 202-4291

GAS:
THE GAS COMPANY
PHONE: (800) 227-2800

TELEPHONE:
VERIZON
PHONE: (760) 323-1231

CABLE TV:
TIME WARNER
PHONE: (800) 340-1312

DIG ALERT
USA UNDERGROUND ALERT
PHONE: (811)

## LEGAL DESCRIPTION

PARCEL NO. 1:

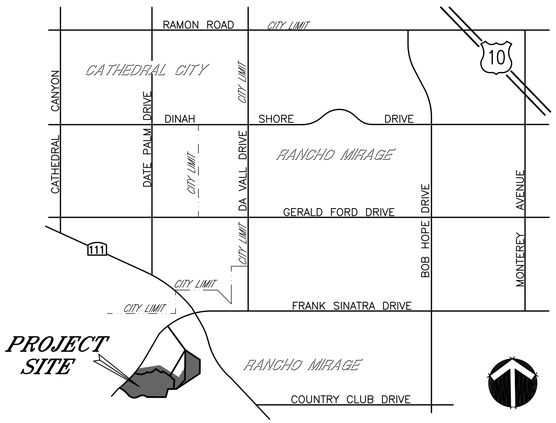
A PORTION OF LOTS 1 AND 2 OF TRACT NO. 34640-1, IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA AS PER MAP RECORDED IN BOOK 443 PAGES 11 THROUGH 16, INCLUSIVE OF MAP IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE OF RIVERSIDE COUNTY, CALIFORNIA.

PARCEL NO. 2:

A PORTION OF PARCEL 2 OF LOT LINE ADJUSTMENT NO. LLA 06-07 IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA AS PER INSTRUMENT NO. 2007-0480660 RECORDED IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE OF RIVERSIDE COUNTY, CALIFORNIA.

PARCEL NO. 3:

PARCEL IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA AS PER INSTRUMENT NO. 1995-405421, RECORDED ON DECEMBER 6, 1995 IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE OF RIVERSIDE COUNTY, CALIFORNIA.




VICINITY MAP
TG: 817-F2 NTS

## SHEET INDEX:


SHEET 1: TITLE SHEET
SHEET 2: SECTIONS
SHEET 3: PRELIMINARY SITE GRADING - GROUND LEVEL - 40 SCALE
SHEET 4: PRELIMINARY SITE GRADING - P2 LEVEL - 40 SCALE
SHEET 5: PRELIMINARY SITE GRADING - P3 LEVEL - 40 SCALE
SHEET 6: PRELIMINARY SITE GRADING - SKY MESA RECREATION AREA
SHEET 7: SITE GRADING-GROUND LEVEL-NW CORNER - 20 SCALE
SHEET 8: SITE GRADING-GROUND LEVEL-NE CORNER - 20 SCALE
SHEET 9: SITE GRADING-GROUND LEVEL-SW CORNER - 20 SCALE
SHEET 10: SITE GRADING-GROUND LEVEL-SE CORNER - WO SCALE
SHEET 11: SITE YARD DRAINAGE PLAN - WESTERLY PORTION
SHEET 12: SITE YARD DRAINAGE PLAN - EASTERLY PORTION
SHEET 13: RETAINING WALL LOCATION AND SECTIONS PLAN - WALLS "A" AND "B"
SHEET 14: RETAINING WALL LOCATION AND SECTIONS PLAN - WALLS "C", "D" AND "E"
SHEET 15: RETAINING WALL LOCATION AND SECTIONS PLAN - WALLS "F"


## SOURCE OF SURVEYING DATA:

EXISTING FIELD DATE SHOWN ON THIS PLAN WAS PROVIDED BY PROJECT ARCHITECT'S OFFICE ON SEPTEMBER 2017.

NOTE:
SECTION 4216/4217 OF THE GOVERNMENT CODE REQUIRES A DIG ALERT IDENTIFICATION NUMBER BE ISSUED BEFORE A PERMIT TO EXCAVATE WILL BE VALID. FOR YOUR DIG ALERT ID NUMBER CALL UNDERGROUND SERVICE ALERT **TOLL FREE "811"** TWO WORKING DAYS BEFORE YOU DIG.

DIGALERT
DIAL BEFORE YOU DIG
TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 811
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

## LEGEND:

| | | | |
|---|---|---|---|
| TC | TOP OF CURB | | RETAINING WALL |
| FL | FLOW LINE | (120) | EXISTING ELEVATION OR DATA |
| FS | FINISHED SURFACE | 120 | PROPOSED ELEVATION OR DATA |
| FG | FINISHED GRADE | TBM | TEMPORY BENCH MARK |
| FF | FINISHED FLOOR | BM | BENCH MARK |
| GF | GARAGE FLOOR | C | CUT |
| PAD | PAD | F | FILL |
| TW | TOP OF WALL | N | NATURAL |
| TF | TOP OF FOOTING | | PROPERTY LINE |
| H | HEIGHT | | EXISTING CONTOURS |
| L | LENGTH | | PROPOSED CONTOURS |
| ℄ | PROPERTY LINE | | LIMIT OF OVEREXCAVATION |
| R/W | RIGHT-OF-WAY | | CUT/FILL DAYLIGHT LINE |
| ☼ | PARKING AREA LIGHT | | TRENCH DRAIN W/FILTER INLET |
| ⊠ | GRATE INLET WITH FILTER | | |

DRAFT PRINT

BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

BENCH MARK
2 1/2" BRASS DISK STAMPED "COUNTY OF RIVERSIDE PD-21, DEC. 1963" SET IN HEADWALL ON SOUTH SIDE OF HWY 111, 360 FEET NW OF FRANK SINATRA DRIVE


OWNER:
KAM SANG COMPANY, INC.
411 E. HUNTINGTON DRIVE, #305
ARCADIA, CA 91006
TEL: (626) 446-2988
FAX: (626) 446-3392
E-MAIL: www.kamsangcompany.com

ARCHITECT:
LCRA
ARCHITECTURE & PLANNING
35 HUGUS ALLEY, SUITE 220
PASADENA, CA 91103
TEL. (626) 449-9698
E-MAIL: www.lcra-architects.com

PREPARED BY:
FOCUS ENGINEERING, INC.
8 CORPORATE PARK, SUITE 300
IRVINE, CA 92606
TEL: (949) 450-0590
E-MAIL: focusengring@sbcglobal.net


REGISTERED PROFESSIONAL ENGINEER
GUIA LIN LIU
No. 41497
EXP. 12/31/23
CIVIL
STATE OF CALIFORNIA

PRINT: 2020/08/18

REVISIONS

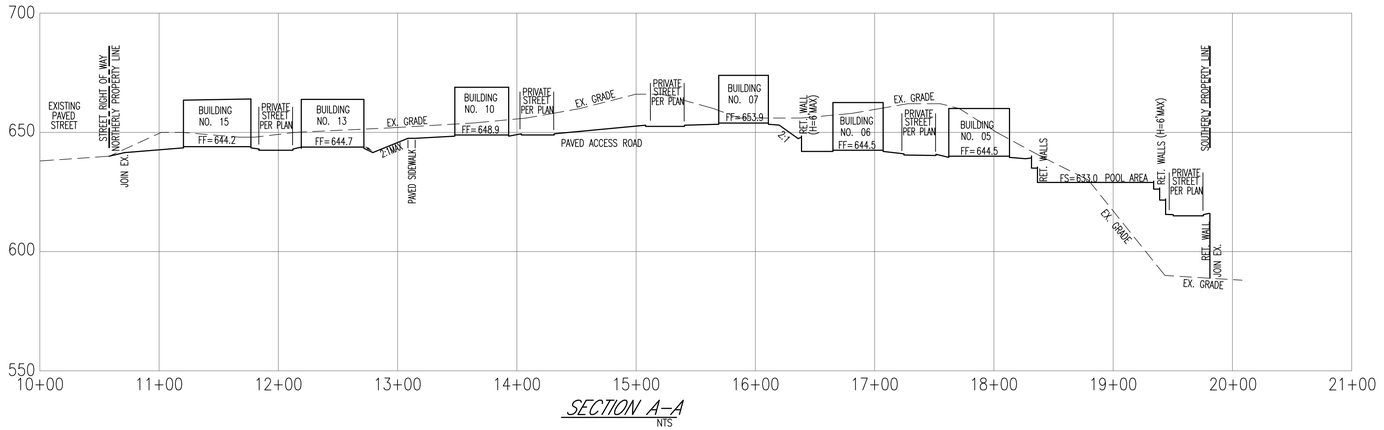
| NO. | DATE | DESCRIPTION |
|---|---|---|
| | | |

CITY OF RANCHO MIRAGE

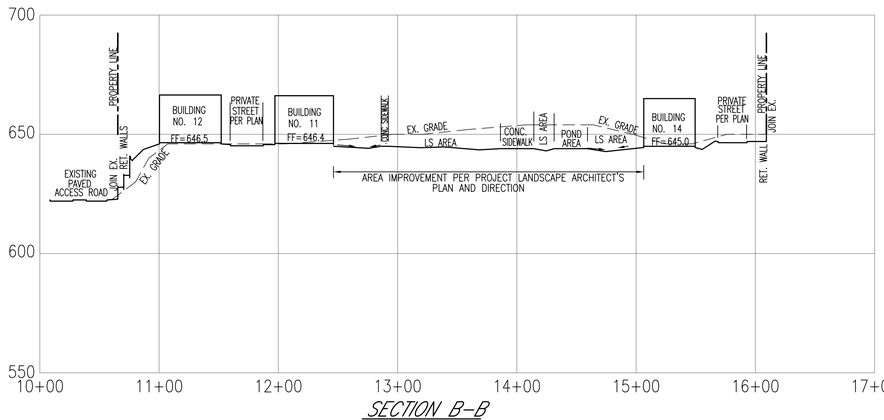
CONCEPTUAL GRADING STUDY FOR RANCHO MIRAGE - RITZ II

TITLE SHEET

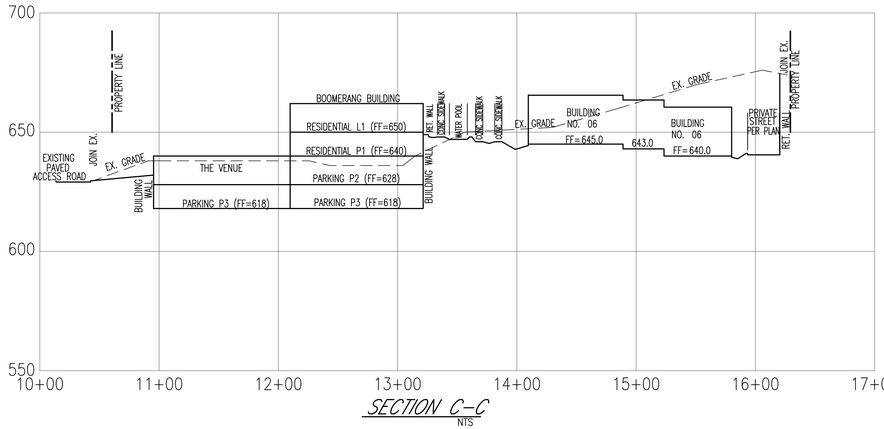
SHEET 1 OF 15



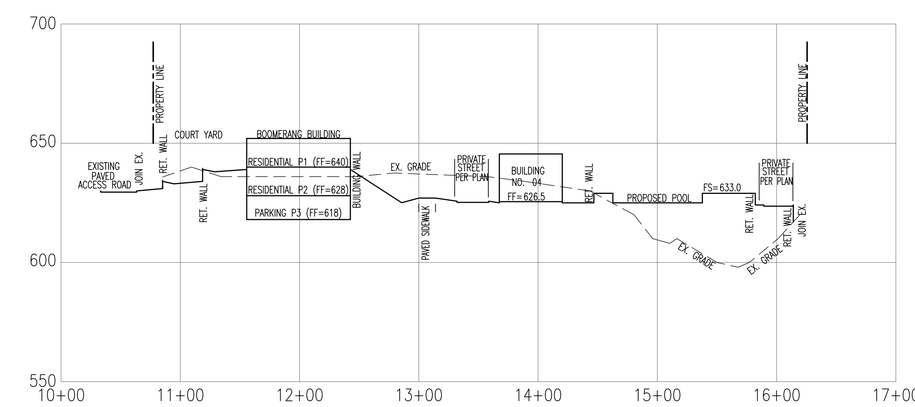

SECTION A–A
NTS



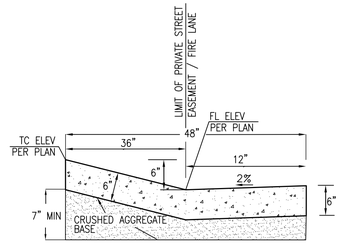

SECTION B–B
NTS




SECTION C–C
NTS

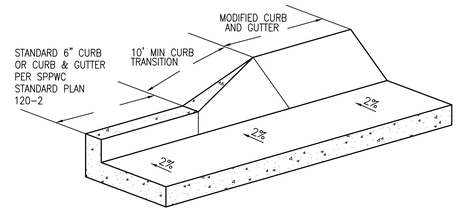



SECTION D–D
NTS

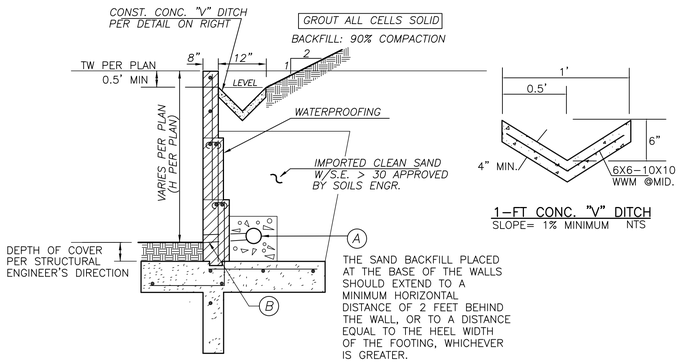



MODIFIED CURB & GUTTER
TYPICAL SECTION
SCALE: NONE

NOTES:
1. CONCRETE SHALL BE CLASS 520–C–2500.
2. WEAKENED PLANE JOINTS ARE REQUIRED AT 20' INTERVALS AND ON BOTH SIDES OF DRIVEWAY APPROACHES.
3. EXPANSION JOINTS ARE REQUIRED AT ALL CURB RETURNS AND AT DRAINAGE STRUCTURES.
4. CURB REPAIR SHALL BE AS DIRECTED BY THE CITY ENGINEER.
5. ALL EXPOSED CORNERS TO BE ROUNDED WITH 3/4" R.




CURB TRANSITION DETAIL
SCALE: NONE

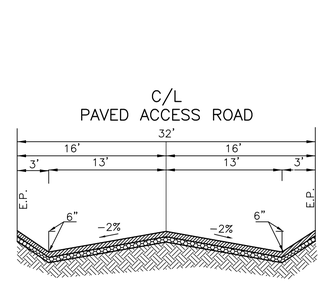



TYPICAL RETAINING WALL SECTION
W/2:1 BACKFILL — RETAINING WALL CONSTRUCTION PER STRUCTURAL ENGINEER'S DIRECTION — N.T.S.

Ⓐ — 4" PERFORATED PVC SCH. 40 PIPE W/MIN. 1 CF/LF OF OPEN GRADED GRAVEL WRAPPED IN MIRAFI 140N, OR EQUAL FILTER FABRIC.
Ⓑ — 2" PVC SCH. 40 PIPE @ 10' O.C. FOR SUBDRAIN OUTLET




1–FT CONC. "V" DITCH
SLOPE= 1% MINIMUM NTS




TYPICAL PRIVATE ACCESS ROAD SECTION
N.T.S.

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BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

BENCH MARK
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E–MAIL: www.lcra–architects.com

PREPARED BY:
FOCUS ENGINEERING, INC.
8 CORPORATE PARK, SUITE 300
IRVINE, CA 92606
TEL: (949) 450–0590
E–MAIL: focusengring@sbcglobal.net


REGISTERED PROFESSIONAL ENGINEER — CHIA LIN LIU — No. 41497 — EXP. 12/31/23 — CIVIL — STATE OF CALIFORNIA

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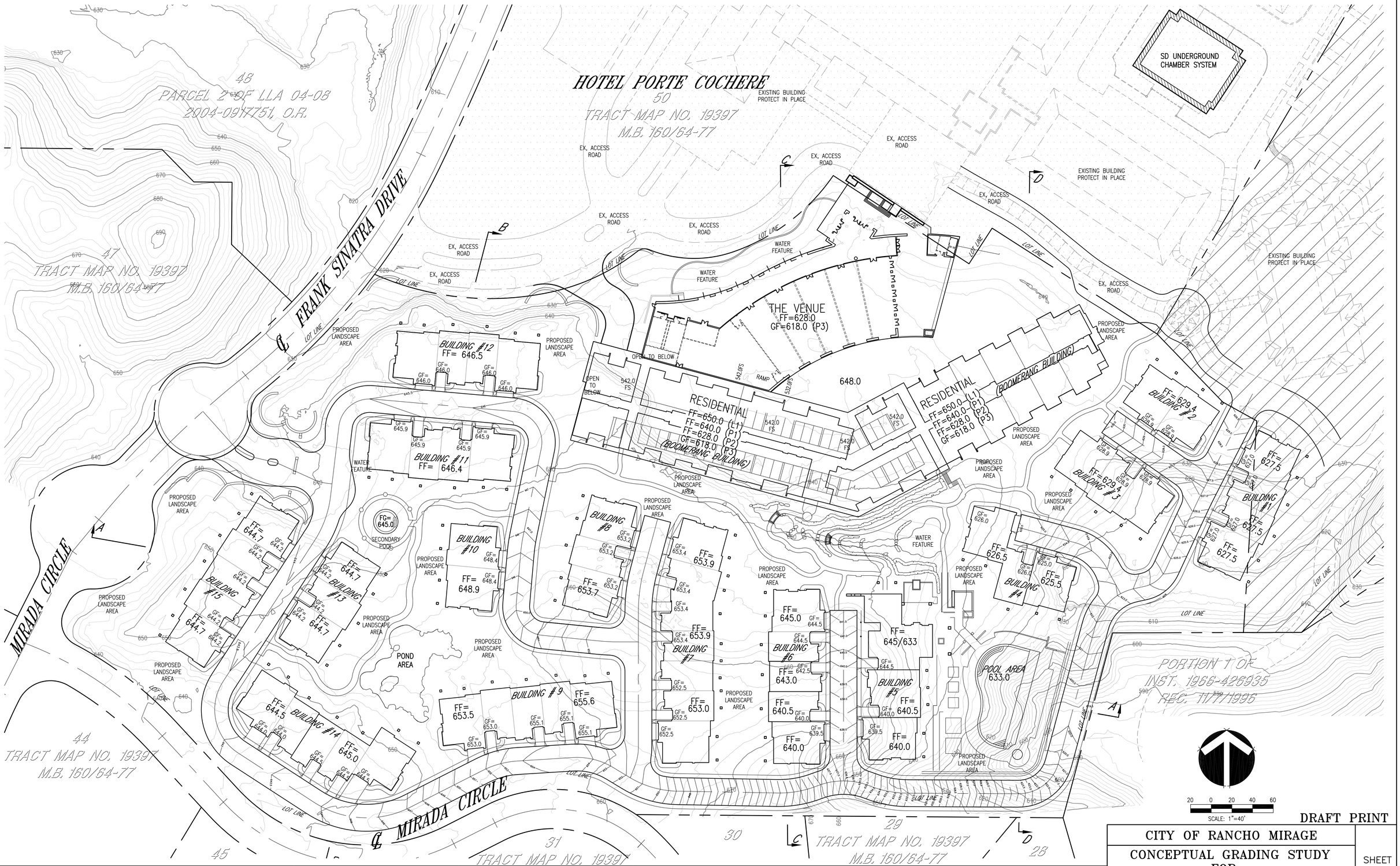
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE – RITZ II
DETAILS & TYPICAL SECTIONS

SHEET 2 OF 15

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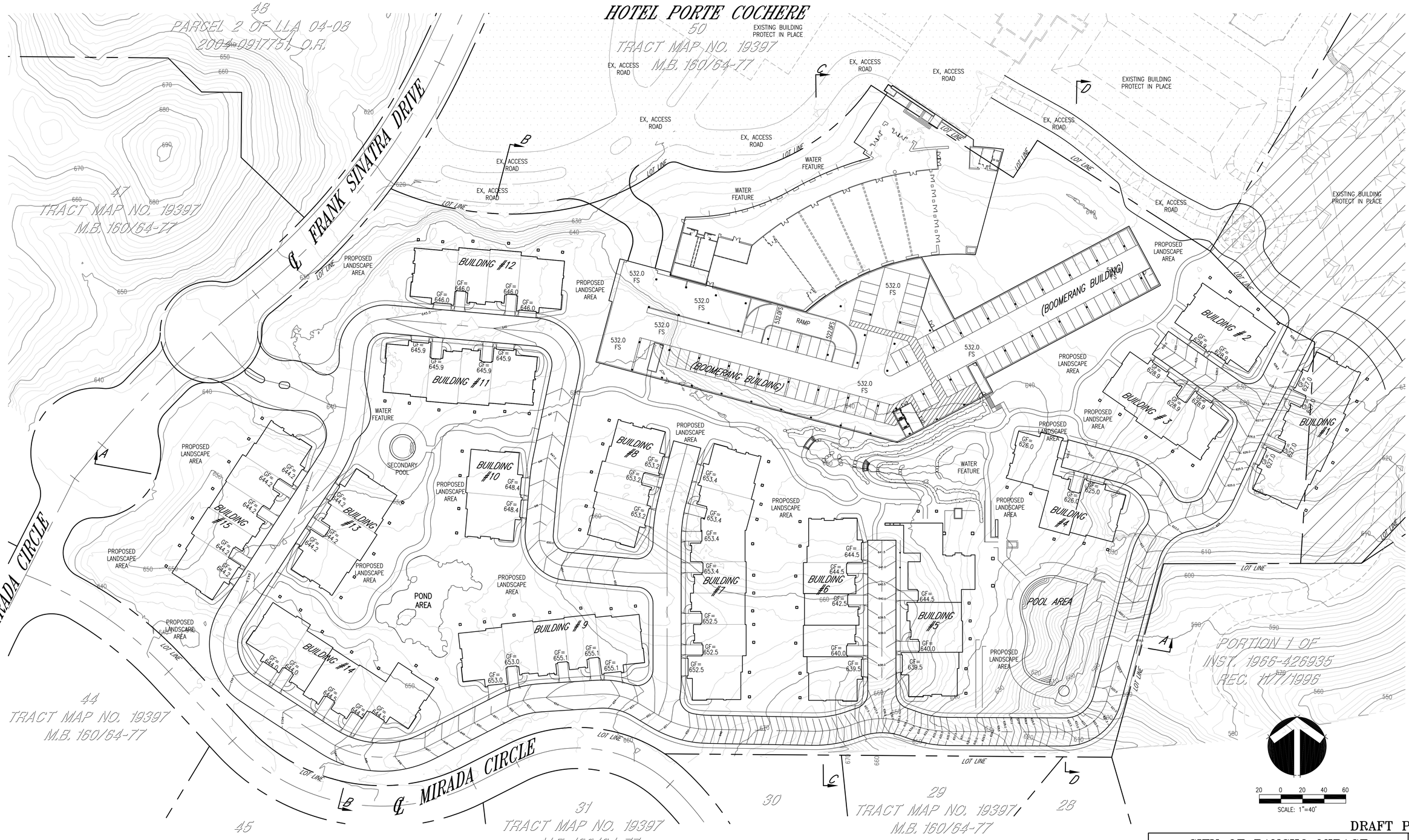
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE – RITZ II

GROUND LEVEL

SHEET 3 OF 15

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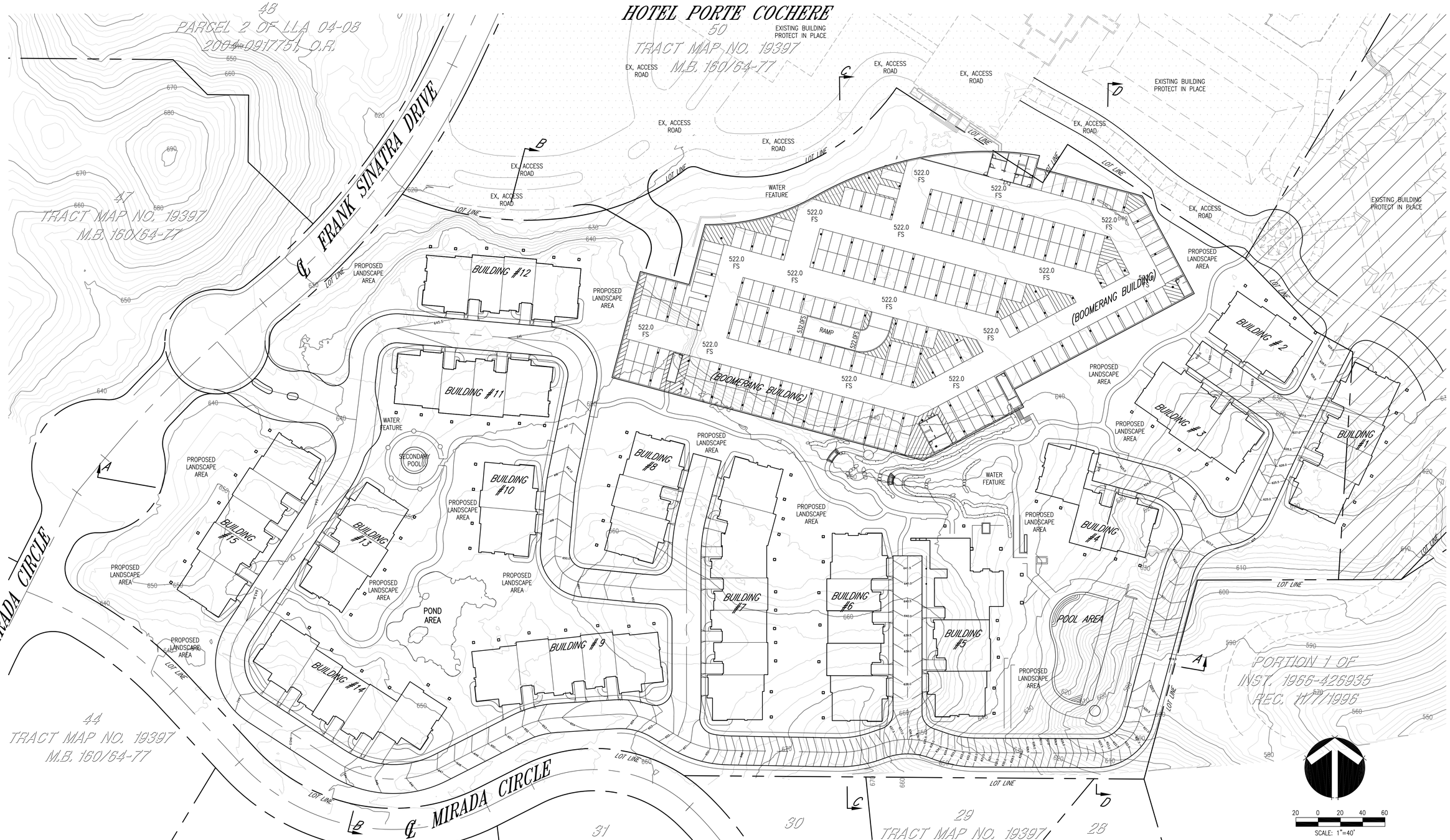
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE - RITZ II
SITE GRADING - P2 LEVEL

SHEET 4 OF 15

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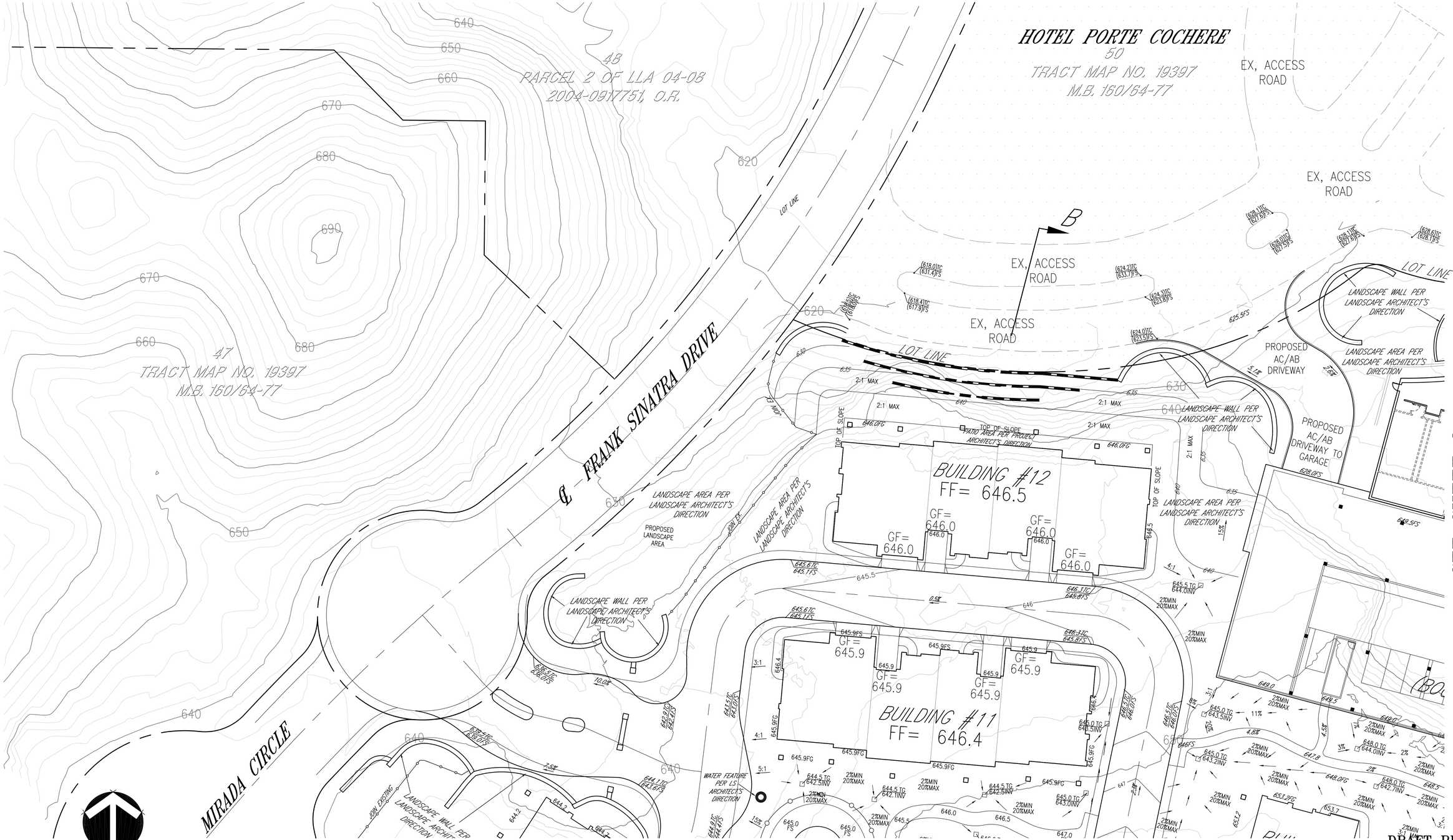
CITY OF RANCHO MIRAGE

# CONCEPTUAL GRADING STUDY FOR RANCHO MIRAGE – RITZ II

## SITE GRADING – P3 LEVEL

SHEET 5 OF 15

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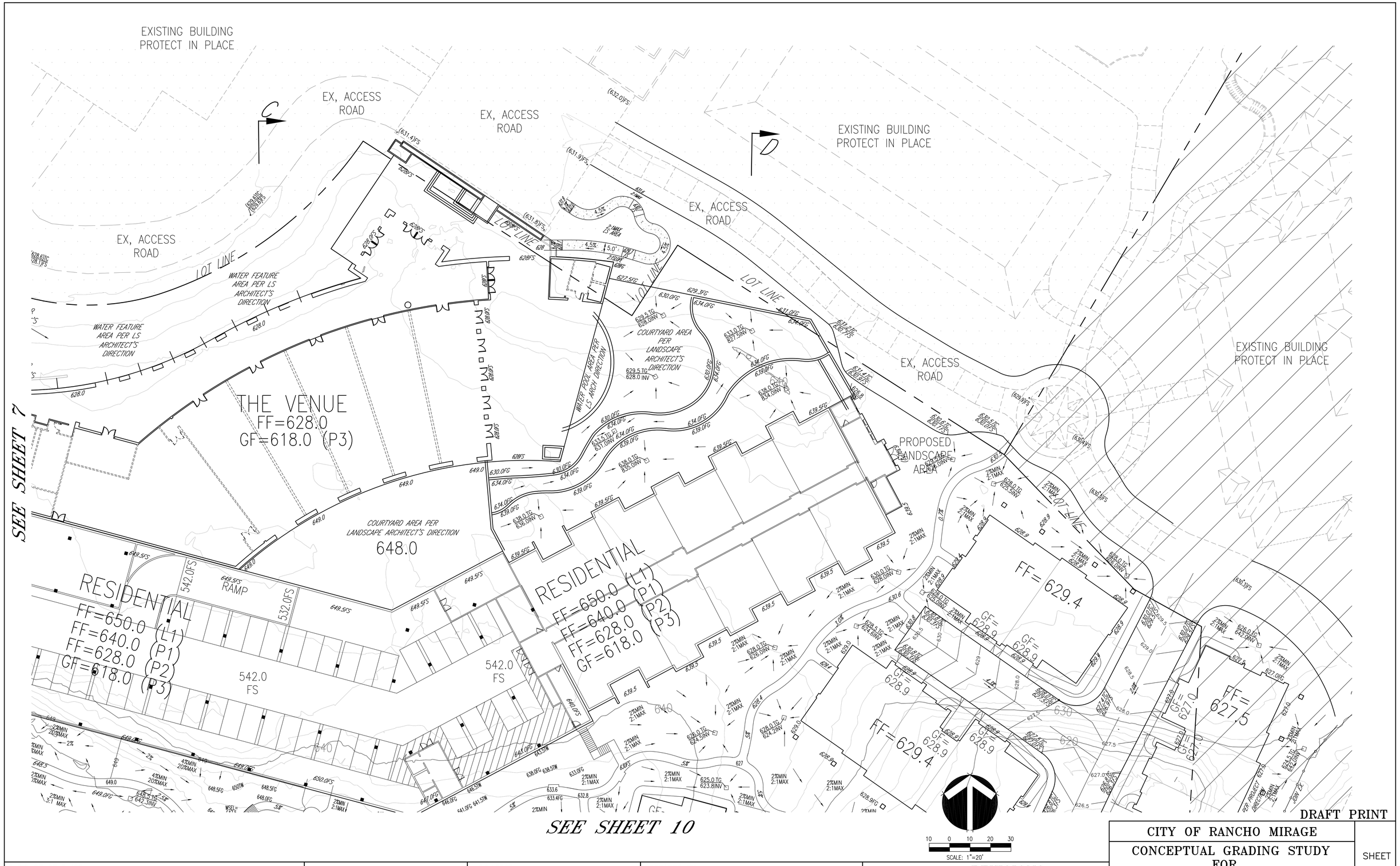
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE – RITZ II
YARD DRAIN-GROUND LEVEL-NW CORNER

SHEET 7 OF 15

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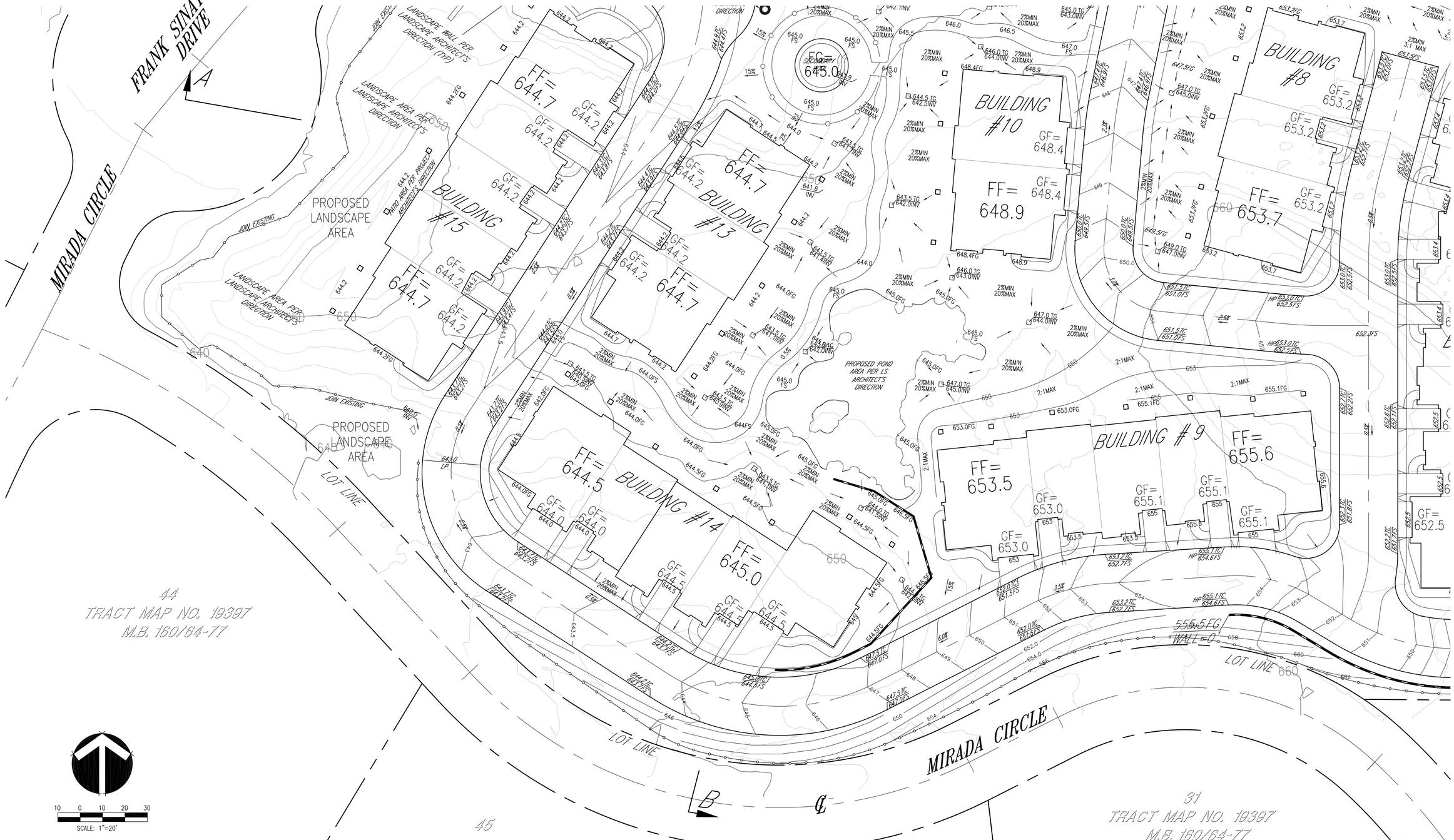
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY FOR RANCHO MIRAGE - RITZ II

YEAR DRAIN-GROUND LEVEL-NE CORNER

SHEET 8 OF 15

SEE SHEET 7




10 0 10 20 30
SCALE: 1"=20'

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CITY OF RANCHO MIRAGE

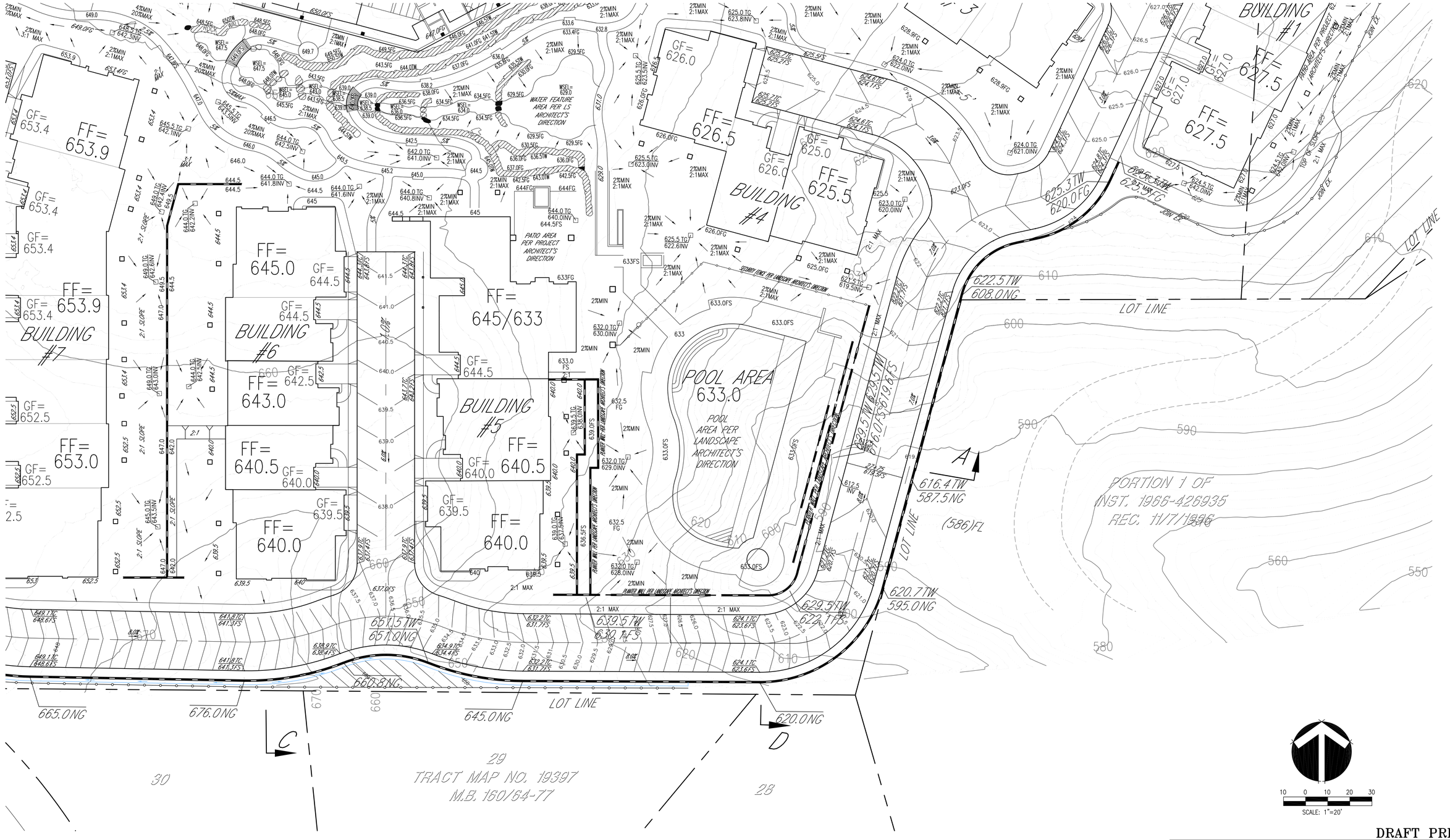
CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE - RITZ II

YARD DRAIN-GROUND LEVEL-SW CORNER

SHEET 9 OF 15

SEE SHEET 8

SEE SHEET 9

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CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE - RITZ II

YARD DRAIN-GROUND LEVEL-SE CORNER

SHEET 10 OF 15




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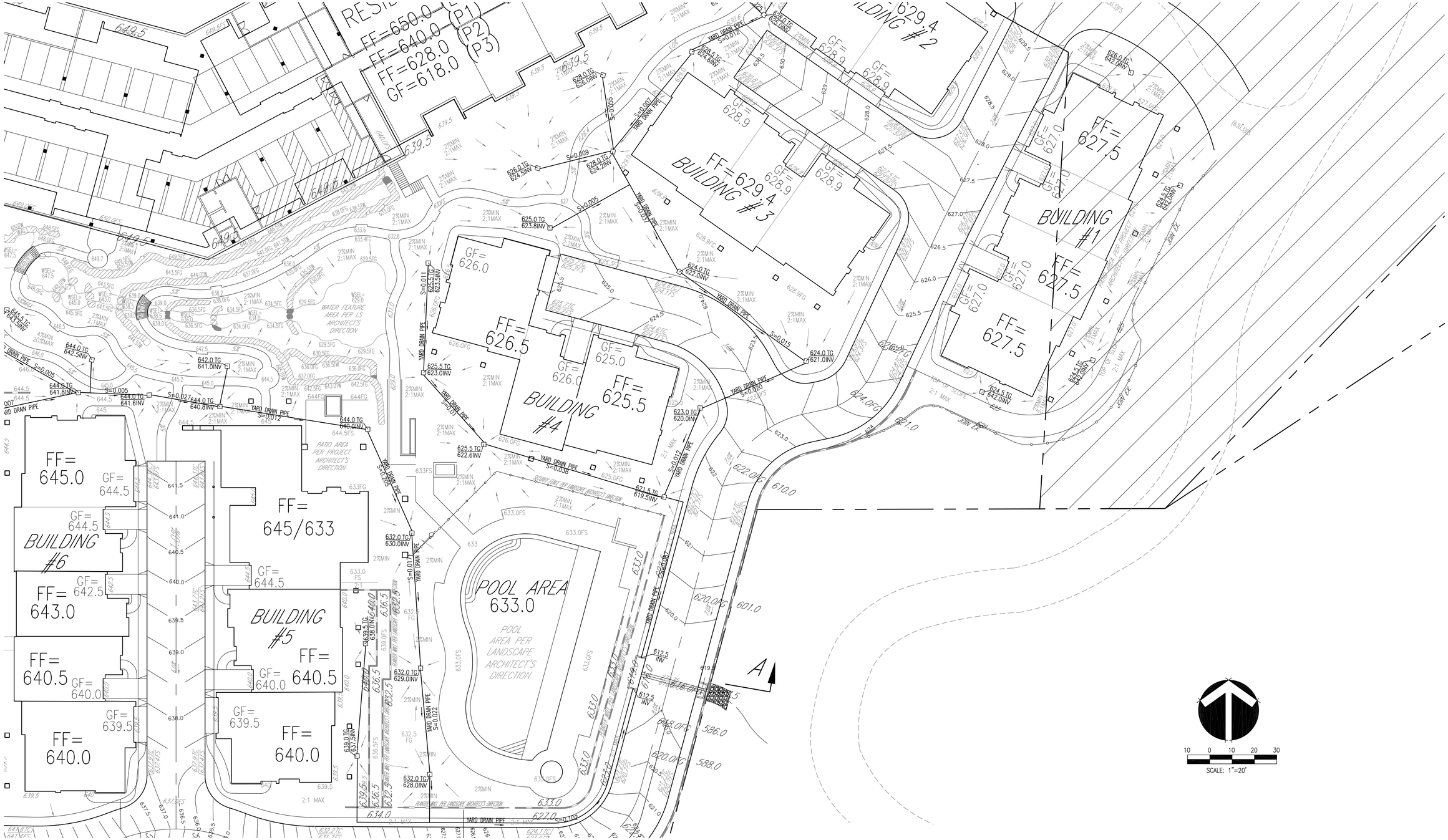
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE - RITZ II
YARD DRAIN-GROUND LEVEL-WESTERLY SITE

SHEET 11 OF 15

SEE SHEET 11

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| CITY OF RANCHO MIRAGE | |
| CONCEPTUAL GRADING STUDY FOR RANCHO MIRAGE – RITZ II | SHEET 12 OF 15 |
| YARD DRAIN-GROUND LEVEL-EASTERLY SITE | |

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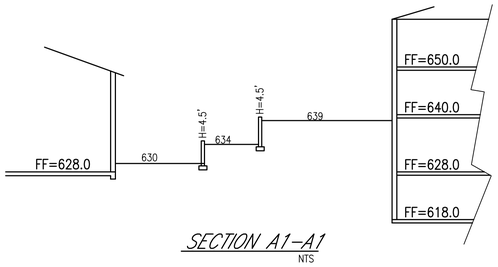
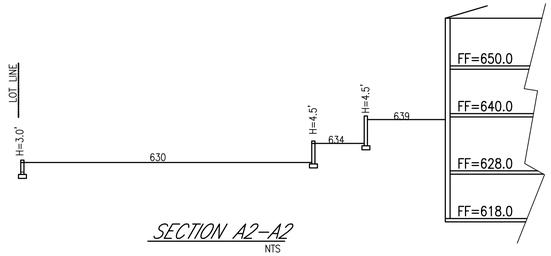
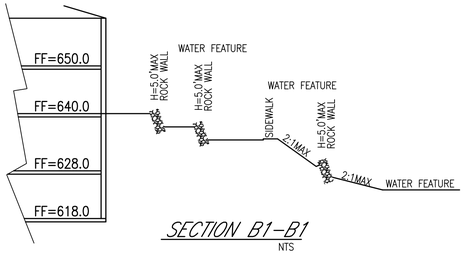


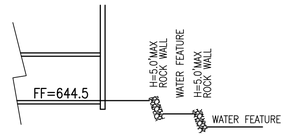

SECTION A1–A1
NTS




SECTION A2–A2
NTS




SECTION B1–B1
NTS

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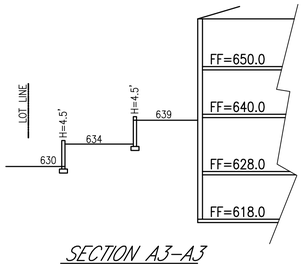


SECTION A3–A3
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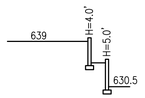


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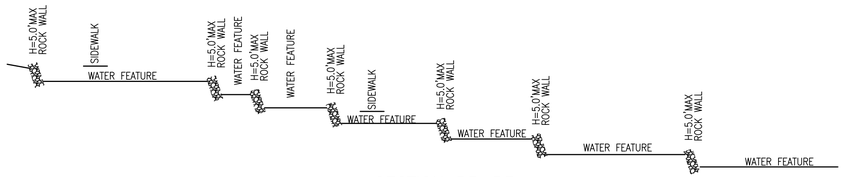


SECTION B3–B3
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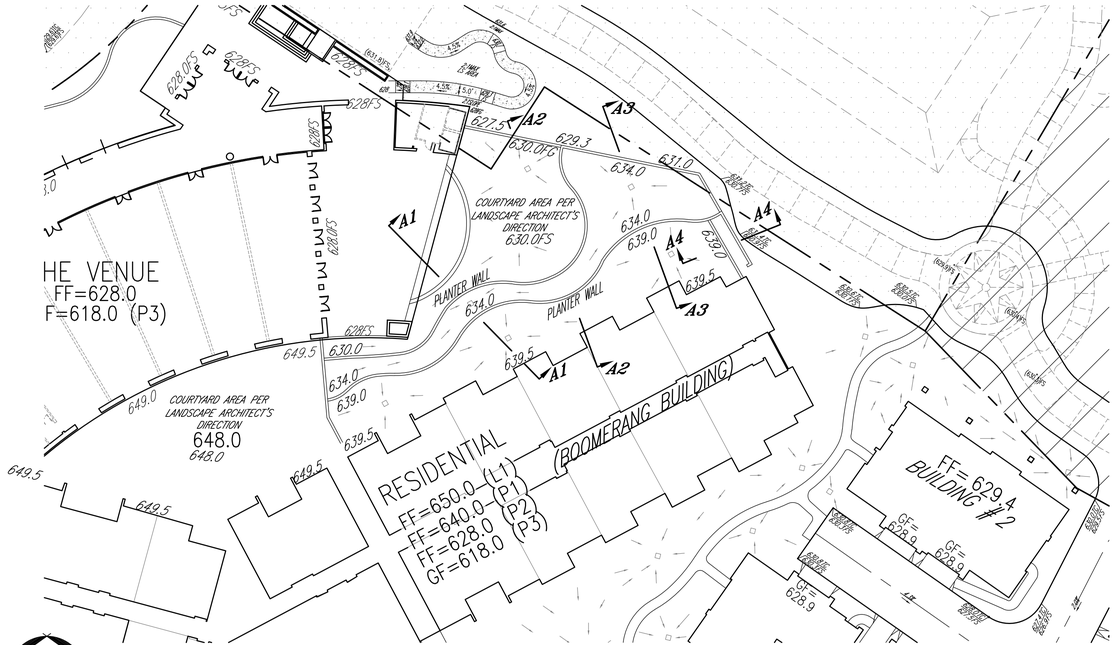
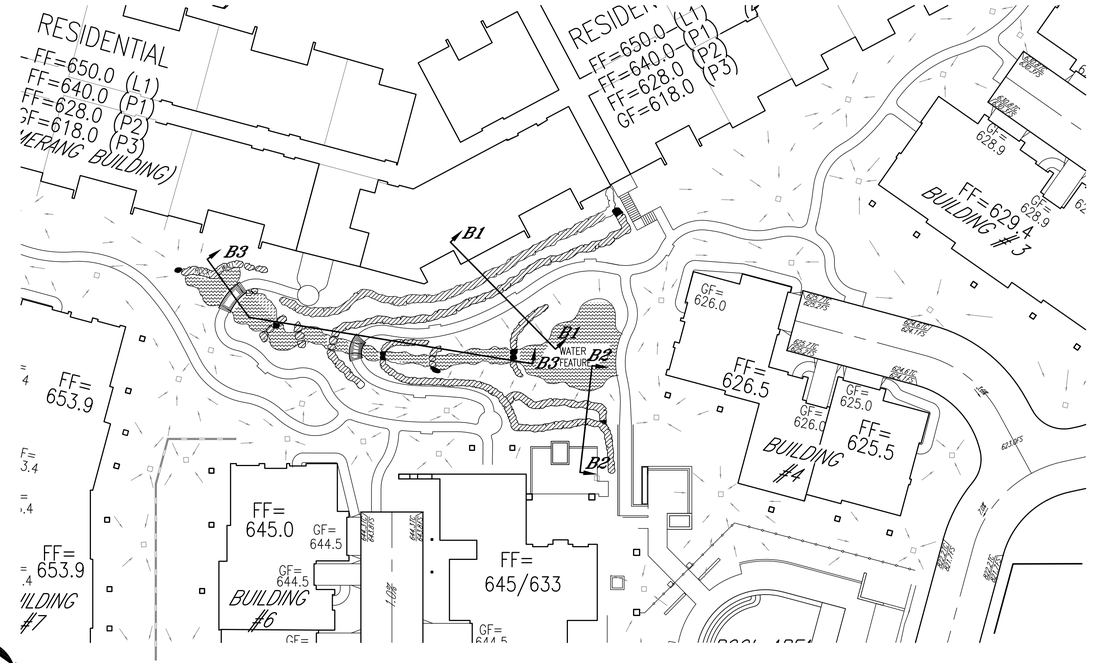


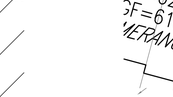

WALL NO – "A"



20 0 20 40 60
SCALE: 1"=30'




WALL NO – "B"



20 0 20 40 60
SCALE: 1"=30'

DRAFT PRINT

BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

BENCH MARK
2 1/2" BRASS DISK STAMPED "COUNTY OF RIVERSIDE PD–21, DEC. 1963" SET IN HEADWALL ON SOUTH SIDE OF HWY 111, 360 FEET NW OF FRANK SINATRA DRIVE

OWNER:
KAM SANG COMPANY, INC.
411 E. HUNTINGTON DRIVE, #305
ARCADIA, CA 91006
TEL: (626) 446–2988
FAX: (626) 446–3392
E–MAIL: www.kamsangcompany.com

ARCHITECT:
LCRA
ARCHITECTURE & PLANNING
35 HUGUS ALLEY, SUITE 220
PASADENA, CA 91103
TEL. (626) 449–9698
E–MAIL: www.lcra–architects.com

PREPARED BY:
FOCUS ENGINEERING, INC.
8 CORPORATE PARK, SUITE 300
IRVINE, CA 92606
TEL: (949) 450–0590
E–MAIL: focusengring@sbcglobal.net

REGISTERED PROFESSIONAL ENGINEER
CHIA LIN LIU
No. 41497
EXP. 12/31/23
CIVIL
STATE OF CALIFORNIA

PRINT: 2022/12/23

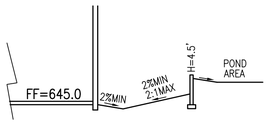
REVISIONS

| NO. | DATE | DESCRIPTION |
|---|---|---|
| | | |

CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE – RITZ II
RETAINING WALL LOCATION & SECTIONS PLAN
WALL NOs – "A" & "B"

SHEET 13 OF 15




SECTION C1–C1
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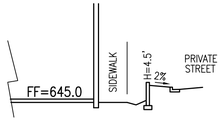


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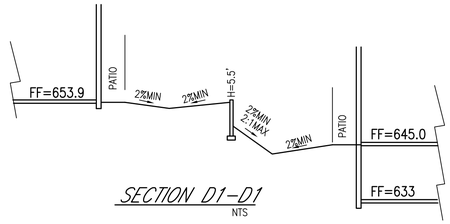


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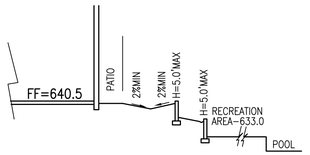


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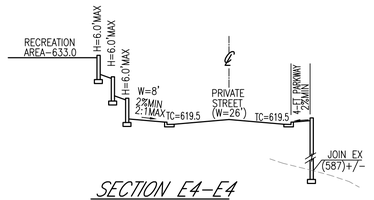


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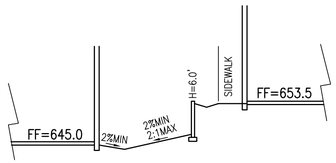
NTS




SECTION C2–C2
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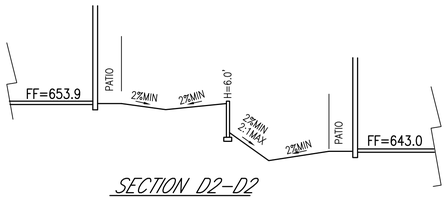
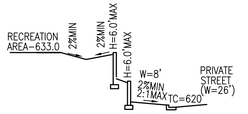



SECTION D2–D2
NTS




SECTION E2–E2
NTS

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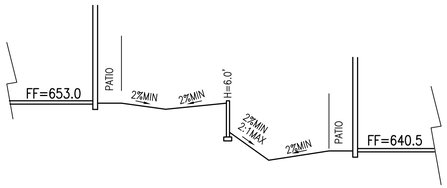
NTS

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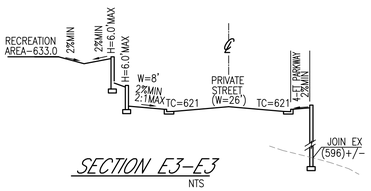
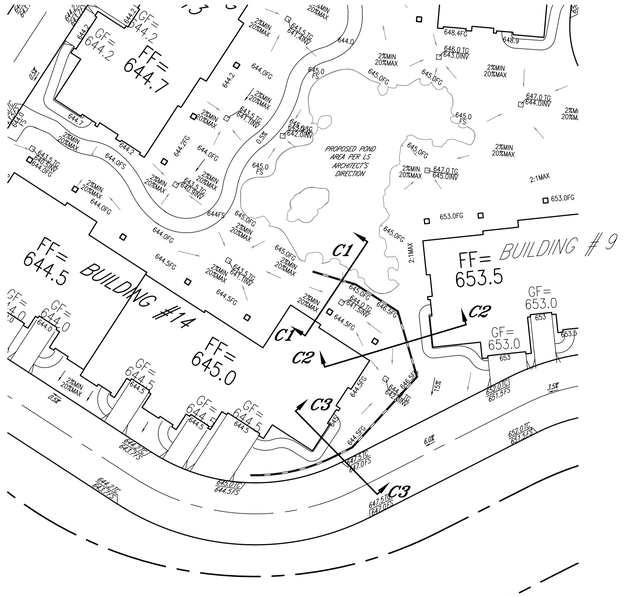



SECTION E3–E3
NTS


GF=644.2
FF=644.7
GF=644.2
GF=644.5
FF=645.0
BUILDING #14
GF=644.0
GF=644.5
GF=644.5
GF=644.5
PROPOSED POND AREA PER I.S. ARCHITECT'S DIRECTION
FF=653.5
BUILDING # 9
GF=653.0
GF=653.0
C1
C2
C3
C1
C2
C3
2%MIN 20%MAX
2:1MAX
644.0FG
645.0FG
646.0FG
647.0FG
644.5FG
645.5FG
653.0FG
644.0TC 643.0INV
645.0TC 644.0INV
647.0TC 646.0INV
641.5TC 640.5INV
641.0TC 640.0INV
641.5TC 640.5INV
641.0TC 640.0INV
644.5TC 643.5INV
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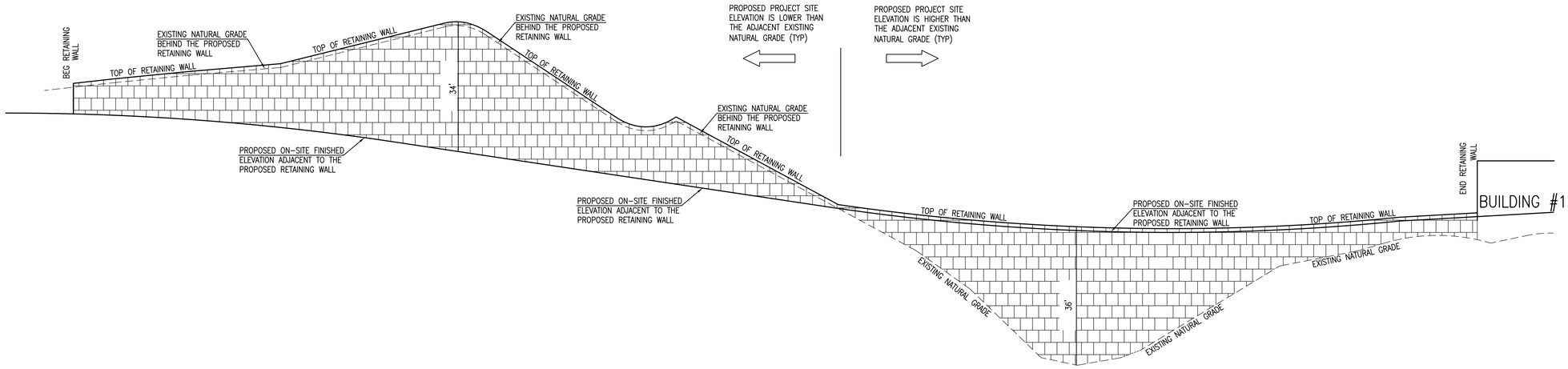
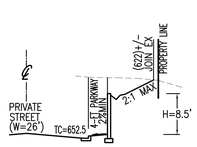
644.0TC 643

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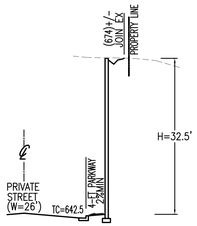
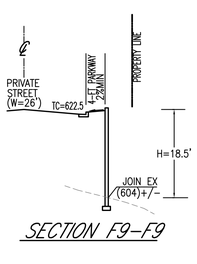



SECTION F4–F4

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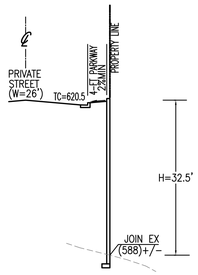


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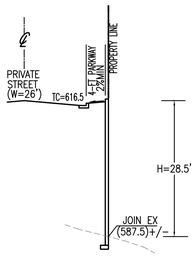


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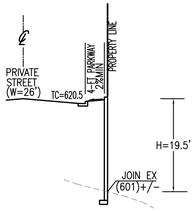


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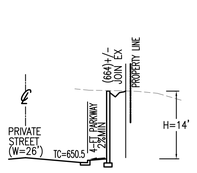
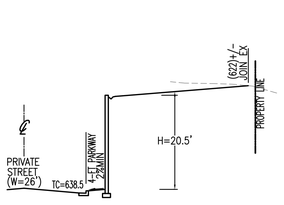
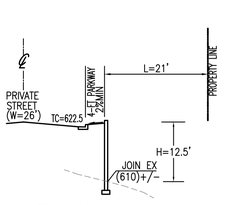


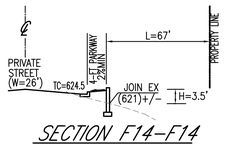

SECTION F2–F2



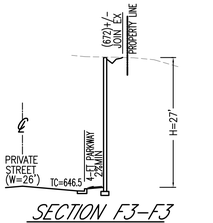

SECTION F5–F5



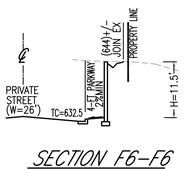

SECTION F13–F13



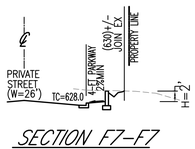

SECTION F14–F14



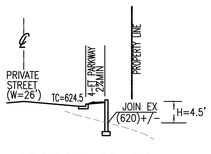

SECTION F3–F3



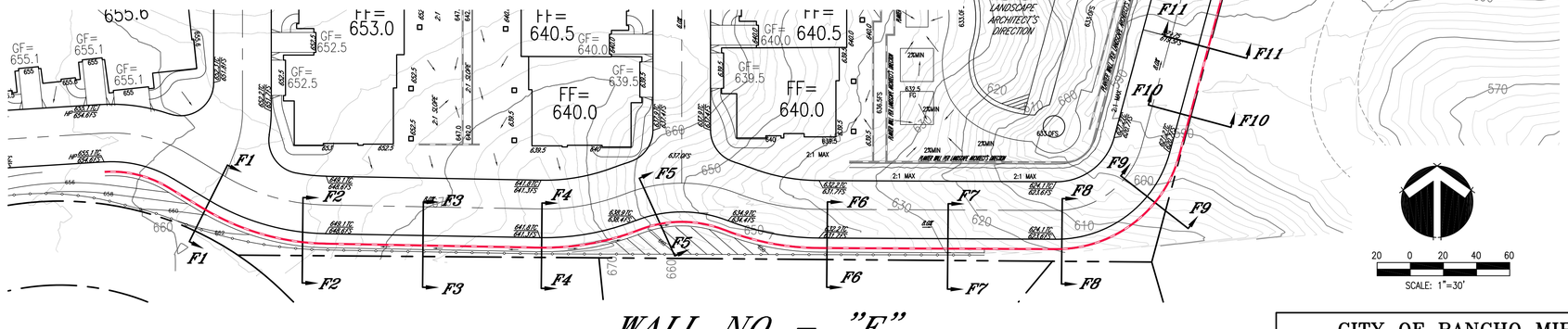

SECTION F6–F6




SECTION F7–F7




SECTION F8–F8




WALL NO – "F"

DRAFT PRINT

BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

BENCH MARK
2 1/2" BRASS DISK STAMPED "COUNTY OF RIVERSIDE PD–21, DEC. 1963" SET IN HEADWALL ON SOUTH SIDE OF HWY 111, 360 FEET NW OF FRANK SINATRA DRIVE

OWNER:
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35 HUGUS ALLEY, SUITE 220
PASADENA, CA 91103
TEL. (626) 449–9698
E–MAIL: www.lcra–architects.com

PREPARED BY:
FOCUS ENGINEERING, INC.
8 CORPORATE PARK, SUITE 300
IRVINE, CA 92606
TEL: (949) 450–0590
E–MAIL: focusengring@sbcglobal.net

REGISTERED PROFESSIONAL ENGINEER CHIA LIN LIU No. 41497 EXP. 12/31/23 CIVIL STATE OF CALIFORNIA

PRINT: 2020/08/18

REVISIONS

| NO. | DATE | DESCRIPTION |
|---|---|---|
| | | |

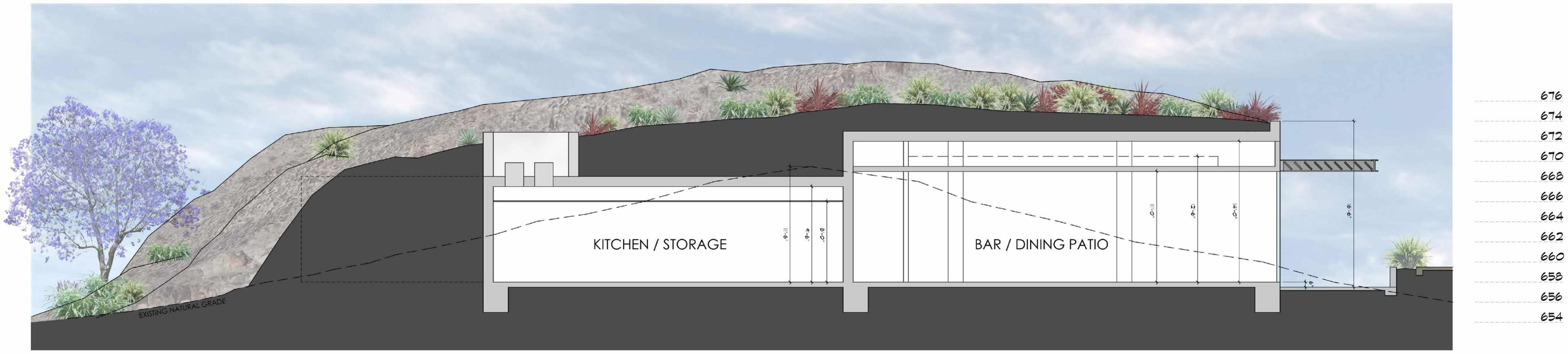
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE – RITZ II
RETAINING WALL PLAN & PROFILE
WALL – "F"

SHEET 15 OF 15




SOUTH ELEVATION




SECTION

# THE RITZ-CARLTON, RANCHO MIRAGE

Ritz Carlton
March 10, 2023

## SKY MESA ELEVATION & SECTION R-1.3

SCALE: 1/4" = 1'-0"

LCRA




# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA ROOF PLAN R-1.4

SCALE: 1/8" = 1'-0"

Ritz Carlton

March 10, 2023

LCRA

EXISTING HOTEL BLDG.

EXISTING CONSOLIDATED TRASH COLLECTION

EXISTING HOTEL BLDG.

EXISTING HOTEL BLDG.

EXISTING HOTEL BLDG.

GEO-MESH RETAINING WALL

A-1

B-12

B-11

B-15

B-13

B-10

B-8

B-7

B-6

B-5

B-4

B-3

B-2

B-1

B-9

B-14

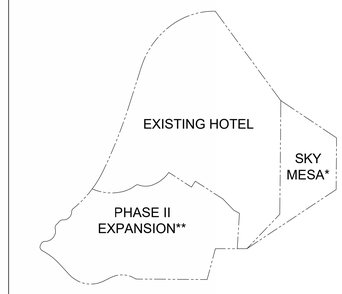
SECONDARY POOL AREA

POOL AREA

GEO-MESH RETAINING WALL

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

KEY PLAN




*SEE SHEET R-0.1 FOR MORE SITE INFO
**SEE SHEET C-0.1 FOR MORE SITE INFO

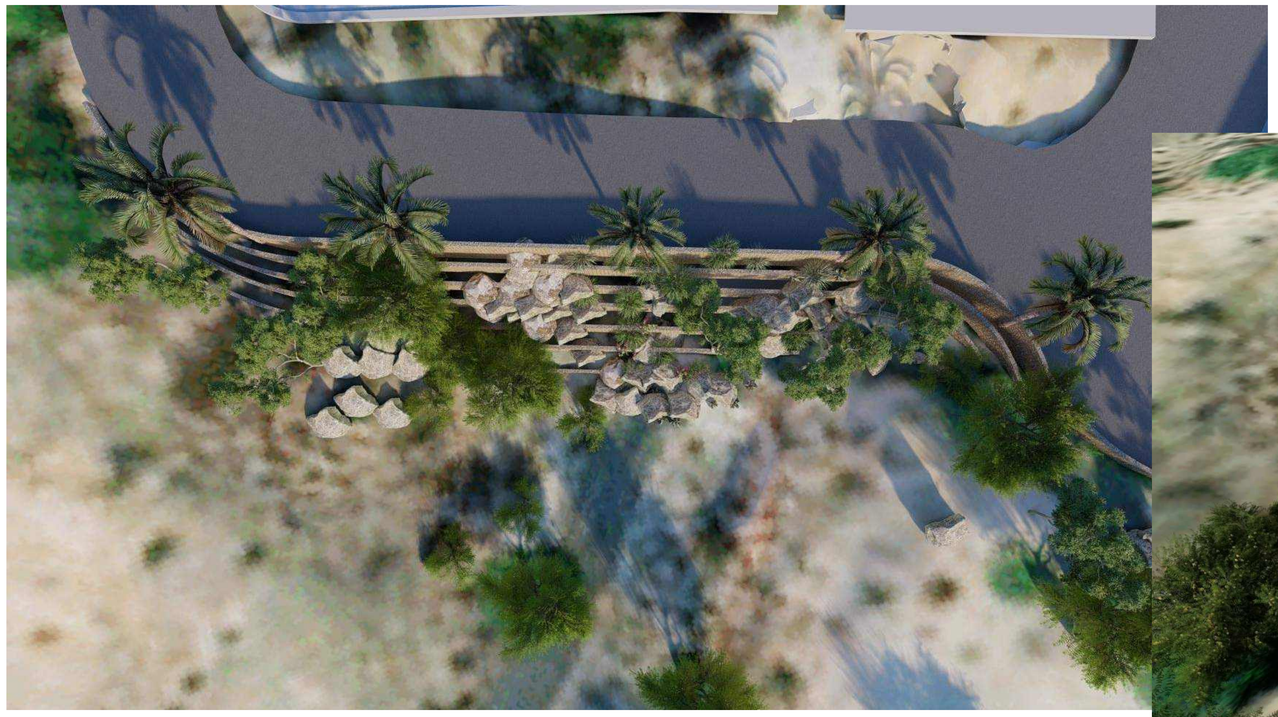
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

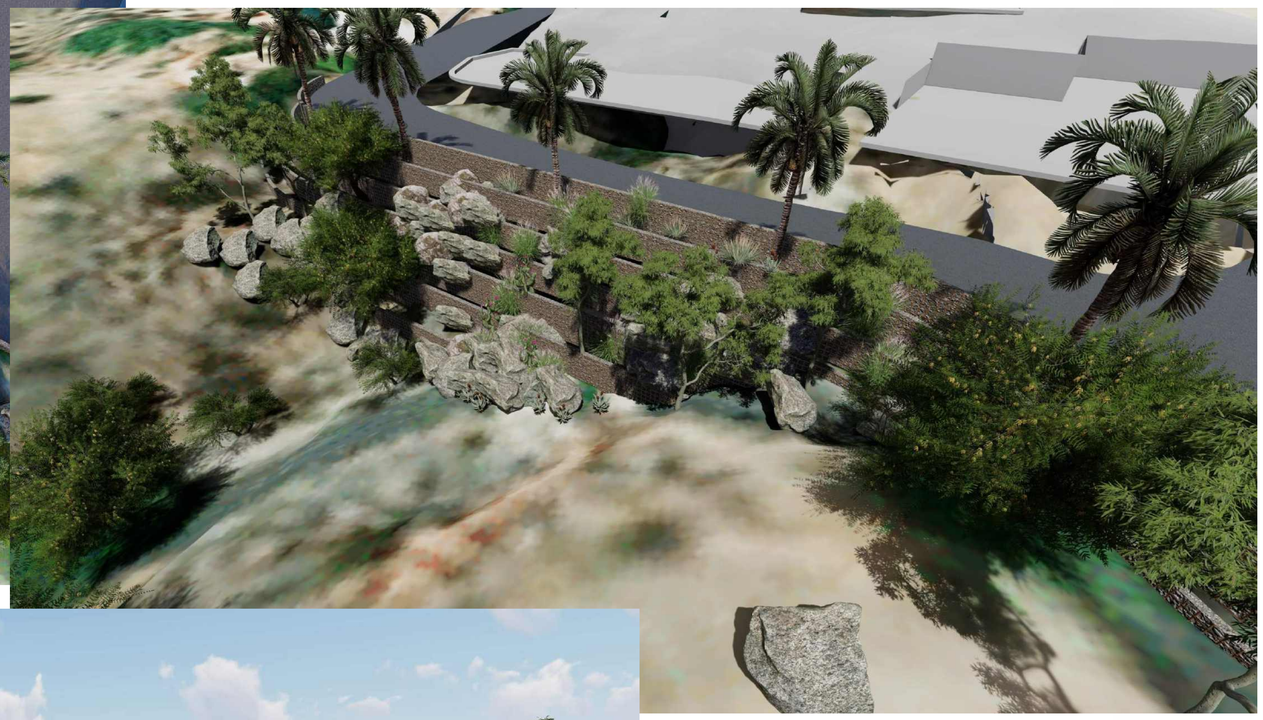
Ritz Carlton
March 10, 2023

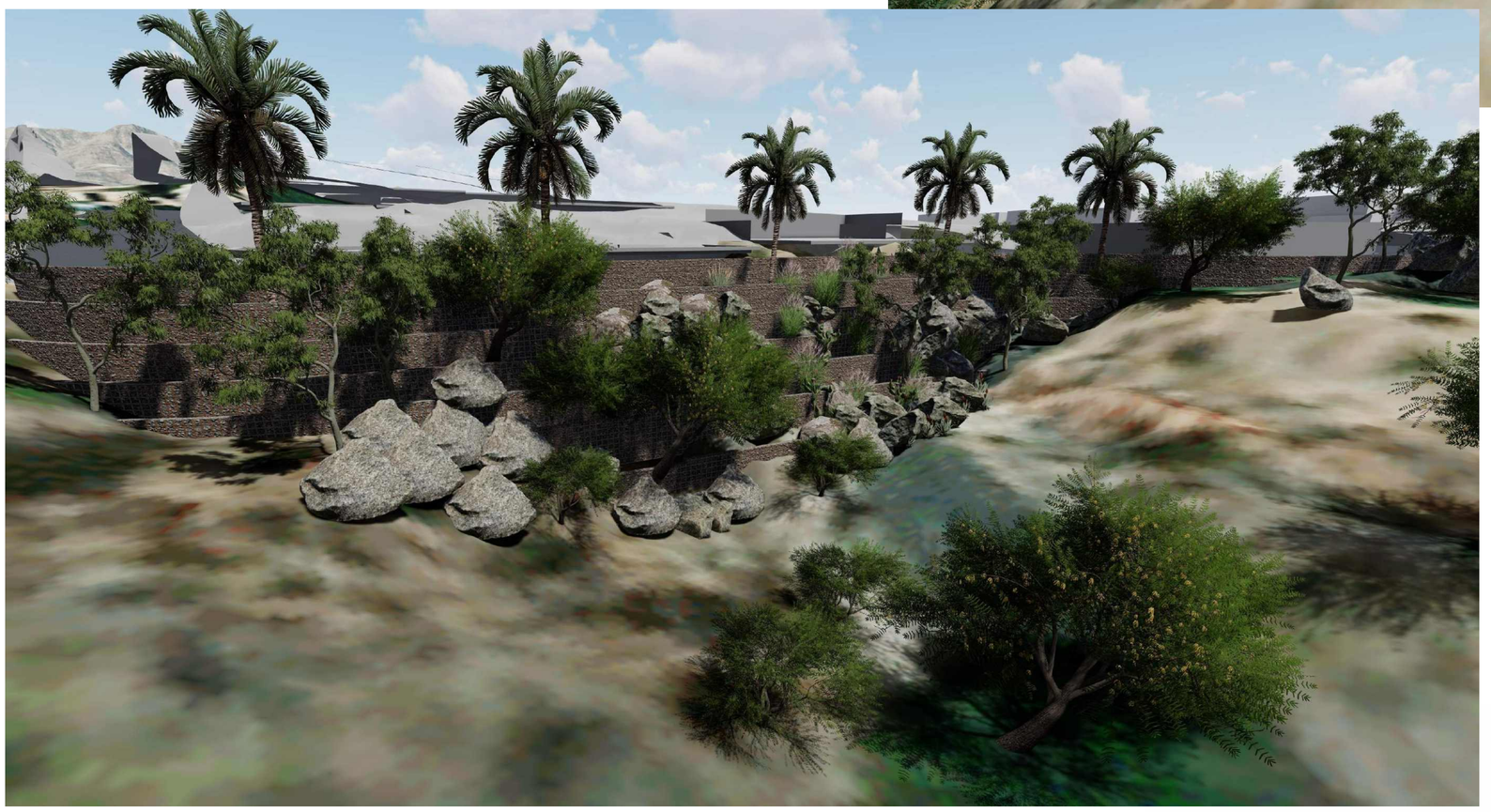
SITE PLAN AL.0.00

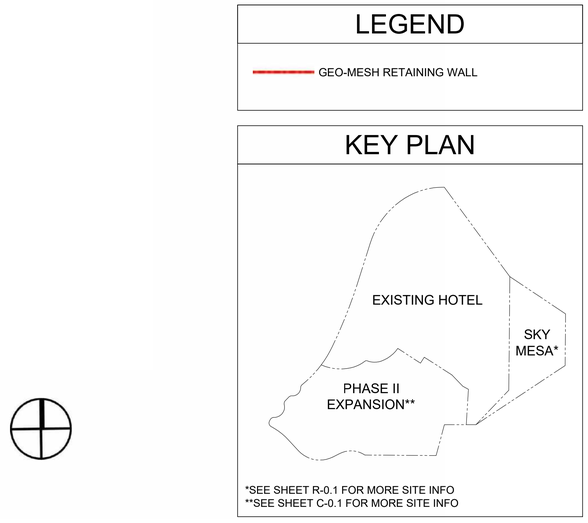
NOT TO SCALE

LCRA










# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## GEOMESH SITE PLAN GM.0.01

NOT TO SCALE

Ritz Carlton
March 10, 2023

LCRA



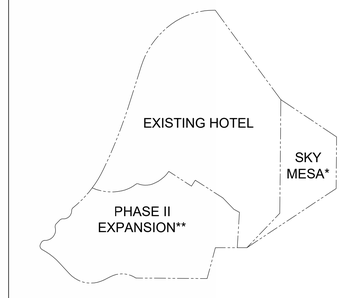




## LEGEND

GEO-MESH RETAINING WALL

## KEY PLAN




*SEE SHEET R-0.1 FOR MORE SITE INFO
**SEE SHEET C-0.1 FOR MORE SITE INFO

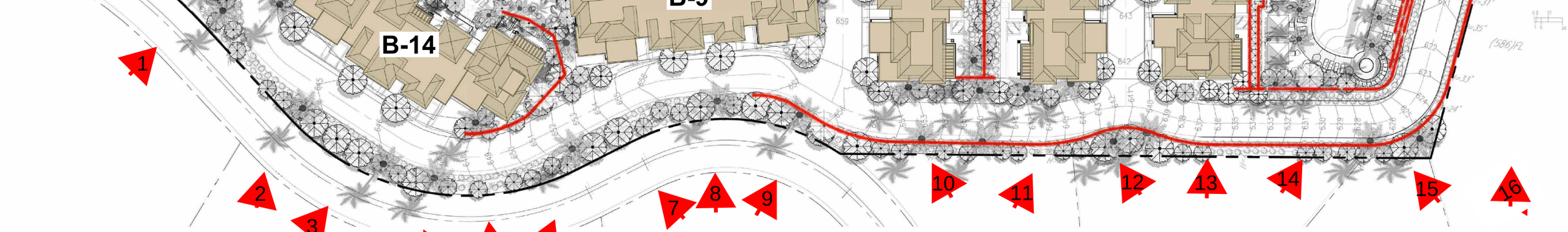
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## GEOMESH SITE PLAN GM.0.02

NOT TO SCALE

Ritz Carlton
March 10, 2023

LCRA




# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE



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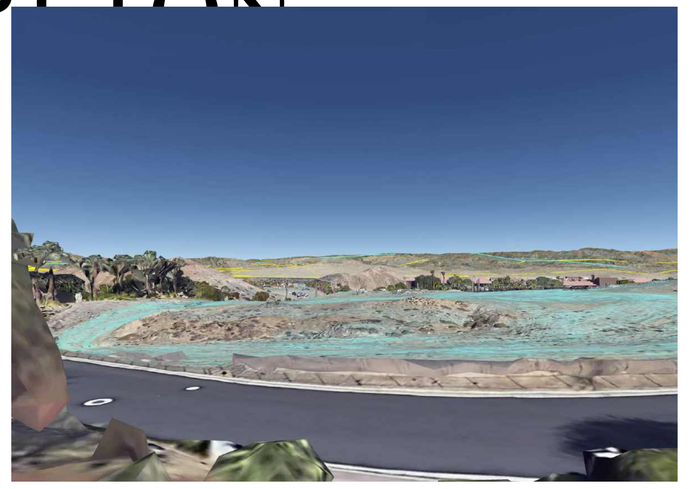

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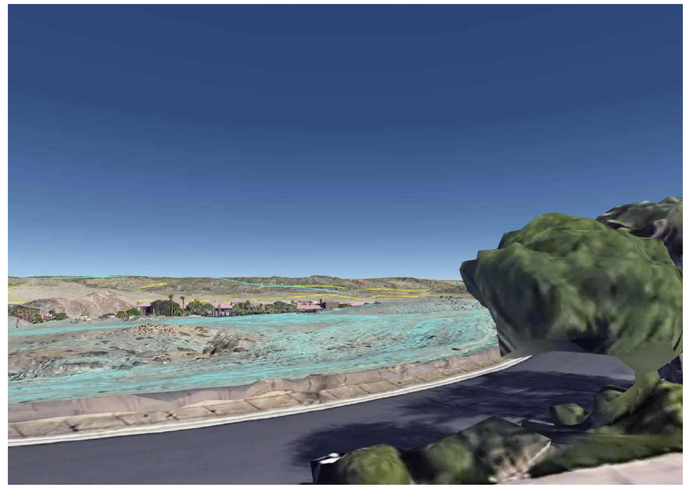

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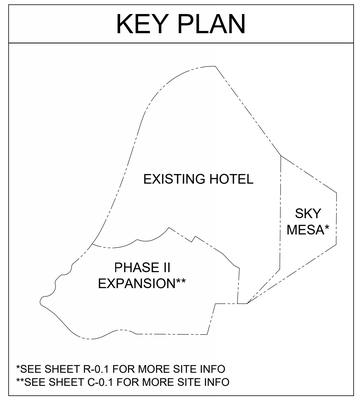
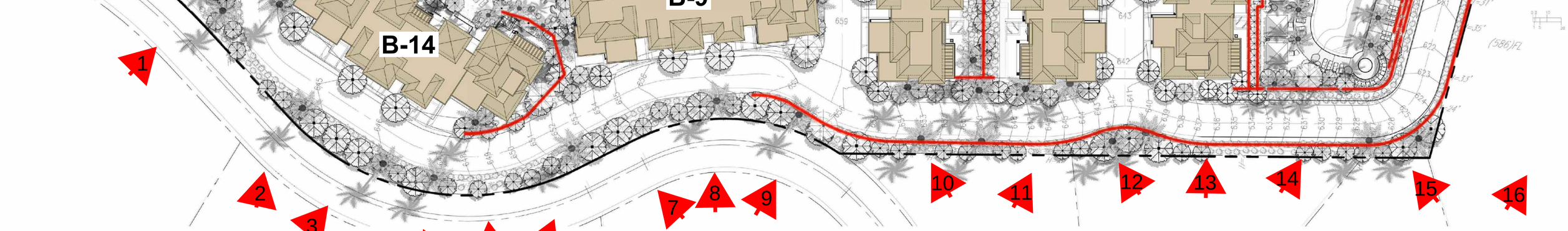



SITE VISUAL PLAN VS.0.01

NOT TO SCALE

Ritz Carlton
March 10, 2023

LCRA

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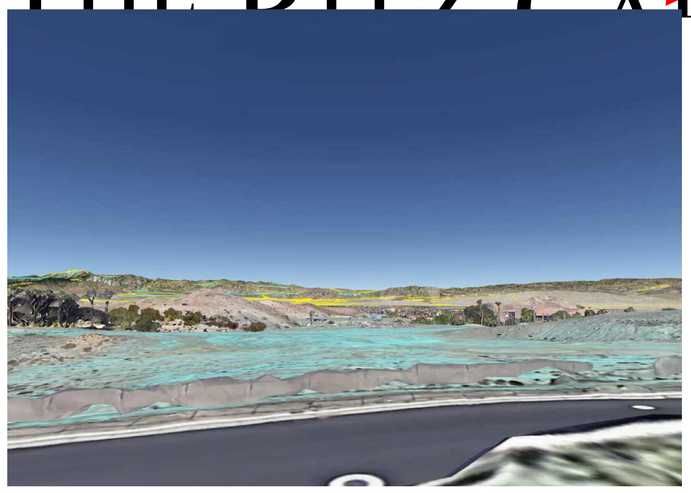

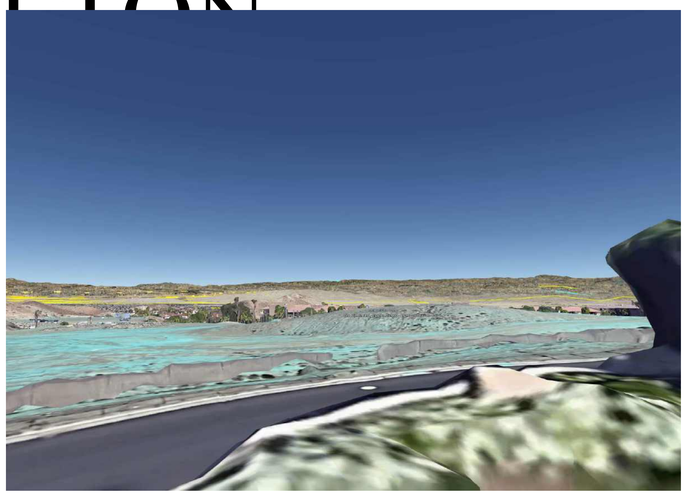

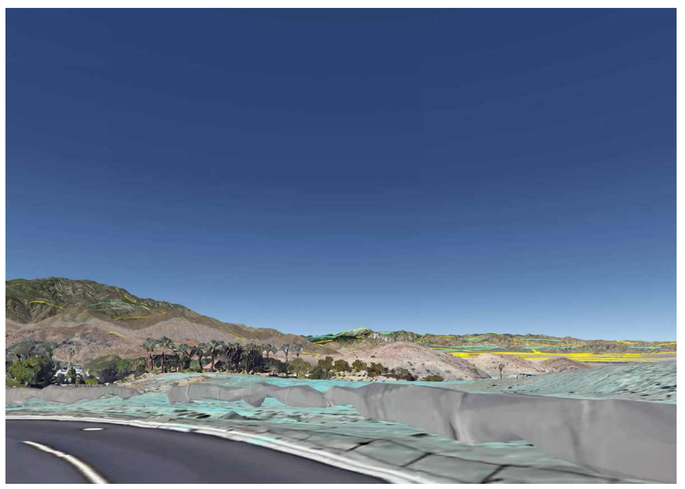

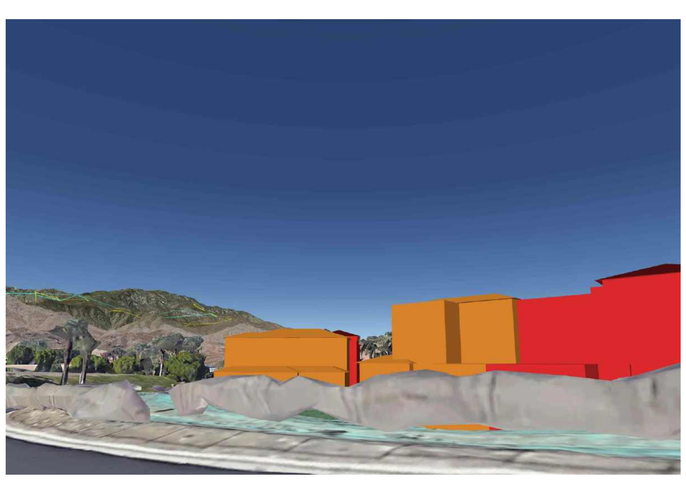

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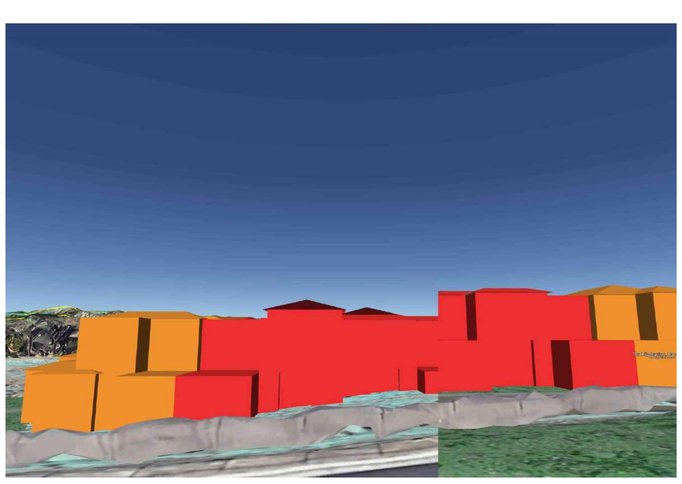

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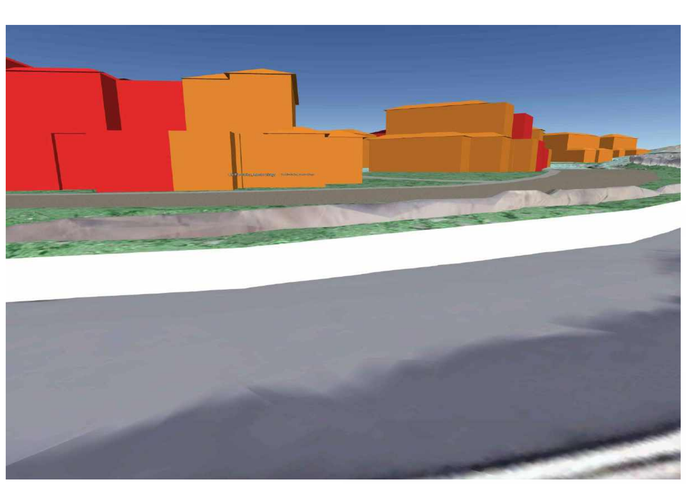

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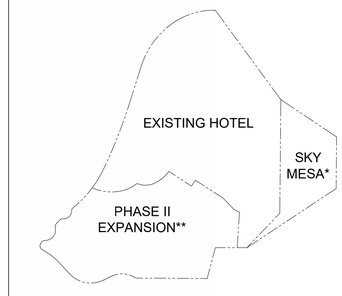
KEY PLAN




*SEE SHEET R-0.1 FOR MORE SITE INFO
**SEE SHEET C-0.1 FOR MORE SITE INFO

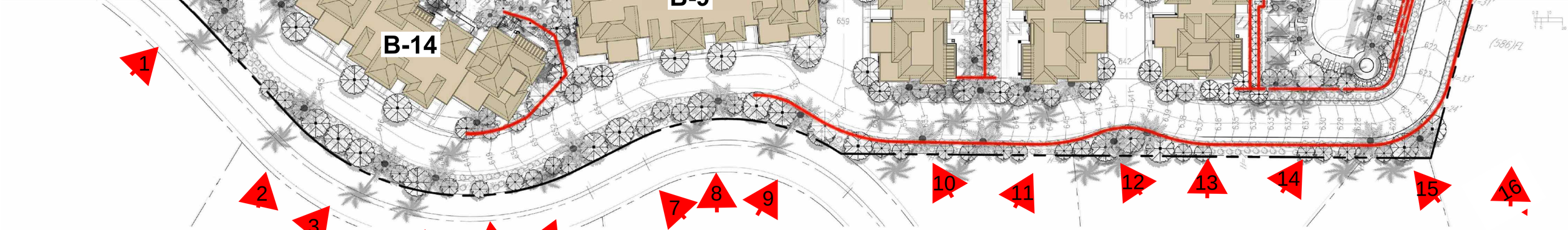
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SITE VISUAL PLAN VS.0.02

Ritz Carlton
March 10, 2023

NOT TO SCALE

LCRA

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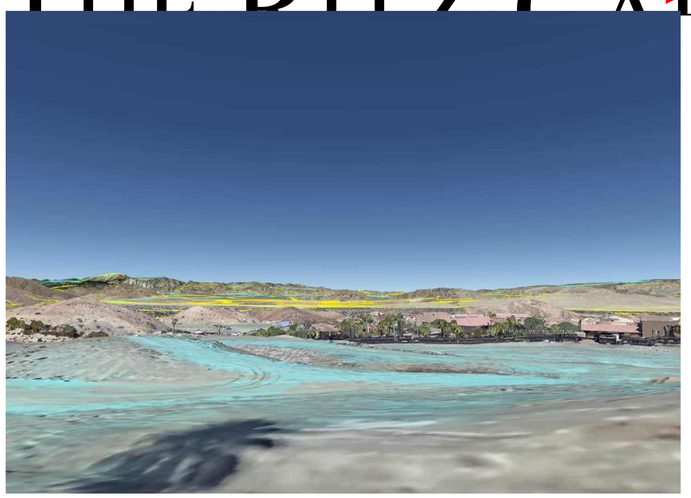

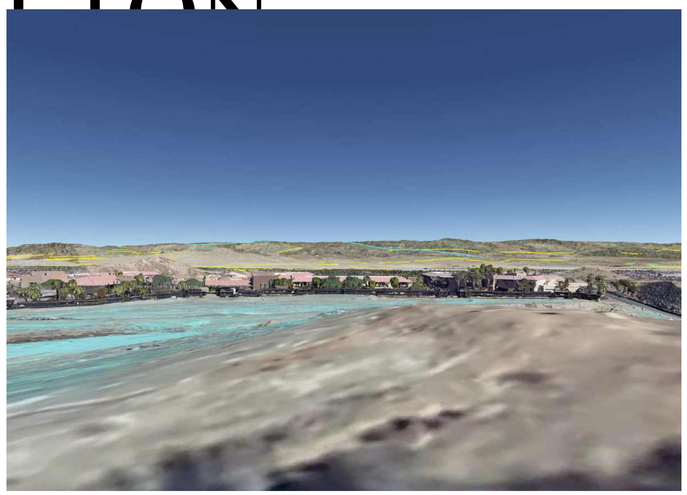

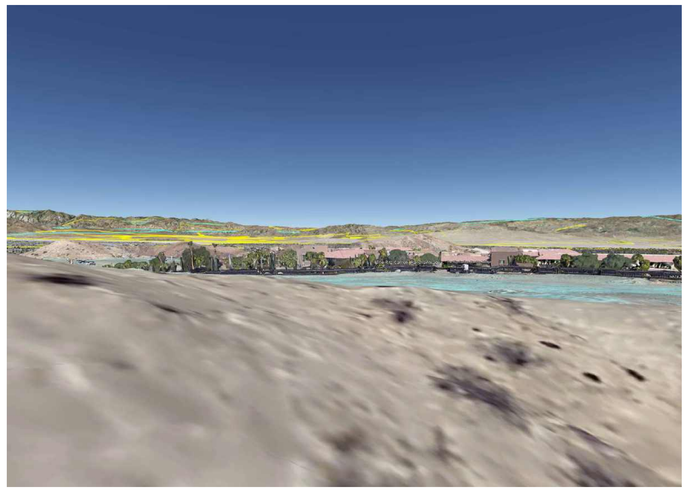



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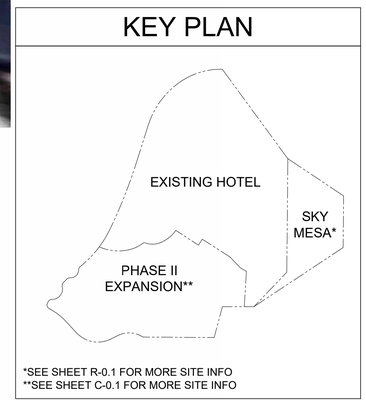



# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

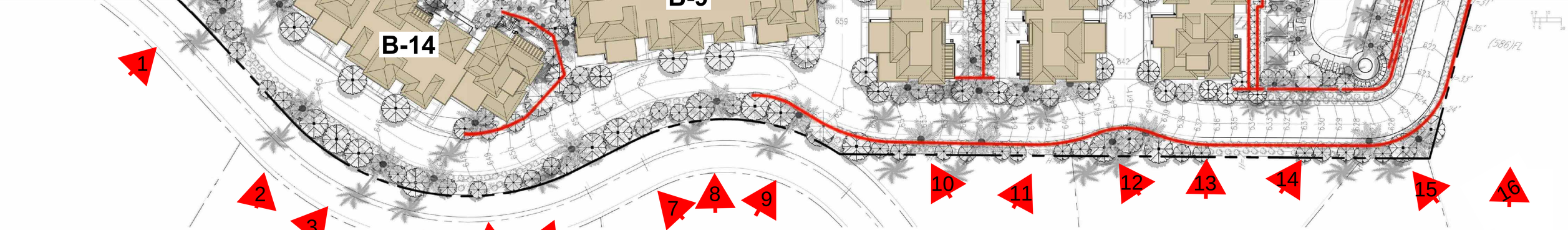
SITE VISUAL PLAN VS.0.03

NOT TO SCALE

Ritz Carlton

March 10, 2023

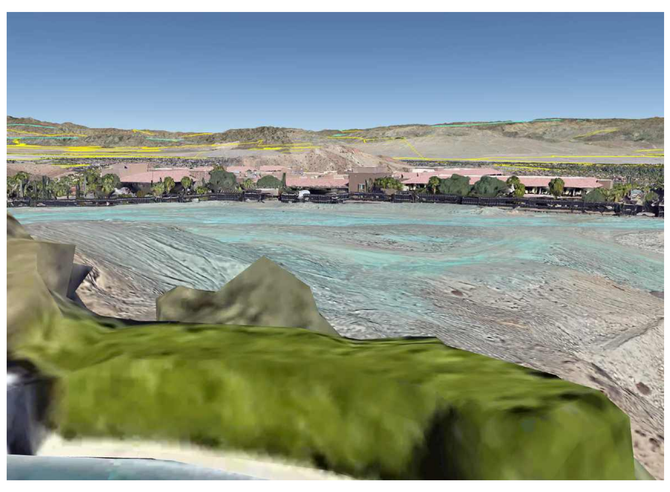
LCRA

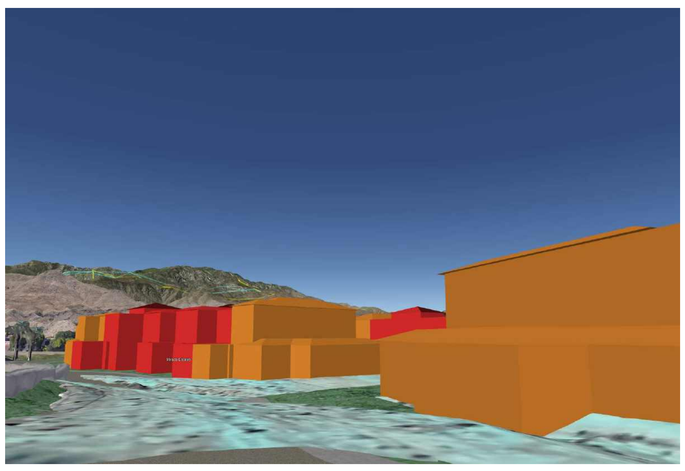



# THE RITZ-CARLTON









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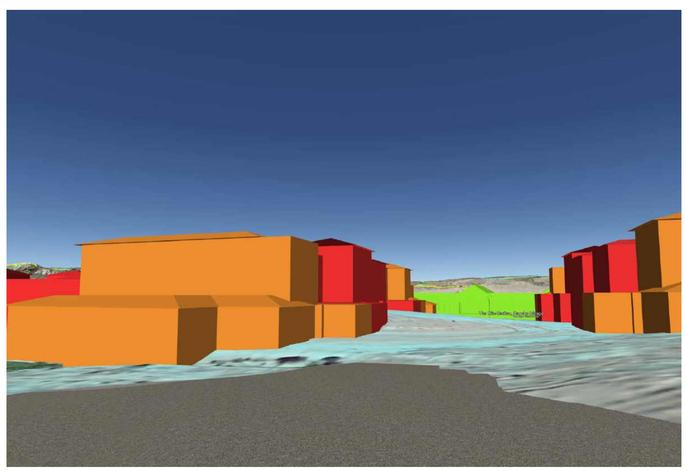

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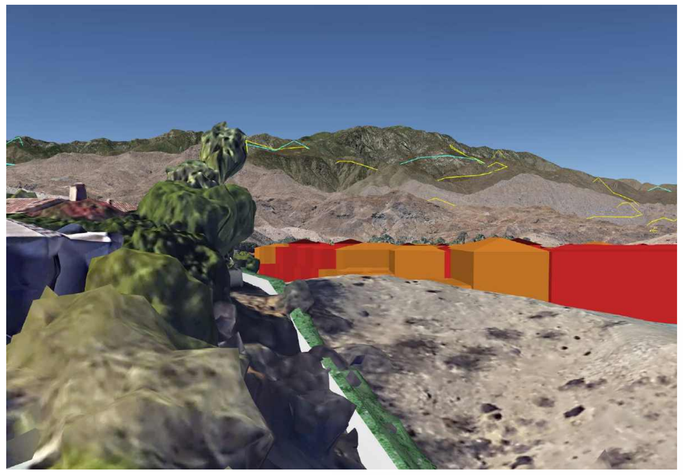

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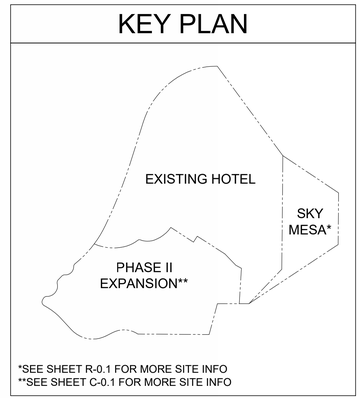


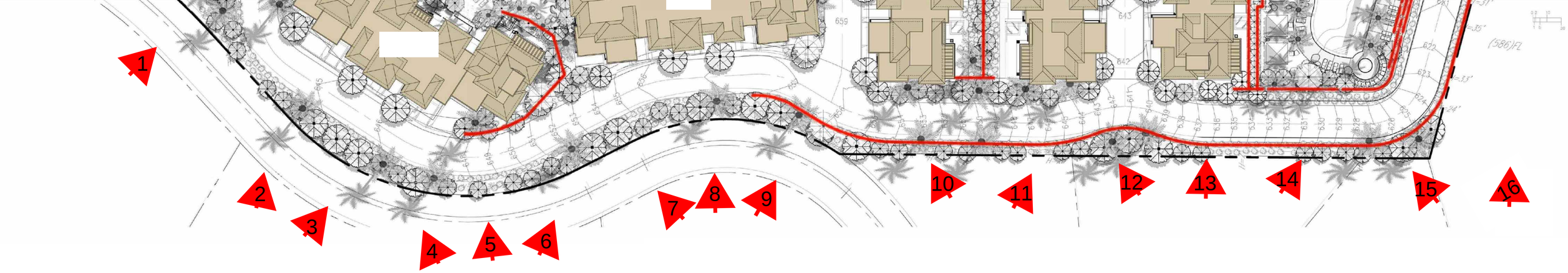

# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SITE VISUAL PLAN VS.0.04

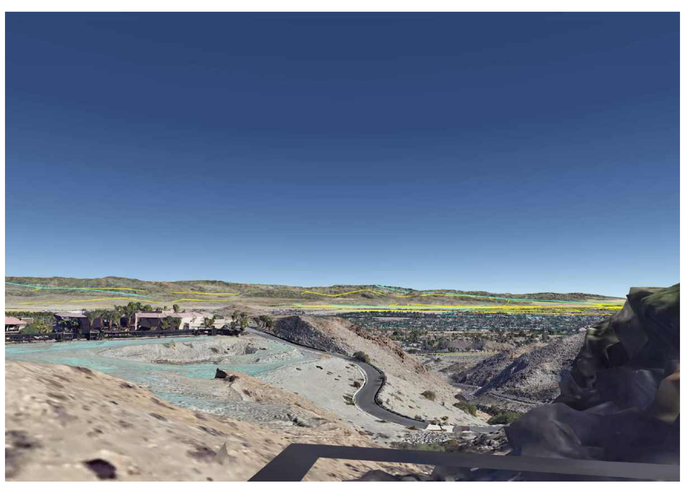
NOT TO SCALE

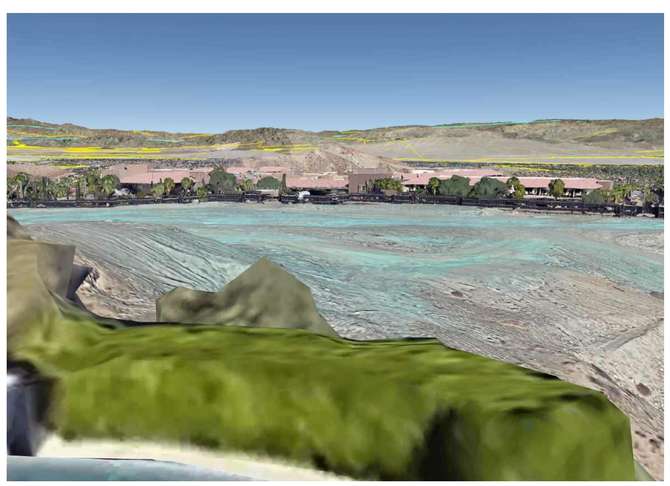
Ritz Carlton
March 10, 2023

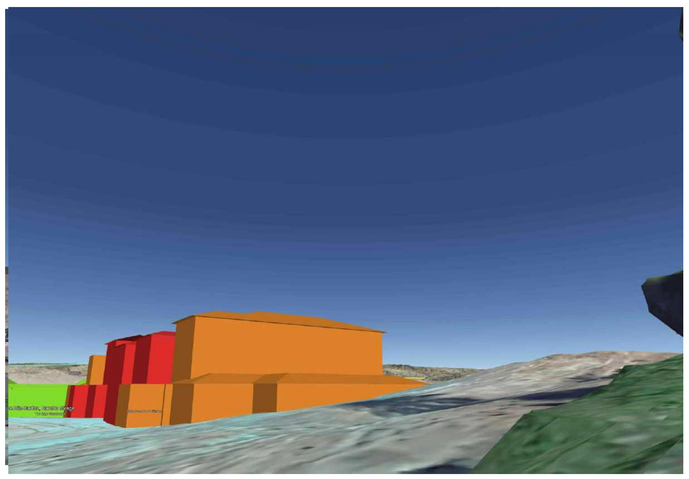
LCRA









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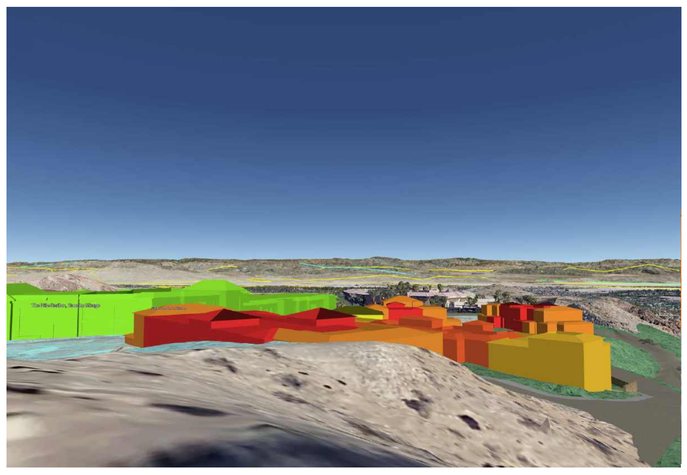

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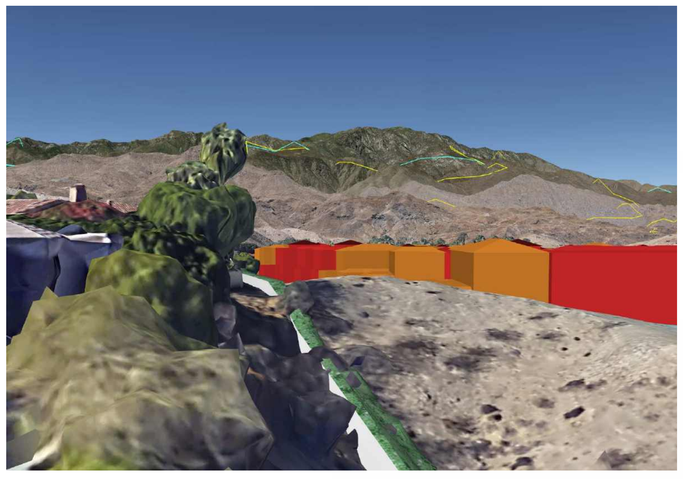

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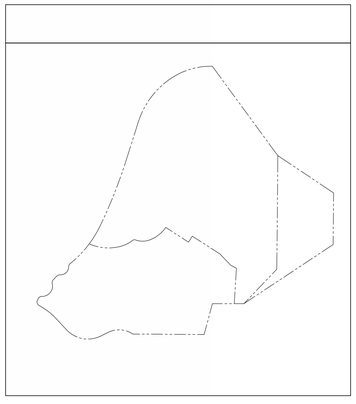
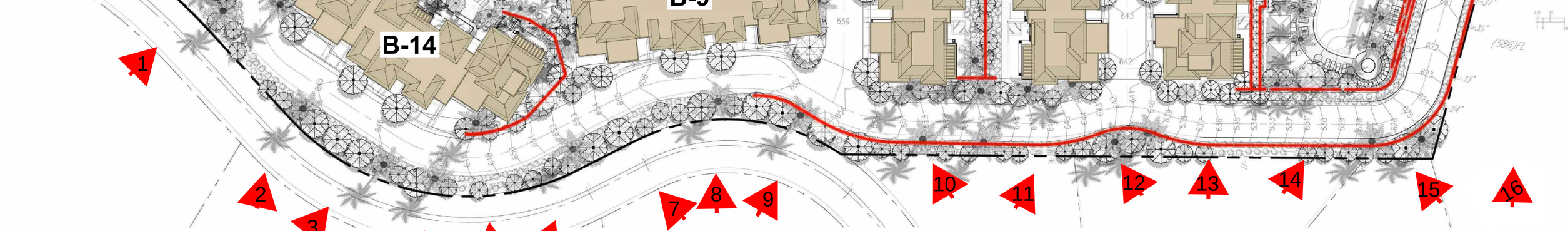


# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SITE VISUAL PLAN VS.0.05

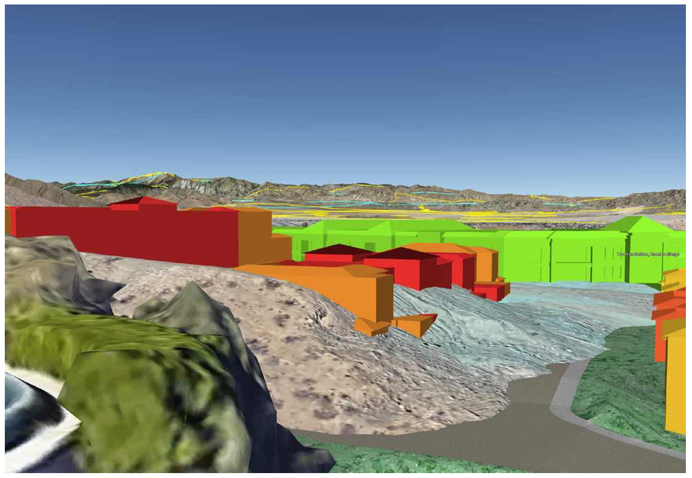
LCRA




# THE RITZ CARLTON







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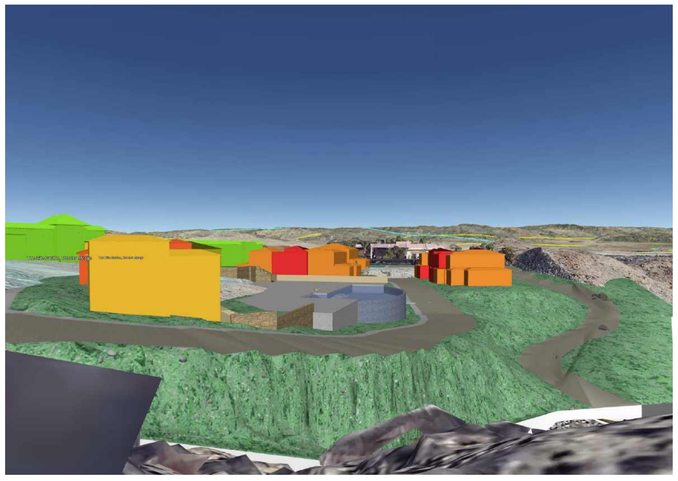

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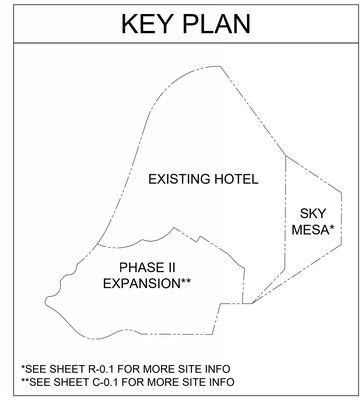



# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SITE VISUAL PLAN VS.0.06

NOT TO SCALE

Ritz Carlton
March 10, 2023

LCRA

**EXHIBIT "D"**

**CITY COUNCIL ORDINANCE APPROVING AND 10TH AMENDMENT TO DEVELOPMENT AGREEMENT WITH NEWAGE RANCHO MIRAGE, LLC -DA21-0002**

**(SEE ATTACHED)**

**ORDINANCE NO. _____**

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, APPROVING THE TENTH AMENDMENT TO STATUTORY DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF RANCHO MIRAGE AND NEWAGE RANCHO MIRAGE, LLC**

**WHEREAS**, City of Rancho Mirage (the "City") is a charter city and a municipal corporation of the State of California, and recognized as a political subdivision of the State for certain purposes; and

**WHEREAS**, on or about August 5, 1983, the City and Federated Development Company ("Federated") entered into a Development Agreement ("Original Development Agreement") under the provisions of the Development Agreement Statute pertaining to the property described therein and which was recorded on November 29, 1983, as Instrument No. 247445, with the Riverside County Recorder's Office and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, the Original Development Agreement has been amended 9 times, with the Original Agreement and all subsequent amendments incorporated herein by this reference, prior to the proposed 10th Amendment, as detailed in the Recitals of the 10th Amendment, attached hereto and incorporated herein by this reference as Exhibit "A" (the "10th Amendment"). As detailed in the Recitals to the 10th Amendment, the original counterparty to the Development has been updated numerous times, with the current owner of the subject property and project applicant being Newage Rancho Mirage, LLC; and

**WHEREAS**, Newage has proposed this 10th Amendment to the Original Development Agreement which includes the following: 1) Environmental Assessment Case Number EA21-0002 for the environmental review of the "Project", which currently includes a proposed Mitigated Negative Declaration that includes Mitigation Measures for Biological Resources, Cultural Resources, Noise, Transportation, and Tribal Cultural Resources; 2) General Plan Zoning Map Amendment Case No. GPZMA21-0001 for a zone change from Mountain Reserve (MR) to Resort Hotel (Rs-H) for the Sky Mesa portion of the Project Site; 3) Development Agreement Case No. DA21-0002 for a 10th Amendment to the Original Development Agreement; 4) Tentative Parcel Map Case No. TPM23-0002 ("TPM38768") which is a parcel map for condominium purposes which establishes three parcels for the Hotel Site (excluding the Sky Mesa area) which include Parcel 1 (2.699 acres) for the existing Spa Suites Site, Parcel 2 (15.995 acres) for the Hotel Site, and Parcel 3 (11.873 acres) for an event space, parking structure, and 106 residential condominium units; and 5) Major Modification Case No. MOD21-0004 for the project entitlements which consist of 106 residential units that include 1 to 3 bedrooms, 23,843 square feet of event space, 6,273 square feet of restaurant, 5,513 square feet for amenities, a 381-space subterranean parking structure, and other recreational amenities; and

**WHEREAS**, to strengthen the public planning process, encourage private participation in comprehensive planning and reduce the economic risk of development, the Legislature of the State of California adopted Sections 65864 et seq. of the California Government Code, "Development Agreement Statute" which authorizes cities to enter into property development agreements with any person(s) or entity(ies) having a legal or equitable interest in real property for the development of such real property in order to establish certain development rights in the real property; and

**WHEREAS**, pursuant to Chapter 17.56, "Development Agreements" of the Rancho Mirage Municipal Code, a development agreement is intended to provide assurances to Developer that an approved project may proceed subject to the policies, rules, regulations, and conditions of approval applicable to the project at the time of approval, regardless of any changes to City policies, rules, and regulations after project approval, and provide assurances that City cannot otherwise unilaterally impose conditions of approval of the project outside the context of a negotiated development agreement; and

**WHEREAS**, this Amendment will eliminate uncertainty in planning for and secure orderly development of the Subject Property, assure progressive installation of necessary improvements, and ensure attainment of the maximum effective utilization of resources within City at the least economic cost to its citizens; and

**WHEREAS**, the Development Agreement Statute, in relevant part, provides that (1) a development agreement may be amended by mutual consent of the parties to the agreement, and (2) notice of intention to amend shall be given in the same manner as a development agreement as set forth in Government Code Section 65867; (3) amendments are subject to Government Code Section 65867.5, which provides that a development agreement is a legislative act that shall be approved by an ordinance, and that the agreement shall not be approved unless the legislative body finds that the provisions of the agreement are consistent with the general plan and any appliable specific plan, and that the requirements apply to charter cities; and

**WHEREAS**, the parties to the Development Agreement desire to amend the agreement, and notice was provided as required in the Development Agreement Statute; and

**WHEREAS**, on January 9, 2025, the Rancho Mirage Planning Commission adopted Resolution No. 2025- [TO BE INSERTED], incorporated herein by this reference, recommending, in part, the City Council introduce and adopt this Ordinance, approving and adopting the proposed 10th Amendment; and

**WHEREAS**, on [TO BE INSERTED], at a duly noticed meeting of the City Council, the City Council approved Resolution No. 2025-[TO BE INSERTED] adopting the Mitigation Monitoring and Reporting Program and approving the Mitigated Negative Declaration; and

**WHEREAS**, based on the foregoing recitals, City has determined that this Amendment is appropriate under the Development Agreement Statute and Chapter 17.56 of the Rancho Mirage Municipal Code; and

**WHEREAS**, the Amendment is voluntarily entered into in consideration of the benefits to and the rights created in favor of each of the parties hereto and in reliance upon the various representations and warranties contained herein.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES ORDAIN AS FOLLOWS:**

**SECTION 1. RECITALS**

That the above Recitals are true and correct and are incorporated as though fully set forth herein.

**SECTION 2. APPROVAL OF 10th AMENDMENT TO DEVELOPMENT AGREEMENT**

That the City Council hereby approves the attached 10th Amendment to Development Agreement by and between City of Rancho Mirage, a municipal corporation located in the County of Riverside, State of California ("City"), and Newage Rancho Mirage, LLC, a California limited liability company ("Developer"), pursuant to the authority of Sections 65864 et seq. of the California Government Code and Chapter 17.56 (Development Agreements) of the Rancho Mirage Municipal Code.

**SECTION 3. CITY ATTORNEY REVIEW**

That the City Attorney prepared and framed this Ordinance pursuant to Section 1.04.010 of the Municipal Code and finds that the City Council has the authority to adopt this Ordinance, that the Ordinance is constitutionally valid and that the Ordinance is consistent with the general power and purposes of the City as set forth in Section 1.04.031 of the Municipal Code.

**SECTION 4. CEQA COMPLIANCE**

That the City Council acting on behalf of the "Lead Agency," under the California Environmental Quality Act ("CEQA") and the CEQA Guidelines, on [INSERT DATE] approved Resolution No. 2025-[NEXT IN ORDER], approving and adopting a mitigated negative declaration (the "MND") and a mitigation monitoring and reporting program ("MMRP") for the Project (Environmental Assessment Case No. EA21-0002), based upon its determination that mitigation measures imposed on the Project will avoid or mitigate impacts to a point where clearly no significant impacts on the environment would occur.

**Section 5.** **GOVERNMENT CODE SECTION 65867.5(b)**

That the City Council finds that the provisions of the Amendment are consistent with the City's General Plan.

**Section 6.** **SEVERABILITY**

That the City Council declares that, should any provision, section, paragraph, sentence or word of this Ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this Ordinance as hereby adopted shall remain in full force and effect.

**SECTION 7.** **GOVERNMENT CODE 66020 NOTICE**

That pursuant to Government Code section 66020(d)(1), notice is hereby given that the Proposed Project is subject to certain fees, dedications, reservations and other exactions as provided herein, in the staff report and conditions of approval (collectively, "Conditions"); and these Conditions constitute written notice of a statement of the amount of such fees, and a description of the dedications, reservations, and other exactions, and that the applicant is hereby notified that the ninety-day approval period in which the applicant may protest these fees, dedications, reservations, and other exactions, pursuant to Government Code Section 66020(a), has commenced upon the date of adoption of this Ordinance.

**SECTION 8.** **EFFECTIVE DATE OF ORDINANCE**

That this Ordinance shall take effect thirty (30) days after its second reading by the City Council.

**SECTION 9.** **EXECUTION AND EFFECTIVE DATE OF AMENDMENT**

That in accordance with Section 17.56.050 of the City's Municipal Code, the 10th Amendment shall not be executed by the City until on or after the effective date of the Ordinance.

**SECTION 10.** **REPEAL OF CONFLICTING PROVISIONS**

That all the provisions of the Rancho Mirage Municipal Code as heretofore adopted by the City of Rancho Mirage that are in conflict with the provisions of this ordinance are hereby repealed.

**SECTION 11. RECORDATION OF AMENDMENT**

That in accordance with Section 17.56.050 of the City's Municipal Code, the City Clerk is hereby directed to record the fully executed Amendment with the Riverside County Recorder no later than ten (10) days after its execution.

**SECTION 12. CERTIFICATION**

That the City Clerk shall certify to the passage of this Ordinance and shall cause the same to be published according to law.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

**PASSED AND ADOPTED THIS _____ day of _____, 2025.**

_____
Ted Weill, Mayor

**ATTEST:**

_____
Kristie Ramos, City Clerk

**APPROVED AS TO FORM:**

_____
Colin D. Kirkpatrick, City Attorney

**EXHIBIT "A"**

**10th AMENDMENT TO DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF RANCHO MIRAGE AND NEWAGE RANCHO MIRAGE, LLC**

(SEE ATTACHED)

**RECORDING REQUESTED BY**
**CITY OF RANCHO MIRAGE**

(Exempt from Recording Fees
Pursuant to Government Code
Section 27383 - Benefits City)

**AND WHEN RECORDED MAIL TO:**

CITY CLERK
CITY OF RANCHO MIRAGE
69-825 Highway 111
Rancho Mirage, CA 92270

SPACE ABOVE THIS LINE FOR RECORDERS USE

# 10TH AMENDMENT TO DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF RANCHO MIRAGE AND NEWAGE RANCHO MIRAGE, LLC

This 10th Amendment to the Development Agreement ("10th Amendment") is entered into this _____ day of _____, 2025, by and between the CITY OF RANCHO MIRAGE, a municipal corporation ("City"), and NEWAGE RANCHO MIRAGE, LLC, a California limited liability company ("Newage"), pursuant to the authority of Sections 65864 et seq. of the California Government Code and Chapter 17.56 of the Rancho Mirage Municipal Code.

## **R E C I T A L S**:

**WHEREAS**, the City of Rancho Mirage ("City") is recognized as a charter city and a political subdivision of the State of California for certain purposes; and

**WHEREAS**, to strengthen the public planning process, encourage private participation in comprehensive planning and reduce the economic risk of development, the Legislature of the State of California adopted Section 65864 et seq. of the California Government Code (the "Development Agreement Statute"); and

**WHEREAS**, the Development Agreement Statute and the Rancho Mirage Municipal Code authorizes the City to enter into a property development agreement with any person or entity having a legal or equitable interest in real property for the development of such real property in order to establish certain development rights in the real property; and

**WHEREAS**, on or about August 5, 1983, the City and Federated Development Company ("Federated") entered into a Development Agreement ("Original Development Agreement") under the provisions of the Development Agreement Statute pertaining to the property described therein and which was recorded on November 29, 1983, as Instrument No. 247445, with the Riverside County Recorder's Office and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS,** in connection with the Original Development Agreement, Federated applied for and received approvals from the City for General Plan Amendment No. 83-84, Zone Change No. 83-82, Tentative Tract Map ("TTM") No. 19397, and "Conceptual Land Use Approval" in Land Use Case No. 83-P-145; and

**WHEREAS**, on or about August 22, 1985, the City and Federated amended the Original Development Agreement ("1st Amendment") pursuant to the Development Agreement Statute, to revise TTM No. 19397 and make associated changes to the "Conceptual Land Use Approval" in Land Use Case No. 83-P-145, which was recorded on February 10, 1986, as Instrument No. 31768 with the Riverside County Recorder's Office and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about November 22, 1989, the City and Federated entered into a 2nd Amendment to the Original Development Agreement ("2nd Amendment") pursuant to the Development Agreement Statute, which was recorded on December 27, 1989, as Instrument No. 453119 with the Riverside County Recorder's Office and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS,** consistent with the 2nd Amendment, the City adopted a Specific Plan Overlay and amended the General Plan to permit property designated for general commercial use to be developed for "community centers, including specialty retail stores, offices and small high end department stores"; and

**WHEREAS**, portions of the Subject Property were acquired by MCO, with Federated retaining title to Lots 11, 12, 14, 48 and 50 of Tract Map No. 19397, and on or about June 6, 1991, the City consented to that certain Assignment and Assumption Agreement between Federated and MCO concerning certain rights and duties under the Original Development Agreement, the 1st Amendment and the 2nd Amendment and which is incorporated herein by this reference as though set forth at length; and

.

**WHEREAS**, on or about September 19, 1991, MCO, Federated and the City entered into a 3rd Amendment to the Original Development Agreement ("3rd Amendment") to substitute newly revised exhibits to the 2nd Amendment which was recorded on November 25, 1991, as Instrument No. 409130, with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about November 19, 1992, MCO, Federated and the City entered into a 4th Amendment to the Original Development Agreement ("4th Amendment") which was recorded on January 8, 1993, as Instrument No. 7776 with the Riverside County Recorder's Office and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, consistent with the 4th Amendment, MCO agreed to develop a certain portion of the Subject Property known as the "Villa Site" that would be operated under a condominium-hotel concept, whereby the units would be partially available for hotel rental, and the hotel facilities would be accessible to the condominium owners or users, in accordance with the zoning and development standards in effect City wide at the time of the issuance of the building permits for the Villa Site; and

**WHEREAS**, on or about November 30, 1995, certain property owned by MCO was transferred to FDC Real Estate ("FDC") pursuant to an Assignment of Rights under Development Agreement by Federated to FDC, with the City consenting to such assignment on December 7 1995, by approving a Consent to Assignment; and

**WHEREAS**, on or about June 19, 1997, MCO, FDC and the City entered into a 5th Amendment to Original Development Agreement ("5th Amendment"), which extended the Term of the Original Development Agreement to December 10, 2011, which was recorded on July 25, 1997, as Instrument No. 262788 with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, or about November 2, 2000, MCO and the City entered into a 6th Amendment to Original Development Agreement ("6th Amendment") which added Tentative Tract Map No. 28741, a revision of Tentative Tract Map No. 24857. which was recorded on April 24, 2001, as Instrument No. 2001-173795, with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about December 2, 2000, MCO and FDC (which soon thereafter divested itself of all rights title and interest in the Project Site) and the City entered into a 7th Amendment to the Original Development Agreement ("7th Amendment") whereby MCO was permitted to elect in its sole discretion to proceed with development of certain portions of the Amended Tentative Tract Map No. 29389 which was recorded on April 24, 2001, as Instrument No. 2001-173794 with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about March 19, 2005, MCO and the City entered into an 8th Amendment to the Original Development Agreement ("Eight Amendment") whereby

MCO was provided with the opportunity to construct 138 two-story hotel villa units on the Villa Site which MCO could either retain or sell, in whole or subdivided, subject to certain restrictions on use and occupancy set forth in the 8th Amendment which was recorded on January 25, 2006, as Instrument No. 2006-0058746 with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about July 28, 2005, GENLB-Rancho ("GENLB") acquired a portion of the Subject Property from VA Rancho Mirage, L.P. ("Vail") which included the current site of the Hotel ("Hotel Site") formerly known as the "Lodge at Rancho Mirage" site, along with a portion of the Subject Property commonly referred to as the "Tennis Site"; and

**WHEREAS**, on or about July 28, 2005, the City consented to that certain Assignment and Assumption Agreement between Vail and GENLB with respect to the Hotel Site and the Tennis Site and concerning certain rights and duties under the Original Development Agreement as amended to date and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about December 16, 2005, GENLB acquired the Villa Site from MCO; and

**WHEREAS**, on or about December 15, 2005, the City consented to that certain Assignment and Assumption Agreement between MCO and GENLB with respect to the Villa Site and concerning certain rights and duties under the Original Development Agreement as amended to date and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, on or about September 30, 2006, GENLB and the City entered into a 9th Amendment to the Original Development Agreement ("9th Amendment") which was recorded on October 27, 2006, as Instrument No. 2006- 0790342 with the Riverside County Recorder's Office and which is incorporated herein by this reference as though set forth at length; and

**WHEREAS**, Judi Bikulege, Vice President of GenLB, in a letter dated December 29, 2010, notified the City of GenLB's assignment of rights and obligations under the 9th Amendment to Rancho California Investments, LLC ("RCI"), an entity in which GenLB's principal shareholders retain a majority interest, and RCI's expressed assumption of the obligations of GenLB under the Ninth Amendment; and

**WHEREAS**, Sebastian Casano, Vice President of RCI, in a letter dated October 30, 2012, requested that the City consent to the assignment of the 9th Amendment to "Kam Sang Company Inc. or any of its affiliates, including Newage Rancho Mirage LLC

("Newage") conditioned upon the acquisition of the Project by Newage and the assumption by Newage of the obligations of RCI under the [Ninth Amendment]"; and

**WHEREAS**, pursuant to an Assignment and Assumption of Agreement GenLB had expressly assigned it rights and obligations under the Ninth Amendment to RCI and RCI has expressly assumed such rights and obligations; and

**WHEREAS**, on or around November 1, 2012, the City consented to that certain Consent to Assignment of 9th Amendment to Development Agreement, between RCI and Newage, concerning certain rights and duties under the Original Development Agreement, as amended to date, and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, Newage has proposed this 10th Amendment to the Original Development Agreement which includes the following: 1) Environmental Assessment Case Number EA21-0002 for the environmental review of the Project, which currently includes a proposed Mitigated Negative Declaration that includes Mitigation Measures for Biological Resources, Cultural Resources, Noise, Transportation, and Tribal Cultural Resources; 2) General Plan Zoning Map Amendment Case No. GPZMA21-0001 for a zone change from Mountain Reserve (MR) to Resort Hotel (Rs-H) for the Sky Mesa portion of the Project Site; 3) Development Agreement Case No. DA21-0002 for a 10th Amendment to the Original Development Agreement; 4) Tentative Parcel Map Case No. TPM23-0002 ("TPM38768") which is a parcel map for condominium purposes which establishes three parcels for the Hotel Site (excluding the Sky Mesa area) which include Parcel 1 (2.699 acres) for the existing Spa Suites Site, Parcel 2 (15.995 acres) for the Hotel Site, and Parcel 3 (11.873 acres) for an event space, parking structure, and 106 residential condominium units; and 5) Major Modification Case No. MOD21-0004 for the project entitlements which consist of 106 residential units that include 1 to 3 bedrooms, 23,843 square feet of event space, 6,273 square feet of restaurant, 5,513 square feet for amenities, a 381-space subterranean parking structure, and other recreational amenities; and

**WHEREAS**, based on the foregoing Recitals, the City has determined that this 10th Amendment is appropriate under the Development Agreement Statute and Chapter 17.56 of the Rancho Mirage Municipal Code; and

**WHEREAS**, this 10th Amendment is voluntarily entered into in consideration of the benefits to and the rights created in favor of each of the parties hereto and in reliance upon the various representations and warranties contained herein; and

**WHEREAS**, the application for this 10th Amendment was considered by the Planning Commission and the City Council at duly noticed public hearings in accordance with the Development Agreement Statute and Chapter 17.56 of the Rancho Mirage Municipal Code; and

**WHEREAS**, this 10th Amendment will eliminate uncertainty in planning for and securing orderly development of the Project and Project Site (as specifically described in this 10th Amendment below), assure progressive installation of necessary improvements, ensure attainment of the maximum effective utilization of resources within the City at the least economic cost to its citizens, and otherwise achieve the goals and purposes for which the Development Agreement Statute was enacted; and

**WHEREAS**, the City Council believes that such orderly development of the Project and Project Site will provide many public benefits to the City through the imposition of development standards and requirements under the provisions and conditions of this 10th Amendment, including, without limitation, the creation of job opportunities and additional tax revenue for the City's general fund; and

**WHEREAS**, it is the intent of the parties that all acts referred to in this 10th Amendment shall be accomplished in such a way as to fully comply with the California Environmental Quality Act (California Public Resources Code §21000 *et seq*.) ("CEQA") and the State CEQA Guidelines (California Code of Regulations, title 14, §15000 *et seq*.), as each is amended from time to time; and

**WHEREAS**, this 10th Amendment is made and entered into in consideration of the mutual covenants and in reliance upon the various representations and warranties contained herein.

**NOW, THEREFORE, in consideration of the mutual covenants and promises of the parties contained herein, the parties agree as follows:**

**A G R E E M E N T**:

**Section 1. Incorporation of Recitals.** The foregoing recitals are incorporated into this 10th Amendment by this reference as though fully set forth herein.

**Section 2. Effective Date.** This 10th Amendment shall be effective upon the effective date ("Effective Date") of the ordinance enacting this 10th Amendment ("Enacting Ordinance").

**Section 3. Project Site.** The "Project Site" consists of the Subject Property as more particularly described in the Legal Description attached hereto as Exhibit A for the Hotel Site which includes the existing Spa Suites, Exhibit B for the Villas Site which includes the T-Wing and Hotel Villas, Exhibit C for the Tennis Site, and Exhibit D for the Sky Mesa Site.

**Section 4. Project.** The "Project" includes the following:

a) Development Agreement (Case No. DA21-0002) – For a 10th Amendment to the Original Development Agreement;

b) General Plan Zoning Map Amendment (Case No. GPZMA21-0001) – For a zone change from Mountain Reserve (MR) to Resort Hotel (Rs-H) for the Sky Mesa Site;

c) Tentative Parcel Map (TPM 38768) (Case No. TPM23-0002) – For a parcel map for condominium purposes to establish three separate parcels for the Project Site (excluding the Sky Mesa area) that includes Parcel 1 (2.699 acres) for the Spa Suites Site which is not subject to future development and remains subject to the terms and conditions of the 9th Amendment, unless modified under this 10th Amendment, Parcel 2 (15.995 acres) for the Hotel Site which is not subject to any further development and remains subject to the terms and conditions of the 9th Amendment, unless modified under this 10th Amendment, and Parcel 3 (11.873 acres) for the Villas Site (that includes the T-Wing and Hotel Villas) for the development of an 106 residential condominium units, an events space, a restaurant, a subterranean parking structure, and various amenities including recreational amenities, which shall be subject to the conditions of approval and all rights and privileges afforded to NEWAGE as successor in interest under Tract Map No. 34640, unless otherwise provided by this Tentative Parcel Map; and

d) Major Modification (MOD21-0004) for the requisite entitlements to permit Parcel 3 (Villas Site) to be developed with 106 residential units ranging in size from 1 to 3 bedrooms, 23,843 square feet of event space, a 6,273 square foot restaurant, 5,513 square feet of amenities, a 381-space subterranean parking structure, and various recreational amenities.

e) The Parties hereto understand and agree that notwithstanding anything to the contrary herein or in the Original Development Agreement, as previously amended, the Project, as defined herein, and associated entitlements and City approvals, shall supersede Tentative Tract Map 34640, Preliminary Development Plan Case No. PDP06001, and all related prior City approvals, as approved by City on or around, or prior to, August 3, 2006, with the exception of the Tennis Villa Units.

**Section 5. Existing Hotel Units.** This Section 5 (Existing Hotel Units) shall apply to the Existing Hotel, which contains 244 traditional hotel rooms/suites, as depicted in the Site Plan, attached hereto as Exhibit F.

(1) Upgrades and Renovations. NEWAGE shall have the right to upgrade and renovate the Hotel's existing rooms/suites, which may include combining individual rooms/suites into larger rooms/suites in order to assure increased room rates and long-term viability.

(2) Lock-Off Configurations. The Existing Hotel Units which have legally approved separate entrance/exit doors may be constructed in a “lock off” configuration to permit the unit to be rented as two separate units.

(3) Condo-Hotel Units, Fractionals and Timeshares Prohibited. None of the 244 Existing Hotel Units shall be marketed, used or sold as condo-hotel units, fractionals or timeshares.

**Section 6. Condo-Hotel Units**. In consideration for the approval of this 10th Amendment, NEWAGE agrees that the Project and Project Site shall be subject to and comply with the City’s condo-hotel regulations as set forth in Ordinance No. 932, attached hereto as Exhibit E, unless specifically provided otherwise in this 10th Amendment. Should there be any inconsistency or conflict between the development standards and limitations and restrictions set forth in Section 17.30.095 of the Municipal Code with respect to development, ownership and operation of condo-hotel units and the provisions specifically set forth in this 10th Amendment, the provisions set forth in this 10th Amendment shall prevail and be applied to the Project and Project Site.

For purposes of this section, “owner occupation” shall include the person or entity listed as the record owner of the condo-hotel unit and the owner’s spouse, by marriage or otherwise, domestic partner, child or stepchild, by natural birth or adoption, parent, brother, sister, half-brother, half-sister, parent-in-law, brother-in-law, sister-in-law, nephew, niece, aunt, uncle, first cousin, or any person denoted by the prefix "grand" or "great," or the spouse of any of these persons.

**a) T-Wing Units**. This Section shall apply to the 48 T-Wing Units currently depicted in the attached Site Plan, attached hereto as Exhibit F, as the Building A-1 Units.

(1) Condo-Hotel Units. The 48 T-Wing Units may, at NEWAGE’s option, be developed as condo-hotel units.

(2) Fractionals and Timeshares Prohibited. None of the T-Wing Units shall be marketed, used or sold as fractionals or timeshares.

(3) Lock-Off Configurations. The T-Wing Units which have two legally approved separate entrance/exit doors may be constructed in a “lock-off” configuration to permit the unit to be rented as two separate units.

(4) Owner’s Allowable Occupancy Period. The period of time an owner of a condo-hotel unit amongst the T-Wing Units (“T-Wing Allowable Occupancy Period”) may occupy his or her unit shall not exceed six (6) months, whether consecutive or non-consecutive periods of occupancy, per calendar year. This provision

shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(5) Additional Owner Occupancy Beyond Owner's Allowable Occupancy Period. Any condo-hotel owner shall have a right to rent its unit for additional personal occupancy beyond the Allowable Occupancy Period as set forth herein, provided that the owner pays transient occupancy taxes for each day the owner occupies its condo-hotel unit beyond the Allowable Occupancy Period, even if the period of owner occupation beyond the owner's allowable occupancy period exceeds 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. This provision shall also replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(6) Rental Availability. When a condo-hotel unit amongst the T-Wing Units is not occupied by the owner, unless it is unoccupied for maintenance or repair purposes, the condo-hotel unit shall be made available for transient rentals to the general public pursuant to the City's condo-hotel regulations as set forth in Ordinance No. 932, attached hereto as Exhibit E, unless otherwise provided in this 10th Amendment.

(7) Transient Occupancy Tax. When a condo-hotel unit amongst the T-Wing Units is used as a transient rental, it shall be subject to the payment of transient occupancy taxes in accordance with the City's transient occupancy tax regulations in effect at the time the transient occupancy tax is due and payable, with the caveat that transient occupancy taxes shall also apply to condo-hotel unit rentals for more than 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. However, whenever any condo-hotel unit is occupied by a non-owner during the owner's occupancy period via a condominium, condo-hotel or any other share, trading or exchange system or program, whether formally established or operated as a "Club" or by any other method or means, the City shall be entitled to receive 100 percent of the applicable transient occupancy tax for each day of occupancy by the non-owner based on the fair market value of the room rate that would otherwise be charged for the subject unit.

**b) Hotel Villa Units**. This Section shall apply to the 58 Hotel Villa Units currently depicted in the Site Plan, attached hereto as Exhibit F, as the Building B1 through B15 Units.

(1) Condo-Hotel Units. The Hotel Villa Units may, at NEWAGE's option, convert the existing hotel rooms/suites into condo-hotel units.

(2) Fractionals and Timeshares Prohibited. None of the Hotel Villa Units shall be marketed, used or sold as fractionals or timeshares.

(3) Owner's Allowable Occupancy Period. The period of time an owner of a condo-hotel unit amongst the Hotel Villa Units ("Hotel Villa Allowable Occupancy Period") may occupy his or her unit shall not exceed six (6) months, whether consecutive or non-consecutive periods of occupancy, per calendar year. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(4) Additional Owner Occupancy Beyond Owner's Allowable Occupancy Period. Any condo-hotel owner shall have a right to rent its unit for additional personal occupancy beyond the Allowable Occupancy Period as set forth herein, provided that the owner pays transient occupancy taxes to the City for each day the owner occupies its condo-hotel unit beyond the Allowable Occupancy Period, even if the period of owner occupation beyond the owner's allowable occupancy period exceeds 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(5) Rental Availability. When a condo-hotel unit amongst the Hotel Villa Units is not occupied by the owner, unless it is unoccupied for maintenance or repair purposes, the condo-hotel unit shall be made available for transient rentals to the general public pursuant to the City's condo-hotel regulations as set forth in Ordinance No. 932, attached hereto as Exhibit E, unless otherwise provided in this 10th Amendment.

(6) Transient Occupancy Tax. When a condo-hotel unit amongst the Hotel Villa Units is used as a transient rental, it shall be subject to the payment of transient occupancy taxes in accordance with the City's transient occupancy tax regulations in effect at the time the transient occupancy tax is due and payable, with the caveat that transient occupancy taxes shall also apply to condo-hotel unit rentals for more than 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. However, whenever any condo-hotel unit is occupied by a non-owner during the owner's occupancy period via a condominium, condo-hotel or any other share, trading or exchange system or program, whether formally established or operated as a "Club" or by any other method or means, the City shall be entitled to receive 100 percent of the applicable transient occupancy tax for each day of

occupancy by the non-owner based on the fair market value of the room rate that would otherwise be charged for the subject unit.

**c) Tennis Villa Units.** This Section shall apply to the 25 Tennis Villa Units currently depicted in the Site Plan, attached hereto as Exhibit F.

(1) Condo-Hotel Units. The 25 Tennis Villa Units may, at NEWAGE's option, be developed as condo-hotel units.

(2) Lock-Off Configurations. The Tennis Villa Units which have two legally approved separate entrance/exit doors may be constructed in a "lock off" configuration to permit the unit to be rented as two separate units.

(3) Fractionals and Timeshares Prohibited. None of the 25 Tennis Villa Units shall be marketed, used or sold as fractionals or timeshares.

(4) Owner's Allowable Occupancy Period. The period of time an owner of a condo-hotel unit amongst the Tennis Villa Units ("Tennis Villa Allowable Occupancy Period") may occupy his or her unit shall be six (6) months, whether consecutive or non-consecutive periods of occupancy, per calendar year. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(5) Additional Owner Occupancy Beyond Owner's Allowable Occupancy Period. Any condo-hotel owner shall have a right to rent its unit for additional personal occupancy beyond the Allowable Occupancy Period as set forth herein, provided that the owner pays transient occupancy taxes to the City for each day the owner occupies its condo-hotel unit beyond the Allowable Occupancy Period, even if the period of owner occupation beyond the owner's allowable occupancy period exceeds 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(6) Rental Availability. When a condo-hotel unit amongst the Tennis Villa Units is not occupied by the owner, unless it is unoccupied for maintenance or repair purposes, the condo-hotel unit shall be made available for transient rentals to the general public pursuant to the City's condo-hotel regulations as set forth in Ordinance No. 932, attached hereto as Exhibit E, unless otherwise provided in this 10th Amendment.

(7) Transient Occupancy Taxes. When a condo-hotel unit amongst the Tennis Villa Units is used as a transient rental, it shall be subject to the payment of transient occupancy taxes in accordance with the City's transient occupancy tax regulations in effect at the time the transient occupancy tax is due and payable, with the caveat that transient occupancy taxes shall also apply to condo-hotel unit rentals for more than 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. However, whenever any condo-hotel unit is occupied by a non-owner during the owner's occupancy period via a condominium, condo-hotel or any other share, trading or exchange system or program, whether formally established or operated as a "Club" or by any other method or means, the City shall be entitled to receive 100 percent of the applicable transient occupancy tax for each day of occupancy by the non-owner based on the fair market value of the room rate that would otherwise be charged for the subject unit.

**d) Spa Suite Units.** This section shall apply to the existing 16 Spa Suite Units which were constructed 2015, as depicted in the Site Plan, attached hereto as Exhibit F, as the Spa Building.

(1) Condo-Hotel Units. The Spa Suite Units may, at NEWAGE's option, be converted into condo-hotel units.

(2) Lock-Off Configurations. The Spa Suite Units which have two legally approved separate entrance/exit doors may be constructed in a "lock off" configuration to permit the unit to be rented as two separate units.

(3) Fractionals and Timeshares Prohibited. None of the Spa Suite Units shall be marketed, used or sold as fractionals or timeshares.

(4) Owner's Allowable Occupancy Period. The period of time an owner, other than the Existing Hotel's professional management entity/company, of a condo-hotel unit amongst the Spa Suite Units ("Spa Suite Allowable Occupancy Period") may occupy his or her unit shall be six months, whether consecutive or non-consecutive periods of occupancy, per calendar year, as permitted under the December 31, 2015, Addendum to the 9$^{th}$ Amendment. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(5) Additional Owner Occupancy Beyond Owner's Allowable Occupancy Period. Any condo-hotel owner, other than the Existing Hotel's professional management entity/company, shall have a right to rent its unit for additional personal occupancy beyond the Allowable Occupancy Period as set forth herein, provided that the owner pays transient occupancy taxes to the City for each day the owner occupies

its condo-hotel unit beyond the Allowable Occupancy Period, even if the period of owner occupation beyond the owner's allowable occupancy period exceeds 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. This provision shall replace and supersede any other restrictions or limitations on the maximum time of owner occupancy by an owner of a condo-hotel unit, including without limitation Section 1 (e) of the 8th Amendment.

(6) Rental Availability. When a condo-hotel unit amongst the Spa Suite Units is not occupied by the owner, unless it is unoccupied for maintenance or repair purposes, the condo-hotel unit shall be made available for transient rentals to the general public pursuant to the City's condo-hotel regulations as set forth in Ordinance No. 932, attached hereto as Exhibit E, unless otherwise provided in this 10th Amendment. Any condo-hotel units owned, in whole or in part by the Existing Hotel's professional management entity/company shall be made available for rent for transient occupancy for no more than twenty-seven consecutive days by any given transient, at all times regardless of whether the Existing Hotel or management entity/company would otherwise have occupancy rights as an owner under this section.

(7) Transient Occupancy Tax. When a condo-hotel unit amongst the Spa Suite Units is used as a transient rental, it shall be subject to the payment of transient occupancy taxes in accordance with the City's transient occupancy tax regulations in effect at the time the transient occupancy tax is due and payable, unless otherwise provided below, and with the caveat that transient occupancy taxes shall also apply to rentals for more than 27 consecutive days, regardless of any restrictions that may be set forth in the City's transient occupancy tax regulations as codified from time to time in the Rancho Mirage Municipal Code. However, whenever any condo-hotel unit is occupied by a non-owner during the owner's occupancy period via a condominium, condo-hotel or any other share, trading or exchange system or program, whether formally established or operated as a "Club" or by any other method or means, the City shall be entitled to receive 100 percent of the applicable transient occupancy tax for each day of occupancy by the non-owner based on the fair market value of the room rate that would otherwise be charged for the subject unit.

**Section 7. Rental of Condo-Hotel Units.** The rental of any condo-hotel units pursuant to the terms and provisions of this 10th Amendment shall not be considered as "short-term rentals" which are prohibited in the City per Section 17.30.270 Short-Term Rentals of the Rancho Mirage Municipal Code since the rental of units located within City-approved hotels shall not be considered short-term rentals.

Considering the foregoing, as a condition to renting out a condo-hotel unit, the owner of the condo-hotel unit shall enter into an agreement with the Existing Hotel's management entity/company which, at a minimum, shall provide that the management

entity/company will collect all transient occupancy taxes required on rentals of that owner's condo-hotel unit and manage all permissible rental operations. The Existing Hotel's management entity/company shall then be responsible for forwarding transient occupancy taxes to the City in accordance with the City's transient occupancy tax regulations as set forth in the Rancho Mirage Municipal Code and any related procedures and regulations in effect at the time the transient occupancy taxes are due and payable to the City, unless otherwise provide in this 10th Amendment. In addition, under no circumstances shall any owner of a condo-hotel unit or any other unit described in this 10th Amendment advertise or cause to be advertised the availability of any such units for transient purposes for any period of time. All advertisements shall be handled, managed and facilitated solely by the Existing Hotel's management entity/company and any such advertisements shall not refer to the any condo-units or any other units covered by this 10th Amendment as "short-term rentals." NEWAGE shall submit documents for recordation which clearly demonstrate the forgoing advertisement restrictions and obligations, subject to the reasonable satisfaction of City Attorney and City Engineer.

**Section 8. Extension of Tentative Map.** In accordance with Government Code Section 66452(a)(1), TPM38768 shall be extended for the greater period of (a) the term of this Agreement or (b) such maximum total time as is permitted in accordance with the State Subdivision Map Act (Government Code Sections 66410 *et seq*.) or Applicable Law.

**Section 9. Operator.** NEWAGE agrees that the Project shall be operated during the life of the Project as an establishment that: (a) reflects the characteristics of the ultimate in luxury and sophistication with first class accommodations, and (b) maintains physical attributes that are extraordinary in every manner, and (c) provides a level of service that is meticulous and exceeds all guests' expectations while maintaining an impeccable standard of excellence.

**Section 10. Previous Amendments.** Except as herein modified and amended, provisions of the Original Development Agreement, the 1st Amendment, the 2nd Amendment, the 3rd Amendment, the 4th Amendment, the 5th Amendment, the 6th Amendment, the 7th Amendment, the 8th Amendment and 9th Amendment, and any addenda thereto, are ratified, confirmed and remain in full force and effect as if set forth and reiterated herein verbatim.

**Section 11. Term**. The parties agree that the Term of this 10th Amendment shall be ten (10) years commencing on the Effective Date subject to the extension and early termination provisions described in this 10th Amendment and this Term shall only apply to the Project Site. Upon termination of this 10th Amendment, this 10th Amendment shall be deemed terminated and of no further force and effect without the need of further documentation from the parties hereto, provided, however, that this termination shall not affect any right or duty arising from the entitlements or approvals

for the Project Site or the financial obligations of NEWAGE or its assignees and successors in interest agreed to by the parties or approved concurrently with, or subsequent to, the Effective Date or as otherwise provided in this 10th Amendment.

**Section 12. Cooperation by NEWAGE.** NEWAGE will, in a timely manner, provide the City with all documents, applications, plans and other information necessary for the City to carry out its obligations hereunder, and cause NEWAGE's planners, engineers, and all other consultants to submit in a timely manner all required materials and documents, therefore. NEWAGE also shall apply in a timely manner for such other permits and approvals from other governmental or quasi-governmental agencies having jurisdiction over the Project Site as may be required for the development of, or provision of services to, the Project Site.

**Section 13. Applicable Rules, Regulations and Policies.** Except as otherwise provided in this 10th Amendment, the rules, regulations, and policies governing the use, density, intensity, design, improvement, construction, building and occupancy standards and specifications of the Project and Project Site shall be those rules, regulations, and policies in place at the time of the Effective Date. The City, however, shall be permitted to apply certain rules, regulations and policies enacted after the Effective Date to discretionary actions which are not part of the Project.

**Section 14. Funding for Processing 10th Amendment and Entitlements Described Therein.** The actual costs for all services provided by the City and its consultants for processing of this 10th Amendment and the entitlements described herein shall be paid by NEWAGE. All such processing costs shall not be the obligations of the City or any of its departments and divisions, and the City shall not be liable for any such costs form its general fund or any other fund. In addition, to the extent that City, on behalf of NEWAGE, attempts to enter into binding agreements with other entities in order to assure the availability of certain permits and approvals or services necessary for development of the Project Site as described in this 10th Amendment, NEWAGE shall reimburse City for all costs and expenses incurred in connection with seeking and entering into any such agreements. Any fees, assessments, or other amounts payable by City pursuant to any such agreements described herein shall be borne by NEWAGE except where NEWAGE has notified City in writing, prior to City entering into any such agreement, that it does not desire for City to execute said agreement.

**Section 15. Processing Fees.** NEWAGE shall pay all land use approvals, building permits or other similar permits, licenses or entitlements which are in force and effect on a City-wide basis at the time application is made for such permits, licenses, or entitlements at the time such fees are due and payable during the development process.

**Section 16. Development Impact Fees.** NEWAGE shall pay all development

impact fees that are designed to pay for new or expanded public facilities needed to serve, or to mitigate the adverse effects of, a given development project (including any species protection or habitat preservation or conservation mitigation fees) that are in effect at the time such fees are due and payable during the development process.

**Section 17. Exactions.** NEWAGE shall pay or provide, as the case may be, all exactions, in-lieu fees or payments, dedication or reservation requirements, obligations for on-site or off-site improvements, construction requirements for public improvements, facilities, or services required of the Project or Project Site, whether such requirements constitute subdivision improvements, mitigation measures in connection with environmental review, or impositions made under any applicable ordinance or other applicable regulation.

**Section 18. Community Facilities District No. 1.** NEWAGE acknowledges the existence of "Community Facilities District No. 1" which was created pursuant to the Mello-Roos Community Facilities Act, as set forth in Government Code section 53311 et seq. for the purpose of funding certain public safety services. If the Project and Project Site are currently subject to the assessments of Community Services District No. 1, NEWAGE voluntarily consents that it will not vote or otherwise support the dissolution of said District. In the event said District formally dissolves, NEWAGE shall consent to paying an in-lieu assessment in a manner and form, deemed acceptable by the City, as though the District had never dissolved. If, however, the Project or Project Site, or any portions thereof, are not currently subject to the assessments of Community Facilities District No. 1, NEWAGE voluntarily consents to take whatever affirmative action it needs to take on its part to ensure that the Project and Project Site, and all portions thereof, are subject to the assessments of the Community Facilities District No. 1, which includes without limitation, voting to annex to said District.

**Section 19. Covenants Running With the Land and Constructive Notice.** All of the terms, provisions, and obligations contained in this 10th Amendment shall be binding upon NEWAGE and its heirs, successors, and assigns, and all other persons or entities acquiring all or any portion of the Project Site or Project, or any interest therein, whether by operation of law or in any manner whatsoever, and the rights thereof shall inure to the benefit of the City and its successors and assigns. As such, all of the provisions of this 10th Amendment shall be enforceable as equitable servitudes and constitute covenants running with the land pursuant to applicable law, including but not limited to, Section 1468 of the Civil Code of the State of California. Notwithstanding the above, every person who now or hereafter owns or acquires any right, title or interest in or to any portion of the Project Site or Project shall be deemed to have consented and agreed to every provision contained in this 10th Amendment, whether or not any reference to this 10th Amendment is contained in the instrument by which such person acquired an interest in the Project Site.

**Section 20. City's Obligations.** The City shall approve the permits, licenses and other entitlements as describe in this 10th Amendment pursuant to the provisions contained herein.

**Section 21. Periodic Review.** The City shall conduct a review of this 10th Amendment as set forth as follows:

**a) Annual Review.** The City will review the extent of good faith compliance by NEWAGE with the terms of this 10th Amendment annually commencing on the first anniversary of the Effective Date of this 10th Amendment.

**b) Notice.** The City shall notify NEWAGE in writing of the date of review at least thirty (30) days prior thereto.

**c) Good-faith Compliance.** During each annual review, NEWAGE is required to demonstrate good faith compliance with the terms of this 10th Amendment.

**d) Production of Documents and Other Evidence.** NEWAGE agrees to furnish such reasonable evidence and adequate documentation of good faith compliance as the City, in the exercise of its reasonable discretion, may require.

**e) Cost of Annual Review.** The costs incurred by City in connection with the annual review shall be borne by NEWAGE.

**Section 22. Relationship of Parties**. It is specifically understood and agreed by and between the parties hereto that the development of the Project Site is a private development and that neither party is acting as the agent of the other in any respect hereunder. The City and NEWAGE also hereby renounce the existence of any form of joint venture or partnership between them, and agree that nothing contained herein or in any document executed in connection herewith shall be construed as making the City and NEWAGE joint venturers or partners.

**Section 23. No Third Party Beneficiaries.** The only parties to this 10th Amendment are NEWAGE and the City. There are no third party beneficiaries and this 10th Amendment is not intended, and shall not be construed, to benefit, or be enforceable by any other person whatsoever.

**Section 24. Assignment.** NEWAGE shall have the right to assign its rights and obligations under this 10th Amendment, by giving prior written notice to the City, to any entity in which the NEWAGE, or its principal shareholders, retain a majority ownership interest so long as such assignee expressly assumes the obligations of NEWAGE hereunder. Otherwise, NEWAGE may not assign all or any portion of its rights hereunder nor delegate all or any portion of its duties and obligations hereunder without the prior written consent of the City, which consent shall not be unreasonably withheld.

**Section 25. Estoppel Certificate.** For and in consideration of entering into this 10th Amendment, the parties hereto acknowledge the receipt of good and valuable consideration. This paragraph shall constitute an Estoppel Certificate and shall be an independent agreement among the parties which is intended to and shall survive any subsequent determination that this 10th Amendment is invalid for any reason, by a final court decision, having jurisdiction thereof. NEWAGE represents to the City that it has no actual knowledge of any Claims, as herein below defined, against City specifically pertaining to the matters set forth in the Original Development Agreement, the 1st Amendment, the 2nd Amendment, the 3rd Amendment, the 4th Amendment, the 5th Amendment, the 6th Amendment, the 7th Amendment, the 8th Amendment and this 10th Amendment. For purposes of this Section, "claims" are defined as all known claims, fees, demands, costs, damages, obligations, expenditures, remedies, liens, rights or arbitration, rights of action and/or causes of action, whether compensatory or punitive, legal or equitable. This estoppel certificate legally bars NEWAGE from filing claims of which it had actual knowledge at the time of the approval by the City of this 10th Amendment.

**Section 26. Hold Harmless.** NEWAGE hereby agrees to, and shall defend, save and hold City and its elected and appointed boards, commissions, officers, agents, and employees harmless from, any and all claims, costs and liability for any damages, personal injury or death, which may arise, directly or indirectly, from NEWAGE's or NEWAGE's contractors', subcontractors', agents or employees' operations under this 10th Amendment, whether such negligent operations be by NEWAGE or by any of NEWAGE's contractors, subcontractors, agents or employees.

**Section 27. Indemnification.** NEWAGE shall defend, indemnify and hold harmless City and its agents, officers and employees against and from any and all liabilities, demands, claims, actions or proceedings and costs and expenses incidental thereto (including costs of defense, settlement and reasonable attorneys' fees), which any or all of them may suffer, incur, be responsible for or pay out as a result of or in connection with any challenge to the legality, validity or adequacy of any of the following: (i) any prior agreements by and between City and NEWAGE and/or its predecessor(s) in interest; (ii) this 10th Amendment and the concurrent and subsequent permits, licenses and entitlements approved for the Project or Project Site; (iii) the environmental impact report prepared in connection with the development of any environmental determinations made by the City in connection with this agreement, the Project and/or Project Site; and (iii) the proceedings undertaken in connection with the adoption or approval of any of the above. In the event of any legal or equitable action or other proceeding instituted by any third party (including a governmental entity or official) challenging the validity of any provision of this 10th Amendment or any portion thereof as set forth herein, the parties shall mutually cooperate with each other in defense of said action or proceeding. Notwithstanding the above, the City, at is sole option, may tender the complete defense of any third party challenge as described herein. In the

event, the City elects to contract with special counsel to provide for such a defense, the City shall meet and confer with NEWAGE regarding the selection of counsel, and NEWAGE shall pay all costs related to retention of such counsel.

**Section 28. Severability.** If any term, provision, covenant or condition of this 10th Amendment is repealed by referendum or is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions, if any, of this 10th Amendment shall continue in full force and effect, unless enforcement of this 10th Amendment as so invalidated would be unreasonable or grossly inequitable under all the circumstances or would frustrate the purposes of this 10th Amendment.

**Section 29. Singular and Plural; Gender; and Person.** Except where the context requires otherwise, the singular of any word shall include the plural and vice versa, and pronouns inferring the masculine gender shall include the feminine gender and neuter, and vice versa, and a reference to “person” shall include, in addition to a natural person, any governmental entity and any partnership, corporation, joint venture or any other form of business entity.

**Section 30. Time Is of the Essence.** Time is of the essence of this 10th Amendment and of each and every term and condition hereof.

**Section 31. Delays in Performance.** In addition to any other provisions of this 10th Amendment with respect to delay, NEWAGE and City shall be excused for performance of their obligations hereunder during any period of delay caused by acts of God or civil commotion, major acts of terrorism occurring in the United States of America, riots, strikes, picketing, or other labor disputes, shortage of materials or supplies, or damage to or prevention of work in process by reason of fire, floods, earthquake, or other casualties, litigation, acts or neglect of the other party, or restrictions imposed or mandated by governmental or quasi-governmental entities, enactment of conflicting provisions of the Constitution or laws of the United States of America or the State of California or any codes, statutes, regulations or executive mandates promulgated thereunder. If written notice of such delay is given to either party within (30) days of the commencement of such delay, an extension of time for such cause shall be granted in writing for the period of the delay, or longer as may be mutually agreed upon.

**Section 32. Events of Default.** Subject to any extensions of time by mutual consent in writing, and subject to the provisions of Section 31 "Delays in Performance", the failure or unreasonable delay by either party to perform any material term or provision of this 10th Amendment for a period of thirty (30) days after the dispatch of a written notice of default from the other party shall constitute a default under this 10th Amendment. If the nature of the alleged default is such that it cannot reasonably be cured within such 30-day period, the commencement of the cure within such time period and the diligent prosecution to completion of the cure shall be deemed a cure within

such period. Any Notice of Default give hereunder shall specify in detail the nature of the alleged Event of Default and the manner in which such Event of Default may be satisfactorily cured in accordance with the terms and conditions of this 10th Amendment. During the time periods herein specified for cure of an Event of Default, the party charged therewith shall not be considered to be in default for purposes of termination of this 10th Amendment, institution of legal proceedings with respect thereto, or whether any further building permits shall be issued with respect to the Project Site.

**Section 33. General Default Remedies.** After notice and expiration of the 30-day period without cure, the non-defaulting party shall have such rights and remedies against the defaulting party as it may have at law or in equity, including, but not limited to, the right to terminate this 10th Amendment pursuant to Government Code Section 65868 or seek mandamus, specific performance, injunctive or declaratory relief. Any rights or remedies available to non-defaulting party under this 10th Amendment and any other rights or remedies that such party may have at law or in equity upon a default by the other party under this 10th Amendment shall be distinct and separate, providing the non-defaulting party with cumulative rights and remedies. None of such rights or remedies, whether or not exercised by the non-defaulting party, shall be deemed to exclude any other rights or remedies available to the non-defaulting party. The non-defaulting party may, in its discretion, exercise any and all of its rights and remedies, at once or in succession, at such time or times as the non-defaulting party considers appropriate.

**Section 34. Legal Action; Attorneys' Fees.** Either party may, in addition to any other rights or remedies, institute legal action to cure, correct or remedy a default, enforce any covenant or agreement herein, enjoin any threatened or attempted violation hereof, or enforce by specific performance the obligations and rights of the parties hereto. The prevailing party in any such action shall be entitled to its reasonable attorneys' fees and costs to be paid by the losing party.

**Section 35. NEWAGE Default.** No building permit shall be issued or building permit application accepted for any structure on the Project Site after NEWAGE is determined by City to be in default of the terms and conditions of this 10th Amendment until such default thereafter is cured by the NEWAGE or is waived by the City. If the City terminates this 10th Amendment because of NEWAGE's default, then the City shall retain any and all benefits, including money or land received by the City hereunder.

**Section 36. Waiver.** All waivers must be in writing to be effective or binding upon the waiving party, and no waiver shall be implied from any omission by a party to take any action with respect to an Event of Default. Failure by a party to insist upon the strict performance of any of the provisions of this 10th Amendment by the other party shall not constitute waiver of such party's right to demand strict compliance by the other party in the future. In addition, no express written waiver of any Event of Default shall

affect any other Event of Default, or cover any other period of time specified in such express waiver.

**Section 37. Amendments.** This 10th Amendment may be amended from time to time by mutual consent of the original parties or their successors in interest, with the City's costs payable by amendment applicants, in accordance with the provisions of Government Code Section 65867 and 65868 and the City's adopted procedures and requirements for the consideration of development agreements.

**Section 38. Ambiguities or Uncertainties.** The parties hereto have mutually negotiated the terms and conditions of this Development Agreement and each party received independent legal advice from its attorneys with respect to the advisability of executing this 10th Amendment and the meaning of the provisions contained herein. As such, this 10th Amendment is a product of the joint drafting efforts of both parties and neither party shall be deemed to have solely or independently prepared or framed this 10th Amendment. Therefore, any ambiguities or uncertainties are not to be construed against or in favor of either party.

**Section 39. Applicable Law.** This 10th Amendment shall be construed and enforced in accordance with the laws of the State of California.

**Section 40. Nexus/Reasonable Relationship Challenges.** NEWAGE consents to, and waives any rights it may have now or in the future to challenge the legal validity of, the conditions, requirements, policies or programs set forth in this 10th Amendment including, without limitation, any claim that they constitute an abuse of the police power, violate substantive due process, deny equal protection of the laws, effect a taking of property without payment of just compensation, or impose an unlawful tax.

**Section 41. Civil Code Section 1542 Waiver**. NEWAGE hereby waives any and all rights they or their successors and assigns may have under Article XIIIC or Article XIIID of the California Constitution and any and all rights they or their successors and assigns may have under any other applicable law to contest the fees, exactions and assessments and/or their amounts payable to the City under this 10th Amendment as follows:

> **In furtherance of the intentions of the parties to this 10th Amendment, NEWAGE with and under advice of counsel, hereby expressly waives any and all right and benefit conferred upon said parties by the provisions of Civil Code Section 1542, which provides as follows:**
>
> > **"A general release does not extend to claims which a creditor or releasing party does not know or suspect to**

**exist in his or her favor at the time of executing the release and that, if known by him or her, would have materially affected his or her settlement with the debtor or released party."**

**NEWAGE further expressly waives any and all rights and benefits conferred upon NEWAGE by any provision of any other state, federal or local statute, code, ordinance or law similar to section 1542 of the Civil Code. NEWAGE expressly consents that the waiver of rights contained in the first paragraph shall be given full force and effect, according to the express terms and provisions of the instant waiver, to unknown and unsuspected claims, demands and causes of action, if any, arising out of or relating to the waiver of rights contained in this 10th Amendment.**

**Initials:**
**NEWAGE ____**

**Section 42. Venue.** In the event that suit is brought by either party to this 10th Amendment, the parties agree that venue shall be exclusively vested in the State courts of the County of Riverside, California or where appropriate, in the United States District Court, Southern District of California, Riverside, California.

**Section 43. No Damages Relief Against City.** The parties acknowledge that the City would not have entered into this 10th Amendment had it been exposed to damage claims from NEWAGE for any breach thereof. As such, the parties agree that in no event shall NEWAGE be entitled to recover damages against City for breach of this 10th Amendment.

**Section 44. Notices.** Any notice or communication required hereunder between City or NEWAGE shall be in writing, and may be given either personally or by registered mail, return-receipt requested. Notice, whether given by registered mail or personal delivery, shall be deemed to have been given and received on the actual receipt by any of the addresses designated below as the party to whom notices are to be sent. Any party hereto may at any time, upon written notice to the other party hereto, designate any other address in substitution of the address to which such notice or communication shall be given. Such notices or communications shall be given to the parties at their addresses set forth below:

To City:

City of Rancho Mirage
69-825 Highway 111
Rancho Mirage, CA 92270
Attention: City Manager

To NEWAGE:

Newage Rancho Mirage LLC
c/o Kam Sang Co., Inc.
411 E Huntington Drive, Ste 305
Arcadia, CA 91006
Attention: Ronnie Lam

**Section 45. Entire Agreement.** The Original Development Agreement, the 1st Amendment, the 2nd Amendment, the 3rd Amendment, the 4th Amendment, the 5th Amendment, the 6th Amendment, the 7th Amendment, the 8th Amendment, the 9th Amendment and this 10th Amendment and the Exhibits attached thereto contain all the representations and the entire agreement between the parties with respect to the subject matter hereof. Except as otherwise specified in this 10th Amendment and the Exhibits attached hereto, any prior correspondence, memoranda, agreements (other than the Original Development Agreement and all subsequent amendments), warranties or representations are superseded in total by this 10th Amendment and Exhibits hereto.

**Section 46. Recordation.** In order to comply with Section 65868.5 of the Development Agreement Statute, the parties do hereby direct the City Clerk to cause a copy of this 10th Amendment to be recorded with the Riverside County Recorder's Office within ten (10) days after the Enacting Ordinance takes effect.

**Section 47. Counterparts.** This 10th Amendment may be executed in duplicate counterpart originals, each of which is deemed to be an original, and all of which when taken together shall constitute one and the same instrument.

[THIS PORTION LEFT BLANK INTENTIONALLY]

DRAFT

IN WITNESS WHEREOF, the parties hereto have caused this 10th Amendment to be executed as of the dates written above.

**City of Rancho Mirage**

**By: _____**
**Ted Weill**
**Mayor**

**ATTEST:**

**By: _____**
**Kristie Ramos**
**City Clerk**

**APPROVED AS TO FORM:**

**By: _____**
**Colin Kirkpatrick**
**City Attorney**

**NEWAGE-RANCHO, LLC., a Delaware limited liability company**

**By:_____**

**Its: _____**

**By:_____**

**Its: _____**
**Chief Financial Officer**

**APPROVED AS TO FORM:**

**By: _____**
**NEWAGE Attorney**

DRAFT

# EXHIBIT “A”

## HOTEL, SPA & SPA SUITES SITE
## LEGAL DESCRIPTION

LOTS 1 AND 2 OF TRACT MAP NO. 34640-1, AS SHOWN BY MAP ON FILE IN BOOK 443, PAGES 11 THROUGH 16, INCLUSIVE, OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY, CALIFORNIA.

APN: 689-330-031; 689-330-032; 689-330-034

DRAFT

# EXHIBIT “B”

# VILLA SITE
# LEGAL DESCRIPTION

LOTS 50 AND 51 OF TRACT MAP NO. 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY, CALIFORNIA.

APN: 689-330-026; 689-330-028

DRAFT

# EXHIBIT “C”

# TENNIS SITE
# LEGAL DESCRIPTION

LOT 48 OF TRACT MAP NO. 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGE 64, INCLUSIVE, OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY, CALIFORNIA.

APN: 689-330-011

DRAFT

# EXHIBIT “D”

## SKY MESA SITE
## LEGAL DESCRIPTION

Parcel No. 4, of Parcel Map No. 11913, in the County of Riverside, State of California, as per Map recorded in Book 53 of Parcel Maps, Pages 18 and 19, Records of said County.

Excepting therefrom any portion thereof lying within Tract No. 19397 as shown by Map on file in Book 160, Pages 64 through 77 of Maps, Records of Riverside County, California.

Also excepting therefrom any portion thereof lying within Parcel Map No. 24865 on file in Book 182, Pages 35 through 37 of Parcel Maps, Records of Riverside County, California.

Also excepting therefrom any portion thereof lying within Tract No. 2864 as shown by Map on file in Book 51, Pages 82 through 86 of Maps, Records of Riverside County, California.

Also excepting therefrom that portion conveyed to the City of Rancho Mirage, a Municipal Corporation by Documents recorded July 23, 1986 as Instrument Nos. 172881 and 172882 and recorded December 27, 1989 as Instrument Nos. 453114, 453116 and 453118, all Official Records of Riverside County, California.

Also excepting therefrom that portion conveyed to the Coachella Valley County Water District by Instrument recorded April 22, 1975 as Instrument No. 1975-45742 of Official Records of Riverside County, California.

Also excepting therefrom that portion conveyed to the City of Rancho Mirage, a Municipal corporation by Deed recorded October 28, 1976 as Instrument No. 165432 Official Records of Riverside County, California.

APN: 689-020-012; 689-020-014

DRAFT

# EXHIBIT “E”

## CONDO-HOTEL
## ORDINANCE NO. 932

DRAFT

# ORDINANCE NO. 932

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE AMENDING RANCHO MIRAGE MUNICIPAL CODE TO INCLUDE DEVELOPMENT AND USE REGULATIONS REGARDING CONDO-HOTEL PROJECTS**

**WHEREAS,** there has been a recent increase in the popularity of the development of and/or use of condo-hotel projects among individual and business investors, national and international hotel corporations, business travelers, members of the vacationing public and developers; and

**WHEREAS**, this increase in popularity has created a need for specific regulations to govern the development and operation of condo-hotel projects to ensure that such projects are developed and operated in a manner that not only effectively mitigate the impacts such projects will have on surrounding land uses and traffic circulation, but also enhances the City's ability to adequately provide for the public service needs of the owners and guests of condo-hotel units and the general public; and

**WHEREAS,** the potential conversion of existing revenue-producing lodging establishments in the City to condo-hotel projects may result in diminished revenue to the City's general fund that is used to pay for many general municipal services demanded of the City's residents, businesses, and transient guests of the City's many lodging establishments unless the City adopts development and operational standards regulating condo-hotel projects that are necessary for ensuring that such projects enhance rather than diminish the City's ability to continue providing optimal municipal services; and

**WHEREAS**, the City desires to enhance rather than diminish the provision of general municipal services to its residents, businesses and transient guests of the City's many lodging establishments now and in the future while promoting development that will result in attracting and encouraging the development of additional revenue-producing business activities to the City; and

**WHEREAS,** the changing hotel market throughout the country has created a demand for condo-hotel projects; and

**WHEREAS,** the City desires to enhance its opportunities in attracting new resort hotel development to meet the demands of the changing tourist trade while at the same time increasing revenue for general municipal services.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES ORDAIN AS FOLLOWS:**

**Section 1. TITLE**

This ordinance shall be known as the "Condo-Hotel Ordinance."

**Section 2. PURPOSE AND INTENT**

The purpose and intent of this Ordinance is to ensure that the development of condo-hotel projects in the City does not detrimentally impact surrounding uses and that such development provides opportunities for the City to enhance its abilities to provide optimal municipal services not only to the prospective owners and users of condo-hotel units, but also to the general public.

**Section 3. AMENDMENT TO SECTION 17.90.020" DEFINITIONS OF SPECIALIZED TERMS AND PHRASES"**

Section 17.90.020 of Chapter 17.90 "Definitions" of Title 17 "Zoning" is hereby amended as follows:

***"Condo-hotel project" shall mean a project which is operated to meet the definition of a hotel, containing condominiums, ownership of which may be structured as whole ownership condominiums, fractional ownership with no more than 12 fractional shares per unit, or other ownership/financing arrangement deemed by the City Council to be similar in function and/or operation, but shall not include timeshares.***

**Section 4. AMENDMENT TO SECTION 17.10.010 "PURPOSE"**

Paragraph B "Individual Zoning Districts" of Section 17.10.010 of Chapter 17.10 "Commercial and Industrial Districts" of Title 17 "Zoning" is hereby amended as follows:

6. Rs-H (Resort Hotel) Zone. The Rs-H zoning district is applied to areas appropriate for hotels and destination resorts, ***including condo-hotel projects,*** with limited ancillary commercial uses, including restaurants and health spas that directly support the primary use. The Rs-H zoning district is consistent with the resort hotel land use designation of the general plan; and

**Section 5.** **AMENDMENT TO SECTION 17.10.012 "ALLOWABLE COMMERCIAL AND INDUSTRIAL ZONE USES, PERMIT REQUIREMENTS AND PROJECT REVIEW AUTHORITY"**

Table 2-4 "Allowable Uses and Permit Requirements for Commercial and Industrial Zoning Districts" of Section 17.10.012 of Chapter 17.10 "Commercial and Industrial Districts" shall be amended to reflect that condo-hotel projects shall only be permitted in the Resort Hotel "Rs-H" District by a Development Permit Plan and a Development Agreement, when one is required, which shall all be subject to the final review authority of the City Council.

**Section 6.** **AMENDMENT TO SECTION 16.06.010 "DEFINITIONS"**

Section 16.06.010 of Chapter 16.06 "Definitions" of Title 16 "Subdivisions" shall be amended as follows:

9. "Condominium" means an estate in real property consisting of an undivided interest in common in a portion of a parcel together with a separate interest in space in a residential or commercial building on the real property, such as an apartment, residence, office, ***condo-hotel unit*** or store. Furthermore, a condominium may include a separate interest in other portions of the real property.

**Section 7.** **AMENDMENT TO CHAPTER 17.30 "STANDARDS FOR SPECIFIC LAND USES"**

Chapter 17.30 "Standard for Specific Land Uses" shall be amended as follows:

***17.30.095 Condo-Hotel projects.***

***A. Development Standards. The development standards applicable to Resort Hotels shall apply to all condo-hotel projects, unless otherwise provided***

*in this chapter or pursuant to a development agreement.*

B. *Conversions. No existing hotel room or existing hotel facility or structure shall be converted to condo-hotel status unless otherwise permitted pursuant to a development agreement.*

C. *Owner and Occupancy Restrictions. The following occupancy restrictions shall apply to all condo-hotel projects:*

1. *The number of units of a condo-hotel project that may be condo-hotel units shall be limited to no more than ten (10)percent of the project's total sum of condo-hotel units and hotel rooms combined unless otherwise permitted pursuant to a development agreement.*

2. *Each owner of a condo-hotel unit and each individual fractional owner of a condo-hotel unit shall be limited to using or occupying any given unit owned by said owner for no more than twenty-seven (27) days per calendar year unless otherwise permitted pursuant to a development agreement. Owners may assign their use and occupancy rights to a third party subject to the City's transient occupancy tax regulations unless otherwise provided pursuant to a development agreement.*

3. *Outside the owner occupancy periods, a condo-hotel unit shall be made available for transient occupancy purposes for no more than 27 consecutive days by any given transient.*

D. *Collection of Transient Occupancy Taxes. The following provisions shall apply to all condo-hotel projects:*

1. *Each owner of a condo-hotel unit shall enter into an agreement with a professional hotel management entity/company which, at a minimum, provides that the management*

*entity/company will collect all transient occupancy taxes required on rentals of that owner's unit, outside the owner occupancy periods, whether or not such rentals are handled by said management entity/company. The management entity/company shall then be responsible for forwarding transient occupancy taxes to the City in accordance with the City's transient occupancy tax regulations.*

*(a) Any condo-hotel units owned, in whole or in part by the parent hotel or professional management entity/company shall be made available for rent for transient occupancy for no more than 27 consecutive days by any given transient, at all times regardless of whether the hotel or management entity/company would otherwise have occupancy rights as an owner under this section.*

*2. The professional management entity/company designated to collect transient occupancy taxes pursuant to this section must have at least five (5) consecutive years of experience, meeting the First Class Hotel Standards and have no fewer than ten (10) other properties (each in separate cities, or distinct and separate projects in any given city, nationally or internationally) under current management unless otherwise provided pursuant to a development agreement.*

**Section 8. EFFECTIVE DATE**

This ordinance shall take effect thirty (30) days after its second reading.

**Section 9. CERTIFICATION**

The City Clerk shall certify to the passage of this ordinance and shall cause the same to be published according to law.

**PASSED AND ADOPTED THIS** 20TH day of July, 2006.

CITY OF RANCHO MIRAGE
CITY COUNCIL

Richard W. Kite
Mayor

ATTEST:

Elena Keeran
City Clerk

APPROVED AS TO FORM:

Steven Quintanilla
City Attorney

## ORDINANCE CERTIFICATION

***I, Elena Keeran, City Clerk of the City of Rancho Mirage, California, do hereby certify under penalty of perjury, that the foregoing Ordinance No. 932 was introduced by first reading at a meeting of the City Council held July 6, 2006, by the following vote:***

**AYES:** MEEPOS, MOLLER, SEMAN, HOBART, KITE
**NOES:** NONE
**ABSENT:** NONE
**ABSTAIN:** NONE

Ordinance No. 932 was adopted at a regular meeting of the City Council held on July 20, 2006 by the following vote:

**AYES:** MEEPOS, MOLLER, SEMAN, HOBART, KITE
**NOES:** NONE
**ABSENT:** NONE
**ABSTAIN:** NONE

I further certify that I have caused the Ordinance to be posted and/or published as required by law (GC Sect. 36933).

Elena Keeran

ELENA KEERAN, CMC
CITY CLERK

# EXHIBIT F

# SITE PLAN

# (SEE ATTACHED)

DRAFT







# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## OVERALL SITE PLAN A-0.2

NOT TO SCALE

Ritz Carlton

February 15, 2023

LCRA

STATE OF CALIFORNIA )
) ss.
COUNTY OF RIVERSIDE )

On _____ before me, _____, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under Penalty of Perjury under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal. (Seal)

Signature_____.

DRAFT

STATE OF CALIFORNIA )
) ss.
COUNTY OF RIVERSIDE )

On _____ before me, _____, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under Penalty of Perjury under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal. (Seal)

Signature_____.

DRAFT

## CERTIFICATION

STATE OF CALIFORNIA )
)
COUNTY OF RIVERSIDE )
)
CITY OF RANCHO MIRAGE )

I, Kristie Ramos, Secretary of the City of Rancho Mirage Planning Commission, do hereby certify that Resolution No. 2025-PC-02 was duly adopted by the City of Rancho Mirage Planning Commission at a regular meeting thereof held on the 9th day of December 2025, by the following vote:

| | |
|---|---|
| AYES: | Agostini, Bryant, Chanter, Curran, Grey. |
| NOES: | None. |
| ABSTAIN: | None. |
| ABSENT: | None. |

Kristie Ramos
Board Secretary

**RESOLUTION NO. _____**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, ADOPTING AND APPROVING A MITIGATED NEGATIVE DECLARATION AND A MITIGATION MONITORING AND REPORTING PROGRAM REGARDING GENERAL PLAN ZONING MAP AMENDMENT GPZMA 21-0001, MAJOR MODIFICATION MOD21-0004, TENTATIVE PARCEL MAP (TPM23-0002) AND 10TH AMENDMENT TO DEVELOPMENT AGREEMENT WITH NEWAGE RANCHO MIRAGE, LLC (DA21-0002)**

**WHEREAS**, the City of Rancho Mirage is a charter city and a municipal corporation of the State of California, and recognized as a political subdivision of the State of California for certain purpose; and

**WHEREAS**, the "Proposed Project" proposes the construction of the Ritz Carlton Residences, including but not limited to amenities and subterranean parking structure; and a Sky Mesa recreation area including but not limited to restaurant and restroom facility, lawn event space and pool area; a General Plan Zoning Map Amendment to amend the Mountain Reserve (MR) designation for the Sky Mesa recreational area to Resort Hotel (Rs-H) on approximately 3.86 acres (GPZMA 21-0002); a Tentative Parcel Map (TPM23-0002) establishing three parcels, with Parcel 3 containing 106 condo units; a Major Modification to existing Preliminary Development Plan PDP06001 (MOD21-0004); and a 10th Amendment to existing Development Agreement with Newage Rancho Mirage, LLC (DA 21-0002) (the "Development Agreement Amendment"); affecting the real property generally located along Frank Sinatra Drive, approximately 0.85 miles southwest of the intersection with Highway 111, within the City of Rancho Mirage, having Assessor Parcel Numbers 689-330-026, -028, -031, -032, and -034; 689-020-012, -014; and 689-331-001, and -018 (the "Subject Property); and

**WHEREAS,** the Project (excluding the Sky Mesa portion, as identified in the January 9, 2025, Planning Commission staff report), is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums. The Tennis Villas project site (7.96 acres on APN: 689-330-011) located west of the existing Ritz Carlton Hotel, which was previously analyzed as part of a 2006 Environmental Impact Report, incorporated herein by reference, was also a part of the 2006 entitlements and is included in the 10th Amendment to the Project's Development Agreement. The Tennis Villas portion of the original entitlements is not being altered or modified from its original entitlements, and no new information relating to significant effects and means of reducing or avoiding any effects, which was not known and could have been known at the time the previous 2006 EIR was certified, has become available; and

**WHEREAS**, the MND was circulated for a 30-day public review period from March 11, 2024, through April 9, 2024. In response to comments received, the City revised the

MND to clarify, correct, or supplement the information presented. The City recirculated the MND in accordance with Sections 15070(a) and 15073.5 of the CEQA Guidelines. The City has reviewed and considered the proposed Project and has determined that no significant impacts will occur with the implementation of mitigation measures. The recirculated MND was circulated for another 30-day public review period commencing July 22, 2024, through August 20, 2024.

**WHEREAS**, on January 9, 2025, the Rancho Mirage Planning Commission adopted Resolution No. 2025-PC-02, incorporated herein by this reference, recommending, in part, the City Council approve and adopt this Resolution, adopting the Mitigated Negative Declaration ("MND") and Mitigation Monitoring and Reporting Program ("MMRP") based upon its determination that there is no substantial evidence in the whole record before it that the Proposed Project will have a significant effect on the environment that has not been mitigated to a level of less than significant, and that the MND reflects the City's independent judgment and analysis of the Proposed Project and its potential impacts on the environment consistent with the provisions of the California Environmental Quality Act and CEQA Guidelines; and

**WHEREAS**, the City Council has reviewed the draft Mitigation Monitoring and Reporting Program and proposed Mitigated Negative Declaration regarding the Proposed Project, attached hereto and incorporated herein by this reference as Exhibit "A".

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, DOES HEREBY RESOLVE AS FOLLOWS:**

**SECTION 1. RECITALS AND EXHIBITS**

That the foregoing Recitals and attached Exhibits are true and correct and are hereby incorporated by this reference.

**SECTION 2. EVIDENCE AND ADMINISTRATIVE RECORD**

That the City Council has considered all of the evidence ("Evidence") submitted into the administrative record ("Administrative Record") for the Proposed Project, including, but not limited to, the following, which are all hereby incorporated herein by reference:

(a) Rancho Mirage Municipal Code;
(b) Rancho Mirage General Plan and Title 16 (Subdivisions) & 17 (Zoning) of the Rancho Mirage Municipal Code and all relevant provisions contained therein;
(c) Tentative Parcel Map (TPM23-0002);
(d) General Plan Zoning Map Amendment GPZMA 21-0001 (the "GPZMA");
(e) Major Modification to Preliminary Development Plan, Case No. MOD21-0004;
(f) Development Agreement Amendment Case No. DA21-0002;

(g) The Original Development Agreement, as defined in the Ordinance attached to the January 9th, 2025, Planning Commission staff report, and all amendments thereto, all incorporated herein by this reference;
(h) The 2006 Environmental Impact Report (EIR06001) and
(i) Initial Study,
(j) Notice of Intent to adopt MND;
(k) MND and MMRP;
(l) Notice of Planning Commission Public Hearing scheduled for January 9, 2025, at 2:00 p.m. in the Council Chamber, located at City Hall at 69-825 Highway 111, Rancho Mirage, California;
(m) Planning Commission Staff Report, attachments and Staff presentation for the Proposed Project, and all public documents, records and references related thereto submitted or provided at or prior to the January 9, 2025, Planning Commission Public Hearing;
(n) Testimony and/or comments from Developer and its representatives submitted or provided at, or prior to, the January 9, 2025, Planning Commission Public Hearing;
(o) Testimony and/or comments from all persons that were provided in written format or correspondence, at, or prior to, the January 9, 2025, Planning Commission Public Hearing;
(p) Notice of City Council Public Hearing scheduled for December 18, 2025, at 1:00 p.m. in the Council Chamber, located at City Hall at 69-825 Highway 111, Rancho Mirage, California;
(q) Planning Commission Staff Report, attachments and Staff presentation for the Proposed Project, and all public documents, records and references related thereto submitted or provided at or prior to the December 18, 2025, City Council Public Hearing;
(r) Testimony and/or comments from Developer and its representatives submitted or provided at, or prior to, the December 18, 2025, City Council Public Hearing; and
(s) Testimony and/or comments from all persons that were provided in written format or correspondence, at, or prior to, the December 18, 2025, City Council Public Hearing.

**SECTION 3. FINDINGS AND DETERMINATIONS**

That based on the foregoing Recitals and the Evidence contained in the Administrative Record for the Proposed Project, as set forth and described herein, the City Council acknowledges, accepts, and approves, and makes the following Findings and Determinations:

(a) That the City has independently reviewed, analyzed, and considered the Mitigated Negative Declaration and Mitigation Monitoring Plan, and the whole record before it (including, the Initial Study and comments received) and, based on the foregoing, the City Council hereby finds that all environmental impacts of the proposed Project, with mitigation measures,

are below a level of significance and there is no substantial evidence supporting a fair argument that the proposed Project will have a significant effect on the environment.

(b) That the Mitigated Negative Declaration and Mitigation Monitoring Plan have been completed in compliance with CEQA and CEQA Guidelines.

(c) That the Mitigated Negative Declaration and Mitigation Monitoring Plan represent the independent judgment and analysis of the Planning Commission and City Council as lead agency for the proposed Project.

(d) That the Mitigated Negative Declaration and Mitigation Monitoring Plan are adequate to serve as the required CEQA environmental documentation for the proposed Project.

(e) That CEQA Guidelines provide that once an EIR has been certified, the basis for an agency's determination a further EIR is not required may be included in the agency's findings on the project or elsewhere in the record (14 Cal Code Regs Section 15164(e); however, adoption of a subsequent mitigated negative declaration is appropriate because potentially significant impacts not addressed in the underlying EIR can be substantially reduced or avoided by adopting additional mitigation measures, which the City has done via the Mitigated Negative Declaration and Mitigation Monitoring Plan. In other words, the City has evaluated changed made to the project and concluded that significant impacts have been avoided or substantially reduced through the adoption of mitigation measures, as set forth herein.

**SECTION 4. ADOPT THE MITIGATION MONITORING AND REPORTING PROGRAM AND APPROVAL OF MITIGATED NEGATIVE DECLARATION**

That based on the Findings and Determinations set forth herein and the substantial evidence included in the Recitals, Exhibits and Evidence contained in Administrative Record, the City Council hereby adopts the Mitigation Monitoring and Reporting Program and approves the Mitigated Negative Declaration, including the findings set forth therein which support a determination that all potentially significant environmental impacts from implementation of the proposed Project have been identified and, with the implementation of the mitigation measures defined and set forth in the Mitigation Monitoring and Reporting Program, will be mitigated to a less-than-significant level.

**SECTION 5. NOTICE OF DETERMINATION**

That the City Council authorizes and directs the Planning Division to prepare, execute, and file a Notice of Determination in accordance with Public Resource Code Section 21152.

**SECTION 6. EFFECTIVE DATE**

That this Resolution shall take effect immediately upon its adoption.

**SECTION 7. SEVERABILITY**

That if any provision, section, paragraph, sentence or word of Resolution or any portion of the Administrative Record for the Proposed Project be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words as hereby adopted shall remain in full force and effect.

**SECTION 8. CERTIFICATION.**

That the City Clerk shall certify as to the adoption of this Resolution and shall cause the same to be processed in the manner required by law.

**SECTION 9. REPEAL OF CONFLICTING PROVISIONS.**

That all provisions of any resolution in effect prior to the effective date of this Resolution as adopted by the City Council that are in conflict with the provisions of this Resolution, are hereby repealed.

**PASSED AND ADOPTED on this ___ day of ____, 2025.**

_____
Lynn Mallotto, Mayor

ATTEST:

_____
Kristie Ramos, City Clerk

APPROVED AS TO FORM:

_____
Colin Kirkpatrick, City Attorney

**EXHIBIT "A"**

**MITIGATED NEGATIVE DECLARATION &**

**MITIGATION MONITORING AND REPORTING PROGRAM**

**(EA21-0002)**

**[TO BE ATTACHED]**

**RESOLUTION NO. _____**

**A RESOLUTION OF THE CITY COUNCIL OF RANCHO MIRAGE, CALIFORNIA, APPROVING GENERAL PLAN ZONING MAP AMENDMENT CASE NO. GPZMA 21-0001, APPROVING TENTATIVE PARCEL MAP TPM 23-0002, AND MAJOR MODIFICATION MOD21-0004, REGARDING THE RITZ CARLTON RANCHO MIRAGE**

**WHEREAS**, the City of Rancho Mirage is a charter city and a municipal corporation of the State of California, and recognized as a political subdivision of State of California for certain purpose; and

**WHEREAS**, on January 9, 2025, the Planning Commission recommended the City Council approve and adopt a Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program regarding the Proposed Project, and approve the "Proposed Project", which proposes the construction of the Ritz Carlton Residences, including but not limited to amenities and subterranean parking structure; and a Sky Mesa recreation area including but not limited to restaurant and restroom facility, lawn event space and pool area; a General Plan Zoning Map Amendment to amend the Mountain Reserve (MR) designation for the Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (GPZMA 21-0002); a Tentative Parcel Map (TPM23-0002) establishing three parcels, with Parcel 3 containing 106 condo units; a Major Modification to existing Preliminary Development Plan PDP06001 (MOD21-0004); and a 10th Amendment to existing Development Agreement with Newage Rancho Mirage, LLC (DA 21-0002) (the "Development Agreement Amendment"); affecting the real property generally located along Frank Sinatra Drive, approximately 0.85 miles southwest of the intersection with Highway 111, within the City of Rancho Mirage, having Assessor Parcel Numbers 689-330-026, 028, -031, -032, and -034; 689-020-012, -014; and 689-331-001, and -018 (the "Subject Property); and

**WHEREAS**, the City Council desires to adopt the General Plan Zoning Map Amendment (GPZMA21-0001) (the "GPZMA"), Tentative Parcel Map TPM 23-0002, and Major Modification (MOD21-0004) (the "Major Mod"); and

**WHEREAS**, on December 18, 2025, the City Council adopted Resolution No. [TO BE INSERTED] approving and adopting a Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program for the Proposed Project.

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, DOES HEREBY RESOLVE AS FOLLOWS:**

**SECTION 1. RECITALS AND EXHIBITS**

That the foregoing Recitals and attached Exhibits are true and correct and are hereby incorporated by this reference.

**SECTION 2. EVIDENCE AND ADMINISTRATIVE RECORD.**

That the City Council conducted a noticed Public Hearing on [INSERT], 2025, and considered all of the evidence submitted into the administrative record for the Proposed Project, including, but not limited to, the following, which are all hereby incorporated herein by reference:

(a) Rancho Mirage Municipal Code;
(b) Rancho Mirage General Plan and Titles 16 (Subdivisions) & 17 (Zoning) of the Rancho Mirage Municipal Code and all relevant provisions contained therein;
(c) Tentative Parcel Map (TPM23-0002);
(d) General Plan Zoning Map Amendment GPZMA 21-0001;
(e) Major Modification to Preliminary Development Plan, Case No. MOD21-0004;
(f) Development Agreement Amendment Case No. DA21-0002;
(g) Initial Study,
(h) Notice of Intent to adopt MND;
(i) MND and MMRP;
(j) Notice of Planning Commission Public Hearing scheduled for January 9, 2025, at 2:00 p.m. in the Council Chamber, located at City Hall at 69-825 Highway 111, Rancho Mirage, California;
(k) Planning Commission Staff Report, attachments and Staff presentation for the Proposed Project, and all public documents, records and references related thereto submitted or provided at or prior to the January 9, 2025, Planning Commission Public Hearing;
(l) Testimony and/or comments from Developer and its representatives submitted or provided at, or prior to, the January 9, 2025, Planning Commission Public Hearing;
(m) Testimony and/or comments from all persons that were provided in written format or correspondence, at, or prior to, the January 9, 2025, Planning Commission Public Hearing;
(n) Notice of City Council Public Hearing scheduled for December 18, 2025, at 1:00 p.m. in the Council Chamber, located at City Hall at 69-825 Highway 111, Rancho Mirage, California;
(o) Planning Commission Staff Report, attachments and Staff presentation for the Proposed Project, and all public documents, records and references related thereto submitted or provided at or prior to the December 18, 2025, City Council Public Hearing;
(p) Testimony and/or comments from Developer and its representatives submitted or provided at, or prior to, the December 18, 2025, City Council Public Hearing; and
(q) Testimony and/or comments from all persons that were provided in written format or correspondence, at, or prior to, the December 18, 2025, City Council Public Hearing.

**SECTION 3. GPZMA FINDINGS**

That the City Council finds the GPZMA is consistent with the General Plan, upon consideration of all of its aspects, including without limitation that the proposed amendment further the objectives and policies of the General Plan and do not obstruct their attainment.

**SECTION 3. ADOPT GENERAL PLAN ZONING MAP AMENDMENT**

That the City Council hereby amends the General Plan Zoning Map, changing the existing designation from Mountain Reserve (MR) to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014), as identified in more detail in Exhibit "A".

**SECTION 4. FINDINGS**

That the City Council finds as follows:

a) That the proposed subdivision, together with the provisions for its design and improvements, are consistent with all applicable provisions of the municipal code;
b) That the proposed Tentative Parcel Map (TPM23-0002) is consistent with applicable general and specific plans as specified in California Government Code Section 65451;
c) That the design or improvement of the proposed subdivision is consistent with applicable general and specific plans;
d) That the site is physically suitable for the type of development;
e) That the site is physically suitable for the proposed density of development;
f) That the design of the subdivision or the proposed improvements is not likely to cause substantial environmental damage or substantially and avoidably injure fish or wildlife or their habitat;
g) That the design of the subdivision or type of improvements is not likely to cause serious public health problems; and
h) That the design of the subdivision or the type of improvements will not conflict with easements, acquired by the public at large, for access through or use of, property within the proposed subdivision;
j) That proposed development under the Major Modification is allowed within the respective zoning district as permitted under the General Plan and applicable Specific Plan;
k) That Major Mod is generally in compliance with all of the applicable provisions of Title 17 that are necessary to carry out the purpose and requirements of the respective zoning district, including prescribed development standards and applicable design guidelines;
l) That Major Mod is consistent with the General Plan and applicable Specific Plan; and
m) The proposed project produces a comprehensive development incorporating a more enhanced environment and architectural excellence (e.g., appropriate variety of structure placement and orientation opportunities, appropriate mix of structure

sizes, high quality architectural design, increased amounts of landscaping and open space, improved solutions to the design and placement of parking facilities, etc.) than would normally be possible under more standard district development requirements;

n) The design, location, shape, size, operating characteristics, and the provision of public and emergency vehicle access and public services and utilities (e.g., drainage, fire protection, sewers, water, etc.), ensure that the proposed development would not endanger, jeopardize, or otherwise constitute a hazard to the public convenience, health, interest, safety, or welfare, or injurious to the property or improvements in the vicinity and the respective zoning district;
o) The design, location, and proposed uses is compatible with the character of existing development in the surrounding neighborhood;
p) The subject site is physically suitable for the type and density/intensity of development being proposed; and
q) That the Proposed Project have been reviewed in compliance with the provisions of the California Environmental Quality Act (CEQA) and CEQA Guidelines.

**SECTION 5. PROJECT APPROVAL**

That based on the foregoing Recitals and the Evidence contained in the Administrative Record for the Proposed Project, the City Council Findings, as set forth and described herein, and the findings and determinations set forth in the January 9, 2025, Planning Commission Staff Report and the resolutions, the City Council hereby approves the Tentative Parcel Map Case No. TPM23-0002, Major Modification Case No. MOD21-0004, and General Plan Zoning Map Amendment Case No. GPZMA21-0001.

**SECTION 6. EFFECTIVE DATE**

That this Resolution shall take effect immediately upon its adoption.

**SECTION 7. GOVERNMENT CODE 66020 NOTICE**

That pursuant to Government Code section 66020(d)(1), notice is hereby given that the Proposed Project is subject to certain fees, dedications, reservations and other exactions as provided herein, in the staff report and conditions of approval (collectively, “Conditions”); and these Conditions constitute written notice of a statement of the amount of such fees, and a description of the dedications, reservations, and other exactions, and that the applicant is hereby notified that the ninety-day approval period in which the applicant may protest these fees, dedications, reservations, and other exactions, pursuant to Government Code Section 66020(a), has commenced upon the date of adoption of this Resolution.

**SECTION 8. SEVERABILITY**

That if any provision, section, paragraph, sentence or word of this Resolution be rendered or declared invalid by any final court action in a court of competent jurisdiction

or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words as hereby adopted shall remain in full force and effect.

**SECTION 9. CERTIFICATION**

That the City Clerk shall certify as to the adoption of this Resolution and shall cause the same to be processed in the manner required by law.

**SECTION 10. REPEAL OF CONFLICTING PROVISIONS**

That all provisions of any resolution and/or General Plan Zoning Map, in effect prior to the effective date of this Resolution as adopted by the City Council that are in conflict with the provisions of this Resolution, are hereby repealed.

The foregoing Resolution was approved and adopted at a meeting of the City Council held on _____ by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

**CITY OF RANCHO MIRAGE:**

_____
Lynn Mallotto, Mayor

**ATTEST:**

_____
Kristie Ramos, City Clerk

**APPROVED AS TO FORM:**

_____
Colin D. Kirkpatrick, City Attorney

**EXHIBIT "A"**

**GENERAL PLAN ZONING MAP AMENDMENT**

**CASE NO. GPZMA24-0001**

**[TO BE ATTACHED]**

**EXHIBIT "B"**

**TENTATIVE PARCEL MAP**

**TPM23-0002 (TPM38768)**

**[TO BE ATTACHED]**

**EXHIBIT "C"**

**MAJOR MODIFICATION**

**MOD21-0004**

**[TO BE ATTACHED]**

**ORDINANCE NUMBER 2025-_____**

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, APPROVING THE TENTH AMENDMENT TO STATUTORY DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF RANCHO MIRAGE AND NEWAGE RANCHO MIRAGE, LLC**

**WHEREAS**, City of Rancho Mirage (the "City") is a charter city and a municipal corporation of the State of California, and recognized as a political subdivision of the State for certain purposes; and

**WHEREAS**, on or about August 5, 1983, the City and Federated Development Company ("Federated") entered into a Development Agreement ("Original Development Agreement") under the provisions of the Development Agreement Statute pertaining to the property described therein and which was recorded on November 29, 1983, as Instrument No. 247445, with the Riverside County Recorder's Office and which is hereby incorporated herein by this reference as though set forth at length; and

**WHEREAS**, the Original Development Agreement has been amended 9 times, with the Original Agreement and all subsequent amendments incorporated herein by this reference, prior to the proposed 10th Amendment, as detailed in the Recitals of the 10th Amendment, attached hereto and incorporated herein by this reference as Exhibit "A" (the "10th Amendment"). As detailed in the Recitals to the 10th Amendment, the original counterparty to the Development has been updated numerous times, with the current owner of the subject property and project applicant being Newage Rancho Mirage, LLC; and

**WHEREAS**, Newage has proposed this 10th Amendment to the Original Development Agreement which includes the following: 1) Environmental Assessment Case Number EA21-0002 for the environmental review of the "Project", which currently includes a proposed Mitigated Negative Declaration that includes Mitigation Measures for Biological Resources, Cultural Resources, Noise, Transportation, and Tribal Cultural Resources; 2) General Plan Zoning Map Amendment Case No. GPZMA21-0001 for a zone change from Mountain Reserve (MR) to Resort Hotel (Rs-H) for the Sky Mesa portion of the Project Site; 3) Development Agreement Case No. DA21-0002 for a 10th Amendment to the Original Development Agreement; 4) Tentative Parcel Map Case No. TPM23-0002 ("TPM38768") which is a parcel map for condominium purposes which establishes three parcels for the Hotel Site (excluding the Sky Mesa area) which include Parcel 1 (2.699 acres) for the existing Spa Suites Site, Parcel 2 (15.995 acres) for the Hotel Site, and Parcel 3 (11.873 acres) for an event space, parking structure, and 106 residential condominium units; and 5) Major Modification Case No. MOD21-0004 for the project entitlements which consist of 106 residential units that include 1 to 3 bedrooms, 23,843 square feet of event space, 6,273 square feet of restaurant, 5,513 square feet for amenities, a 381-space subterranean parking structure, and other recreational amenities; and

**WHEREAS**, to strengthen the public planning process, encourage private participation in comprehensive planning and reduce the economic risk of development, the Legislature of the State of California adopted Sections 65864 et seq. of the California Government Code, "Development Agreement Statute" which authorizes cities to enter into property development agreements with any person(s) or entity(ies) having a legal or equitable interest in real property for the development of such real property in order to establish certain development rights in the real property; and

**WHEREAS**, pursuant to Chapter 17.56, “Development Agreements” of the Rancho Mirage Municipal Code, a development agreement is intended to provide assurances to Developer that an approved project may proceed subject to the policies, rules, regulations, and conditions of approval applicable to the project at the time of approval, regardless of any changes to City policies, rules, and regulations after project approval, and provide assurances that City cannot otherwise unilaterally impose conditions of approval of the project outside the context of a negotiated development agreement; and

**WHEREAS**, this Amendment will eliminate uncertainty in planning for and secure orderly development of the Subject Property, assure progressive installation of necessary improvements, and ensure attainment of the maximum effective utilization of resources within City at the least economic cost to its citizens; and

**WHEREAS**, the Development Agreement Statute, in relevant part, provides that (1) a development agreement may be amended by mutual consent of the parties to the agreement, and (2) notice of intention to amend shall be given in the same manner as a development agreement as set forth in Government Code Section 65867; (3) amendments are subject to Government Code Section 65867.5, which provides that a development agreement is a legislative act that shall be approved by an ordinance, and that the agreement shall not be approved unless the legislative body finds that the provisions of the agreement are consistent with the general plan and any appliable specific plan, and that the requirements apply to charter cities; and

**WHEREAS**, the parties to the Development Agreement desire to amend the agreement, and notice was provided as required in the Development Agreement Statute; and

**WHEREAS**, on January 9, 2025, the Rancho Mirage Planning Commission adopted Resolution No. 2025-PC-02, incorporated herein by this reference, recommending, in part, the City Council introduce and adopt this Ordinance, approving and adopting the proposed 10th Amendment; and

**WHEREAS**, on December 18, 2025, at a duly noticed meeting of the City Council, the City Council approved Resolution No. 2025-[TO BE INSERTED] adopting the Mitigation Monitoring and Reporting Program and approving the Mitigated Negative Declaration; and

**WHEREAS**, based on the foregoing recitals, City has determined that this Amendment is appropriate under the Development Agreement Statute and Chapter 17.56 of the Rancho Mirage Municipal Code; and

**WHEREAS**, the Amendment is voluntarily entered into in consideration of the benefits to and the rights created in favor of each of the parties hereto and in reliance upon the various representations and warranties contained herein.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES ORDAIN AS FOLLOWS:**

**SECTION 1. RECITALS**

That the above Recitals are true and correct and are incorporated as though fully set forth herein.

**SECTION 2. APPROVAL OF 10th AMENDMENT TO DEVELOPMENT AGREEMENT**

That the City Council hereby approves the attached 10th Amendment to Development Agreement by and between City of Rancho Mirage, a municipal corporation located in the County of Riverside, State of California ("City"), and Newage Rancho Mirage, LLC, a California limited liability company (“Developer”), pursuant to the authority of Sections 65864 et seq. of the California Government Code and Chapter 17.56 (Development Agreements) of the Rancho Mirage Municipal Code.

**SECTION 3. CITY ATTORNEY REVIEW**

That the City Attorney prepared and framed this Ordinance pursuant to Section 1.04.010 of the Municipal Code and finds that the City Council has the authority to adopt this Ordinance, that the Ordinance is constitutionally valid and that the Ordinance is consistent with the general power and purposes of the City as set forth in Section 1.04.031 of the Municipal Code.

**SECTION 4. CEQA COMPLIANCE**

That the City Council acting on behalf of the “Lead Agency,” under the California Environmental Quality Act (“CEQA”) and the CEQA Guidelines, on December 18, 2025 approved Resolution No. 2025-[NEXT IN ORDER], approving and adopting a mitigated negative declaration (the “MND”) and a mitigation monitoring and reporting program (“MMRP”) for the Project (Environmental Assessment Case No. EA21-0002), based upon its determination that mitigation measures imposed on the Project will avoid or mitigate impacts to a point where clearly no significant impacts on the environment would occur.

**Section 5. GOVERNMENT CODE SECTION 65867.5(b)**

That the City Council finds that the provisions of the Amendment are consistent with the City's General Plan.

**Section 6. SEVERABILITY**

That the City Council declares that, should any provision, section, paragraph, sentence or word of this Ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this Ordinance as hereby adopted shall remain in full force and effect.

**SECTION 7. GOVERNMENT CODE 66020 NOTICE**

That pursuant to Government Code section 66020(d)(1), notice is hereby given that the Proposed Project is subject to certain fees, dedications, reservations and other exactions as provided herein, in the staff report and conditions of approval (collectively, "Conditions"); and these Conditions constitute written notice of a statement of the amount of such fees, and a description of the dedications, reservations, and other exactions, and that the applicant is hereby notified that the ninety-day approval period in which the applicant may protest these fees, dedications, reservations, and other exactions, pursuant to Government Code Section 66020(a), has commenced upon the date of adoption of this Ordinance.

**SECTION 8. EFFECTIVE DATE OF ORDINANCE**

That this Ordinance shall take effect thirty (30) days after its second reading by the City Council.

**SECTION 9. EXECUTION AND EFFECTIVE DATE OF AMENDMENT**

That in accordance with Section 17.56.050 of the City's Municipal Code, the 10th Amendment shall not be executed by the City until on or after the effective date of the Ordinance.

**SECTION 10. REPEAL OF CONFLICTING PROVISIONS**

That all the provisions of the Rancho Mirage Municipal Code as heretofore adopted by the City of Rancho Mirage that are in conflict with the provisions of this ordinance are hereby repealed.

**SECTION 11. RECORDATION OF AMENDMENT**

That in accordance with Section 17.56.050 of the City's Municipal Code, the City Clerk is hereby directed to record the fully executed Amendment with the Riverside County Recorder no later than ten (10) days after its execution.

**SECTION 12.** **CERTIFICATION**

That the City Clerk shall certify to the passage of this Ordinance and shall cause the same to be published according to law.

**PASSED AND ADOPTED THIS _____** day of **_____**, 2025.

CITY OF RANCHO MIRAGE
CITY COUNCIL

_____
Lynn Mallotto
Mayor

ATTEST:

_____
Kristie Ramos, CMC
City Clerk

APPROVED AS TO FORM:

_____
Colin D. Kirkpatrick
City Attorney

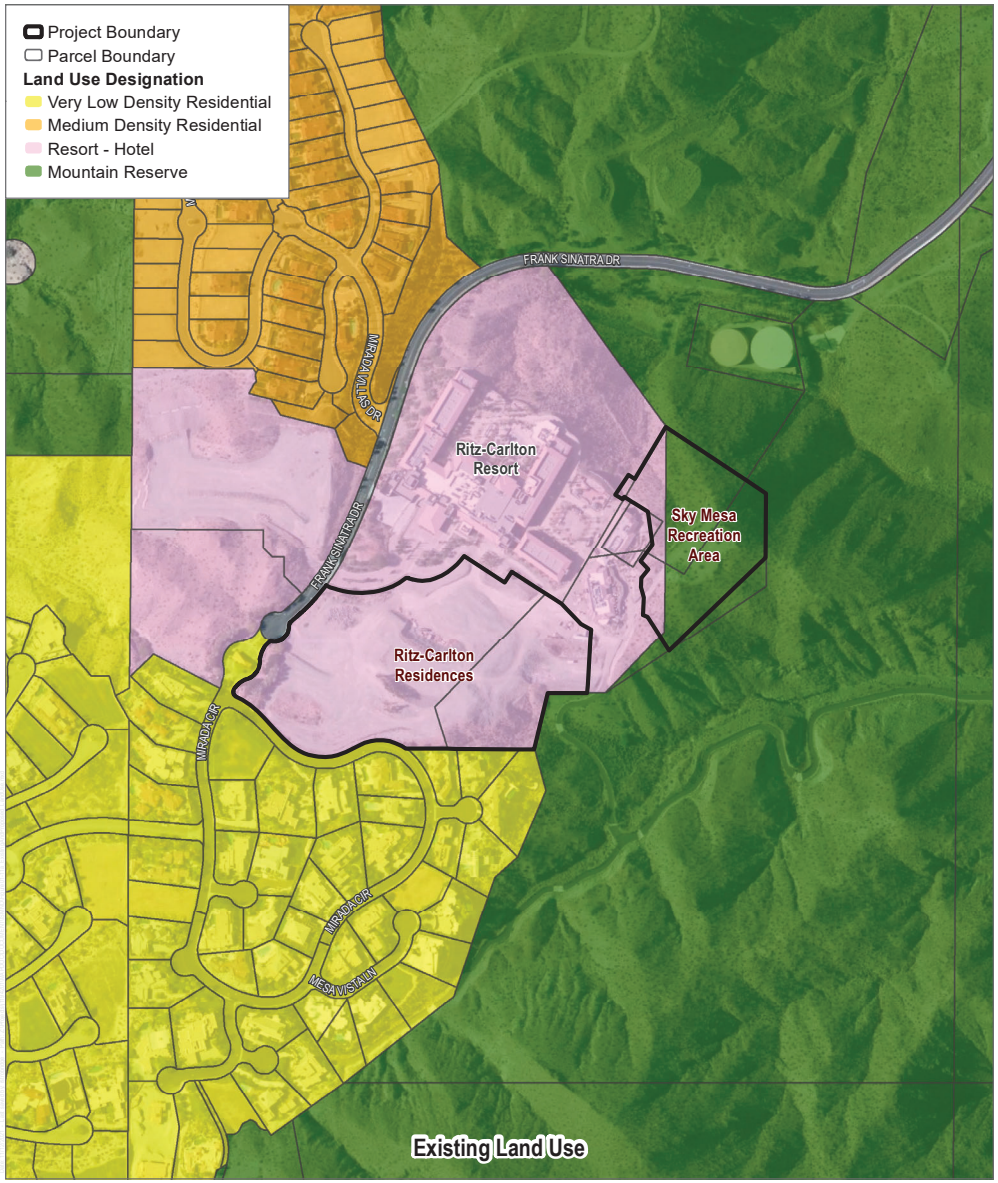
**ATTACHMENT "A"**

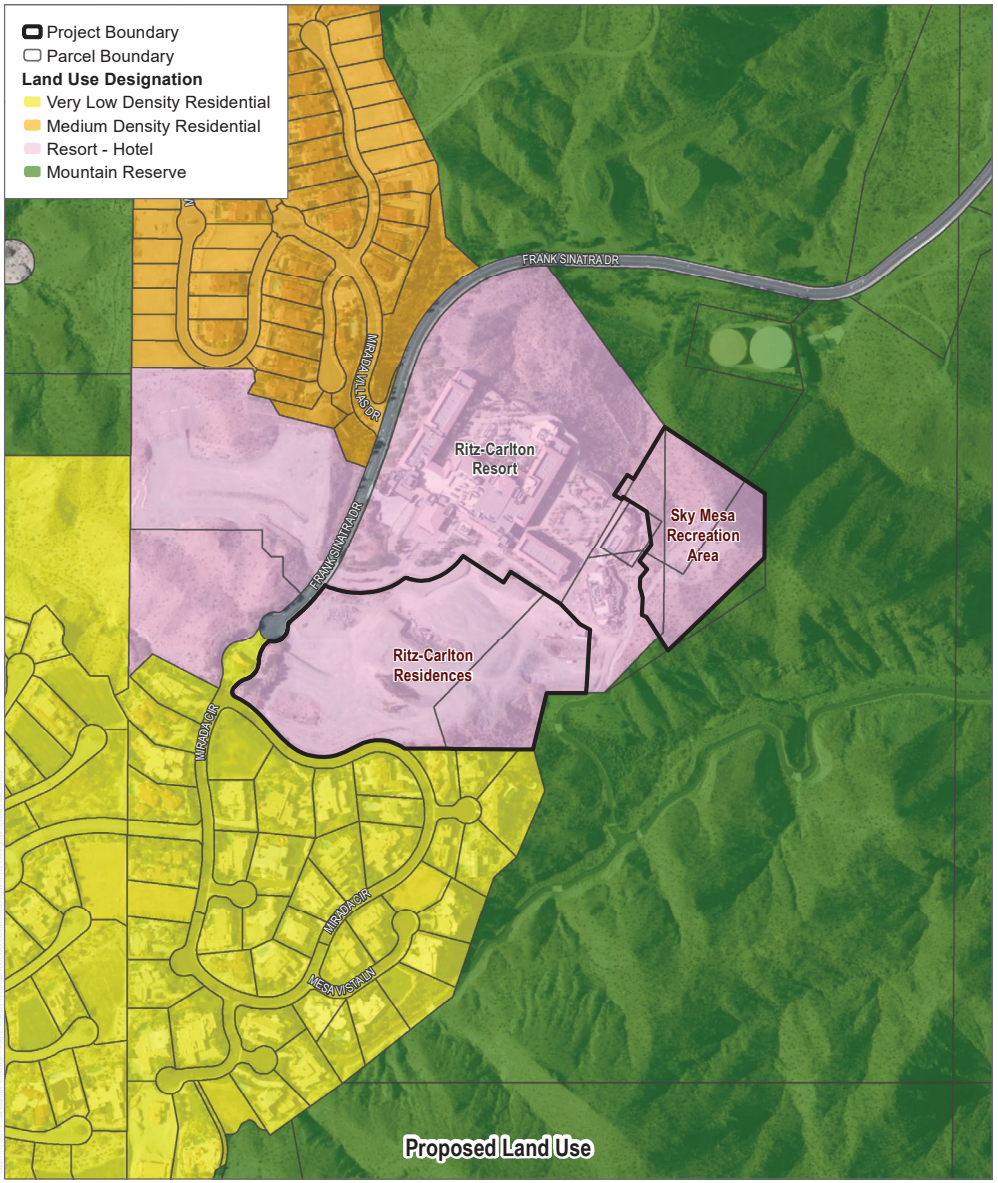
**10th AMENDMENT TO DEVELOPMENT AGREEMENT**
**BY AND BETWEEN**
**THE CITY OF RANCHO MIRAGE**
**AND**
**NEWAGE RANCHO MIRAGE, LLC**

**[TO BE ATTACHED]**

**ATTACHMENT 13**

# General Plan Zoning Map Amendment (GPZMA21-0001) Exhibit




SOURCE: ESRI Clarity Imagery 2019

DUDEK

0 200 400 Feet

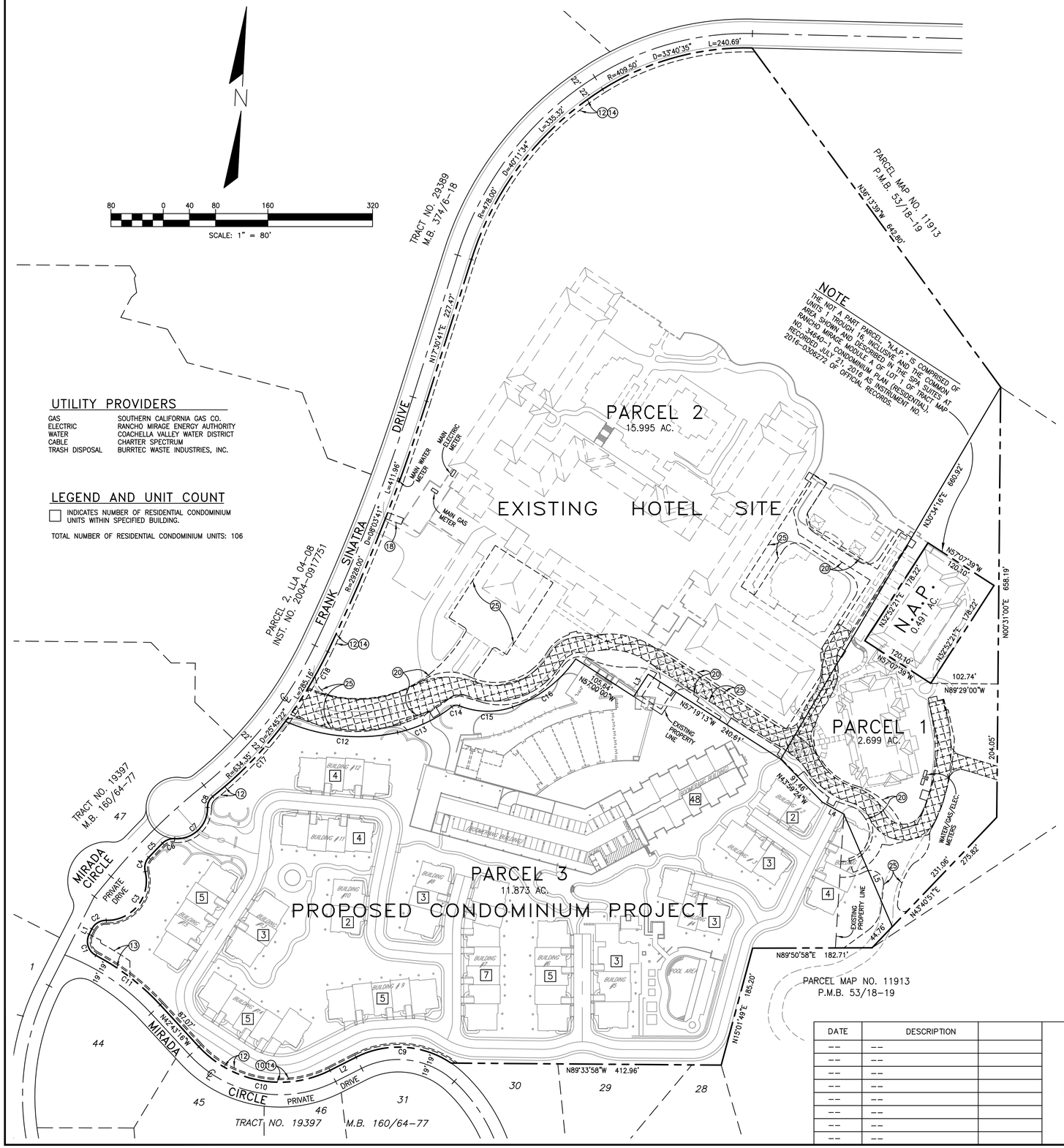
**FIGURE 1-12**

Existing and Proposed Land Use Designations

Ritz-Carlton Rancho Mirage Initial Study

# TENTATIVE PARCEL MAP NO. 38768

## IN THE CITY OF RANCHO MIRAGE
## COUNTY OF RIVERSIDE, STATE OF CALIFORNIA
## FOR CONDOMINIUM PURPOSES




NOTE
THE NOT A PART PARCEL "N.A.P." IS COMPRISED OF UNITS 1 TROUGH 16, INCLUSIVE AND THE COMMON AREA SHOWN AND DESCRIBED IN THE SPA SUITES AT RANCHO MIRAGE MODULE A OF LOT 1 OF TRACT MAP NO. 34640-1 CONDOMINIUM PLAN (RESIDENTIAL), RECORDED JULY 21, 2016 AS INSTRUMENT NO. 2016-0306272, OF OFFICIAL RECORDS.

### UTILITY PROVIDERS

| | |
|---|---|
| GAS | SOUTHERN CALIFORNIA GAS CO. |
| ELECTRIC | RANCHO MIRAGE ENERGY AUTHORITY |
| WATER | COACHELLA VALLEY WATER DISTRICT |
| CABLE | CHARTER SPECTRUM |
| TRASH DISPOSAL | BURRTEC WASTE INDUSTRIES, INC. |

### LEGEND AND UNIT COUNT

☐ INDICATES NUMBER OF RESIDENTIAL CONDOMINIUM UNITS WITHIN SPECIFIED BUILDING.

TOTAL NUMBER OF RESIDENTIAL CONDOMINIUM UNITS: 106

LINE DATA

| NO. | BEARING | DISTANCE |
|---|---|---|
| L1 | N26°54'41"E | 9.25' |
| L2 | N63°09'51"E | 44.56' |
| L3 | N33°00'00"E | 40.78' |
| L4 | N61°01'12"W | 37.59' |
| L5 | N23°19'08"W | 187.51' |

CURVE DATA

| NO. | RADIUS | DELTA | ARC |
|---|---|---|---|
| C1 | 24.00' | 89°02'30" | 37.30' |
| C2 | 24.00' | 64°25'31" | 26.99' |
| C3 | 60.00' | 105°19'38" | 110.30' |
| C4 | 24.00' | 55°07'34" | 23.09' |
| C5 | 950.91' | 01°49'55" | 30.41' |
| C6 | 24.00' | 49°01'32" | 20.54' |
| C7 | 47.00' | 95°03'04" | 77.97' |
| C8 | 21.00' | 52°21'26" | 19.19' |
| C9 | 144.00' | 60°42'42" | 152.58' |
| C10 | 169.00' | 74°06'46" | 218.60' |
| C11 | 369.00' | 19°24'33" | 125.00' |
| C12 | 278.00' | 36°04'40" | 175.05' |
| C13 | 205.00' | 25°51'28" | 92.52' |
| C14 | 11.50' | 60°20'04" | 12.11' |
| C15 | 115.50' | 41°16'55" | 83.22' |
| C16 | 195.00' | 36°18'53" | 123.59' |
| C17 | 634.35' | 14°28'35" | 160.27' |
| C18 | 634.35' | 11°16'47" | 124.88' |

### OWNER/SUBDIVIDER

NEWAGE RANCHO MIRAGE, LLC
68900 FRANK SINATRA DR.
RANCHO MIRAGE, CA 92270

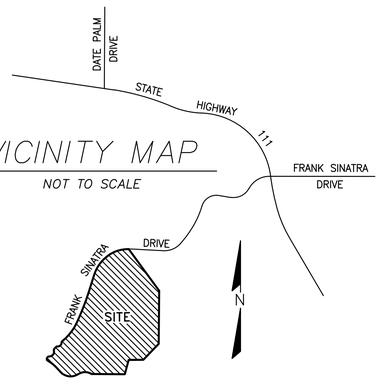
PREPARED UNDER THE SUPERVISION OF:

KENT COOPER P.L.S. 9322

PROFESSIONAL LAND SURVEYOR ★ KENT COOPER NO. 9322 ★ STATE OF CALIFORNIA

### AREA TABULATION

| | |
|---|---|
| PARCEL 1 | 2.699 AC. / 117,549 SQ. FT. |
| PARCEL 2 | 15.995 AC. / 696,744 SQ. FT. |
| PARCEL 3 | 11.873 AC. / 517,202 SQ. FT. |
| TOTAL | 30.567 AC. |
| MAP BOUNDARY | 31.058 AC. |
| N.A.P. | −0.491 AC. |
| TOTAL | 30.567 AC. |




### NOTE

SEE SHEET 2 FOR LEGAL DESCRIPTION.

### EXISTING EASEMENT NOTES ◯ INDICATES EASEMENT PLOTTED HEREON.

THE FOLLOWING EASEMENT NUMBERS CORRESPOND TO EXCEPTION NUMBERS OF PRELIMINARY REPORT, ORDER NO. NHSC-6955664, DATED FEBRUARY 7, 2023 PREPARED BY FIRST AMERICAN TITLE COMPANY, UNLESS OTHERWISE NOTED.

8. AN EASEMENT FOR ROADS, PIPELINES, DITCHES AND CONDUITS AND INCIDENTAL PURPOSES, RECORDED JANUARY 16, 1941 AS INSTRUMENT NO. 973 IN BOOK 489, PAGE 141 OF OFFICIAL RECORDS.
IN FAVOR OF: COACHELLA VALLEY COUNTY WATER DISTRICT
THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

(10) AN EASEMENT SHOWN OR DEDICATED ON THE MAP AS REFERRED TO IN THE LEGAL DESCRIPTION
FOR: PUBLIC UTILITY, EMERGENCY ACCESS ROAD AND INCIDENTAL PURPOSES.

(12) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED JULY 24, 1987 AS INSTRUMENT NO. 1987-0213561 OF OFFICIAL RECORDS.
IN FAVOR OF: SOUTHERN CALIFORNIA EDISON COMPANY

(13) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED NOVEMBER 25, 1987 AS INSTRUMENT NO. 1987-0337350 OF OFFICIAL RECORDS.
IN FAVOR OF: SOUTHERN CALIFORNIA EDISON COMPANY
THE EFFECT OF A DOCUMENT ENTITLED "PARTIAL QUITCLAIM OF EASEMENT", RECORDED MAY 11, 2007 AS INSTRUMENT NO. 2007-0316712 OF OFFICIAL RECORDS.

(14) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED DECEMBER 16, 1987 AS INSTRUMENT NO. 1987-0354070 OF OFFICIAL RECORDS.
IN FAVOR OF: GENERAL TELEPHONE COMPANY OF CALIFORNIA

(20) AN EASEMENT FOR UNDERGROUND PIPELINE AND NECESSARY DEVICES AND APPURTENANCES AND INCIDENTAL PURPOSES, RECORDED FEBRUARY 19, 2008 AS INSTRUMENT NO. 2008-0079681 OF OFFICIAL RECORDS.
IN FAVOR OF: COACHELLA VALLEY WATER DISTRICT, A PUBLIC AGENCY OF THE STATE OF CALIFORNIA

THE FOLLOWING EASEMENT NUMBERS CORRESPOND TO EXCEPTION NUMBERS OF PRELIMINARY REPORT, ORDER NO. NHSC-6958366, DATED FEBRUARY 21, 2023 PREPARED BY FIRST AMERICAN TITLE COMPANY, UNLESS OTHERWISE NOTED.

(18) AN EASEMENT FOR UNDERGROUND PIPELINE AND NECESSARY DEVICES AND APPURTENANCES AND INCIDENTAL PURPOSES, RECORDED JUNE 18, 2008 AS INSTRUMENT NO. 2008-0333030 OF OFFICIAL RECORDS.
IN FAVOR OF: COACHELLA VALLEY WATER DISTRICT, A PUBLIC AGENCY OF THE STATE OF CALIFORNIA

(25) AN EASEMENT SHOWN OR DEDICATED ON THE MAP AS REFERRED TO IN THE LEGAL DESCRIPTION
FOR: EMERGENCY ACCESS ROAD EASEMENT FOR EMERGENCY ACCESS PURPOSES, WITH THE RIGHT OF INGRESS AND EGRESS FOR EMERGENCY VEHICLES AND PERSONNEL AND INCIDENTAL PURPOSES.

### PROPOSED EASEMENT NOTES

EASEMENT — INDICATES AN ACCESS EASEMENT FOR THE USE AND BENEFIT OF THE OWNERS OF UNITS 1 TROUGH 16, INCLUSIVE AND THE COMMON AREA SHOWN AND DESCRIBED IN THE SPA SUITES AT RANCHO MIRAGE MODULE A OF LOT 1 OF TRACT MAP NO. 34640-1 CONDOMINIUM PLAN (RESIDENTIAL), RECORDED JULY 21, 2016 AS INSTRUMENT NO. 2016-0306272 OF OFFICIAL RECORDS.

| DATE | DESCRIPTION | |
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raSmith
CREATIVITY BEYOND ENGINEERING
8911 Research Drive
Irvine, CA 92618-4237
(949) 872-2378
rasmith.com

TENTATIVE
PARCEL MAP NO. 38768
68900 FRANK SINATRA DR.
A.P.N.'s 689-330-026, 028, 031, 032, 034
RANCHO MIRAGE, CA

| | |
|---|---|
| DATE: | 7/06/23 |
| SCALE: | 80 |
| JOB NO. | 3230037 |
| PROJECT MANAGER: | CHRIS BRATTY |
| DESIGNED BY: | TFW |
| CHECKED BY: | KEC |
| SHEET 1 OF 2 | |

# TENTATIVE PARCEL MAP NO. 38768

IN THE CITY OF RANCHO MIRAGE
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA
FOR CONDOMINIUM PURPOSES

## LEGAL DESCRIPTION

### PARCEL 1

REAL PROPERTY IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

LOTS 1 AND 2 OF TRACT NO. 34640–1, AS PER MAP RECORDED IN BOOK 443 PAGES 11 THROUGH 16 INCLUSIVE OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT FROM LOT 1, UNITS 1 THROUGH 16, INCLUSIVE AND COMMON AREA SHOWN AND DESCRIBED IN THE SPA SUITES AT RANCHO MIRAGE MODULE A OF LOT 1 OF TRACT MAP NO. 34640–1 CONDOMINIUM PLAN (RESIDENTIAL), RECORDED JULY 21, 2016 AS INSTRUMENT NO. 2016–0306272 OF OFFICIAL RECORDS.

APN: 689–330–031 (LOT 2), 689–330–032 (PORTION OF LOT 1) AND 689–330–034 (PORTION OF LOT 1)

### PARCEL 2

REAL PROPERTY IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

THOSE PORTIONS OF LOTS 50 AND 51 OF TRACT MAP NO. 19397, AS SHOWN BY MAP ON FILE IN BOOK 160 PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS, BEING LOCATED IN THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 5 SOUTH, RANGE 5 EAST, S.B.M., MORE PARTICULARLY DESCRIBED AS A WHOLE AS FOLLOWS:

BEGINNING AT THE MOST EASTERLY NORTHEAST CORNER OF SAID LOT 50; THENCE SOUTH 30°34'16" WEST, A DISTANCE OF 646.95 FEET; THENCE NORTH 57°00'00" WEST, A DISTANCE OF 226.38 FEET; THENCE SOUTH 33°00'00" WEST, A DISTANCE OF 56.08 FEET; THENCE NORTH 57°00'00" WEST, A DISTANCE OF 125.02 FEET TO THE BEGINNING OF A NON–TANGENT CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 92.50 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 70°08'57" EAST; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 27°55'01", AN ARC DISTANCE OF 45.07 FEET TO THE BEGINNING OF A COMPOUND CURVE, CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 195.00 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 42°13'55" EAST; THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 23°02'28", AN ARC DISTANCE OF 78.42 FEET TO THE BEGINNING OF A COMPOUND CURVE, CONCAVE NORTHERLY, AND HAVING A RADIUS OF 115.50 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 19°11'27" EAST; THENCE WESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 41°16'55", AN ARC DISTANCE OF 83.22 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE SOUTHERLY, AND HAVING A RADIUS OF 11.50 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 22°05'28" EAST; THENCE WESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 60°20'04", AN ARC DISTANCE OF 12.11 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 205.00 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 38°14'36" EAST; THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 25°51'28", AN ARC DISTANCE OF 92.52 FEET TO THE BEGINNING OF A COMPOUND CURVE, CONCAVE NORTHERLY, AND HAVING A RADIUS OF 278.00 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 12°23' 08" EAST; THENCE WESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 36°05'31", AN ARC DISTANCE OF 175.12 FEET TO A POINT ON THE WESTERLY LINE OF SAID LOT 50 OF TRACT MAP NO. 19397 AND THE BEGINNING OF A NON–TANGENT CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 634.35 FEET, A RADIAL LINE FROM LAST SAID NON–TANGENT CURVE TO SAID POINT BEARS SOUTH 53°08'51" EAST; THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE AND ALONG THE WESTERLY LINES OF SAID LOTS 50 AND 51, THROUGH A CENTRAL ANGLE OF 14°28'34", AN ARC DISTANCE OF 160.27 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE SOUTHEASTERLY AND HAVING A RADIUS OF 21.00 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 38°40'18" WEST; THENCE CONTINUING SOUTHERLY ALONG THE WESTERLY LINES OF SAID LOT 51 THROUGH THE FOLLOWING FOUR (4) COURSES:

1. THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 52°22'39", AN ARC DISTANCE OF 19.20 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 47.00 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 88°57'03" EAST;

2. THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 104°40'22", AN ARC DISTANCE OF 85.86 FEET TO THE BEGINNING OF A NON–TANGENT CURVE CONCAVE SOUTHEASTERLY AND HAVING A RADIUS OF 24.00 FEET, A RADIAL LINE FROM LAST SAID NON–TANGENT CURVE TO SAID POINT BEARS NORTH 21°46'24" WEST;

3. THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 22°58'08", AN ARC DISTANCE OF 9.62 FEET TO THE BEGINNING OF A COMPOUND CURVE, CONCAVE SOUTHEASTERLY AND HAVING A RADIUS OF 950.91 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 44°44'32 WEST;

4. THENCE SOUTHWESTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 00°40'54", AN ARC DISTANCE OF 11.31 FEET TO THE BEGINNING OF A NON–TANGENT CURVE CONCAVE EASTERLY AND HAVING A RADIUS OF 94.50 FEET, A RADIAL LINE FROM LAST SAID NON– TANGENT CURVE TO SAID POINT BEARS NORTH 52°09'57" WEST, SAID POINT ALSO BEING THE MOST NORTHERLY CORNER OF PORTION C, AS DESCRIBED IN CITY OF RANCHO MIRAGE LOT LINE ADJUSTMENT NO. 00–23, RECORDED OCTOBER 16, 2001 AS INSTRUMENT NO. 2001–501976 OF OFFICIAL RECORDS; THENCE SOUTHERLY ALONG THE EASTERLY LINE OF SAID PORTION C, AND THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 32°58'34", AN ARC DISTANCE OF 54.39 FEET TO THE BEGINNING OF A NON–TANGENT CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 60.00 FEET, A RADIAL LINE FROM LAST SAID NON–TANGENT CURVE TO SAID POINT BEARS NORTH 87°18'53" EAST, ALSO BEING A POINT ON SAID WESTERLY LINE OF LOT 51; THENCE SOUTHWESTERLY ALONG SAID WESTERLY LINE AND THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 78°08'58", AN ARC DISTANCE OF 81.84 FEET TO THE BEGINNING OF A NON– TANGENT CURVE CONCAVE SOUTHEASTERLY AND HAVING A RADIUS OF 78.50 FEET, A RADIAL LINE FROM LAST SAID NON–TANGENT CURVE TO SAID POINT BEARS NORTH 20°32'39" WEST, SAID POINT BEING THE NORTHWESTERLY CORNER OF PORTION B AS DESCRIBED IN CITY OF RANCHO MIRAGE LOT LINE ADJUSTMENT NO. 00–23, RECORDED OCTOBER 16, 2001 AS INSTRUMENT NO. 01–501976 OF OFFICIAL RECORDS; THENCE SOUTHWESTERLY ALONG THE EASTERLY LINE OF SAID PORTION B AND THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 35°05'08", AN ARC DISTANCE OF 48.07 FEET TO THE BEGINNING OF A COMPOUND CURVE, CONCAVE EASTERLY AND HAVING A RADIUS OF 19.50 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 55°37'47" WEST; THENCE CONTINUING SOUTHERLY ALONG SAID EASTERLY LINE OF PORTION B AND THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 49°01'23", AN ARC DISTANCE OF 16.68 FEET TO THE BEGINNING OF A NON–TANGENT CURVE CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 24.00 FEET, A RADIAL LINE FROM LAST SAID NON–TANGENT CURVE TO SAID POINT BEARS SOUTH 67°59'25" WEST, SAID POINT BEING ON THE SOUTHERLY LINE OF SAID LOT 51 OF TRACT MAP NO. 19397; THENCE ALONG THE SOUTHERLY, SOUTHEASTERLY AND EASTERLY LINES OF SAID LOT 51, THROUGH THE FOLLOWING TEN (10) COURSES:

1. THENCE SOUTHEASTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 39°32'15", AN ARC DISTANCE OF 16.56 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 369.00 FEET, A RADIAL LINE TO SAID POINT BEARS NORTH 28°27'10" EAST;

2. THENCE SOUTHEASTERLY ALONG THE ARC OF LAST SAID CURVE, THROUGH A CENTRAL ANGLE OF 18°49'32", AN ARC DISTANCE OF 121.24 FEET;

3. THENCE TANGENT TO SAID CURVE SOUTH 42°43'18" EAST, A DISTANCE OF 87.07 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHERLY AND HAVING A RADIUS OF 169.00 FEET;

04. THENCE EASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 74°06'51", AN ARC DISTANCE OF 218.61 FEET;

5. THENCE TANGENT TO SAID CURVE NORTH 63°09'51" EAST, A DISTANCE OF 44.56 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHERLY AND HAVING A RADIUS OF 144.00 FEET;

6. THENCE EASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 60°42'41", AN ARC DISTANCE OF 152.58 FEET;

7. THENCE NON–TANGENT TO SAID CURVE SOUTH 89°35'00" EAST, A DISTANCE OF 413.17 FEET;

8. THENCE NORTH 15°00'00" EAST, A DISTANCE OF 185.00 FEET;

9. THENCE NORTH 89°50'00" EAST, A DISTANCE OF 182.65 FEET;

10. THENCE NORTH 43°40'00" EAST, A DISTANCE OF 275.95 FEET;

THENCE CONTINUING ALONG THE EASTERLY LINE OF SAID LOT 51 AND ALONG THE EASTERLY LINE OF SAID LOT 50 NORTH 00°31'00" EAST, A DISTANCE OF 658.00 FEET TO THE POINT OF BEGINNING.

SAID LAND IS ALSO KNOWN AS PARCEL 2, AS SHOWN ON A MAP MARKED EXHIBIT "B" ATTACHED TO LOT LINE ADJUSTMENT NO. 06–07 CERTIFICATE OF COMPLIANCE, RECORDED JULY 25, 2007 AS INSTRUMENT NO. 2007–0480660 OF OFFICIAL RECORDS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPTING THEREFROM:

ALL OF LOT 1 OF TRACT NO. 34640–1, AS PER MAP RECORDED IN BOOK 443 PAGES 11 THROUGH 16 INCLUSIVE OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

APN: 689–330–026 and 689–330–028

| DATE | DESCRIPTION | |
|---|---|---|
| –– | –– | |
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| –– | –– | |
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| –– | –– | |

raSmith
CREATIVITY BEYOND ENGINEERING
8911 Research Drive
Irvine, CA 92618-4237
(949) 872-2378
rasmith.com

TENTATIVE
PARCEL MAP NO. 38768
68900 FRANK SINATRA DR.
A.P.N.'s 689–330–026, 028, 031, 032, 034
RANCHO MIRAGE, CA

DATE: 7/06/23
SCALE: NONE
JOB NO. _____
PROJECT MANAGER: CHRIS BRATTY
DESIGNED BY: TFW
CHECKED BY: KEC
SHEET 2 OF 2

**PROJECT CASE NUMBERS: EA21-0002, GPZMA21-0001, MOD21-0004, DA21-0002**



# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

# SHEET INDEX


**COVER**

| | |
|---|---|
| A-0.1 | SHEET INDEX & PROJECT DATA |
| A-0.2 | OVERALL SITE PLAN |
| A-0.3 | PARTIAL SITE PLAN |
| A-R.1 | SITE ENTRY RENDERING |
| A-R.2 | THE VENUE RENDERING |
| A-R.3 | THE LOUNGE RENDERING |
| A-R.4 | BUILDING A-1 RENDERING |

**BUILDING A-1**

| | |
|---|---|
| C-1.0 | PARKING LEVEL P3 |
| C-1.1 | PARKING LEVEL P2 |
| C-1.2 | PARKING LEVEL P1 / GROUND FLOOR |
| C-1.3 | FIRST FLOOR PLAN |
| C-1.4 | SECOND FLOOR PLAN |
| C-1.5 | ROOF PLAN |
| C-2.0 | ELEVATIONS - THE VENUE |
| C-2.1 | ELEVATIONS - THE VENUE |
| C-2.2 | ELEVATIONS - RESIDENTIAL UNITS |
| C-2.3 | ELEVATIONS - RESIDENTIAL UNITS |
| C-2.4 | SITE SECTION |
| C-2.5 | LINE-OF-SIGHT STUDY |
| C-3.0 | THE VENUE PLAN |
| C-3.1 | RESIDENTIAL UNIT PLANS |

**BUILDING B-1 to B-15**

| | |
|---|---|
| V-1.0 | TYP. DUPLEX/TRIPLEX FLOOR PLANS |
| V-1.1 | TYP. FOURPLEX FLOOR PLANS |
| V-1.2 | TYP. FIVEPLEX FLOOR PLANS |
| V-1.3 | BUILDING B-5 FLOOR PLANS |
| V-1.4 | BUILDING B-9 FLOOR PLANS |
| V-1.5 | BUILDING B-11 FLOOR PLANS |
| V-1.6 | BUILDING B-12 FLOOR PLANS |
| V-1.7 | TYPICAL ROOF PLANS |
| V-1.8 | BUILDING B-5 & B-9 ROOF PLANS |
| V-1.9 | BUILDING B-11 & B-12 ROOF PLANS |
| V-2.0 | DUPLEX ELEVATIONS |
| V-2.1 | TRIPLEX ELEVATIONS |
| V-2.2 | FOURPLEX ELEVATIONS |
| V-2.3 | FIVEPLEX ELEVATIONS |
| V-2.4 | BUILDING B-9 ELEVATIONS |
| V-2.5 | BUILDING B-11 ELEVATIONS |
| V-2.6 | SITE SECTION |
| V-3.0 | UNIT FLOOR PLANS |
| V-3.1 | UNIT FLOOR PLANS |
| V-3.2 | THE LOUNGE ENLARGED PLANS |
| V-3.3 | THE LOUNGE ENLARGED PLANS |
| V-3.4 | THE LOUNGE ENLARGED PLANS |

**SKY MESA AREA**

| | |
|---|---|
| R-1.0A | SKY MESA COLORED SITEPLAN |
| R-1.0 | SKY MESA ENLARGED SITEPLAN |
| R-1.1 | SKY MESA FLOOR PLAN |
| R-1.2 | SKY MESA ELEVATIONS |
| R-1.3 | SKY MESA ELEVATION & SECTION |
| R-1.4 | SKY MESA ROOF PLAN |
| R-2.1 | SKY MESA RESTROOM PLAN |
| R-2.2 | SKY MESA RESTROOM SECTIONS |

**RETAINING WALL LOCATIONS**

| | |
|---|---|
| AL.0.00 | SITE PLAN |
| AL.0.01 | ENHANCED RETAINING WALL PLAN VIEW |
| AL.0.02 | ENHANCED RETAINING OVERALL ELEVATION A&B |
| AL.0.01 | ENHANCED RETAINING WALL ELEVATION DETAIL A&B |
| AL.0.01 | ENHANCED RETAINING WALL AXONOMETRIC VIEW |

**COLOR & MATERIALS**

| | |
|---|---|
| CM-1.0 | PHASE II EXPANSION |
| CM-1.1 | SKY MESA |

**LANDSCAPE**

| | |
|---|---|
| LR-0 | SHEET INDEX - ILLUSTRATIVE REF. PLAN |
| LR-01 | SHEET ORGANIZATION MATER & MASTER PLANT PALETTE - RESIDENTIAL |
| LR-02 | SHEET ORGANIZATION MATER & MASTER PLANT PALETTE - SKY MESA |
| LS-01 | SHRUB PLAN |
| LS-02 | SHRUB PLAN |
| LS-03 | SHRUB PLAN |
| LS-04 | SHRUB PLAN |
| LS-05 | SHRUB PLAN |
| LS-06 | SHRUB PLAN |
| LS-07 | SHRUB PLAN |
| LS-08 | SHRUB PLAN |
| LS-09 | SHRUB PLAN |
| LS-10 | SHRUB PLAN |
| LS-11 | SHRUB PLAN |
| LS-12 | SHRUB PLAN |
| LT-01 | TREE PLAN |
| LT-02 | TREE PLAN |
| LT-03 | TREE PLAN |
| LT-04 | TREE PLAN |
| LT-05 | TREE PLAN |
| LT-06 | TREE PLAN |
| LT-07 | TREE PLAN |
| LT-08 | TREE PLAN |
| LT-09 | TREE PLAN |
| LT-10 | TREE PLAN |
| LT-11 | TREE PLAN |
| LT-12 | TREE PLAN |
| LN-01 | LANDSCAPE NOTES |
| LF-01 | LANDSCAPE FEATURES PLAN - RESIDENTIAL |
| LF-02 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-03 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-04 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-05 | LANDSCAPE FEATURES PLAN - SKY MESA |

**CIVIL**

| | |
|---|---|
| C-1 | TITLE SHEET |
| C-2 | DETAILS & TYPICAL SECTIONS |
| C-3 | SITE GRADING - GROUND LEVEL |
| C-4 | SITE GRADING - P2 LEVEL |
| C-5 | SITE GRADING - P3 LEVEL |
| C-6 | SITE GRADING - SKY MESA |
| C-7 | YARD DRAIN-GROUND LEVEL-NW CORNER |
| C-8 | YARD DRAIN-GROUND LEVEL-NE CORNER |
| C-9 | YARD DRAIN-GROUND LEVEL-SW CORNER |
| C-10 | YARD DRAIN-GROUND LEVEL-SE CORNER |
| C-11 | YARD DRAIN-GROUND LEVEL-WESERTLY SITE |
| C-12 | YARD DRAIN-GROUND LEVEL-EASTERTLY SITE |
| C-13 | RETAINING WALL LOCATION & SECTIONS PLAN WALL NO. A & B |
| C-14 | RETAINING WALL LOCATION & SECTIONS PLAN WALL NO. C, D, & E |
| C-15 | RETAINING WALL PALN & PROFILE WALL - F |


## PROJECT CASE NUMBERS:

**EA21-0002, GPZMA21-0001, MOD21-0004, DA21-0002**

## ARCHITECTURAL STYLE NARRATIVE:

THE PROJECT'S ARCHITECTURAL STYLE IS CONTEMPORARY DESERT ARCHITECTURE COMPATIBLE WITH THE EXISTING RITZ-CARLTON ARCHITECTURAL STYLE. COLORS AND MATERIALS RELATE BACK TO THE EXISTING HOTEL AND ARE INFLUENCED BY THE SURROUNDING NATURAL DESERT TO GROUND IT ONTO THE SITE.

# AREA BREAKDOWN

## BUILDING A-1

| **THE VENUE** | **NET AREA** |
|---|---|
| PRE-FUNCTION SPACE | 5,600 SF |
| MAIN EVENT SPACE | 11,135 SF |
| AUXILIARY SPACES | 7,108 SF |
| **VENUE TOTAL** | **23,843 SF** |
| **EXTENSION COMMON SPACE** | **3,960 SF** |

**RESIDENTIAL UNITS**

| **PLAN TYPE** | **COUNT** | **UNIT AREA** | **NET AREA** |
|---|---|---|---|
| PLAN A - 1BR/1BA | 26 | 1063 | 27,638 SF |
| PLAN B - 2BR/2BA LOCK-OFF | 12 | 1645 | 19,740 SF |
| PLAN C - 2BR/3BA LOCK-OFF | 10 | 1918 | 19,180 SF |
| **RESIDENTIAL UNITS TOTAL** | **48** | | **66,558 SF** |

**BUILDING A-1 TOTAL** **90,401 SF**

## BUILDING B-1 to B-15

| **RESIDENTIAL UNIT TYPE** | **COUNT** | **UNIT AREA** | **SUBTOTAL** |
|---|---|---|---|
| PLAN 1 - 2BR/2BA | 15 | 2131 | 31,965 SF |
| PLAN 1X - 2BR/2BA | 14 | 2117 | 29,638 SF |
| PLAN 2 - 3BR/3BA | 15 | 2461 | 36,915 SF |
| PLAN 2X - 3BR/3BA | 14 | 2525 | 35,350 SF |
| **RESIDENTIAL UNIT TOTAL** | **58** | | **133,868 SF** |

| **THE LOUNGE** | |
|---|---|
| ENTRY LEVEL | 2,444 SF |
| LOWER LEVEL | 3,069 SF |
| **THE LOUNGE TOTAL** | **5,513 SF** |

**BUILDING B-1 TO B-15** **139,381 SF**

| **SKY MESA** | **AREA** |
|---|---|
| RESTAURANT | 6,273 SF |
| RESTROOMS | 693 SF |
| **SKY MESA TOTAL** | **6,966 SF** |

**TOTAL PROJECT** **236,748 SF**

# PARKING BREAKDOWN

| **PARKING PROPOSED/PROVIDED** | |
|---|---|
| THE VENUE (1 SPACE PER 50 SF)* | 223 SPACES |
| RESIDENTIAL UNITS (1.1 SPACES PER GUEST RM) | 53 SPACES |
| RESIDENTIAL UNITS (2 SPACES PER UNIT)** | 116 SPACES |
| RESIDENTIALGUEST SPACE (1 SPACE PER 2 UNITS) | 29 SPACES |
| SKY MESA RESTAURANT (1 SPACE PER 80 SF) | 78 SPACES |
| **TOTAL PARKING PROPOSED/PROVIDED*** ** | **499 SPACES** |

*BASED ON EVENT SPACE AREA
**58 SPACES PROVIDED IN 2-CAR GARAGES, 58 SPACES PROVIDED AS A COMBINATION OF 1-CAR GARAGE PLUS DRIVEWAY SPACE
***381 SPACES PROVIDED IN SUBTERRANEAN PARKING STRUCTURE

| **SUBTERRANEAN PARKING AREA (BUILDING A-1)** | |
|---|---|
| P1 LEVEL | 26,783 SF |
| P2 LEVEL | 50,853 SF |
| P3 LEVEL | 91,596 SF |
| **TOTAL** | **169,232 SF** |

# PROJECT TEAM


**OWNER:**
KAM SANG COMPANY, INC.
411 E HUNTINGTON DRIVE, STE 305
ARCADIA, CA 91006
(626) 446-2988

**ARCHITECT:**
LCRA
CONTACT: EVERARDO GARCIA
35 HUGUS ALLEY, STE 220
PASADENA, CA 91103
(626) 449-9698

**CIVIL:**
FOCUS ENGINEERING, INC.
CONTACT: CHARLIE LIU
25 MAUCHLY #317, IRVINE, CA 92618
(949) 450-0590

**LANDSCAPE:**
DESIGN STUDIO OF MICHAEL MCKAY
CONTACT: MICHAEL MCKAY
246 FLOWER ST., COSTA MESA, CA 92627
(949) 378-3238


# PROJECT DATA

**PROJECT ADDRESS:** 68900 FRANK SINATRA DRIVE

**GENERAL PLAN LAND DESIGNATION:** RANCHO MIRAGE GENERAL PLAN RS-H (RESORT HOTEL)

**LOT SIZE:**

| ASSESSOR PARCEL NUMBER | AREA |
|---|---|
| 689330031 | 698,827 SF |
| 689330026 & 689330028 | 505,497 SF |
| 689020012 & 689020014 | 174,653 SF |
| 689330032, 689330034, 689331001 & 689331018 | 148,565 SF |
| TOTAL LOT AREA | 1,553,500 SF / 35.07 AC |

| **TOTAL LOT COVERAGE:** | | |
|---|---|---|
| | EXISTING HOTEL | 167,635 SF |
| | BUILDING A-1 | 76,161 SF |
| | BUILDING B-1 TO B-15 | 109,244 SF |
| | SKY MESA | 6,966 SF |
| | TOTAL COVERAGE | 360,006 SF |
| | (DIVIDE BY TOTAL LOT AREA) | (23.17%) |

# PROJECT DESCRIPTION

THE PROJECT CONSISTS OF THREE DIFFERENT BUILDING(S) HEREBY REFERRED TO AS "BUILDING A-1", "BUILDING B-1 TO B-15" & "SKY MESA".

**BUILDING A1**

CONSTRUCTION OF NEW TWO-STORY BUILDING INCLUDING:
1) HOTEL EVENT SPACE & ANCILLARY SERVICE AREAS
2) 48 RESIDENTIAL UNITS (KEYS)
3) 2.5 LEVELS OF UNDERGROUND PARKING

| **OCCUPANCY TYPE:** | | **CONSTRUCTION TYPE:** |
|---|---|---|
| A | EVENT SPACE | TYPE IIIB |
| R-2 | RESIDENTIAL | TYPE VB |
| S-2 | PARKING | TYPE IA |

**BUILDING STORIES:** 2-STORIES

**BUILDING B1 - B15**

CONSTRUCTION OF NEW RESIDENTIAL UNITS & THE LOUNGE INCLUDING:
1) 58 TWO-STORY ATTACHED TOWN-HOME RESIDENTIAL UNITS WITH ATTACHED GARAGE WITHIN 15 SEPARATE BUILDINGS
2) TWO-STORY LOUNGE
3) POOL TERRACE & SECONDARY POOL AREA
4) SURFACE GUEST PARKING

| **OCCUPANCY TYPE:** | | **CONSTRUCTION TYPE:** |
|---|---|---|
| A | LOUNGE | TYPE VB |
| R-2 | RESIDENTIAL | TYPE VB |

**BUILDING STORIES:** 2-STORIES

**TOTAL PROJECT KEYS:** 106

**SKY MESA**

CONSTRUCTION OF NEW HOTEL AMENITY SPACE INCLUDING:
1) POOL TERRACE & BATHROOMS
2) OUTDOOR EVENT SPACE
3) DINING AREA

| **OCCUPANCY TYPE:** | | **CONSTRUCTION TYPE:** |
|---|---|---|
| A | DINING AREA | TYPE I |

**BUILDING STORIES:** 1-STORY







# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

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February 15, 2023

## OVERALL SITE PLAN A-0.2

NOT TO SCALE

LCRA




| LEGEND | |
|---|---|
| NO. | BUILDING TYPE |
| A-1 | RESIDENTIAL UNITS W/ ATTACHED EVENT SPACE |
| B-1 | (4) FOURPLEX |
| B-2 | (4) FOURPLEX |
| B-3 | (5) FIVEPLEX |
| B-4 | (3) TRIPLEX |
| B-5 | (5) FIVEPLEX |
| B-6 | (2) DUPLEX |
| B-7 | (3) TRIPLEX |
| B-8 | (5) FIVEPLEX |
| B-9 | (7) SEVENPLEX |
| B-10 | (5) FIVEPLEX |
| B-11 | (3) TRIPLEX W/ ATTACHED LOUNGE |
| B-12 | (3) TRIPLEX |
| B-13 | (3) TRIPLEX |
| B-14 | (2) DUPLEX |
| B-15 | (4) FOURPLEX |

# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## PARTIAL SITE PLAN A-0.3

SCALE: 1/32" = 1'

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# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SITE ENTRY RENDERING A-R.1

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# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

THE VENUE RENDERING A-R.2

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# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

THE LOUNGE RENDERING A-R.3

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# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

BUILDING A1 RENDERING A-R.4

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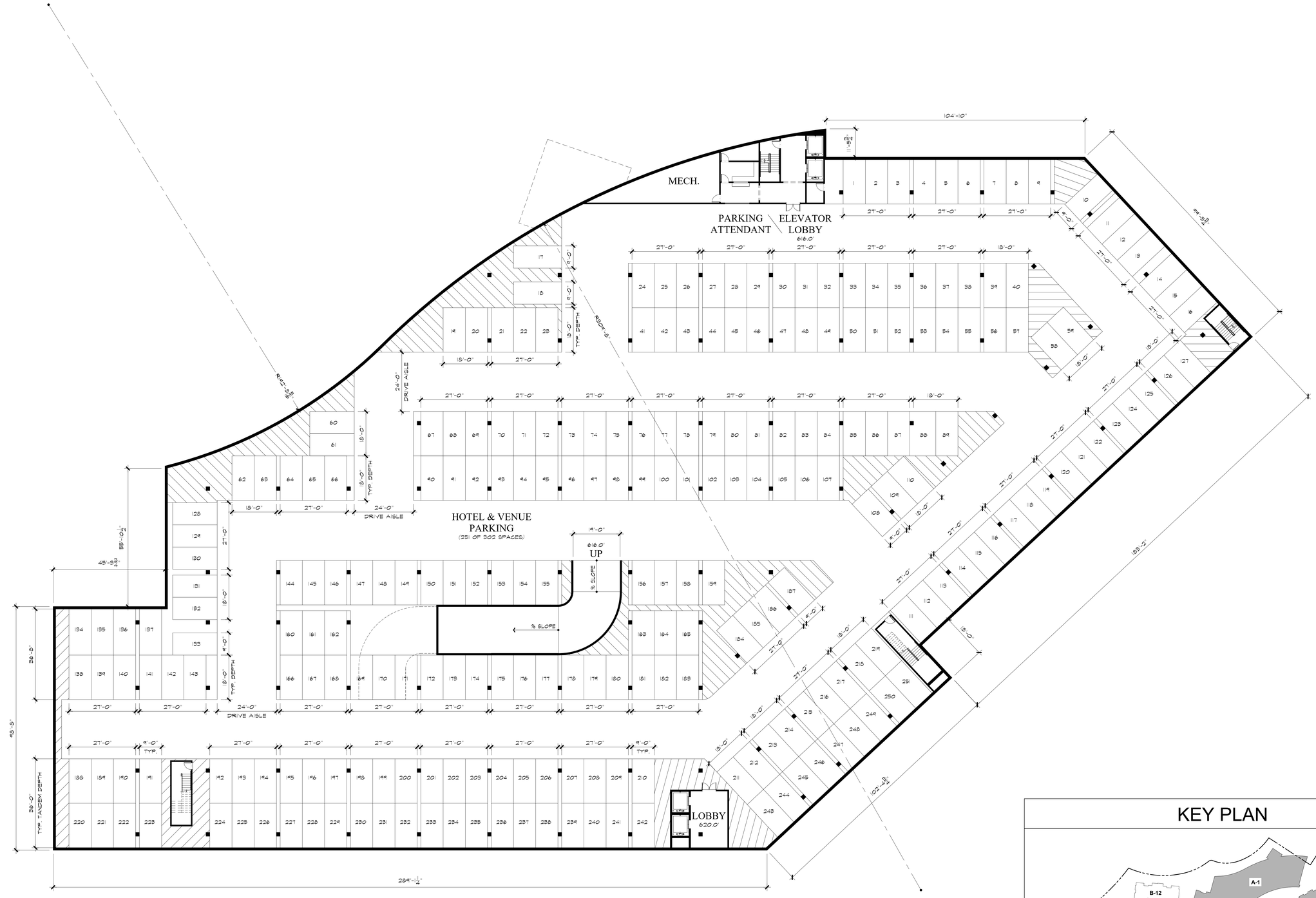
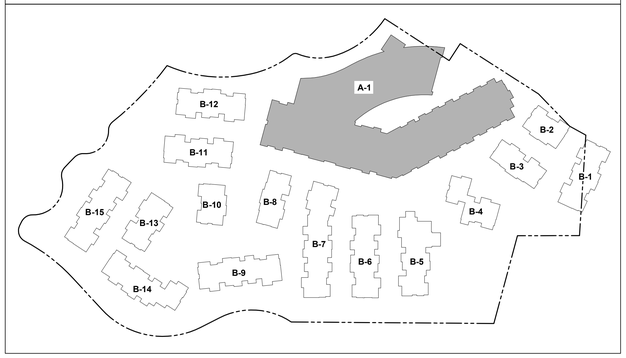
# BUILDING A-1

## THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE




## KEY PLAN



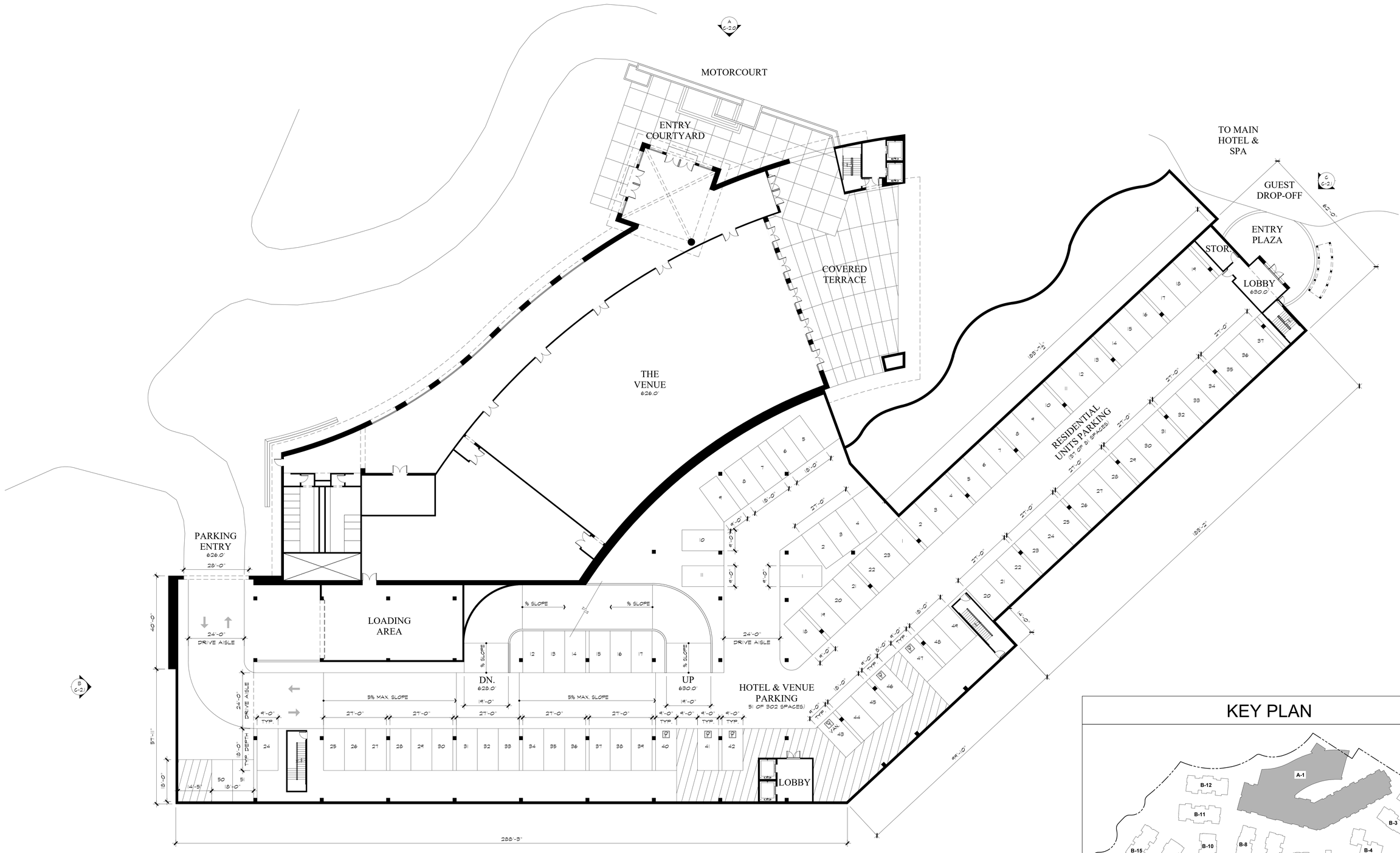

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

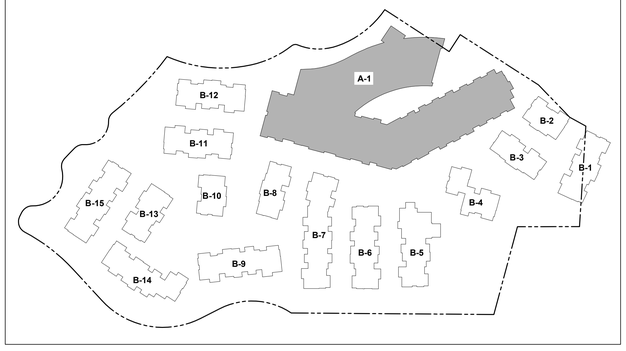
## PARKING LEVEL P3 C-1.0

SCALE: 1/16" = 1'-0"

LCRA




## KEY PLAN




# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## PARKING LEVEL P2 C-1.1

SCALE: 1/16" = 1'-0"

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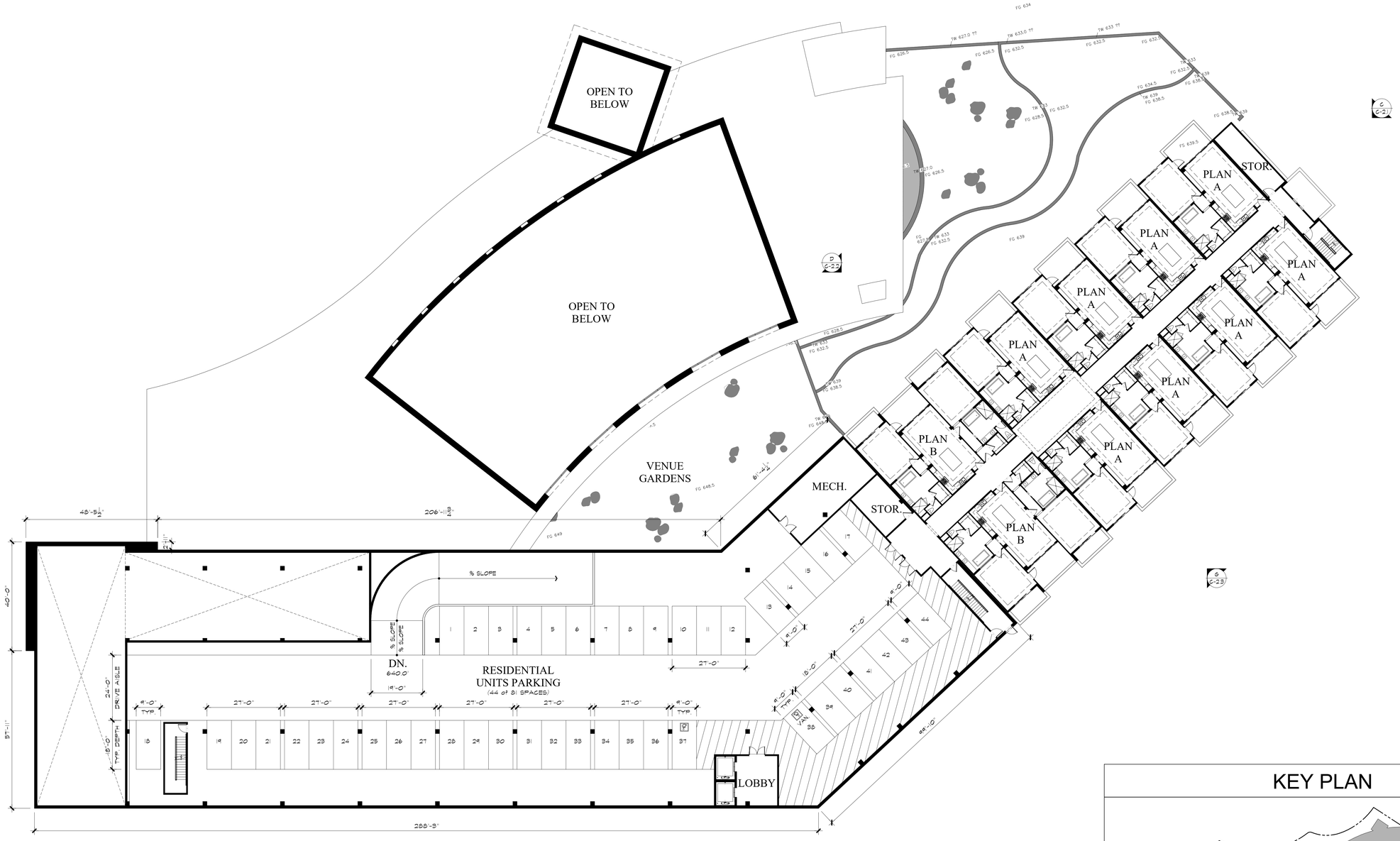
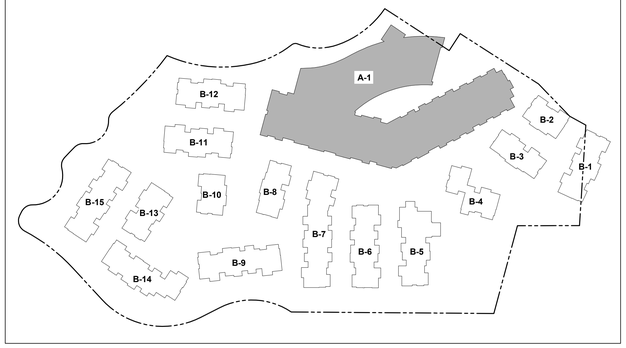
LCRA




KEY PLAN




**RESIDENTIAL UNITS: PLAN A, PLAN B, & PLAN C**
**(UNIT PLANS REFER TO SHEET C-3.1)**

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## PARKING LEVEL P1 C-1.2

SCALE: 1/16" = 1'-0"

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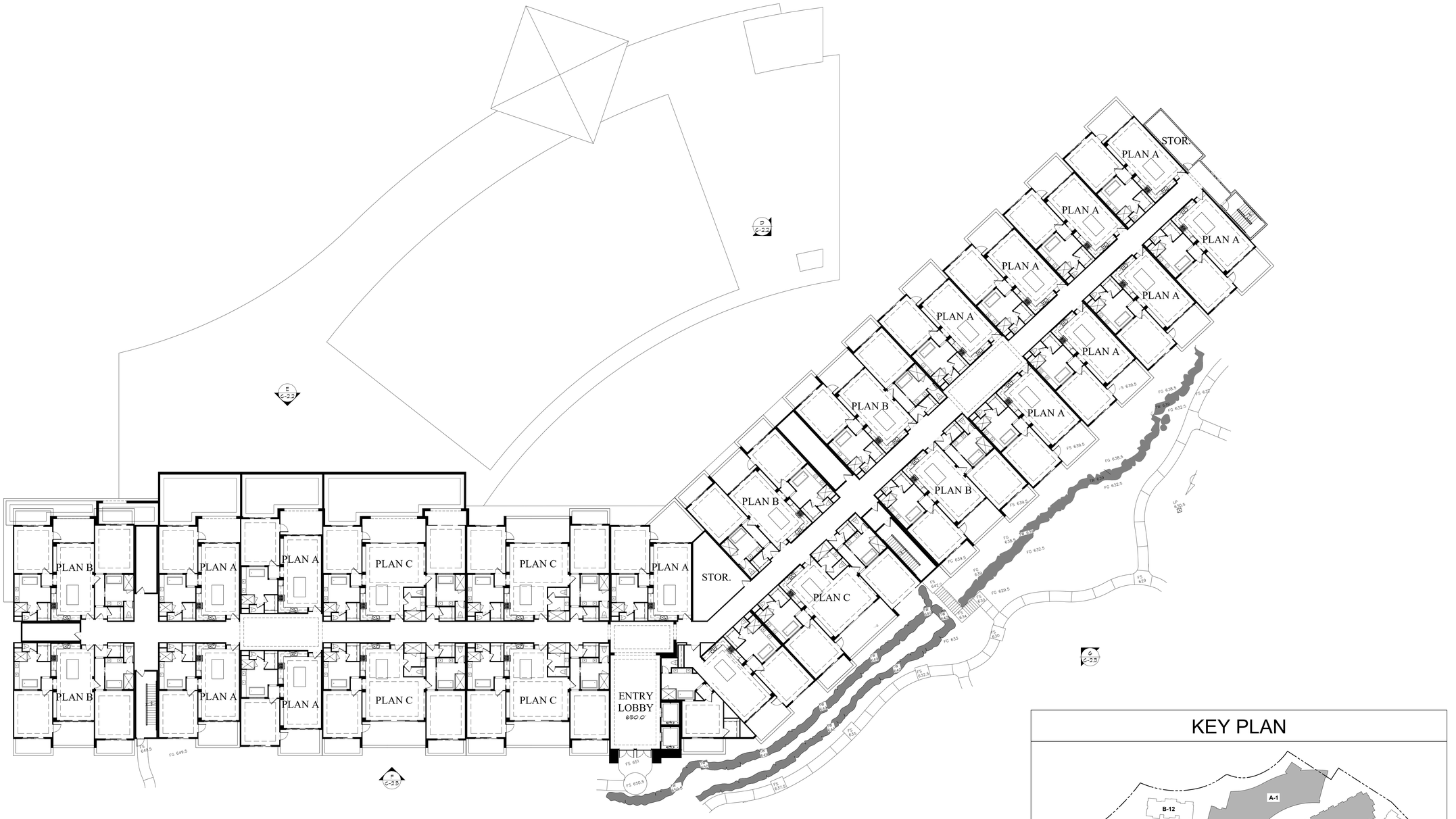
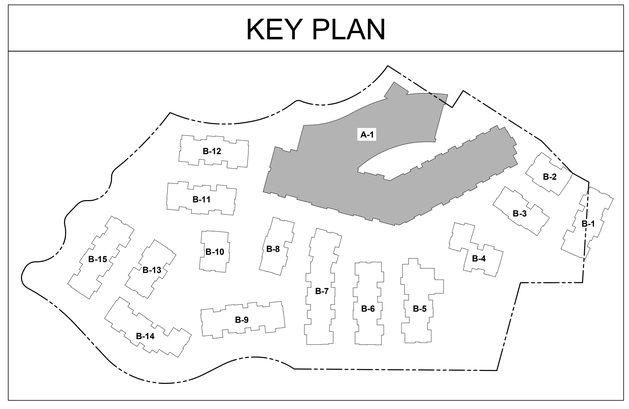



**RESIDENTIAL UNITS: PLAN A, PLAN B, & PLAN C**
**(UNIT PLANS REFER TO SHEET C-3.1)**



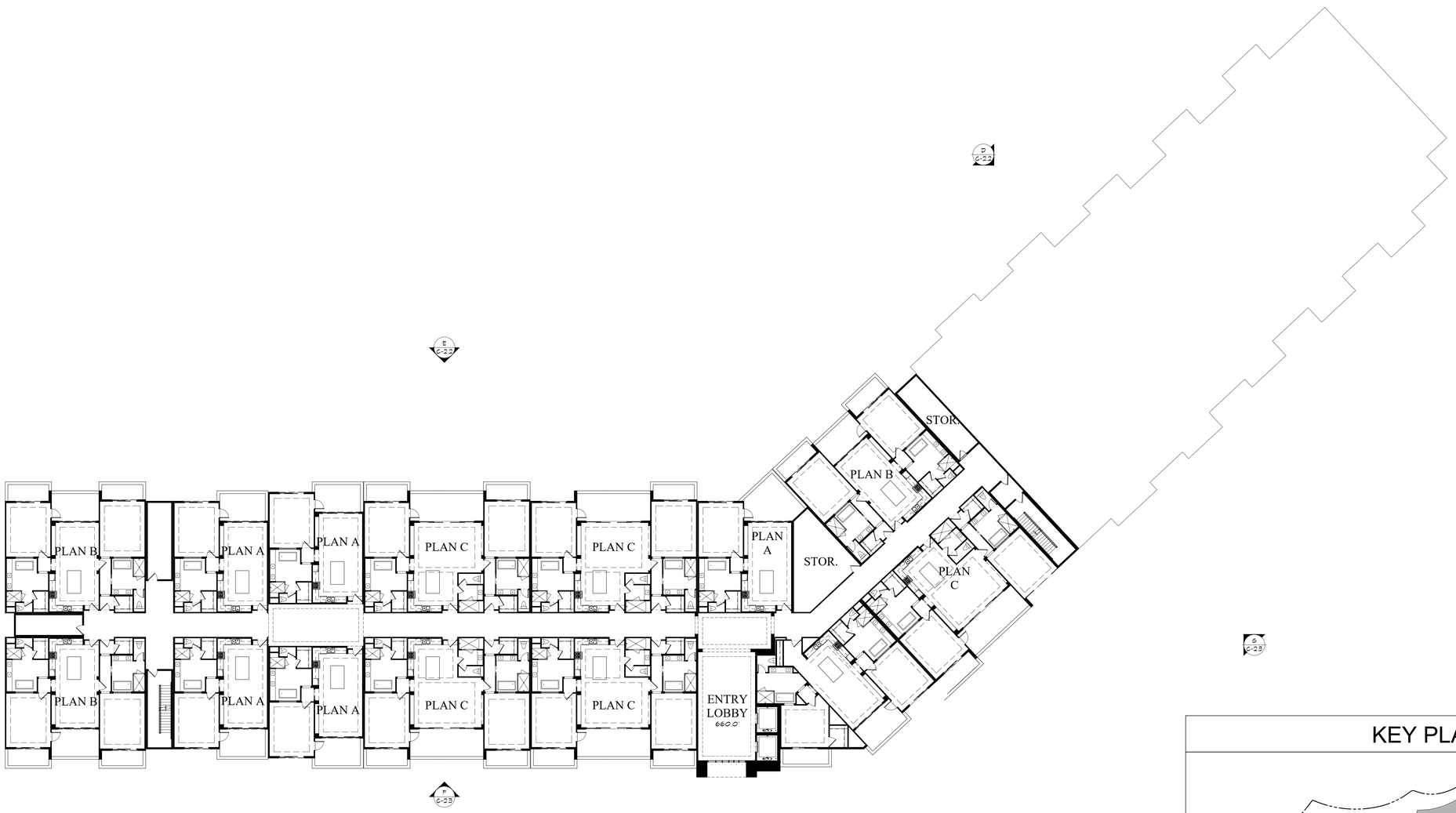

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## FIRST FLOOR PLAN C-1.3

SCALE: 1/16" = 1'-0"

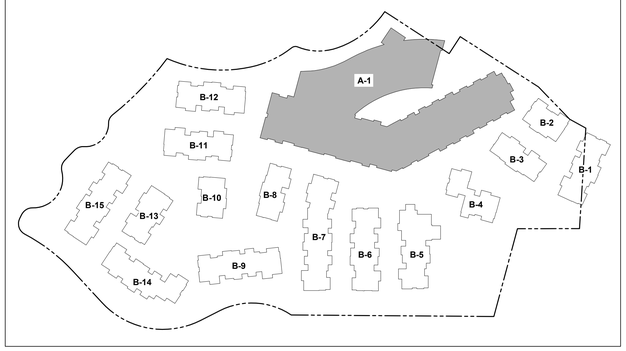
Ritz Carlton
February 15, 2023

LCRA




**RESIDENTIAL UNITS: PLAN A, PLAN B, & PLAN C**
**(UNIT PLANS REFER TO SHEET C-3.1)**

KEY PLAN




# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

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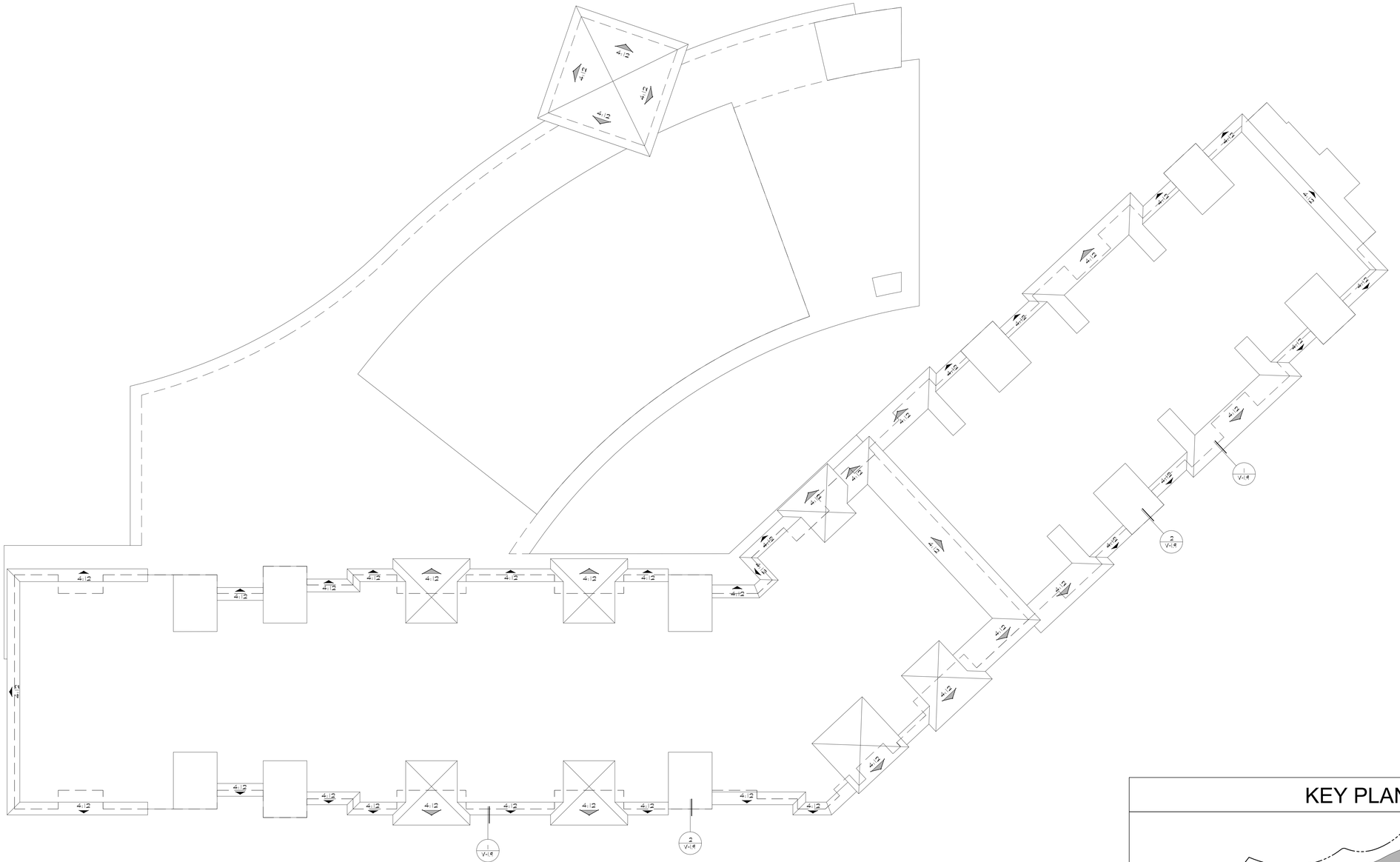
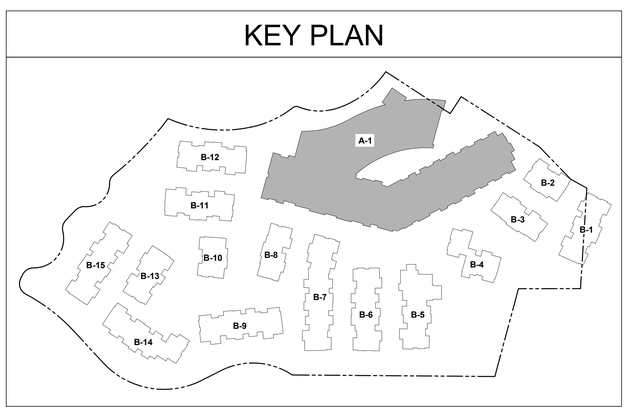
February 15, 2023

## SECOND FLOOR PLAN C-1.4

SCALE: 1/16" = 1'-0"

LCRA




# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

ROOF PLAN C-1.5
SCALE: 1/16" = 1'-0"

LCRA







FRONT ELEVATION

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

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February 15, 2023

ELEVATIONS - THE VENUE C-2.0
SCALE: 1/8" = 1'-0"

LCRA




WEST ELEVATION




EAST ELEVATION

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

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February 15, 2023

ELEVATIONS - THE VENUE C-2.1
SCALE: 1/8" = 1'-0"

LCRA







NORTH ELEVATION

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

ELEVATIONS - RESIDENTIAL UNITS C-2.2

SCALE: 1/8" = 1'-0"

Ritz Carlton

February 15, 2023

LCRA







SOUTH ELEVATION

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

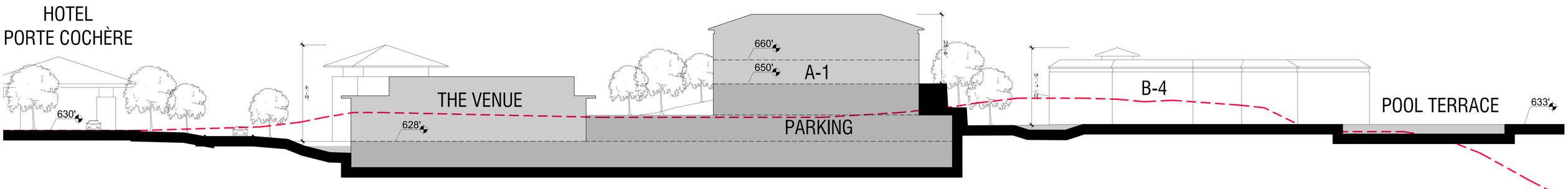
ELEVATIONS - RESIDENTIAL UNITS C-2.3

SCALE: 1/8" = 1'-0"

Ritz Carlton

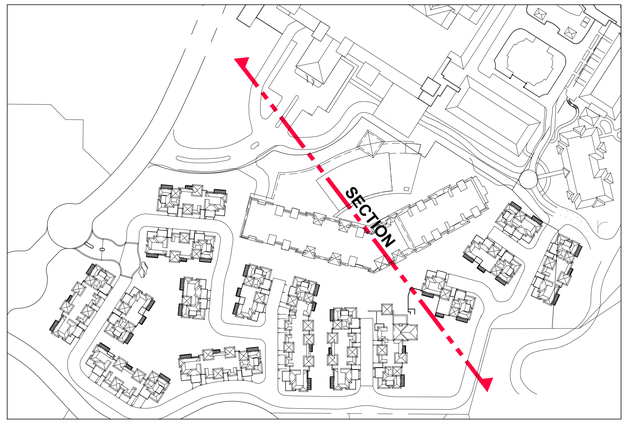
February 15, 2023

LCRA




**LEGEND**

EXISTING NATURAL GRADE

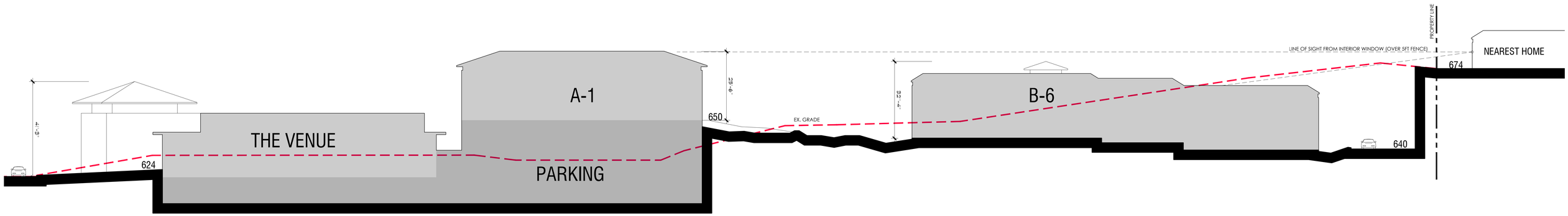



# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

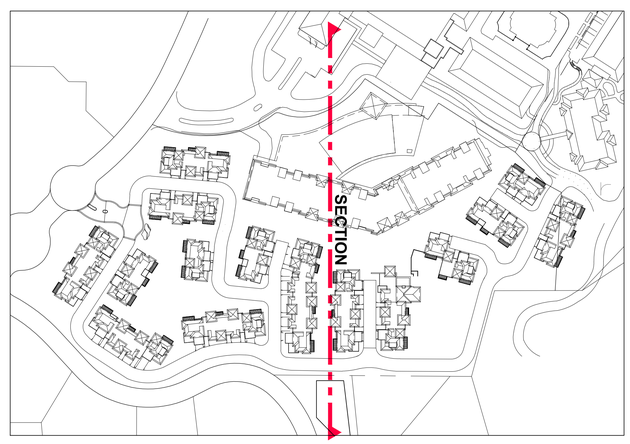
SITE SECTION C-2.4
SCALE: 1/16" = 1'-0"

LCRA




**LEGEND**

EXISTING NATURAL GRADE



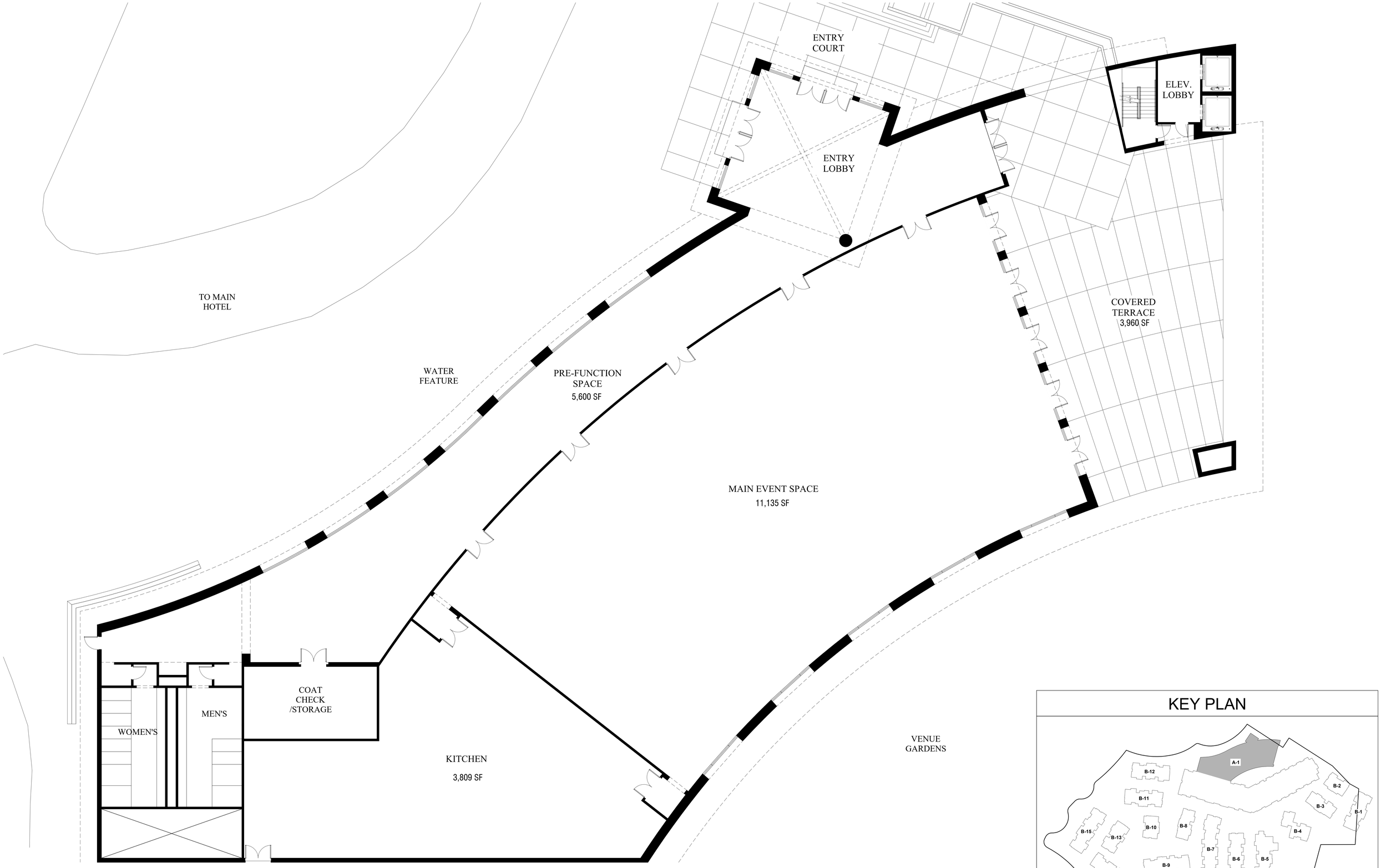

# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

LINE-OF-SIGHT STUDY C-2.5

SCALE: 1/16" = 1'-0"

LCRA




KEY PLAN




# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

THE VENUE PLAN C-3.0

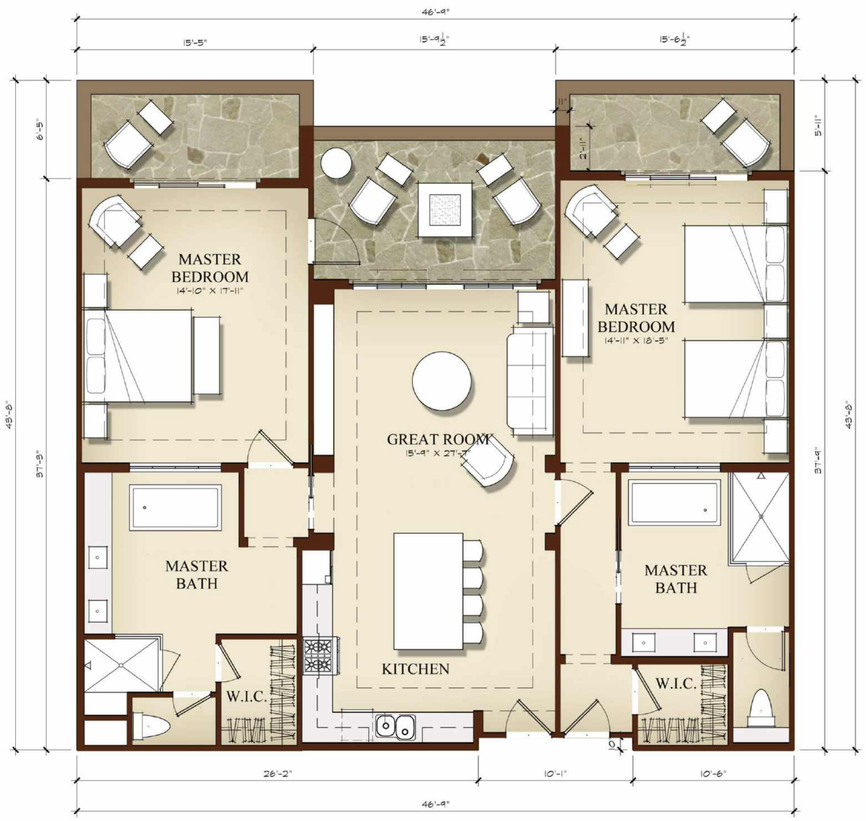
SCALE: 1/8" = 1'-0"

Ritz Carlton
February 15, 2023

LCRA




FLOOR PLAN — PLAN A
1,063 SF

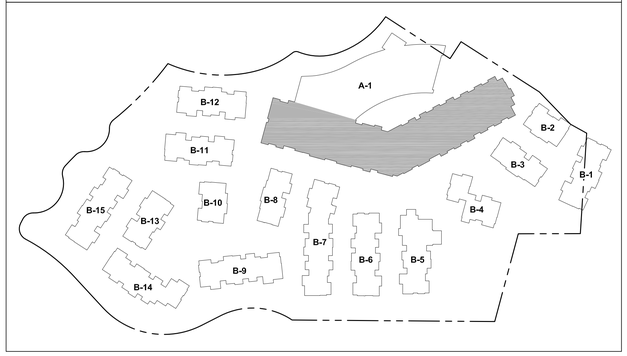



FLOOR PLAN — PLAN B
1,637 SF




FLOOR PLAN — PLAN C
1,902 SF

KEY PLAN




# BUILDING A-1
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

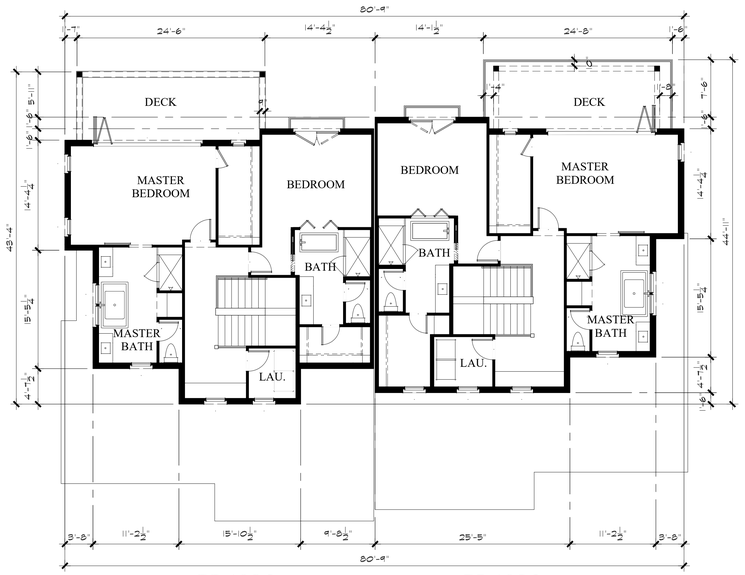
RESIDENTIAL UNIT PLANS C-3.1
SCALE: 1/4" = 1'-0"

LCRA



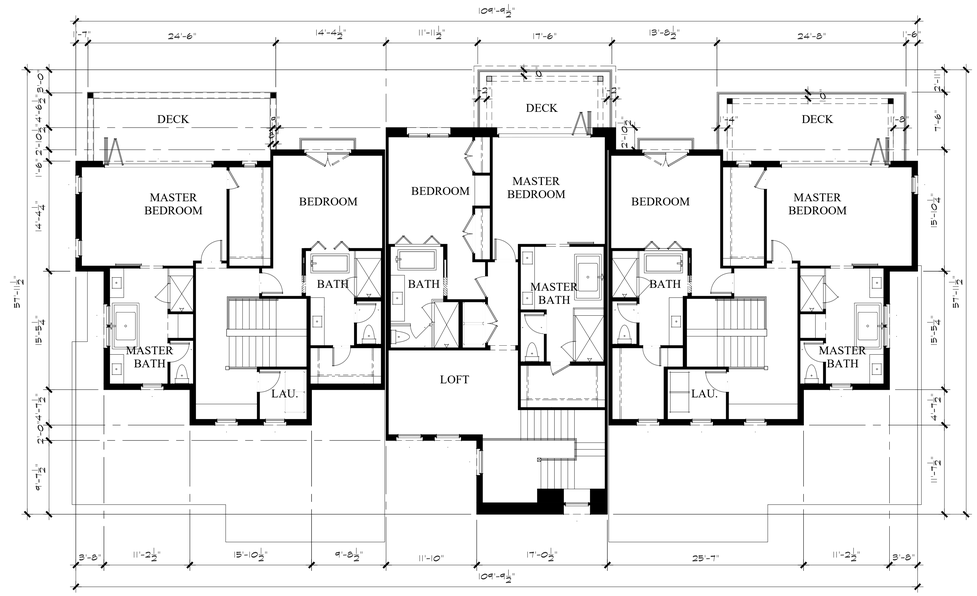
# BUILDING B-1 TO B-15

## THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE



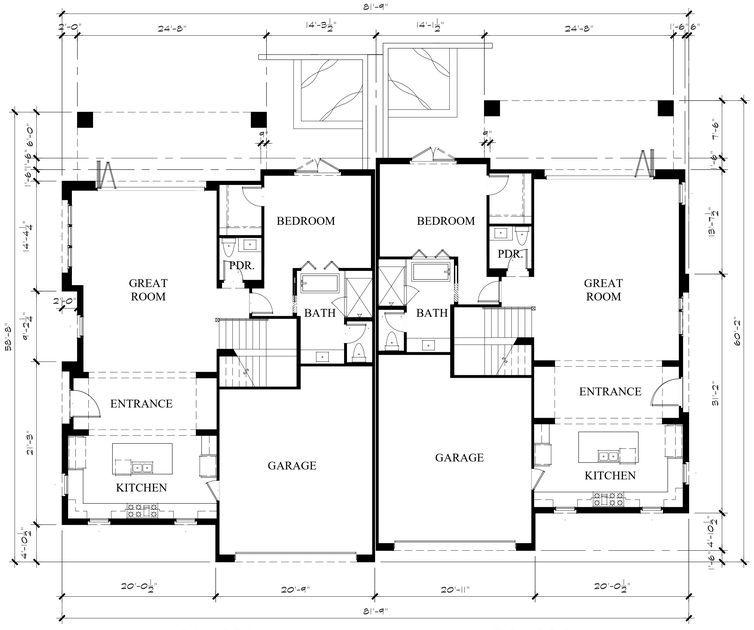

PLAN 2 PLAN 2x

## UPPER LEVEL DUPLEX (B-10 & B-2)




PLAN 2 PLAN 1 PLAN 2x

## UPPER LEVEL TRIPLEX (B-13, B-8 & B-3)




PLAN 2 PLAN 2x

## ENTRY LEVEL DUPLEX (B-10 & B-2)

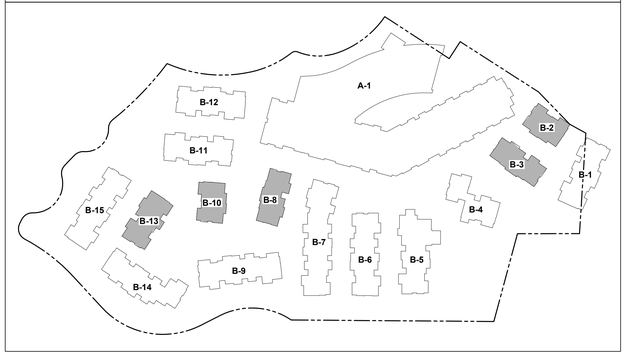



PLAN 2 PLAN 1 PLAN 2x

## ENTRY LEVEL TRIPLEX (B-13, B-8 & B-3)

**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN



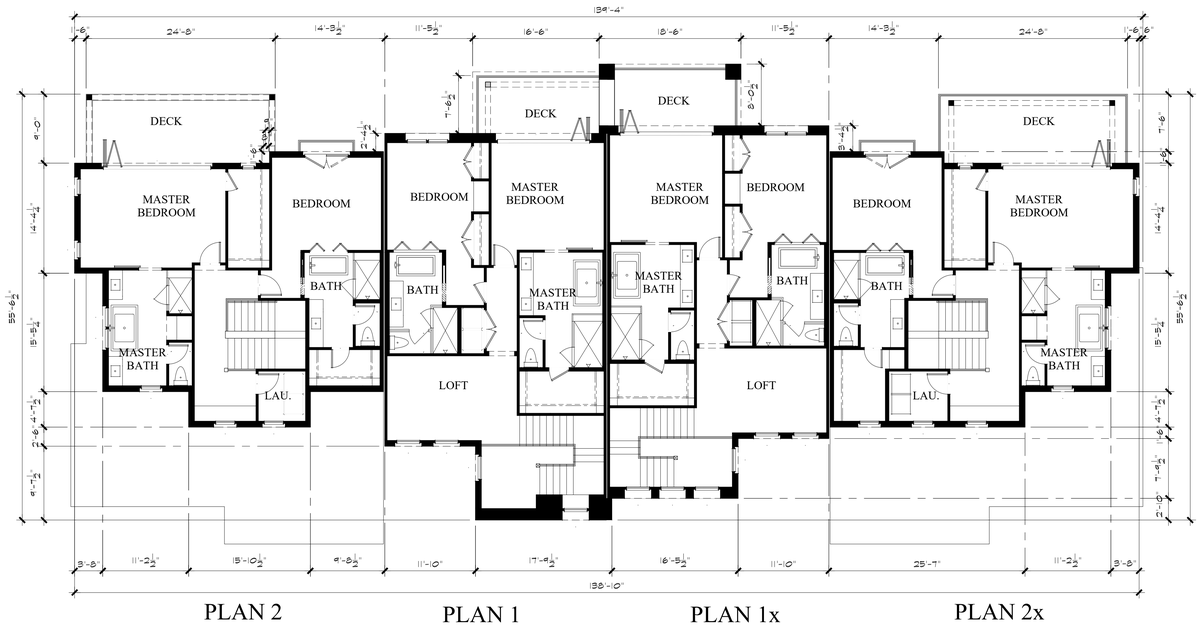

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

TYP. DUPLEX/TRIPLEX FLOOR PLANS V-1.0

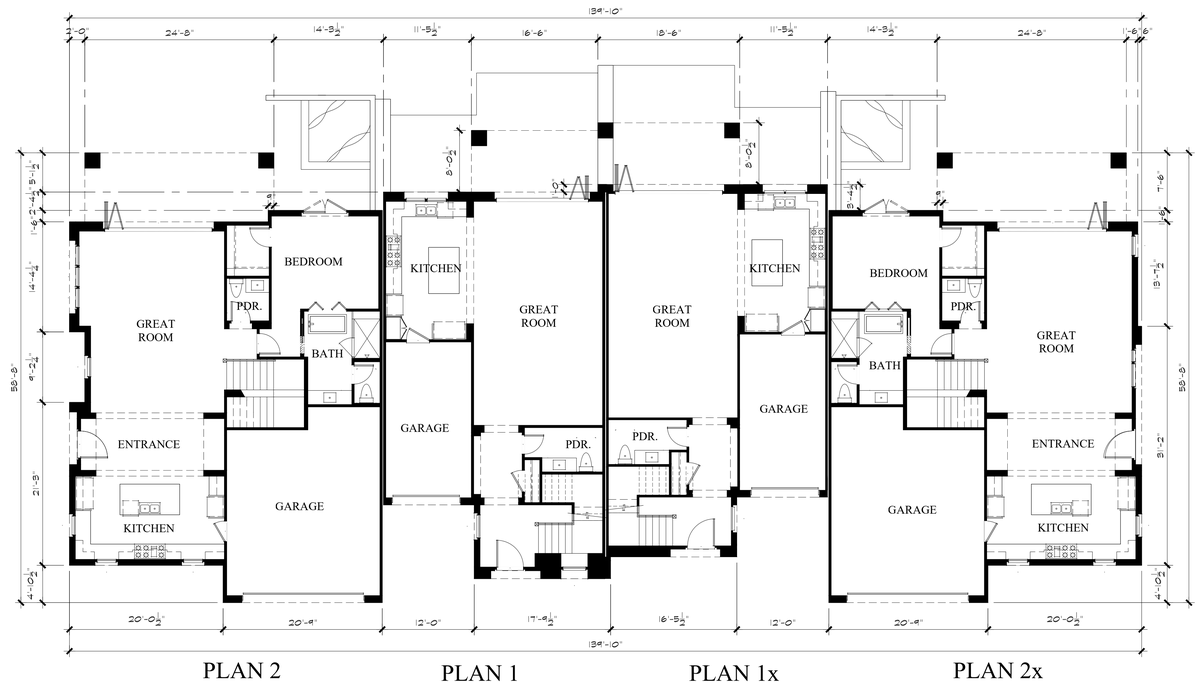
SCALE: 1/8" = 1'-0"

Ritz Carlton
December 20, 2022

LCRA



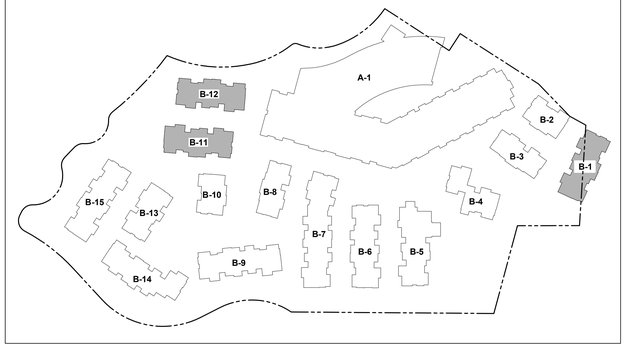

UPPER LEVEL — FOURPLEX (B-12, B-11 & B-1)




ENTRY LEVEL — FOURPLEX (B-12, B-11 & B-1)

**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN



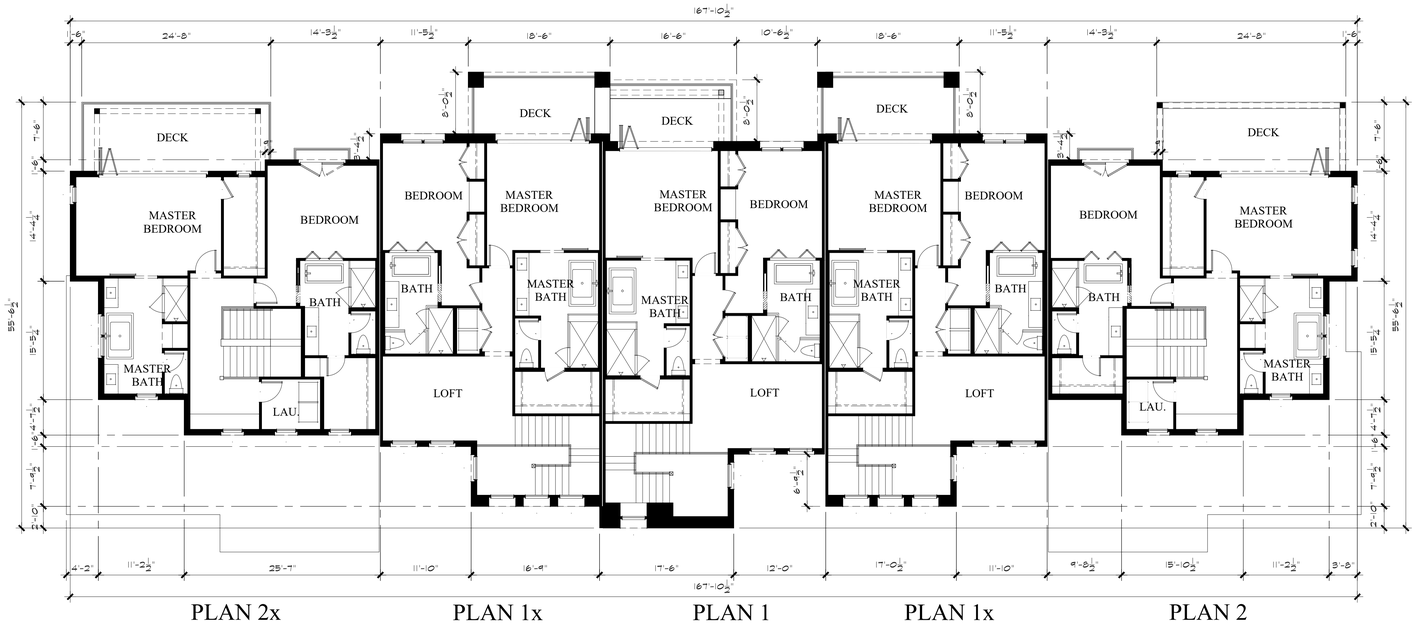

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## TYPICAL FOURPLEX FLOOR PLANS V-1.1

SCALE: 1/8" = 1'-0"

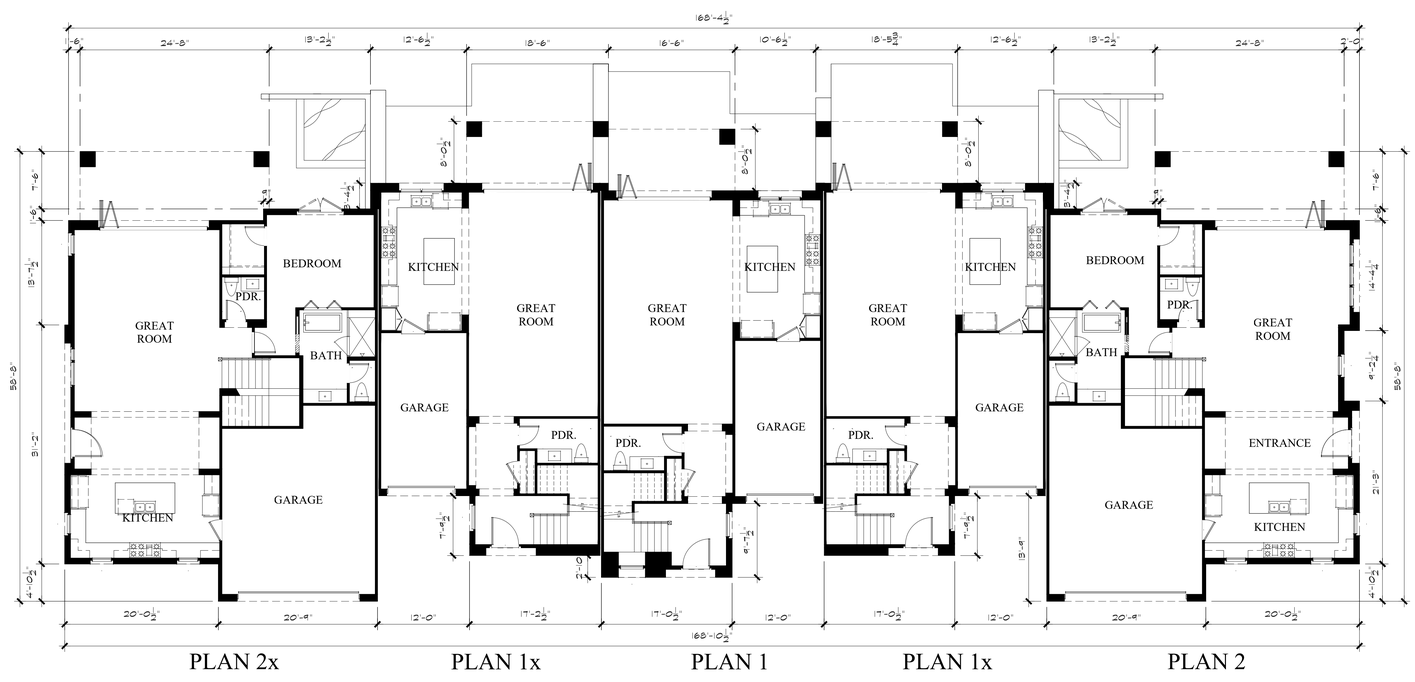
Ritz Carlton
December 20, 2022

LCRA




UPPER LEVEL

FIVEPLEX (B-15, B-9 & B-6)

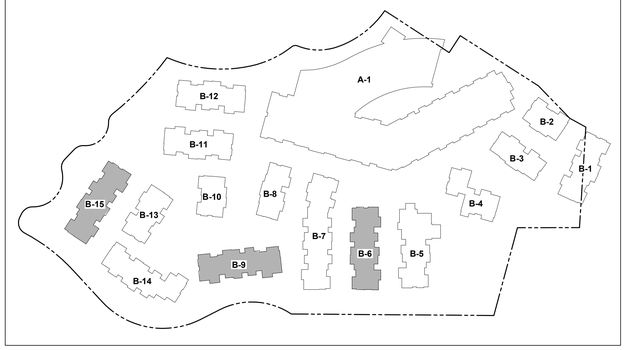



ENTRY LEVEL

FIVEPLEX (B-15, B-9 & B-6)

**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

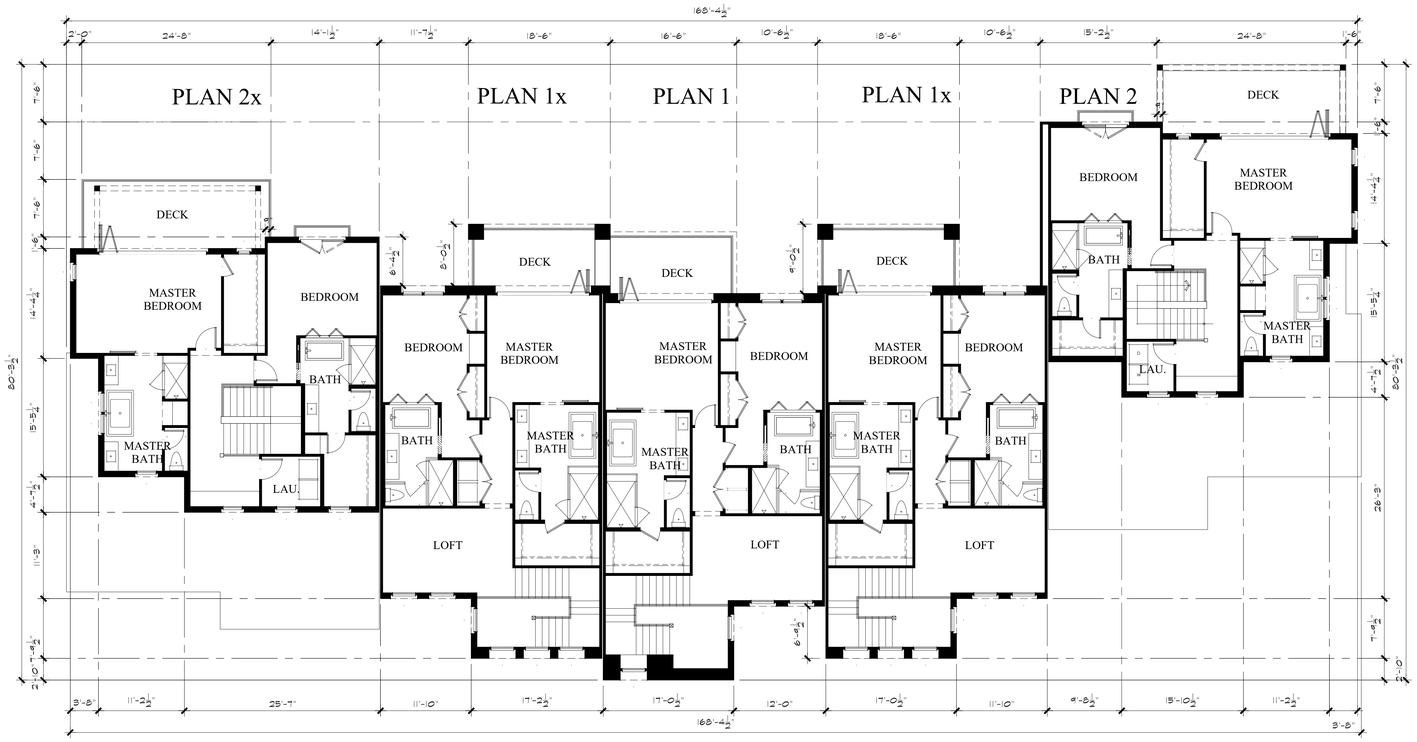
TYPICAL FIVEPLEX FLOOR PLANS V-1.2

SCALE: 1/8" = 1'-0"

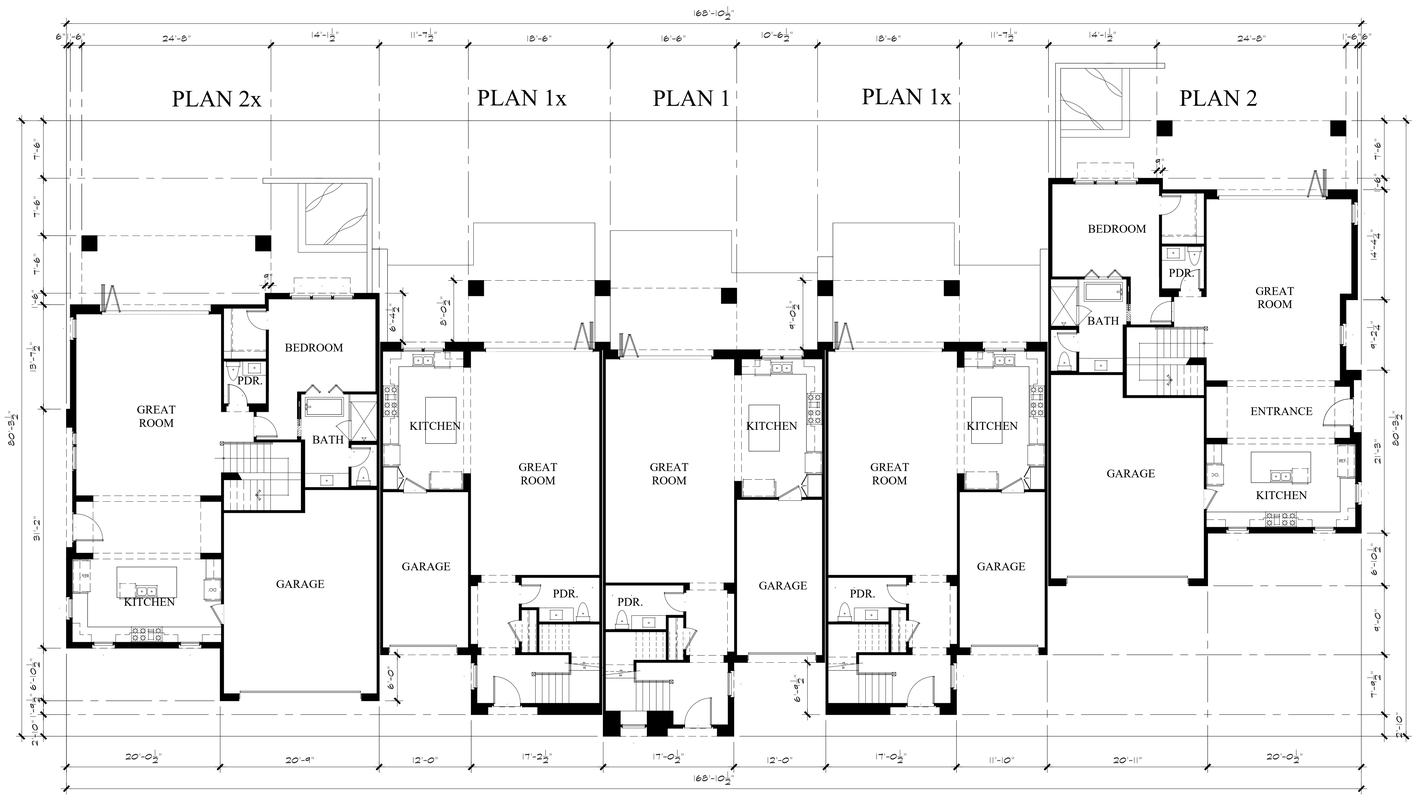
Ritz Carlton

December 20, 2022

LCRA



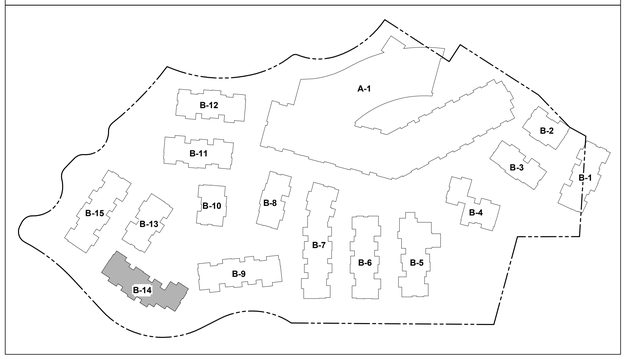

UPPER LEVEL — FIVEPLEX (B-14)




ENTRY LEVEL — FIVEPLEX (B-14)

**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN



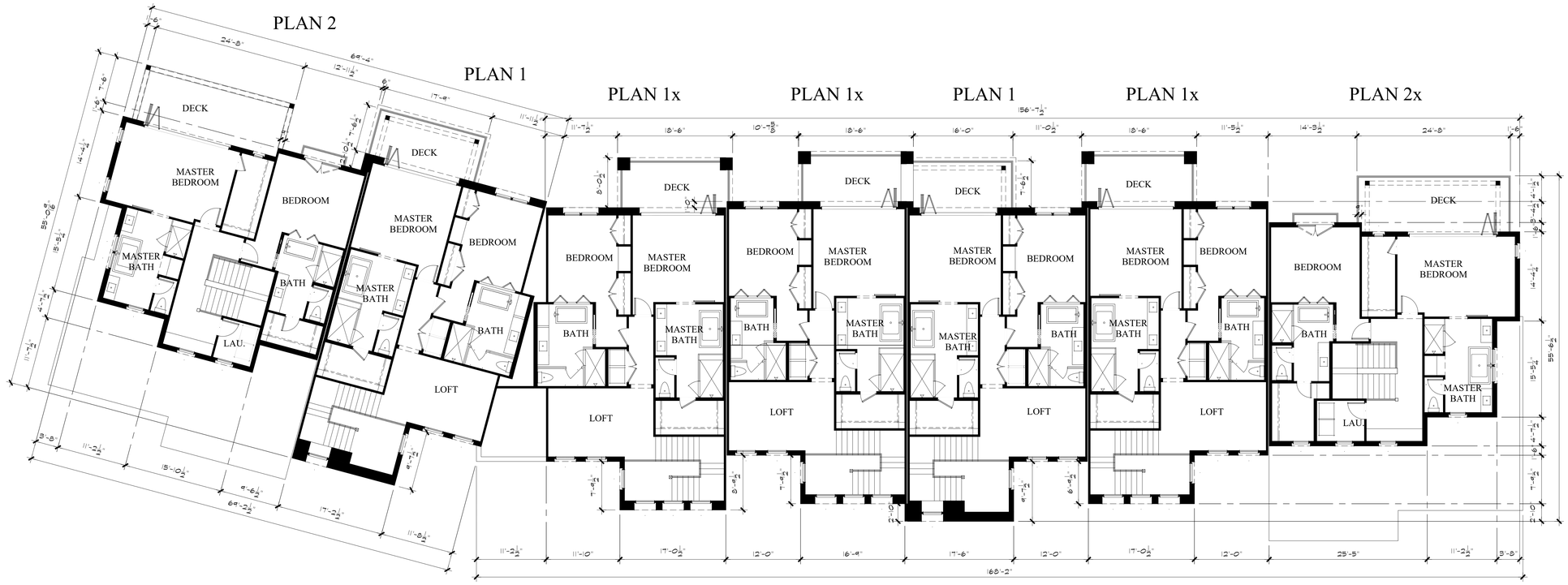

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## BUILDING B-14 FLOOR PLANS V-1.3

SCALE: 1/8" = 1'-0"

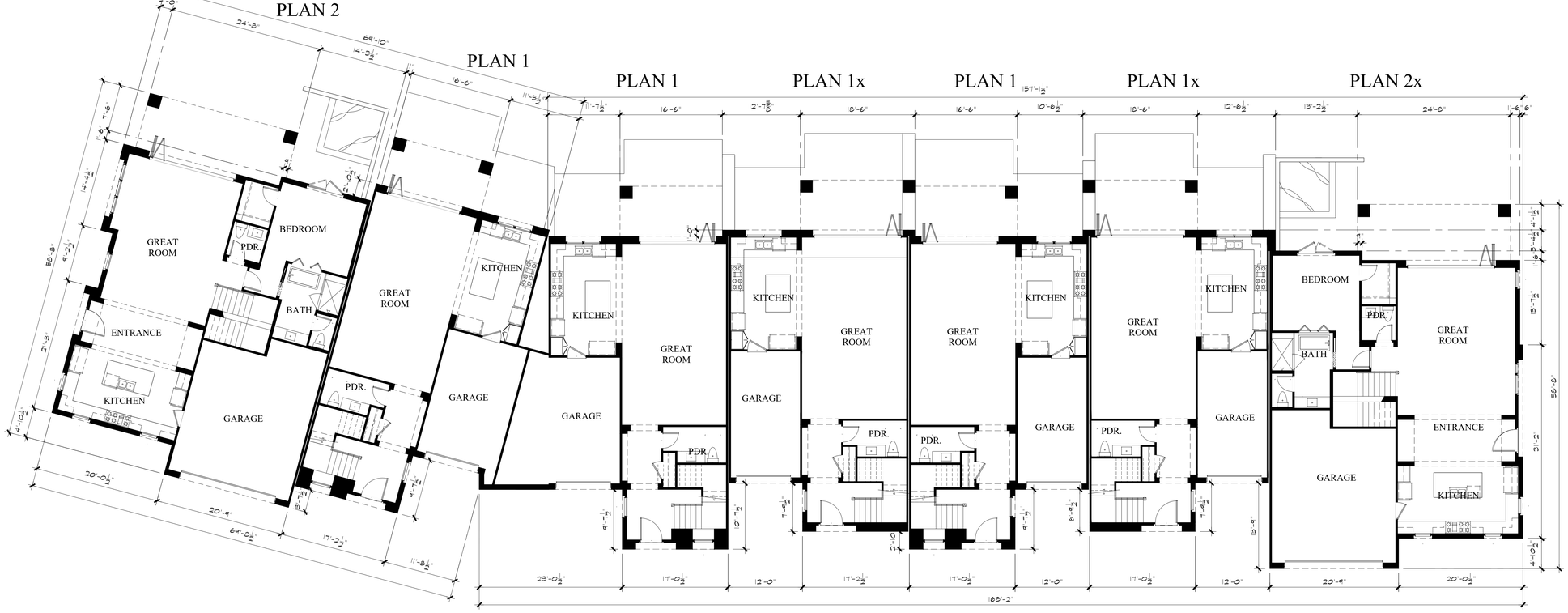
Ritz Carlton
December 20, 2022

LCRA




UPPER LEVEL

SEVENPLEX (B-7)




LOWER LEVEL

SEVENPLEX (B-7)

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

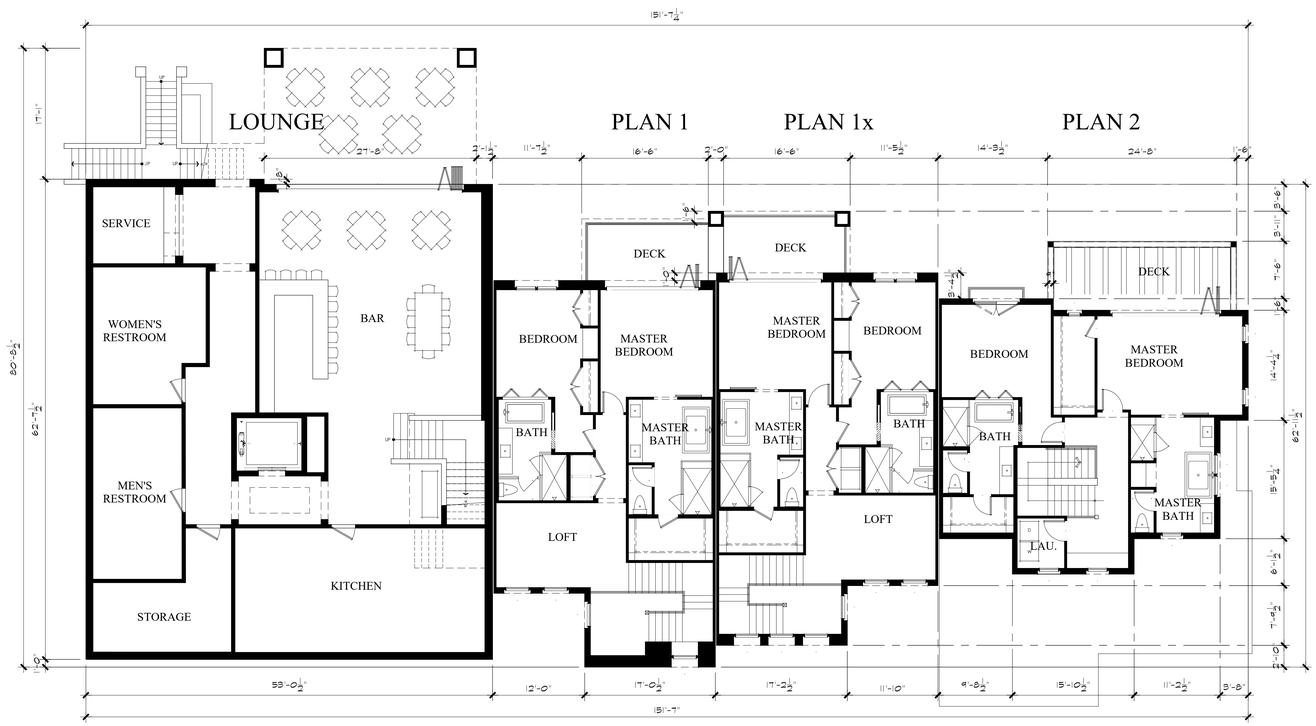
NOTE: SEE SHEET V-1.5 FOR KEY PLAN
UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.

## BUILDING B-7 FLOOR PLANS V-1.4

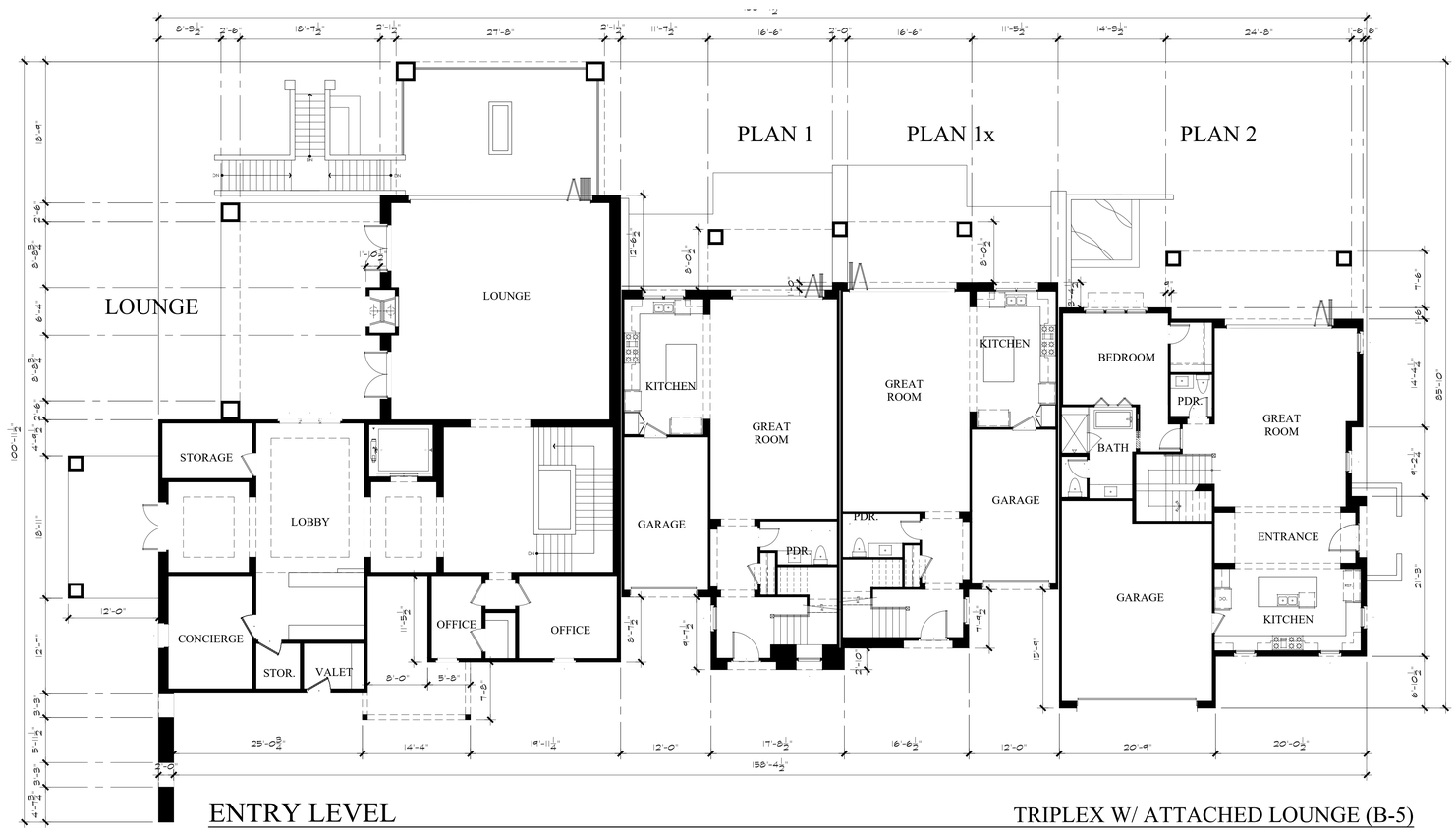
SCALE: 1/8" = 1'-0"

Ritz Carlton
December 20, 2022

LCRA



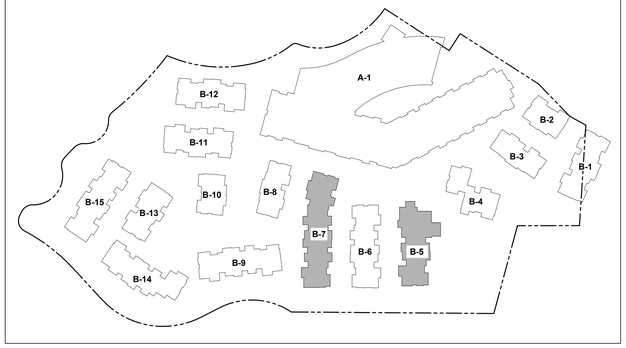

UPPER LEVEL — TRIPLEX W/ ATTACHED LOUNGE (B-5)




ENTRY LEVEL — TRIPLEX W/ ATTACHED LOUNGE (B-5)

**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN




NOTE: SEE SHEET V-1.4 FOR BUILDING B-7 FLOOR PLAN

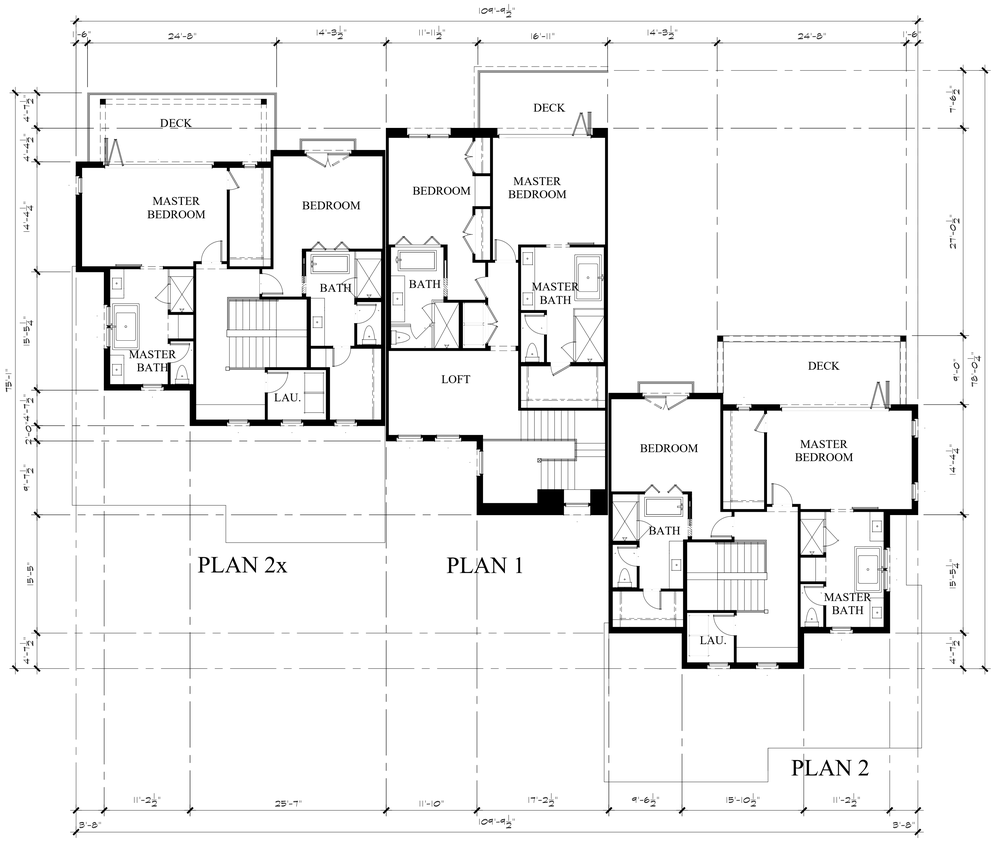
# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

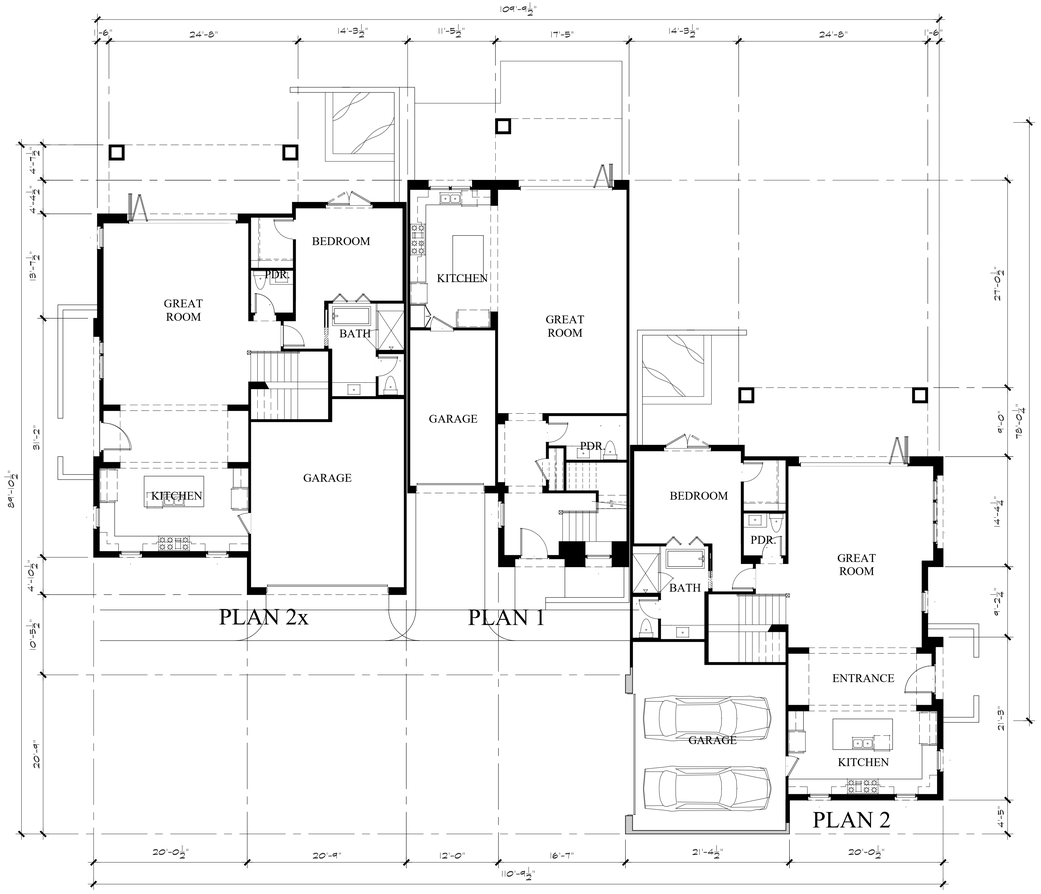
## BUILDING B-5 FLOOR PLANS V-1.5

SCALE: 1/8" = 1'-0"

Ritz Carlton
December 20, 2022

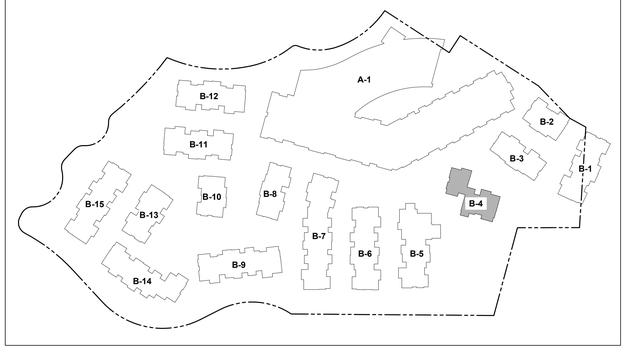
LCRA




**UNIT FLOOR PLANS REFER TO SHEET V-3.0 TO V-3.4.**

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

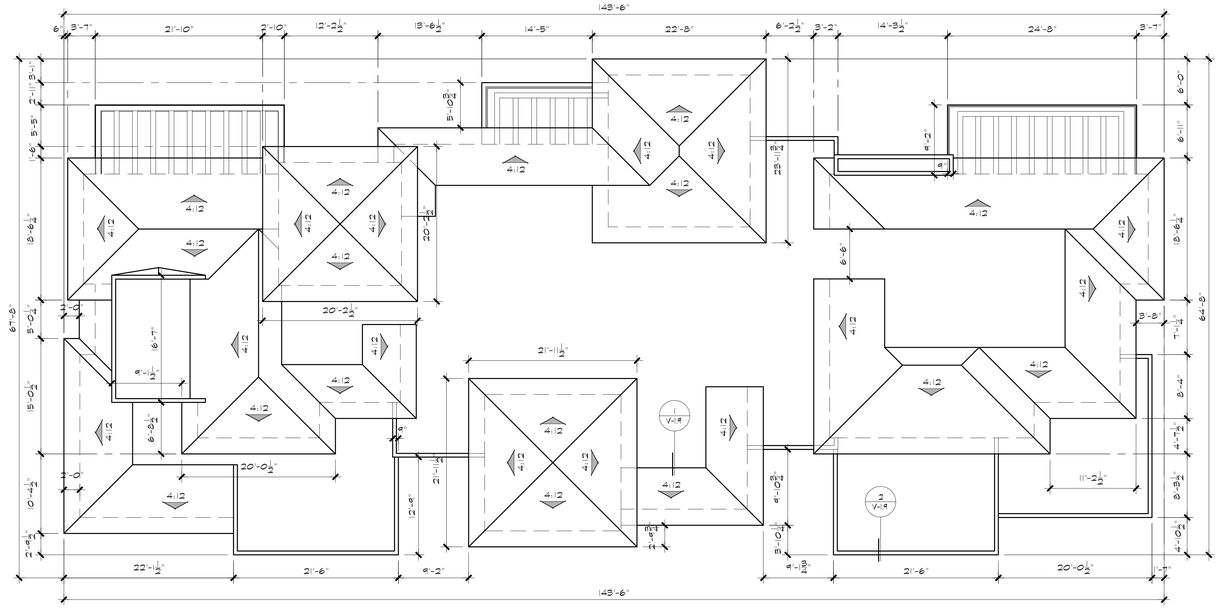
## BUILDING B-4 FLOOR PLANS V-1.6

SCALE: 1/8" = 1'-0"

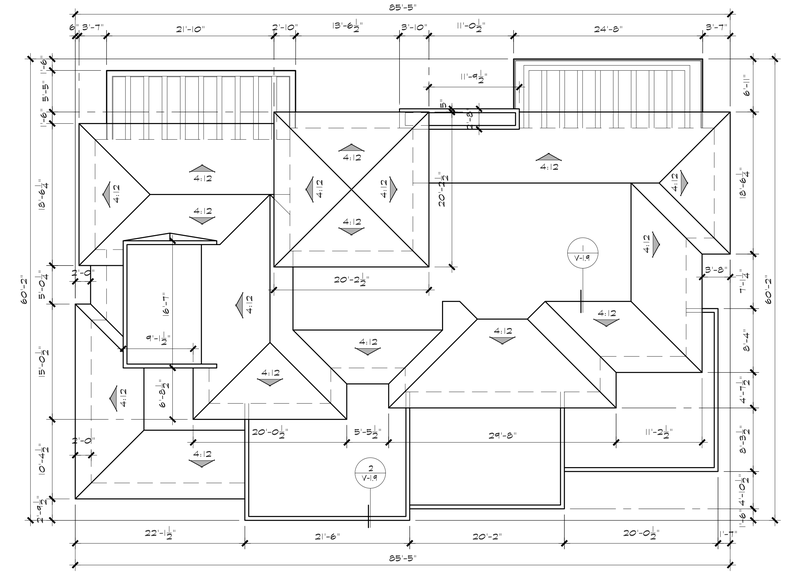
Ritz Carlton

December 20, 2022

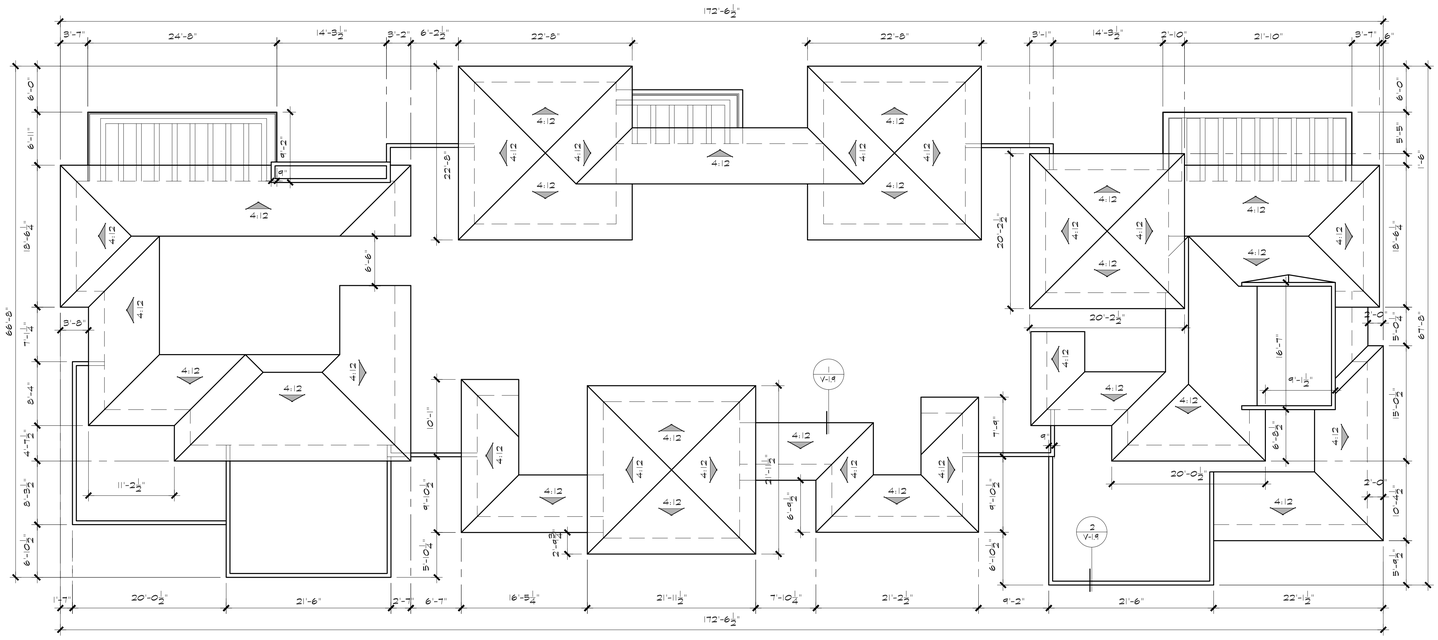
LCRA



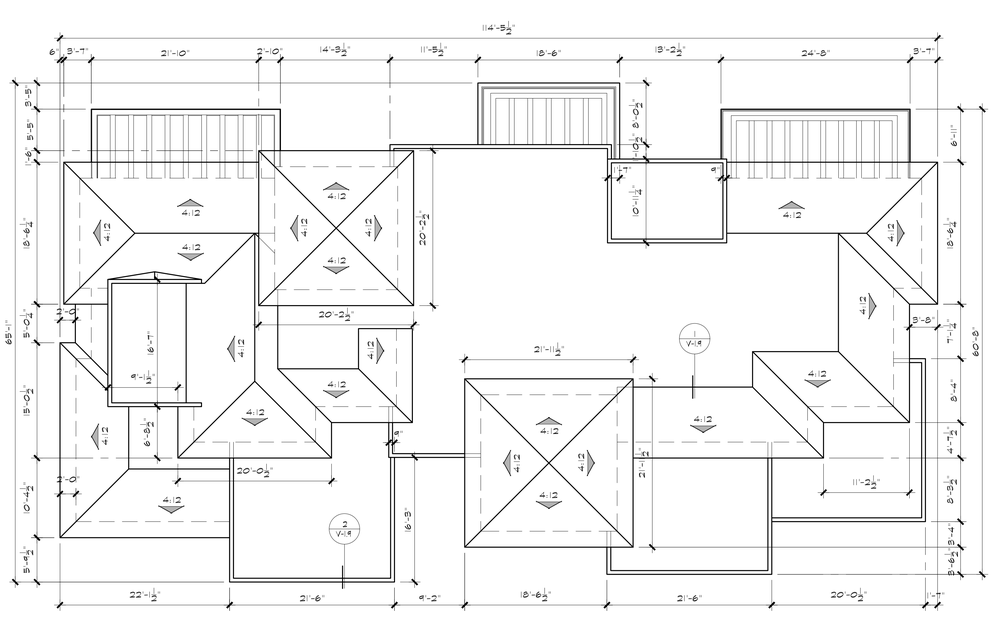
ROOF PLAN — FOURPLEX (B-12, B-11 & B-1)



ROOF PLAN — DUPLEX (B-10 & B-2)



ROOF PLAN — FIVEPLEX (B-15, B-9 & B-6)



ROOF PLAN — TRIPLEX (B-13, B-8 & B-3)

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

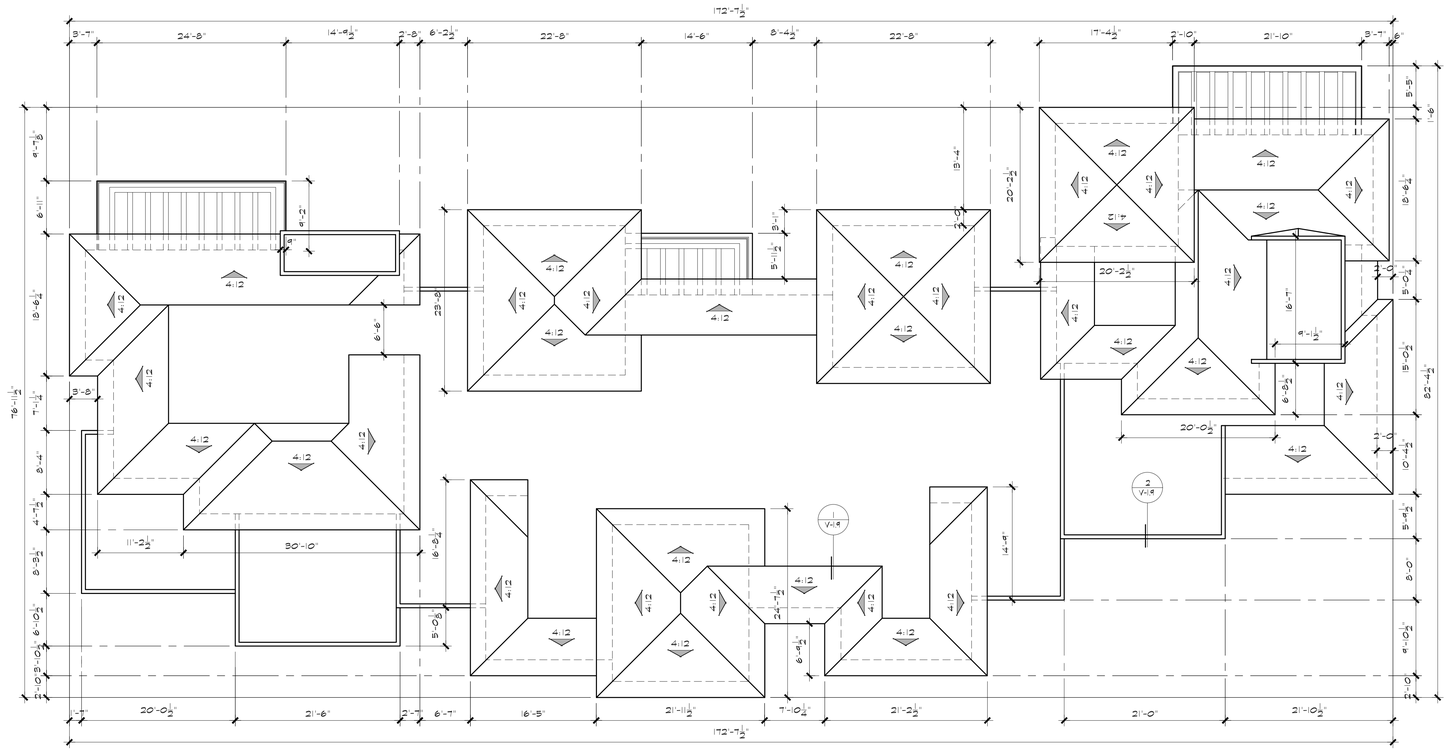
## TYPICAL ROOF PLANS V-1.7

SCALE: 1/8" = 1'-0"

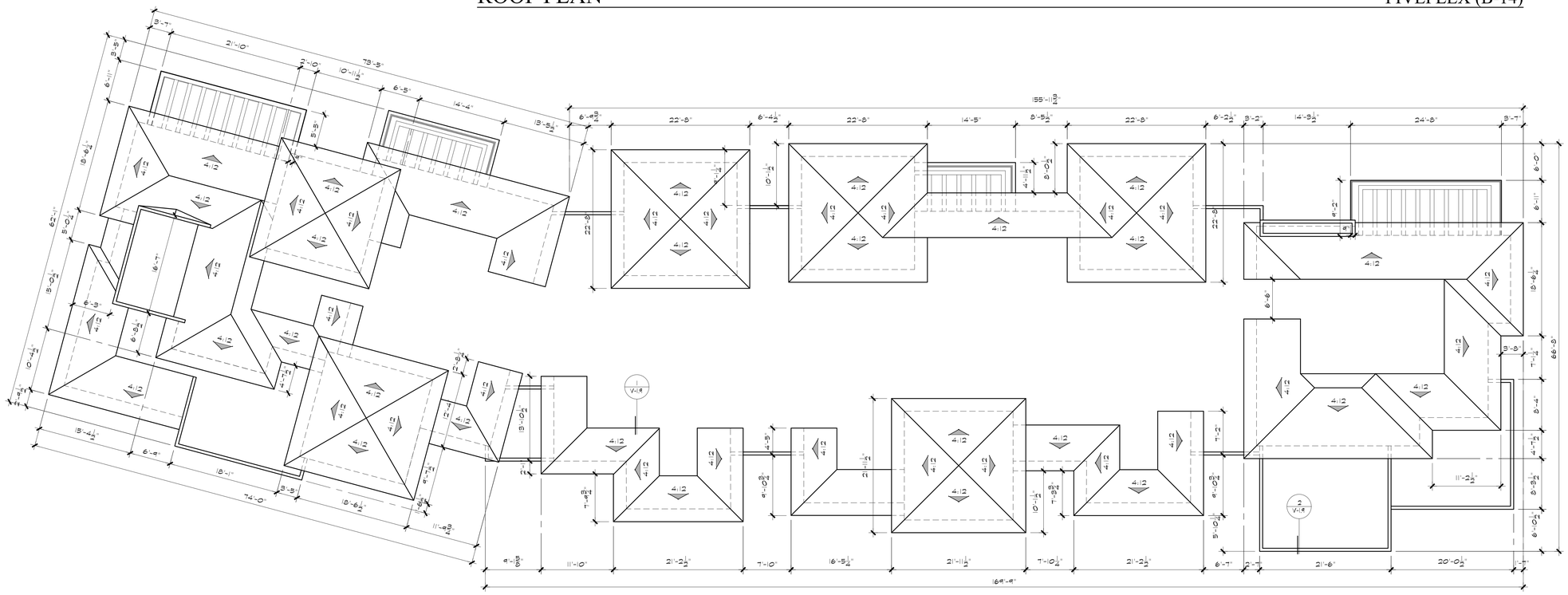
Ritz Carlton

December 20, 2022

LCRA



ROOF PLAN — FIVEPLEX (B-14)



ROOF PLAN — SEVENPLEX (B-7)

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

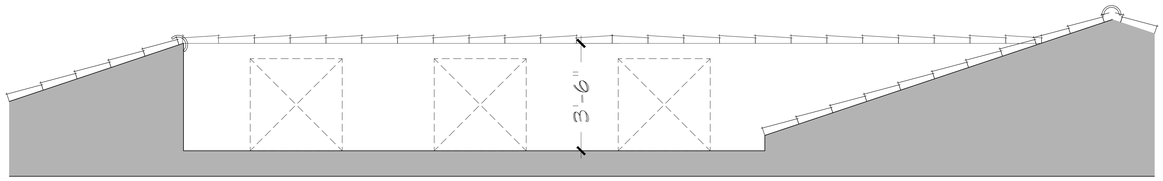
BUILDING B-14 & B-7 ROOF PLANS V-1.8

SCALE: 1/8" = 1'-0"

Ritz Carlton

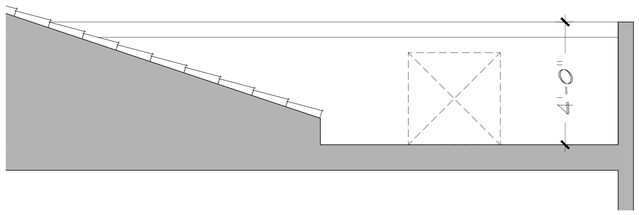
December 20, 2022

LCRA



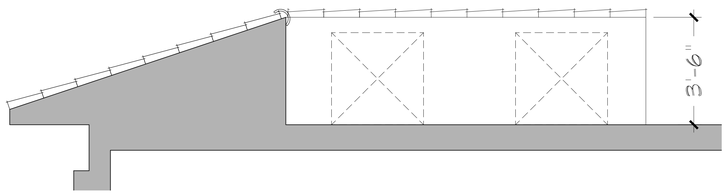

TYP. MECHANICAL WELL A2

1/2" = 1'-0"



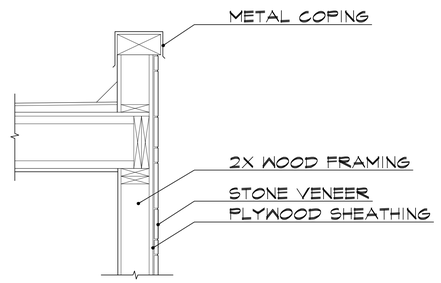

TYP. MECHANICAL WELL A3

1/2" = 1'-0"



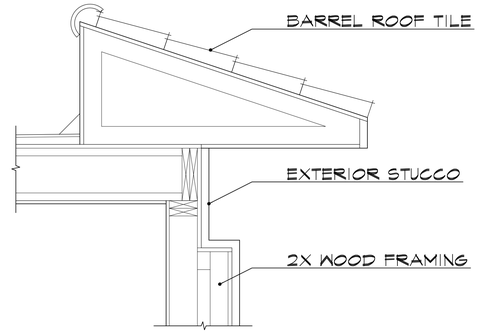

TYP. MECHANICAL WELL A1

1/2" = 1'-0"



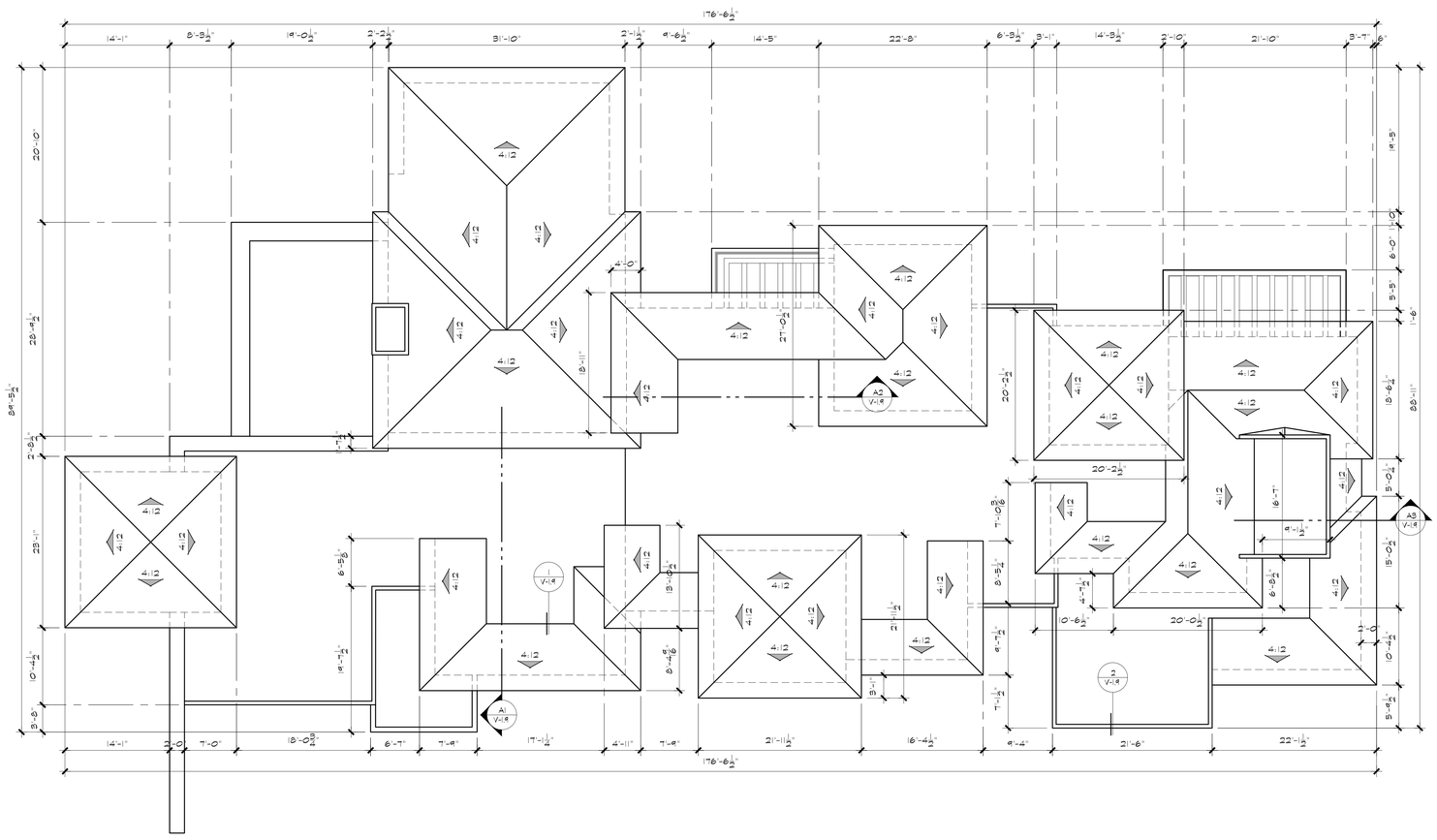

PARAPET DETAIL #2

1" = 1'-0"

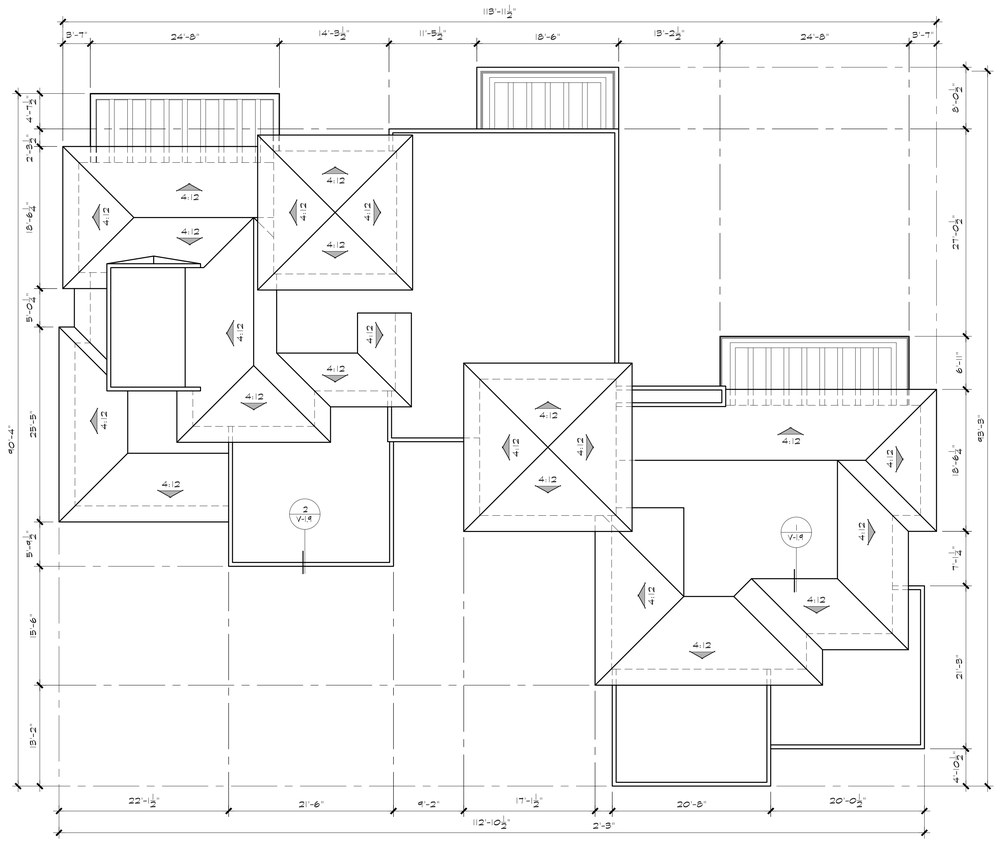



SLOPED ROOF DETAIL #1

1" = 1'-0"



ROOF PLAN TRIPLEX W/ ATTACHED LOUNGE (B-5)



ROOF PLAN TRIPLEX (B-4)

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
December 20, 2022

## BUILDING B-5 & B-4 ROOF PLANS V-1.9

SCALE: 1/8" = 1'-0"

LCRA




FRONT ELEVATION - STREETSIDE




REAR ELEVATION

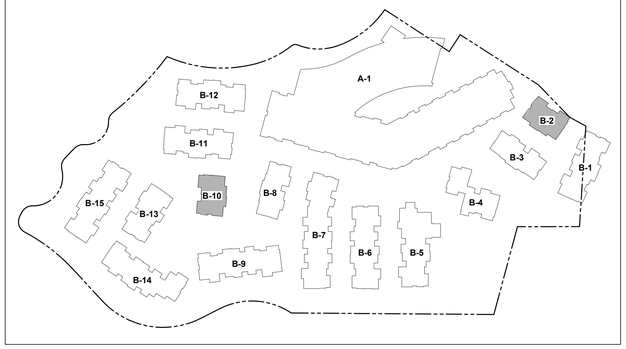



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

## DUPLEX ELEVATIONS V-2.0

SCALE: 1/8" = 1'-0"

LCRA




FRONT ELEVATION - STREETSIDE




FRONT ELEVATION (B-13)




REAR ELEVATION




REAR ELEVATION (B-13)

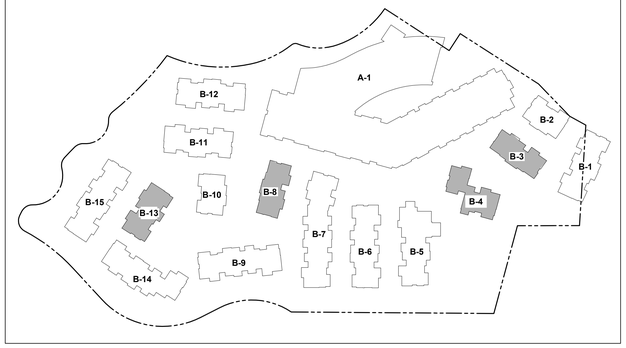



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

## TRIPLEX ELEVATIONS V-2.1

SCALE: 1/8" = 1'-0"

LCRA




FRONT ELEVATION - STREETSIDE




FRONT ELEVATION (B-1)




REAR ELEVATION



REAR ELEVATION (B-1)

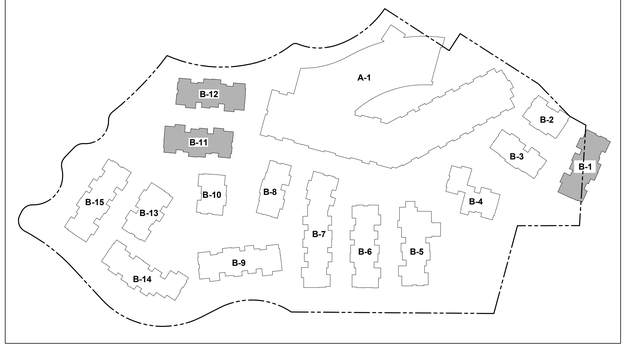



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## FOURPLEX ELEVATIONS V-2.2

SCALE: 1/8" = 1'-0"

Ritz Carlton

February 15, 2023

LCRA



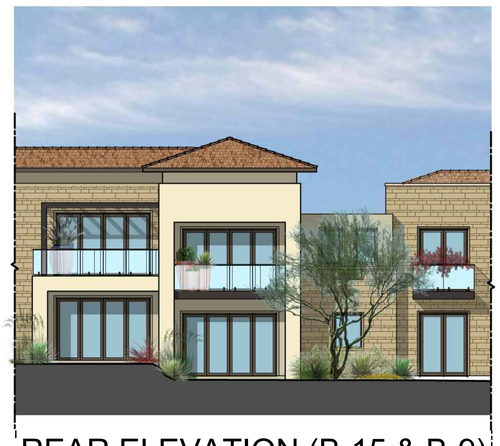

FRONT ELEVATION - STREETSIDE




FRONT ELEVATION (B-15 & B-9)




REAR ELEVATION



REAR ELEVATION (B-15 & B-9)

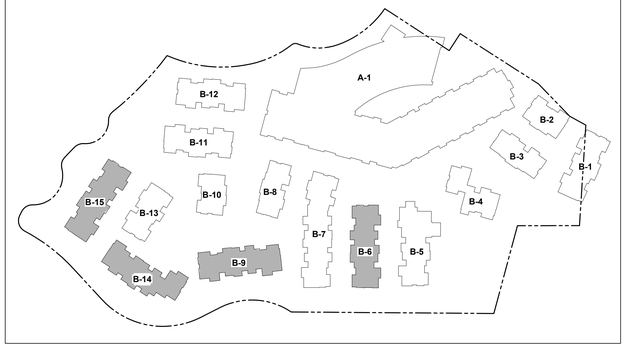



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

FIVEPLEX ELEVATIONS V-2.3
SCALE: 1/8" = 1'-0"

LCRA




FRONT ELEVATION - STREETSIDE




REAR ELEVATION

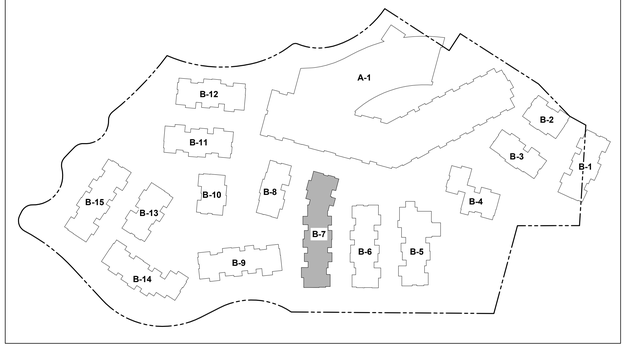



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN




# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

BUILDING B-7 ELEVATIONS V-2.4
SCALE: 1/8" = 1'-0"

LCRA




FRONT ELEVATION - STREETSIDE




REAR ELEVATION

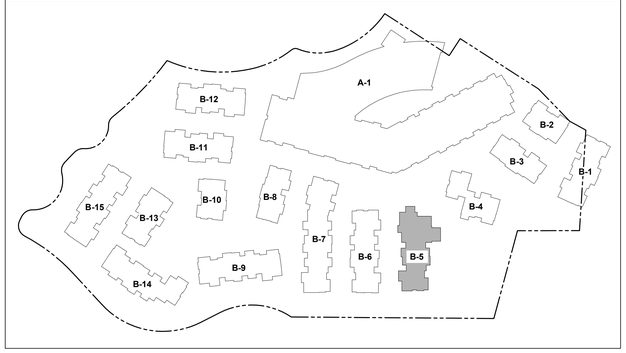



SIDE ELEVATION - LEFT




SIDE ELEVATION - RIGHT

KEY PLAN

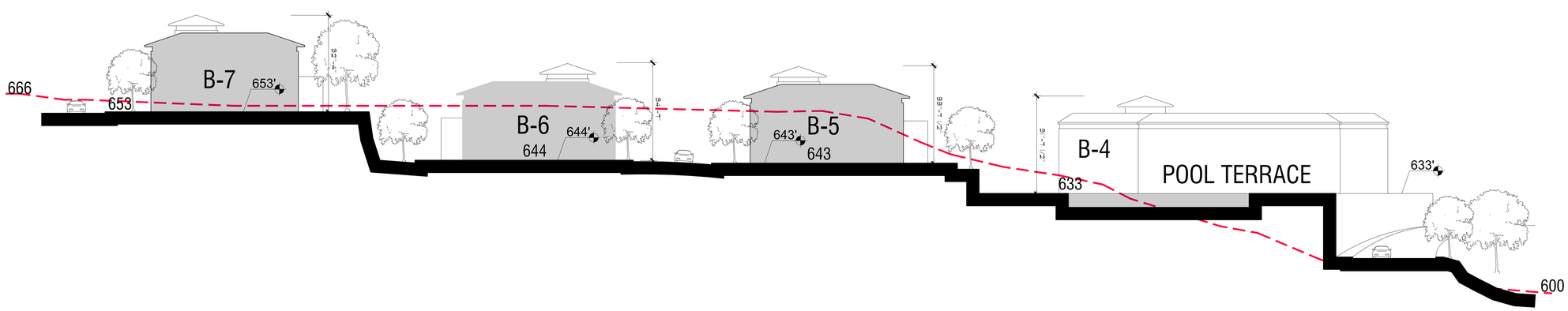


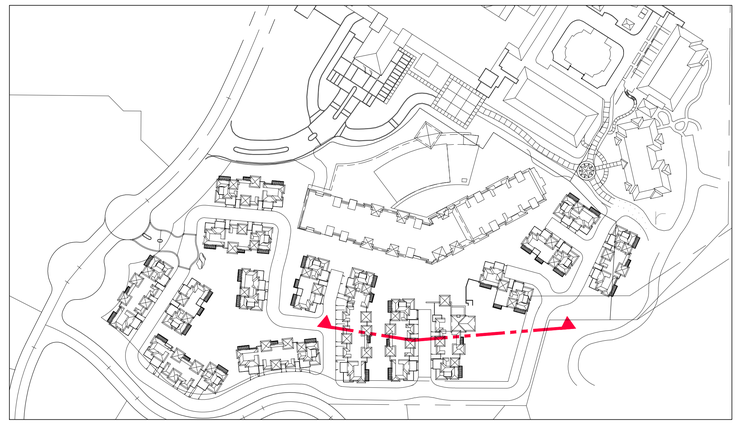

# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

Ritz Carlton
February 15, 2023

BUILDING B-5 ELEVATIONS V-2.5
SCALE: 1/8" = 1'-0"

LCRA



# BUILDING B-1 TO B-15
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## SITE SECTION V-2.6

SCALE: 1/16" = 1'-0"

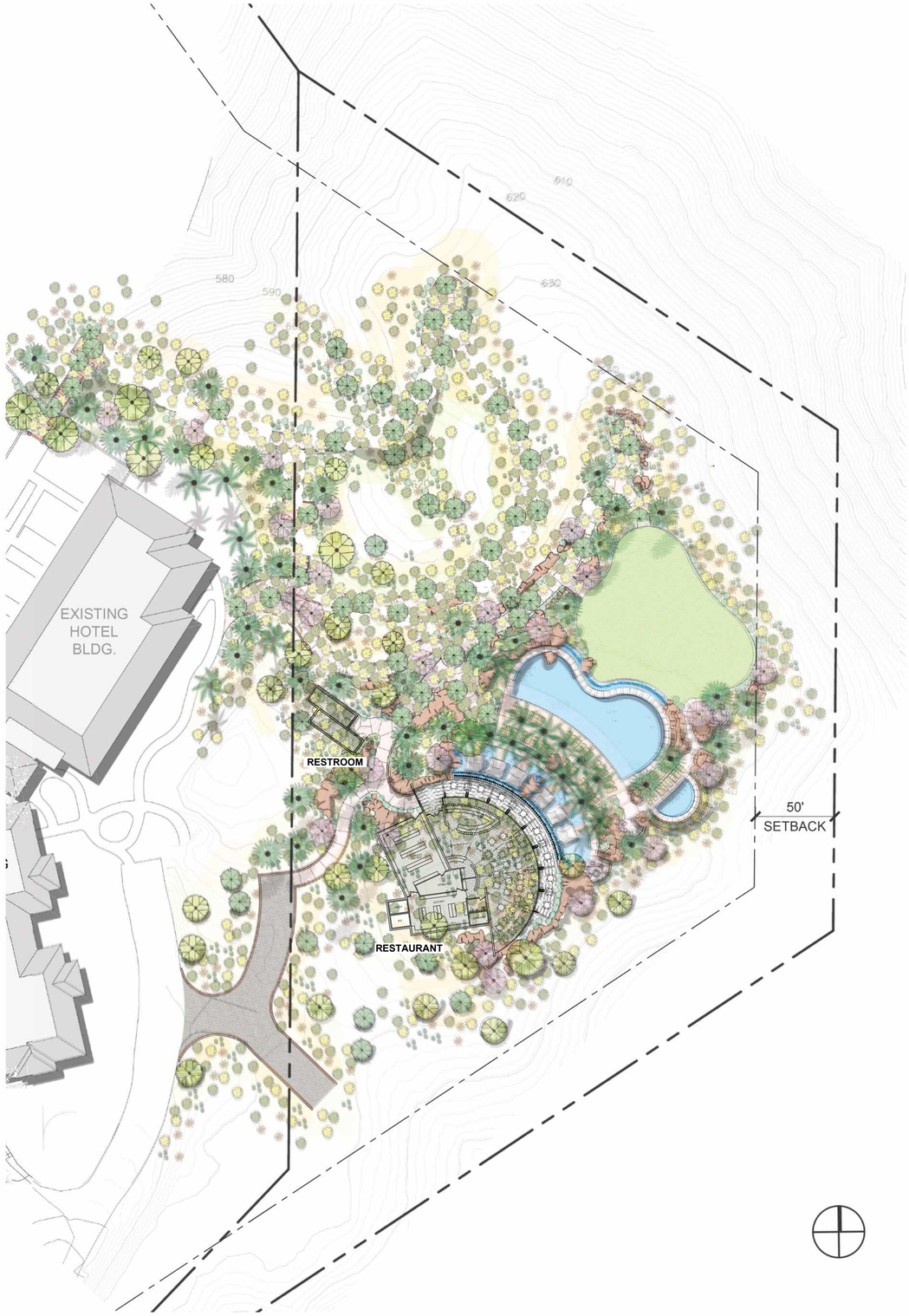
Ritz Carlton
February 15, 2023

LCRA

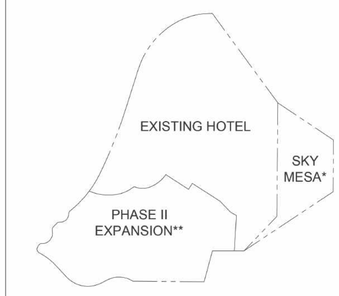


# SKY MESA

## THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE




KEY PLAN




*SEE SHEET R-0.1 FOR MORE SITE INFO
**SEE SHEET C-0.1 FOR MORE SITE INFO

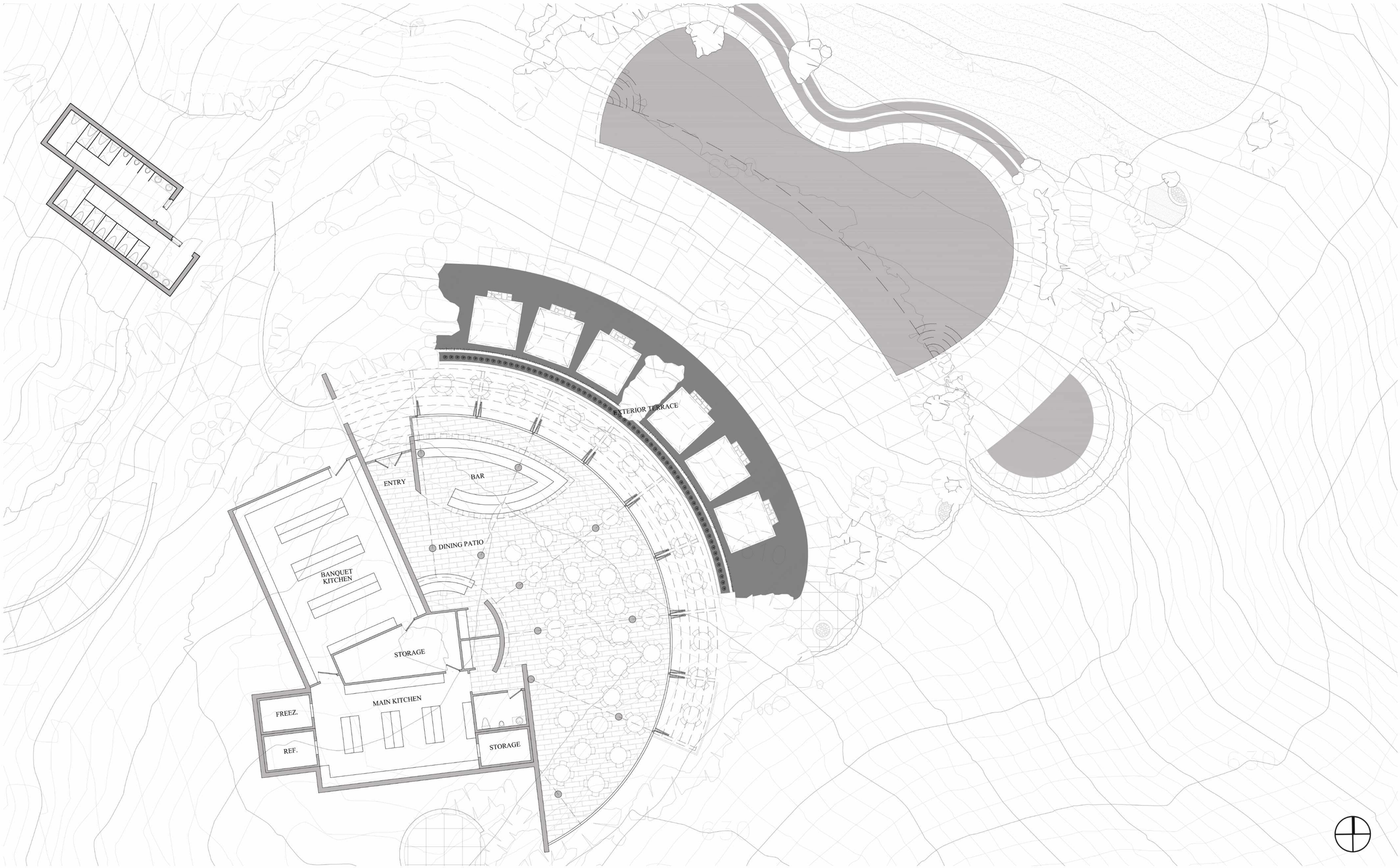
# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA COLORED SITE PLAN R-1.0A

SCALE: 1/32" = 1'-0"

Ritz Carlton
February 15, 2022

LCRA



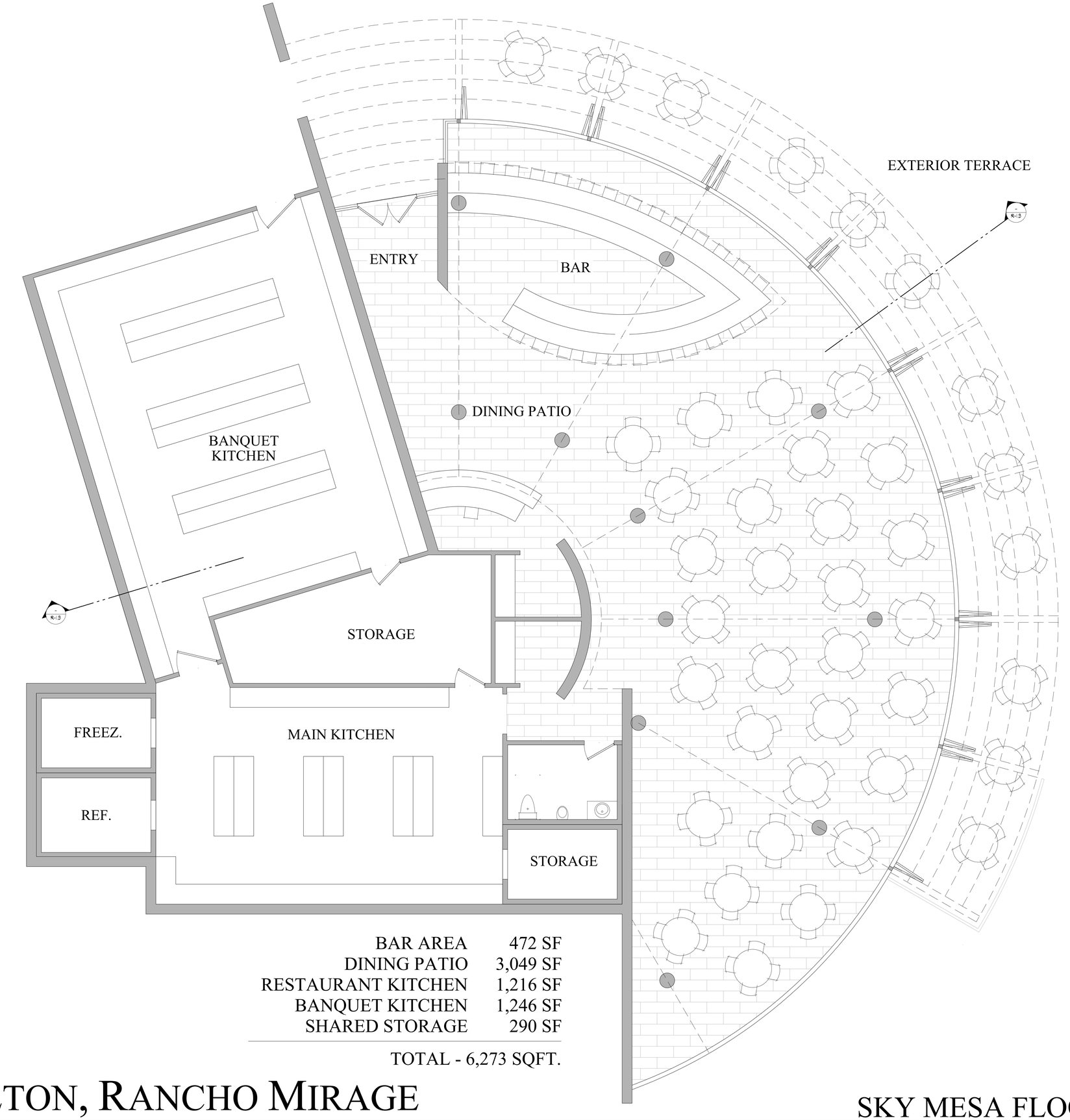

# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA ENLARGED SITE PLAN R-1.0

SCALE: 1/8" = 1'-0"

Ritz Carlton
February 15, 2022

LCRA




| | |
|---|---|
| BAR AREA | 472 SF |
| DINING PATIO | 3,049 SF |
| RESTAURANT KITCHEN | 1,216 SF |
| BANQUET KITCHEN | 1,246 SF |
| SHARED STORAGE | 290 SF |
| TOTAL - 6,273 SQFT. | |

# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA FLOOR PLAN R-1.1

SCALE: 1/4" = 1'-0"

Ritz Carlton

February 15, 2022

LCRA




NORTH ELEVATION



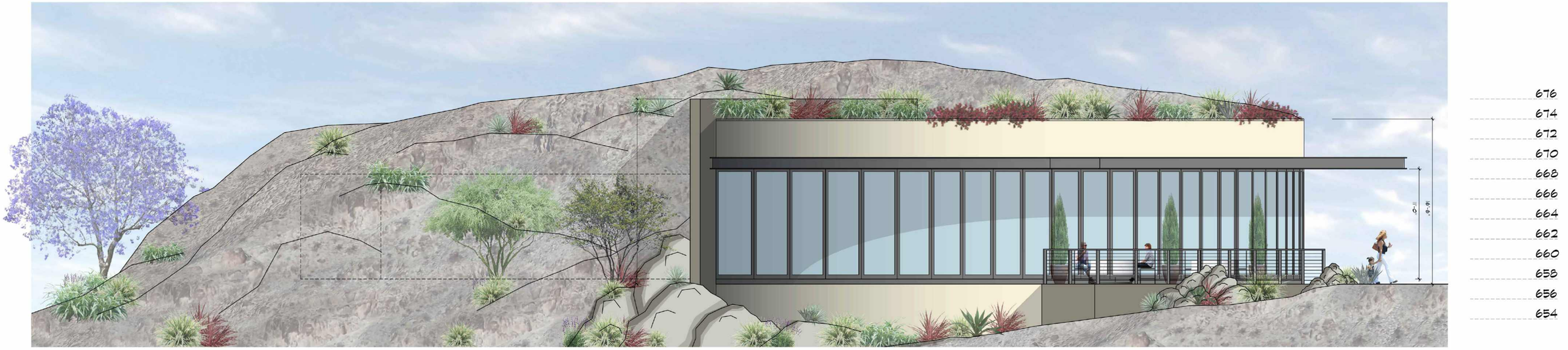

EAST ELEVATION

# THE RITZ-CARLTON, RANCHO MIRAGE

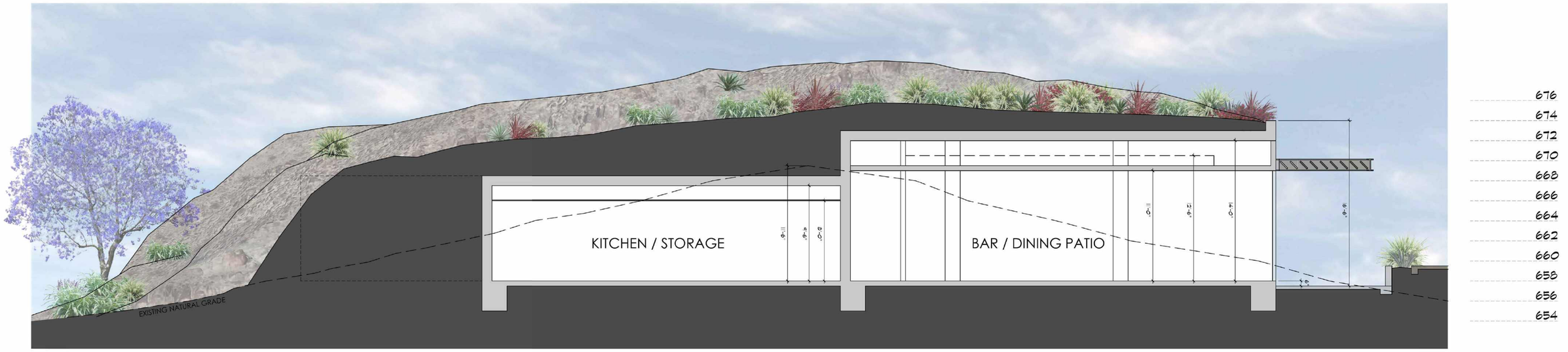
Ritz Carlton
February 15, 2022

SKY MESA ELEVATIONS R-1.2
SCALE: 1/4" = 1'-0"

LCRA




SOUTH ELEVATION




SECTION

# THE RITZ-CARLTON, RANCHO MIRAGE

Ritz Carlton
February 15, 2022

## SKY MESA ELEVATION & SECTION R-1.3

SCALE: 1/4" = 1'-0"

LCRA




Total Minimum Plumbing Fixtures:
Men: 4 Water Closets, 3 Urinal, 2 Lavatory
Women: 7 Water Closets, 3 Lavatory

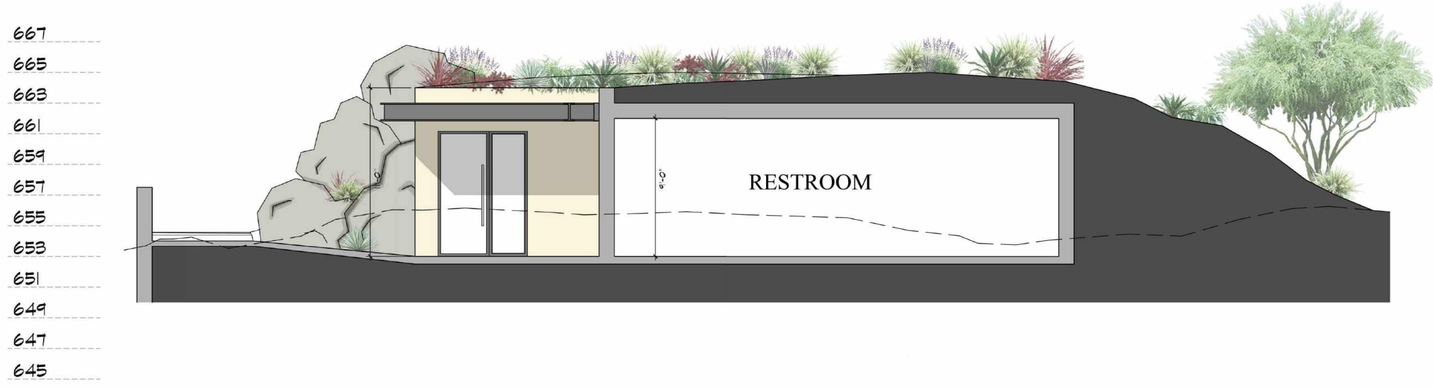
# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA RESTROOM PLAN R-2.1

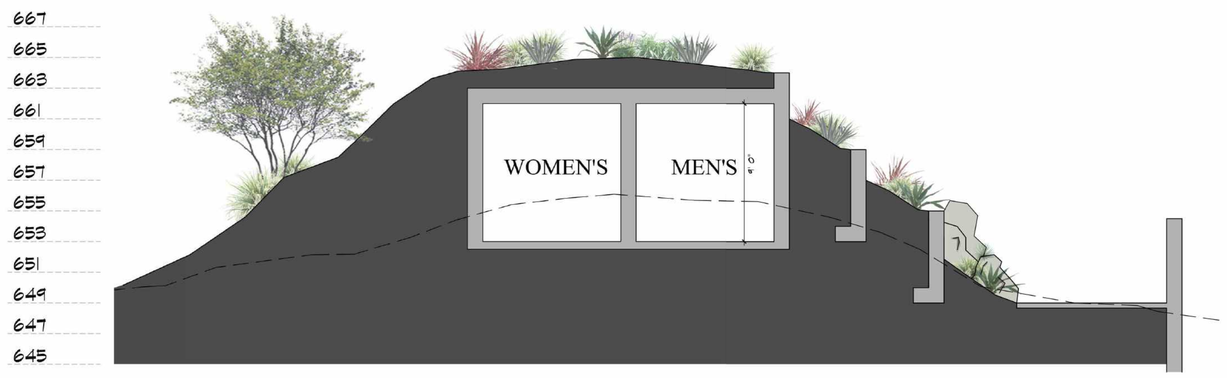
SCALE: 1/4" = 1'-0"

Ritz Carlton
February 15, 2022

LCRA




SECTION A




SECTION B

# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA RESTROOM SECTIONS R-2.2

SCALE: 1/4" = 1'-0"

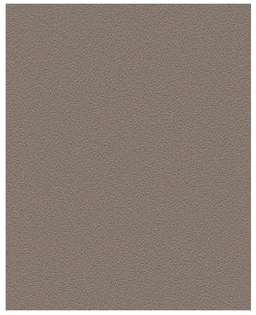
Ritz Carlton

February 15, 2022

LCRA



1



2



3



4



5



6



7



8



9



10



11



12



13




TYPICAL FRONT ELEVATION - STREETSIDE




TYPICAL REAR ELEVATION

| NO. | MATERIAL |
|---|---|
| 1 | MAIN STUCCO: BENJAMIN MOORE HC-80 BLEEKER BEIGE INTEGRAL COLOR STUCCO WITH SMOOTH FINISH |
| 2 | ACCENT STUCCO: SHERWIN WILLIAMS - SW7025 BACKDROP INTEGRAL COLOR STUCCO WITH SMOOTH FINISH |
| 3 | MASONRY VENEER: CREATIVE MINES - CUSTOM BLEND OF CRAFT SPLIT MODULAR AND URBAN RECTANGLE IN TIMBERWOLF COLOR. |
| 4 | ROOFING: NEWPOINT CONCRETE ROOF TILE - DURALITE SAXONY SLATE IN CALIFORNIA MISSION BLEND |
| 5 | FASCIA: BENJAMIN MOORE - 2112-30 STONE BROWN |
| 6 | GUARDRAILS: CRL GLASS WINDSCREEN CLAMP SYSTEM AND CRL-BLUMCRAFT 337 SERIES RAILING CAP IN DARK BRONZE ANODIZED FINISH |
| 7 | WINDOWS: SOUTHLAND WINDOWS AND DOORS - CLAD CASEMENT WINDOWS IN DARK BRONZE FINISH |
| 8 | DOORS: SOUTHLAND WINDOWS AND DOORS - CLAD FRENCH DOORS AND BI-FOLD DOORS IN DARK BRONZE FINISH |
| 9 | ENTRY DOORS: ETO DOORS - FORTIS FIBERGLASS MULTI-HORIZONTAL PLANK DOOR W/HORIZONTAL TEXTURED GRAIN IN STAIN FINISH TO MATCH TRELLIS |
| 10 | GARAGE DOOR: CLOPAY GARAGE DOORS - CANYON RIDGE MODERN "PLANK" DOOR IN BENJAMIN MOORE 2112-30 STONE BROWN |
| 11 | ENTRY LIGHTING: QUOIZEL - BEACON LED OUTDOOR WALL FIXTURE IN BLACK FINISH |
| 12 | METAL TRIM/TRELLIS STRUCTURE: BENJAMIN MOORE - 2118-20 TOUCAN BLACK |
| 13 | WOOD TRELLIS INSERTS/PRIVACY SCREENS: RESYSTA - CLADDING IN 614 SIAM COLOR (BEHIND MATERIAL 12) |

# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

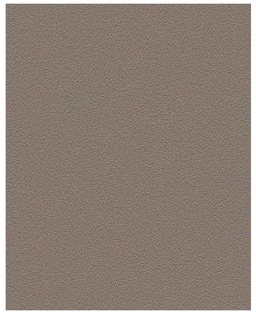
## VENUE, BUILDING A-1, & B1 TO B15
## TYPICAL COLOR & MATERIALS - CM-1.0

Ritz Carlton
February 15, 2023

LCRA



1



2



3



4



5



6



7




SKY MESA - PARTIAL FRONT ELEVATION - NORTH




SKY MESA - SIDE ELEVATION - EAST

| NO. | MATERIAL |
|---|---|
| 1 | MAIN STUCCO: BENJAMIN MOORE HC-80 BLEEKER BEIGE INTEGRAL COLOR STUCCO WITH SMOOTH FINISH |
| 2 | ACCENT STUCCO: SHERWIN WILLIAMS - SW7025 BACKDROP INTEGRAL COLOR STUCCO WITH SMOOTH FINISH |
| 3 | CONCRETE WALL: BOARD FORMED CONCRETE WITH SMOOTH FINISH |
| 4 | GUARDRAILS: VIEARAIL CABLE RAIL SYSTEM AND LED-ENHANCED HANDRAIL IN DARK BRONZE ANODIZED FINISH |
| 5 | DOORS: SOUTHLAND WINDOWS AND DOORS - BI-FOLD DOORS IN DARK BRONZE FINISH |
| 6 | METAL TRIM/TRELLIS STRUCTURE: BENJAMIN MOORE - 2118-20 TOUCAN BLACK |
| 7 | WOOD TRELLIS INSERTS/PRIVACY SCREENS: RESYSTA - CLADDING IN 614 SIAM COLOR (BEHIND MATERIAL 6) |

# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SKY MESA AREA
TYPICAL COLOR & MATERIALS - CM-1.1

Ritz Carlton
February 15, 2023

LCRA




RESIDENCES



SKY MESA

**LANDSCAPE**
**REFERENCE ONLY**

SEE SUBMITTAL SHEET INDEX FOR SPECIFIC SUBMITTAL EXHIBITS

RITZ CARLTON EXPANSION PROJECT

**LANDSCAPE SUBMITTAL SHEET INDEX**
CONCEPTUAL PLAN SUBMITTAL

SHEET INDEX

| SHEET | DESCRIPTION |
|---|---|
| LR-0 | SHEET INDEX - ILLUSTRATIVE REFERENCE PLANS |
| LR-01 | SHEET ORGANIZATION MASTER & MASTER PLANT PALETTE - RESIDENTIAL |
| LR-02 | SHEET ORGANIZATION MASTER & MASTER PLANT PALETTE - SKY MESA |
| LS-01 | SHRUB PLAN |
| LS-02 | SHRUB PLAN |
| LS-03 | SHRUB PLAN |
| LS-04 | SHRUB PLAN |
| LS-05 | SHRUB PLAN |
| LS-06 | SHRUB PLAN |
| LS-07 | SHRUB PLAN |
| LS-08 | SHRUB PLAN |
| LS-09 | SHRUB PLAN |
| LS-10 | SHRUB PLAN |
| LS-11 | SHRUB PLAN |
| LS-12 | SHRUB PLAN |
| LT-01 | TREE PLAN |
| LT-02 | TREE PLAN |
| LT-03 | TREE PLAN |
| LT-04 | TREE PLAN |
| LT-05 | TREE PLAN |
| LT-06 | TREE PLAN |
| LT-07 | TREE PLAN |
| LT-08 | TREE PLAN |
| LT-09 | TREE PLAN |
| LT-10 | TREE PLAN |
| LT-11 | TREE PLAN |
| LT-12 | TREE PLAN |
| LN-01 | LANDSCAPE NOTES |
| LF-01 | LANDSCAPE FEATURES PLAN - RESIDENTIAL |
| LF-02 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-03 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-04 | LANDSCAPE FEATURES PLAN - SKY MESA |
| LF-05 | LANDSCAPE FEATURES PLAN - SKY MESA |

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Design Studio of Michael McKay
Landscape Architecture, Planning & Consultants

Architect:

LCRA ARCHITECTS

Sheet Title:
SHEET INDEX - ILLUSTRATIVE REFERENCE PLAN
CONCEPT PLAN SUBMITTAL

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Viscinity Map:




Typical Revisions:

| △ | Date: | Description: |
|---|---|---|
| | | |

Sheet Title:
SHEET INDEX

Sheet Reference:
LR-0

C:\Users\vmily\Documents\1_Projects\Ritz\2022 Final Landscape Package\171201-Siteplan - Landscape Submittal - Standard\Ritz - Landscape Plans - Current.dwg

## PLANTING LEGEND

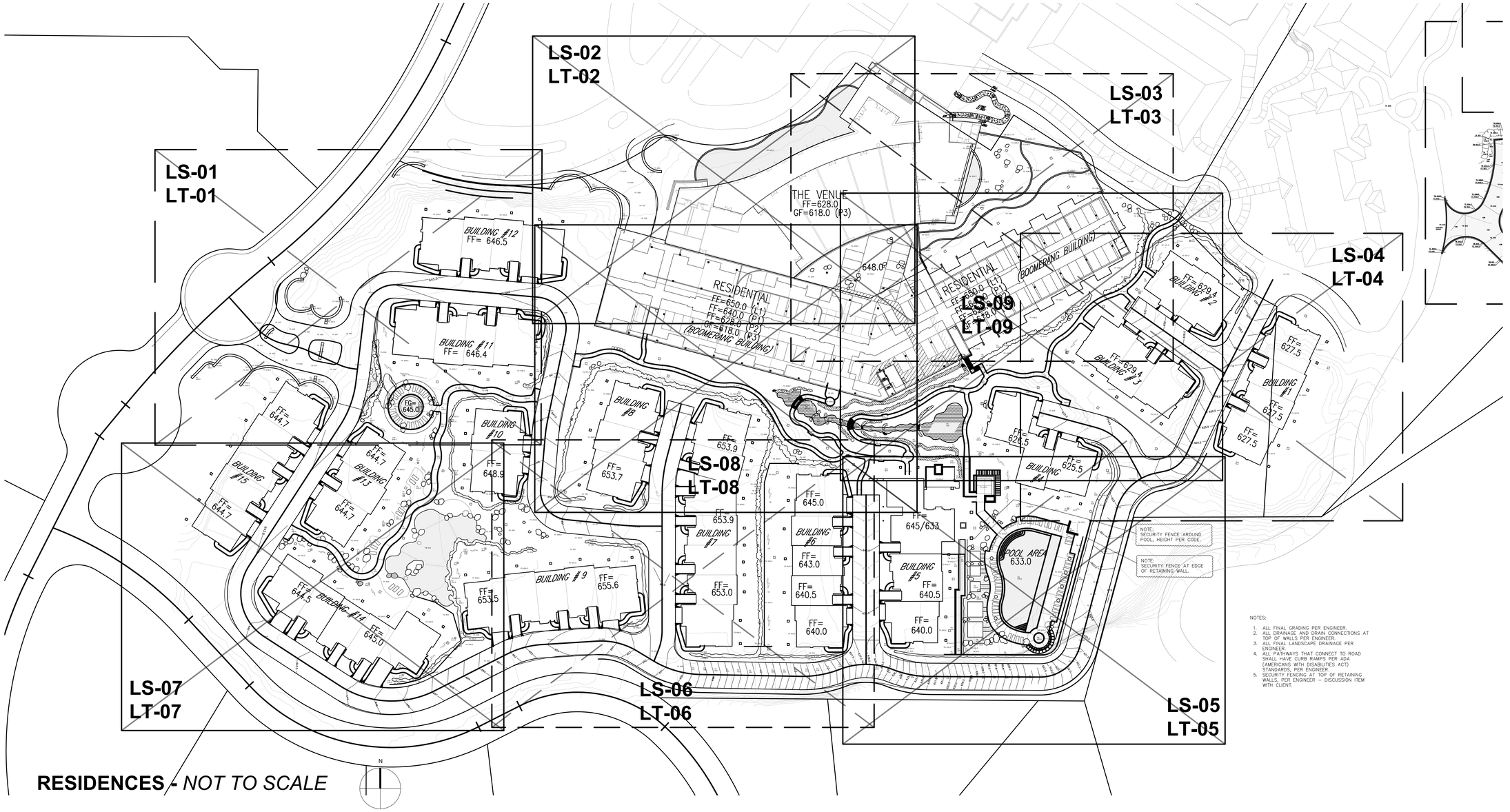
| SYMBOL | PLANT NAME | QTY. | SIZE | WUCOLS |
|---|---|---|---|---|
| TREES: | | | | |
| | ACACIA ANEURA<br>MULGA | 22 | 36" BOX | LOW |
| | ACACIA FARNESIANA<br>SWEET ACACIA | 16 | 36" BOX<br>MULTI-TRUNK | LOW |
| | CHILOPSIS LINEARIS<br>DESERT WILLOW | 74 | 36" BOX | MODERATE/<br>MEDIUM |
| | X CHITALPA TASHKENTENSIS<br>PINK DAWN | 107 | 36" BOX | LOW |
| | PARKINSONIA FLORIDA<br>BLUE PALO VERDE | 24 | 36" BOX | LOW |
| | PARKINSONIA X 'DESERT MUSEUM'<br>DESERT MUSEUM PALO VERDE | 197 | 36" BOX | LOW |
| | PROSOPIS CHILENSIS 'THORNLESS'<br>CHILEAN MESQUITE | 107 | 36" BOX | LOW |
| | VITEX AGNUS-CASTUS<br>CHASTE TREE | 17 | 36" BOX | LOW |
| PALMS: | | | | |
| | BRAHEA ARMATA<br>BLUE HESPER PALM | 5 | 6' BTH | MODERATE/<br>MEDIUM |
| | PHOENIX DACTYLIFERA 'MEDJOOL'<br>MEDJOOL DATE PALM | 34 | 15' BTH | MODERATE/<br>MEDIUM |
| | WASHINGTONIA FILIFERA<br>CALIFORNUA FAN PALM | 143 | 10'-15' BTH<br>SKINNED<br>40% AT 15'<br>20% AT 13'<br>40% AT 10' | MODERATE/<br>MEDIUM |

| SHRUBS - SMALL: | | QTY: | SIZE: | WUCOLS: |
|---|---|---|---|---|
| S2 | ASCLEPIAS SUBULATA<br>DESERT MILKWEED | 500 | 5 GAL. | LOW |
| S3 | BACCHARIS X 'CENTENNIAL'<br>CENTENNIAL DESERT BROOM | 230 | 5 GAL. | LOW |
| S5 | DALEA FRUTESCENS<br>BLACK DALEA | 620 | 1 GAL. | LOW |
| S6 | ENCELIA FARINOSA<br>BRITTLE BUSH | 215 | 5 GAL. | VERY LOW |
| S7 | ERIOGONUM FASCICULATUM<br>'THEODORE PAYNE' | 185 | 1 GAL. | VERY LOW |
| S8 | GAURA LINDHEIMERI | 95 | 1 GAL. | MODERATE/<br>MEDIUM |
| S9 | LOBELIA LAXIFLORA<br>MEXICAN BUSH LOBELIA | 435 | 5 GAL. | MODERATE/<br>MEDIUM |
| S10 | SALVIA GREGGII<br>AUTUMN SAGE | 400 | 5 GAL. | MODERATE/<br>MEDIUM |
| SHRUBS - MEDIUM: | | | | |
| M1 | ABUTILON PALMERI<br>INDIAN MALLOW | 30 | 5 GAL. | MODERATE/<br>MEDIUM |
| M2 | CALLIANDRA CALIFORNICA<br>BAJA FAIRY DUSTER | 150 | 5 GAL. | LOW |
| M3 | FALLUGIA PARADOXA<br>APACHE PLUME | 60 | 5 GAL. | LOW |
| M5 | JUSTICIA CALIFORNICA<br>CHUPAROSA | 230 | 5 GAL. | VERY LOW |
| M6 | LEUCOPHYLLUM CANDIDUM<br>'SILVER CLOUD' | 65 | 5 GAL. | LOW |
| M7 | LEUCOPHYLLUM FRUTESCENS<br>'GREEN CLOUD' | 205 | 5 GAL. | LOW |
| M8 | LEUCOPHYLLUM FRUTESCENS<br>'THUNDER CLOUD' | 270 | 5 GAL. | LOW |
| M9 | SENNA ARTEMISIOIDES<br>FEATHERY CASSIA | 1725 | 5 GAL. | LOW |
| M10 | SPHAERALCEA AMBIGUA<br>APRICOT MALLOW | 100 | 5 GAL. | VERY LOW |

| SHRUBS - LARGE: | | | | |
|---|---|---|---|---|
| L1 | CAESALPINIA PULCHERRIMA<br>RED BIRD OF PARADISE | 135 | 5 GAL. | LOW |
| L2 | CHAMELAUCIUM UNCINATUM<br>'PURPLE PRIDE'<br>GERARLDTON WAX FLOWER | 4 | 5 GAL. | MODERATE/<br>MEDIUM |
| L3 | CORDIA BOISSIERI<br>WILD OLIVE | 9 | 5 GAL. | LOW |
| L4 | CORDIA PARVIFOLIA<br>LITTLE-LEAF CORDIA | 80 | 5 GAL. | LOW |
| L5 | DODONAEA VISCOSA 'PURPUREA'<br>PURPLE HOSEED BUSH | 30 | 5 GAL. | MODERATE/<br>MEDIUM |

| ACCENTS - CACTUS / SUCCULENTS | | | | |
|---|---|---|---|---|
| A1 | AGAVE AMERICANA<br>CENTURY PLANT | 290 | 5 GAL. | VERY LOW |
| A2 | AGAVE ATTENUATA 'BOUTIN BLUE'<br>BLUE FOX TAIL AGAVE | 240 | 5 GAL. | LOW |
| A3 | AGAVE 'BLUE GLOW'<br>BLUE GLOW AGAVE | 140 | 5 GAL. | LOW |
| A4 | AGAVE DESMETTIANA 'VARIEGATA'<br>VARIEGATED SMOOTH AGAVE | 695 | 5 GAL. | LOW |
| A8 | AGAVE VICTORIAE-REGINAE<br>QUEEN VICTORIA AGAVE | 55 | 5 GAL. | LOW |
| A9 | AGAVE VILMORINIANA<br>OCTOPUS AGAVE | 200 | 5 GAL. | LOW |
| A11 | ALOE 'BLUE ELF'<br>BLUE ELF ALOE | 385 | 5 GAL. | LOW |
| A12 | ALOE STRIATA<br>CORAL ALOE | 350 | 5 GAL. | LOW |
| A13 | ALOE VERA<br>MEDICINAL ALOE | 260 | 5 GAL. | LOW |
| A15 | CEREUS PERUVIANUS<br>APPLE CACTUS | 17 | 5 GAL. | LOW |
| A16 | CISTANTHE GRANDIFLORA<br>ROCK PURSLANE | 320 | 5 GAL. | LOW/MEDIUM |
| A17 | DASYLIRION WHEELERI<br>DESERT SPOON | 295 | 5 GAL. | LOW |
| A18 | ECHINOCACTUS GRUSONII<br>GOLDEN BARREL CACTUS | 160 | 5 GAL. | LOW |
| A19 | FOUQUIERIA SPLENDENS<br>OCOTILLO | 475 | 5 GAL. | VERY LOW |
| A20 | HESPERALOE 'BRAKELIGHTS'<br>RED YUCCA | 2220 | 5 GAL. | LOW |
| A21 | OPUNTIA MOLACEA VAR. SANTA RITA<br>PURPLE PRICKLY PEAR | 50 | 5 GAL. | VERY LOW |
| A22 | YUCCA ROSTRATA<br>BEAKED YUCCA | 105 | 15 GAL. | LOW |

| GROUNDCOVER: | | | | |
|---|---|---|---|---|
| | DALEA GREGGII<br>TRAILING INDIGO BUSH | 7000 S.F. | FLATTED<br>12" O.C. | LOW |
| | MYOPORUM PARVIFOLIUM<br>CREEPING MYOPORUM | 900 S.F. | FLATTED<br>12" O.C. | MODERATE/<br>MEDIUM |
| VINES: | | | | |
| | BOUGAINVILLEA SPP.<br>BOUGAINVILLEA | 160 | 5 GAL. | MODERATE/<br>MEDIUM |
| GRASSES: | | | | |
| | BOUTELOUA GRACILIS<br>BLUE GRAMA | 4800 S.F. | SEEDED | LOW |
| G3 | MUHLENBERGIA CAPILLARIS 'REGAL MIST'<br>PINK MUHLY | 1730 | 5 GAL. | MODERATE/<br>MEDIUM |
| G4 | MUHLENBERGIA RIGENS<br>DEER GRASS | 1650 | 5 GAL. | MODERATE/<br>MEDIUM |
| | ARTIFICIAL TURF | 2700 S.F. | INSTALLED<br>PER MANUF.<br>RECOMMENDATIONS | |




**RESIDENCES** - *NOT TO SCALE*

NOTES:

1. ALL FINAL GRADING PER ENGINEER.
2. ALL DRAINAGE AND DRAIN CONNECTIONS AT TOP OF WALLS PER ENGINEER.
3. ALL FINAL LANDSCAPE DRAINAGE PER ENGINEER.
4. ALL PATHWAYS THAT CONNECT TO ROAD SHALL HAVE CURB RAMPS PER ADA (AMERICANS WITH DISABILITIES ACT) STANDARDS, PER ENGINEER.
5. SECURITY FENCING AT TOP OF RETAINING WALLS, PER ENGINEER - DISCUSSION ITEM WITH CLIENT.

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Design Studio of Michael McKay
Landscape Architecture, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
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68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:
SHEET ORGANIZATION MASTER & MASTER PLANT PALETTES
CONCEPT PLAN SUBMITTAL
RESIDENCES

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|
| | |

Sheet Title:
SHEET ORGANIZATION & PLANT PALETTES

Sheet Reference:
LR-01

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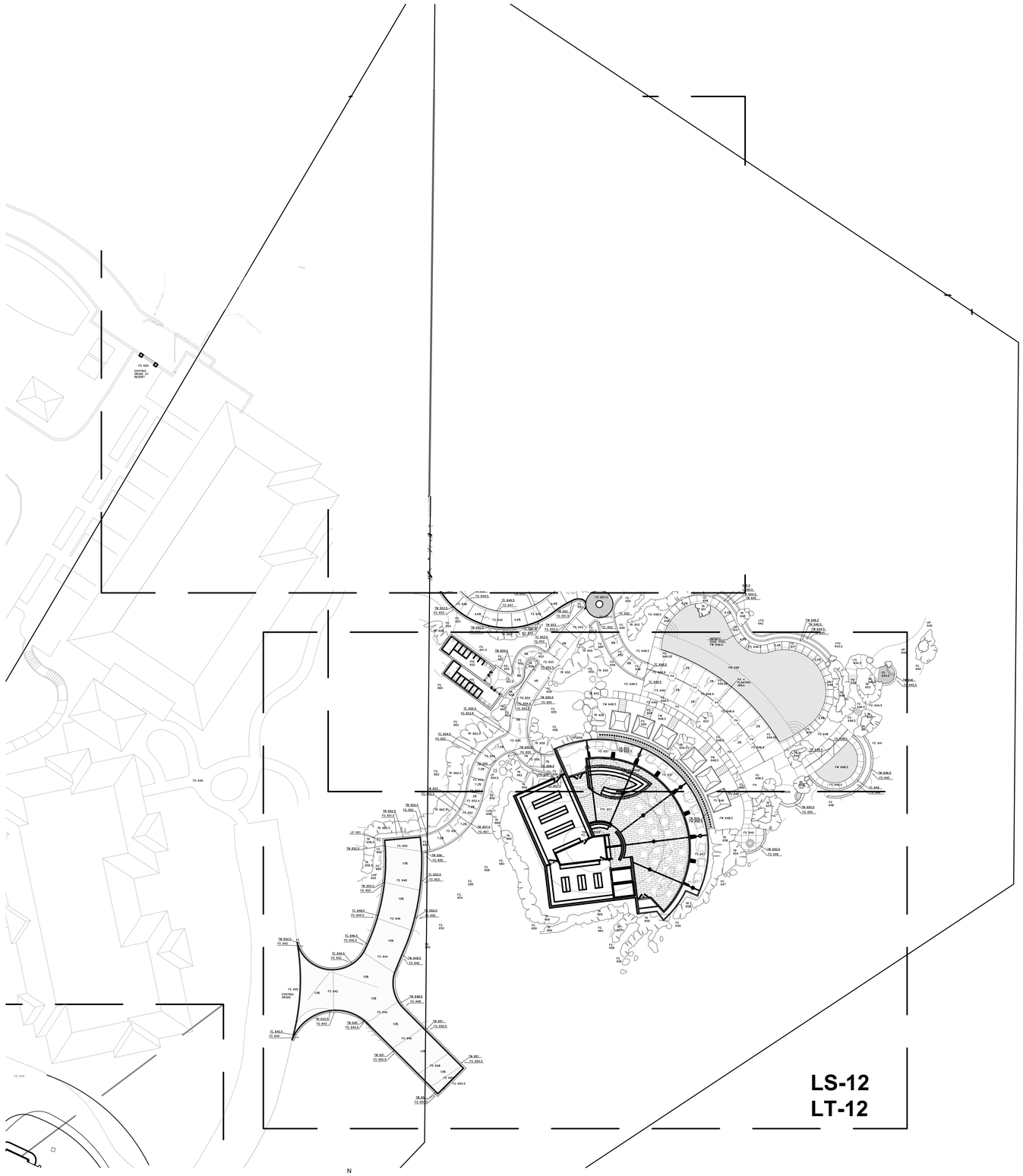


**SKY MESA -** *NOT TO SCALE*

## PLANTING LEGEND

| SYMBOL | PLANT NAME | QTY. | SIZE | WUCOLS |
|---|---|---|---|---|
| TREES: | | | | |
| | ACACIA ANEURA<br>MULGA | 0 | 36" BOX | LOW |
| | ACACIA FARNESIANA<br>SWEET ACACIA | 0 | 36" BOX MULTI-TRUNK | LOW |
| | CHILOPSIS LINEARIS<br>DESERT WILLOW | 30 | 36" BOX | MODERATE/ MEDIUM |
| | X CHITALPA TASHKENTENSIS<br>PINK DAWN | 0 | 36" BOX | LOW |
| | PARKINSONIA FLORIDA<br>BLUE PALO VERDE | 0 | 36" BOX | LOW |
| | PARKINSONIA X 'DESERT MUSEUM'<br>DESERT MUSEUM PALO VERDE | 35 | 36" BOX | LOW |
| | PROSOPIS CHILENSIS 'THORNLESS'<br>CHILEAN MESQUITE | 40 | 36" BOX | LOW |
| | VITEX AGNUS-CASTUS<br>CHASTE TREE | 0 | 36" BOX | LOW |
| PALMS: | | | | |
| | BRAHEA ARMATA<br>BLUE HESPER PALM | 0 | 6' BTH | MODERATE/ MEDIUM |
| | PHOENIX DACTYLIFERA 'MEDJOOL'<br>MEDJOOL DATE PALM | 5 | 15' BTH | MODERATE/ MEDIUM |
| | WASHINGTONIA FILIFERA<br>CALIFORNUA FAN PALM | 9 | 10'-15' BTH SKINNED | MODERATE/ MEDIUM |
| SHRUBS - SMALL: | | QTY: | SIZE: | WUCOLS: |
| S2 | ASCLEPIAS SUBULATA<br>DESERT MILKWEED | 105 | 5 GAL. | LOW |
| S3 | BACCHARIS X 'CENTENNIAL'<br>CENTENNIAL DESERT BROOM | 80 | 5 GAL. | LOW |
| S5 | DALEA FRUTESCENS<br>BLACK DALEA | 25 | 1 GAL. | LOW |
| S6 | ENCELIA FARINOSA<br>BRITTLE BUSH | 100 | 5 GAL. | VERY LOW |
| S7 | ERIOGONUM FASCICULATUM<br>'THEODORE PAYNE' | 360 | 1 GAL. | VERY LOW |
| S8 | GAURA LINDHEIMERI | 0 | 1 GAL. | MODERATE/ MEDIUM |
| S9 | LOBELIA LAXIFLORA<br>MEXICAN BUSH LOBELIA | 25 | 5 GAL. | MODERATE/ MEDIUM |
| S10 | SALVIA GREGGII<br>AUTUMN SAGE | 40 | 5 GAL. | MODERATE/ MEDIUM |
| SHRUBS - MEDIUM: | | | | |
| M1 | ABUTILON PALMERI<br>INDIAN MALLOW | 25 | 5 GAL. | MODERATE/ MEDIUM |
| M2 | CALLIANDRA CALIFORNICA<br>BAJA FAIRY DUSTER | 0 | 5 GAL. | LOW |
| M3 | FALLUGIA PARADOXA<br>APACHE PLUME | 0 | 5 GAL. | LOW |
| M4 | JUSTICIA CALIFORNICA<br>CHUPAROSA | 20 | 5 GAL. | VERY LOW |
| M6 | LEUCOPHYLLUM CANDIDUM<br>'SILVER CLOUD' | 10 | 5 GAL. | LOW |
| M7 | LEUCOPHYLLUM FRUTESCENS<br>'GREEN CLOUD' | 10 | 5 GAL. | LOW |
| M8 | LEUCOPHYLLUM FRUTESCENS<br>'THUNDER CLOUD' | 0 | 5 GAL. | LOW |
| M9 | SENNA ARTEMISIOIDES<br>FEATHERY CASSIA | 130 | 5 GAL. | LOW |
| M10 | SPHAERALCEA AMBIGUA<br>APRICOT MALLOW | 90 | 5 GAL. | VERY LOW |
| SHRUBS - LARGE: | | | | |
| L1 | CAESALPINIA PULCHERRIMA<br>RED BIRD OF PARADISE | 50 | 5 GAL. | LOW |
| L2 | CHAMELAUCIUM UNCINATUM<br>'PURPLE PRIDE'<br>GERARLDTON WAX FLOWER | 0 | 5 GAL. | MODERATE/ MEDIUM |
| L3 | CORDIA BOISSIERI<br>WILD OLIVE | 0 | 5 GAL. | LOW |
| L4 | CORDIA PARVIFOLIA<br>LITTLE-LEAF CORDIA | 20 | 5 GAL. | LOW |
| L5 | DODONAEA VISCOSA 'PURPUREA'<br>PURPLE HOSEED BUSH | 0 | 5 GAL. | MODERATE/ MEDIUM |
| ACCENTS - CACTUS / SUCCULENTS | | | | |
| | AGAVE AMERICANA<br>CENTURY PLANT | 15 | 5 GAL. | VERY LOW |
| | AGAVE ATTENUATA 'BOUTIN BLUE'<br>BLUE FOX TAIL AGAVE | 20 | 5 GAL. | LOW |
| AG3 | AGAVE 'BLUE GLOW'<br>BLUE GLOW AGAVE | 0 | 5 GAL. | LOW |
| | AGAVE DESMETTIANA 'VARIEGATA'<br>VARIEGATED SMOOTH AGAVE | 70 | 5 GAL. | LOW |
| AG5 | AGAVE VICTORIAE-REGINAE<br>QUEEN VICTORIA AGAVE | 0 | 5 GAL. | LOW |
| | AGAVE VILMORINIANA<br>OCTOPUS AGAVE | 20 | 5 GAL. | LOW |
| | ALOE 'BLUE ELF'<br>BLUE ELF ALOE | 110 | 5 GAL. | LOW |
| | ALOE STRIATA<br>CORAL ALOE | 80 | 5 GAL. | LOW |
| | ALOE VERA<br>MEDICINAL ALOE | 55 | 5 GAL. | LOW |
| AV3 | CEREUS PERUVIANUS<br>APPLE CACTUS | 14 | 15 GAL. | LOW |
| CR1 | CISTANTHE GRANDIFLORA<br>ROCK PURSLANE | 100 | 5 GAL. | LOW/MEDIUM |
| | DASYLIRION WHEELERI<br>DESERT SPOON | 55 | 5 GAL. | LOW |
| EN | ECHINOCACTUS GRUSONII<br>GOLDEN BARREL CACTUS | 0 | 5 GAL. | LOW |
| | FOUQUIERIA SPLENDENS<br>OCOTILLO | 30 | 5 GAL. | VERY LOW |
| HA | HESPERALOE 'BRAKELIGHTS'<br>RED YUCCA | 0 | 5 GAL. | LOW |
| | OPUNTIA VIOLACEA VAR. SANTA RITA<br>PURPLE PRICKLY PEAR | 0 | 5 GAL. | VERY LOW |
| | YUCCA ROSTRATA<br>BEAKED YUCCA | 20 | 5 GAL. | LOW |

| | | | | |
|---|---|---|---|---|
| GROUNDCOVER: | | | | |
| | DALEA GREGGII<br>TRAILING INDIGO BUSH | 3,000 S.F. | FLATTED 12" O.C. | LOW |
| | MYOPORUM PARVIFOLIUM<br>CREEPING MYOPORUM | 80 S.F. | FLATTED 12" O.C. | MODERATE/ MEDIUM |
| | REVEGETATION AREA - ASCLEPIAS SUBULATA, ENCELIA FARINOSA, ERIOGONUM FASCICULATUM, HESPEROYUCCA WHIPPLEI, LARREA TRIDENTATA, SALVIA APIANA, SPHAERALCEA AMBIGUA | 21,300 S.F. | PLANTED 3-4' APART IN A RANDOM MIX | LOW |
| GRASSES: | | | | |
| | BOUTELOUA GRACILIS<br>BLUE GRAMA | 700 S.F. | SEEDED | LOW |
| G3 | MUHLENBERGIA CAPILLARIS 'REGAL MIST'<br>PINK MUHLY | 90 | 5 GAL. | MODERATE/ MEDIUM |
| G4 | MUHLENBERGIA RIGENS<br>DEER GRASS | 130 | 5 GAL. | MODERATE/ MEDIUM |
| | ARTIFICIAL TURF | 7200 S.F. | INSTALLED PER MANUF. RECOMMENDATIONS | |

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Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

# SHEET ORGANIZATION MASTER & MASTER PLANT PALETTES
## CONCEPT PLAN SUBMITTAL
## SKY MESA

Sheet Title:

Viscinity Map:



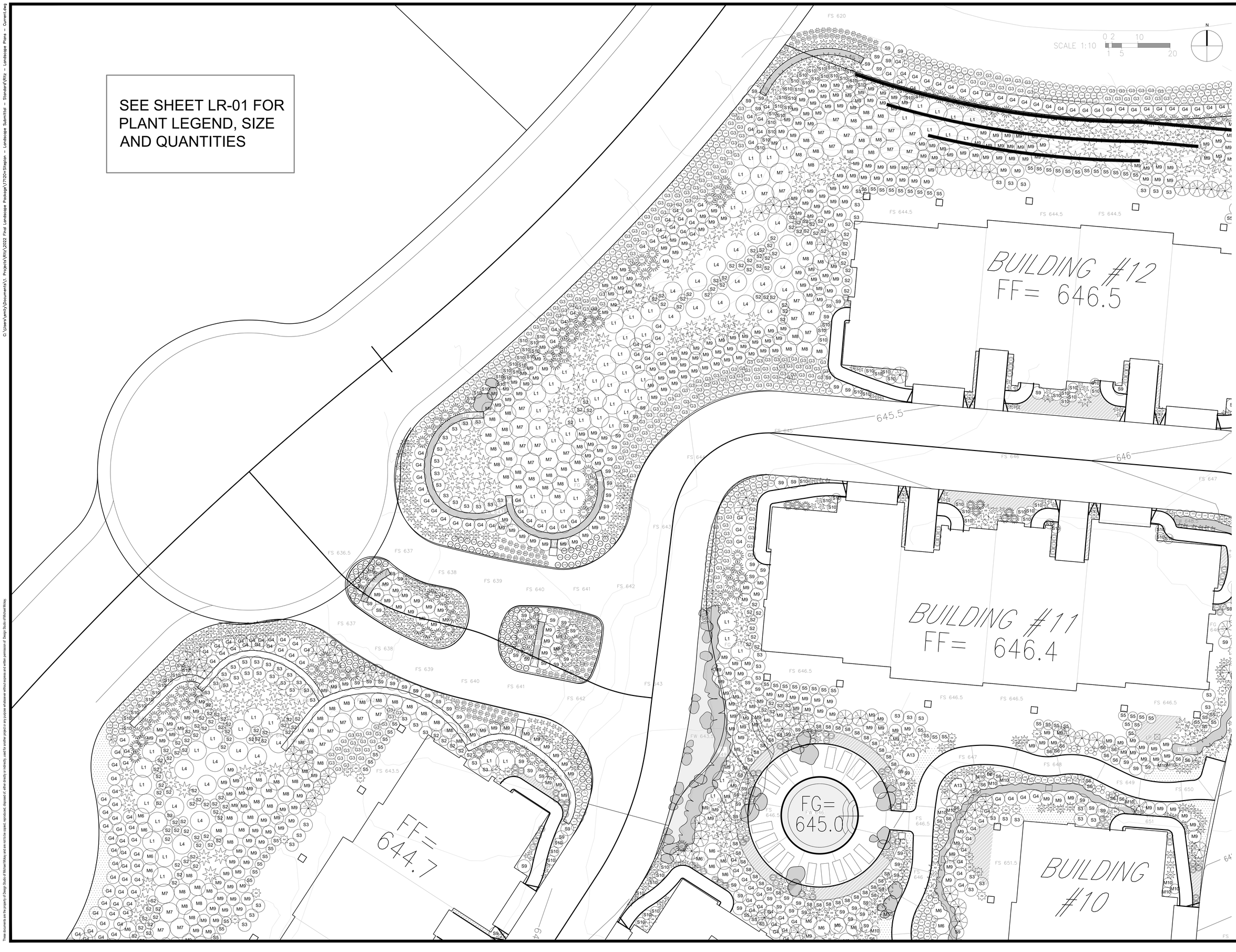

Typical Revisions:

| Date: | Description: |
|---|---|
| | |

Sheet Title:
SHEET ORGANIZATION & PLANT PALETTES

Sheet Reference:
LR-02

SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

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MOD21-0004, DA21-0002
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Sheet Title:

# SHRUB PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

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Sheet Title:

SHRUB PLAN

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SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

SCALE 1:10 0 2 10 1 5 20

N

THE VENUE
FF=628.0
GF=618.0 (P3)

RESIDENTIAL
FF=650.0 (L1)
FF=640.0 (P1)
GF=628.0 (P3)

FW 625.5

FS 630 FS 629 FS 628 FS 627 FS 626 FS 644.5 FS 647 FS 648 FS 649.5

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Sheet Title: SHRUB PLAN - RESIDENCES
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Sheet Title: SHRUB PLAN

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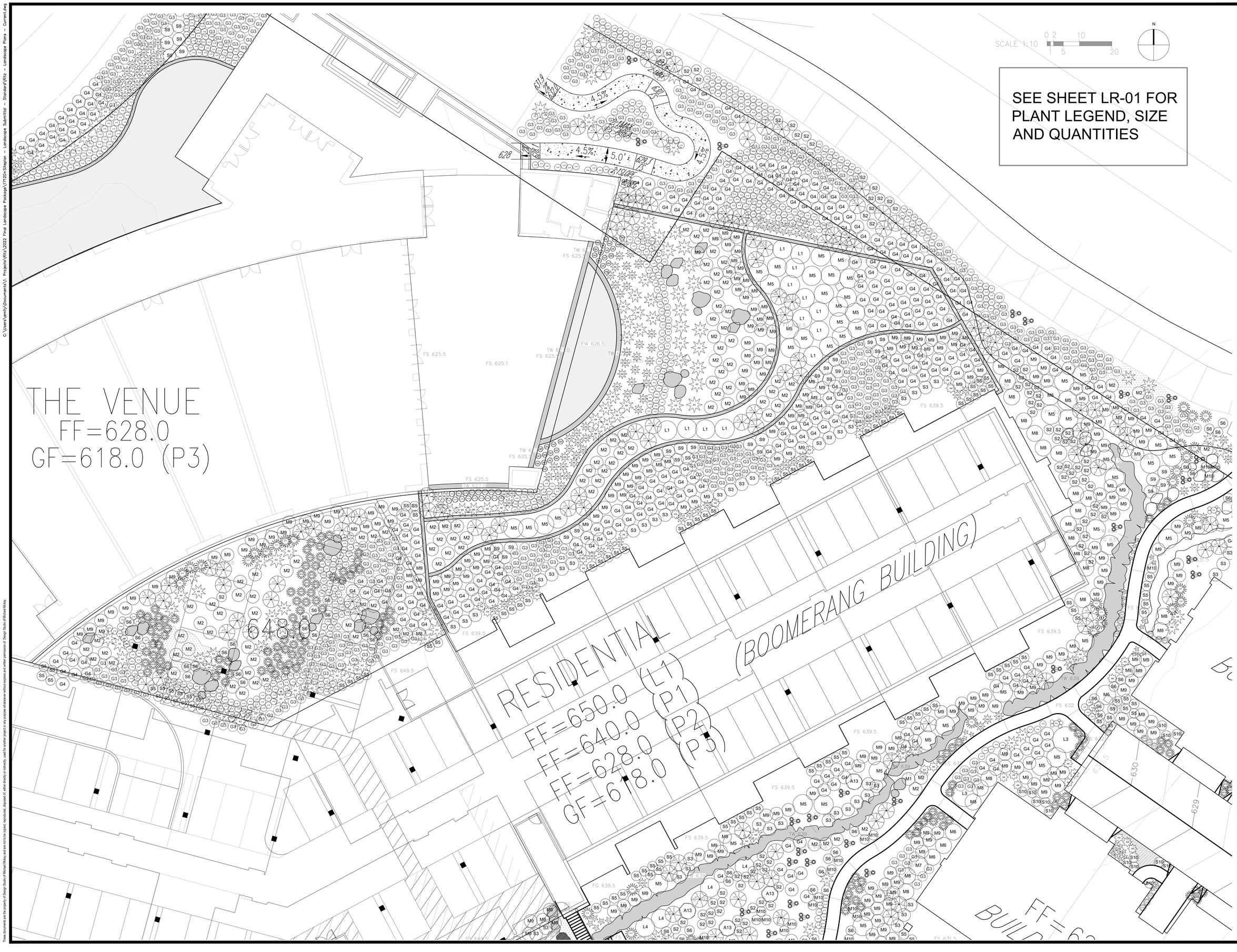


SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

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Architect:

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# SHRUB PLAN - RESIDENCES
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SHRUB PLAN

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[redacted]

SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

FF=629.4
BUILDING #2

FF=629.4
BUILDING #3

FF=625.5
BUILDING #4

FF=627.5
BUILDING #1

FF=627.5

SCALE 1:10
0 2 10
1 5 20

N

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Architect:

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PROJECT: RITZ CARLTON EXPANSION
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# SHRUB PLAN - RESIDENCES
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SHRUB PLAN

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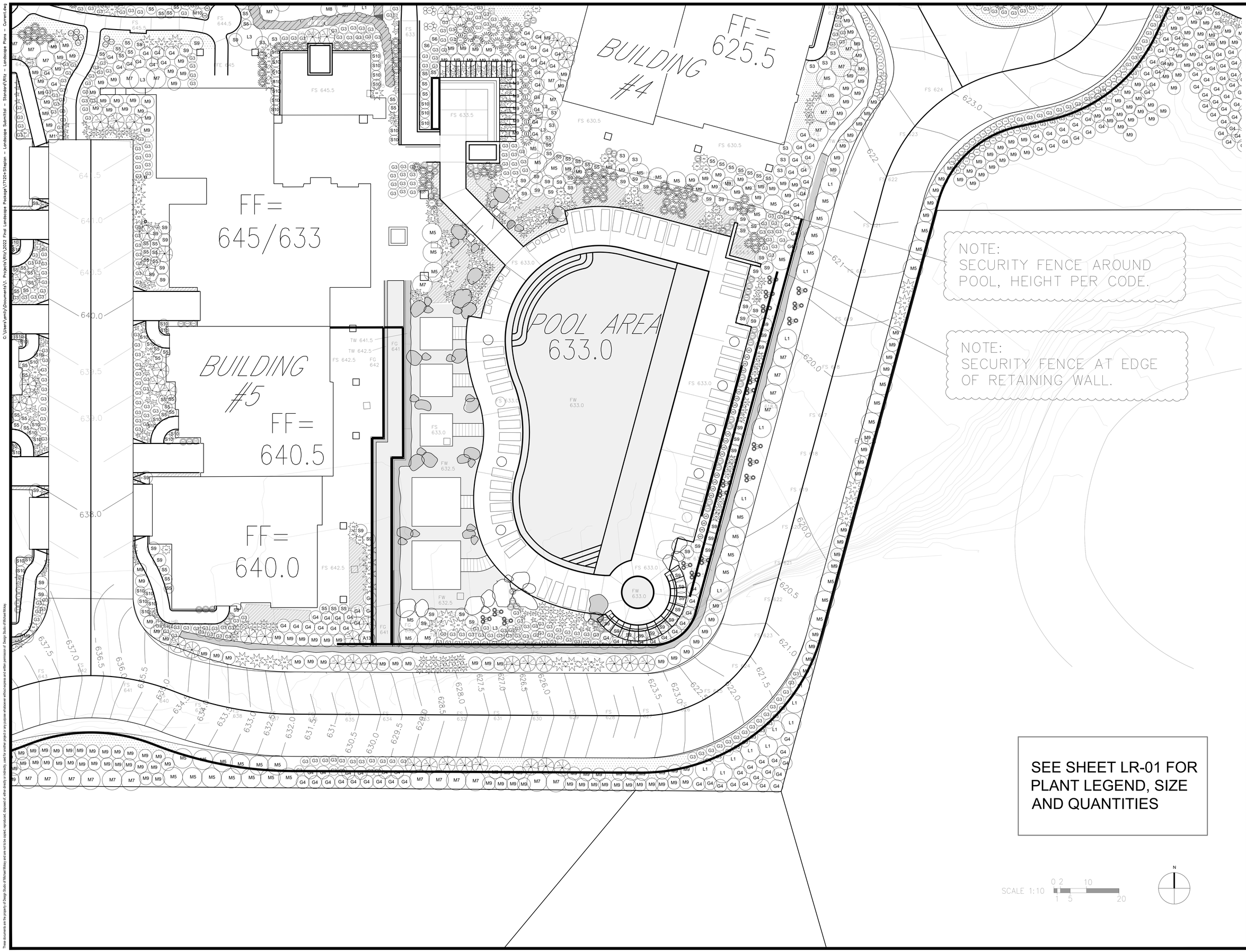


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Architect:

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PROJECT: RITZ-CARLTON EXPANSION
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# SHRUB PLAN - RESIDENCES
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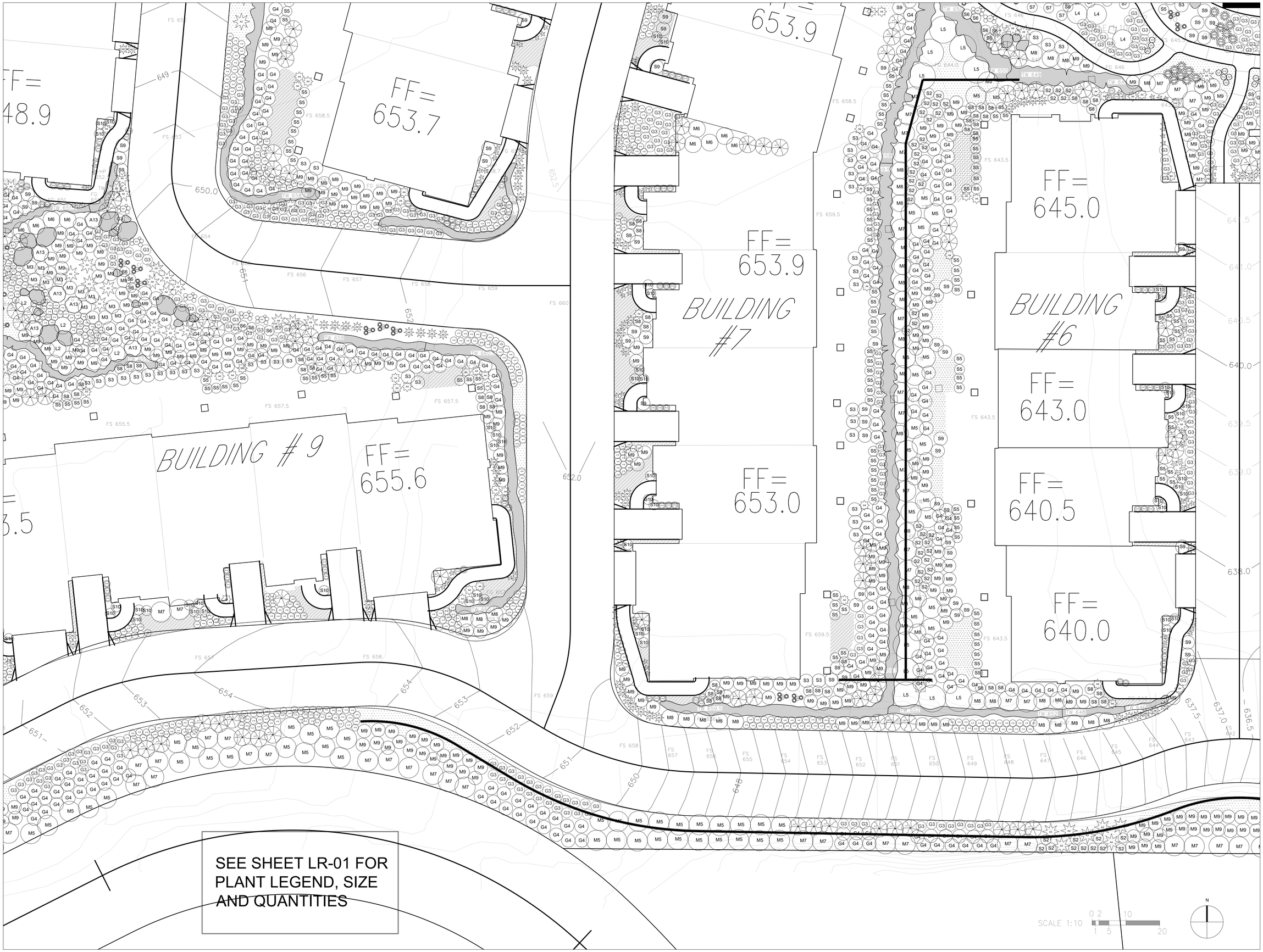
| Date: | Description: |
|---|---|

Sheet Title:

SHRUB PLAN

Sheet Reference:

LS-05




SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

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Architect:

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# SHRUB PLAN - RESIDENCES
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BUILDING #15
FF= 644.7

BUILDING #13
FF= 644.7

BUILDING #14
FF= 645.0

FF= 644.5

FF= 648.9

FF= 653.5

SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

SCALE 1:10 0 2 10 1 5 20

N

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# SHRUB PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

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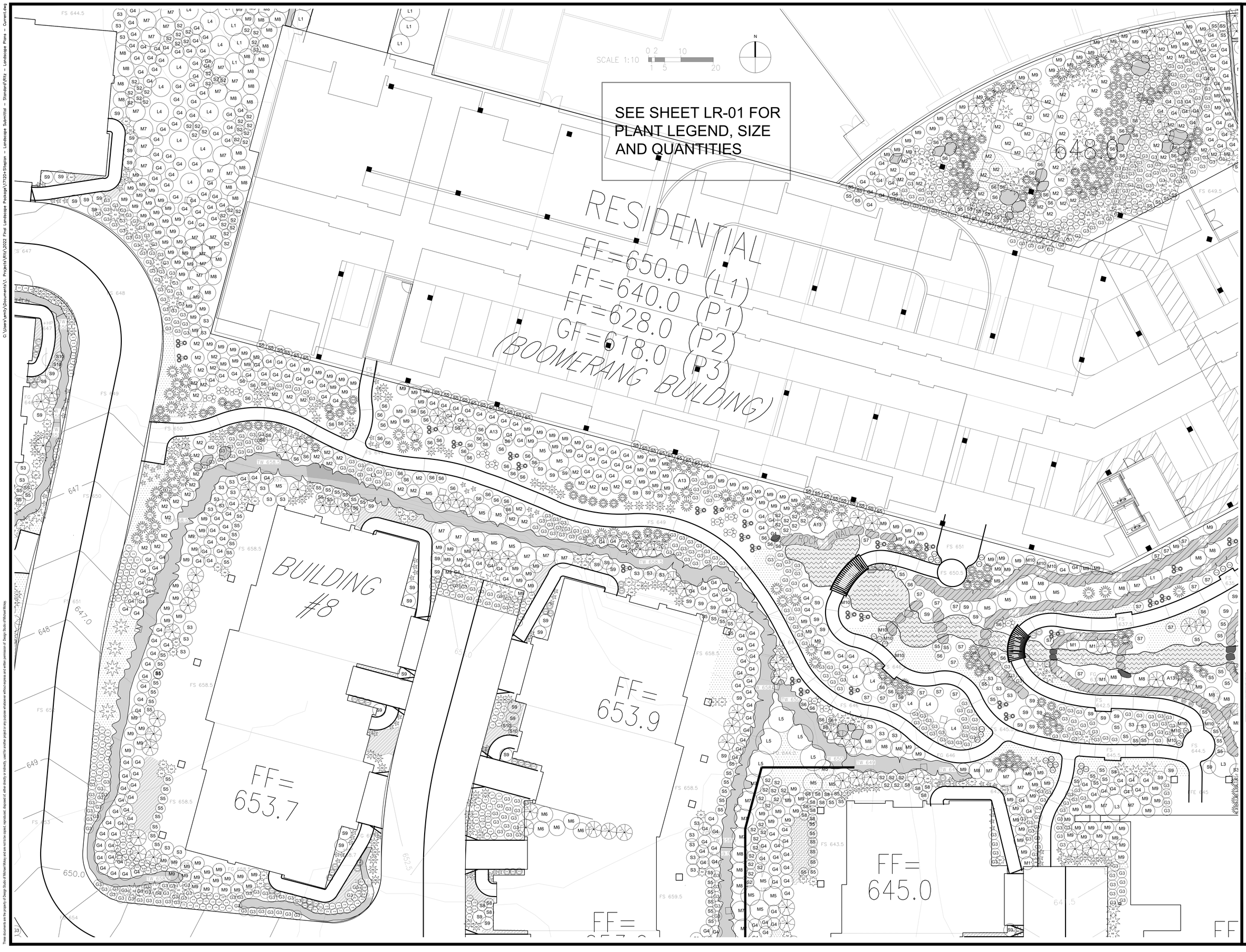
|---|---|

Sheet Title:

SHRUB PLAN

Sheet Reference:

LS-07

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SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

RESIDENTIAL (BOOMERANG BUILDING)
FF=650.0 (L1)
FF=640.0 (P1)
FF=628.0 (P2)
GF=618.0 (P3)

FF=629.4
BUILDING #2

FF=629.4
BUILDING #3

FF=626.5

FF=625.5
BUILDING #4

SCALE 1:10
0 2 5 10 15 20

N


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Architect:

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# SHRUB PLAN - RESIDENCES
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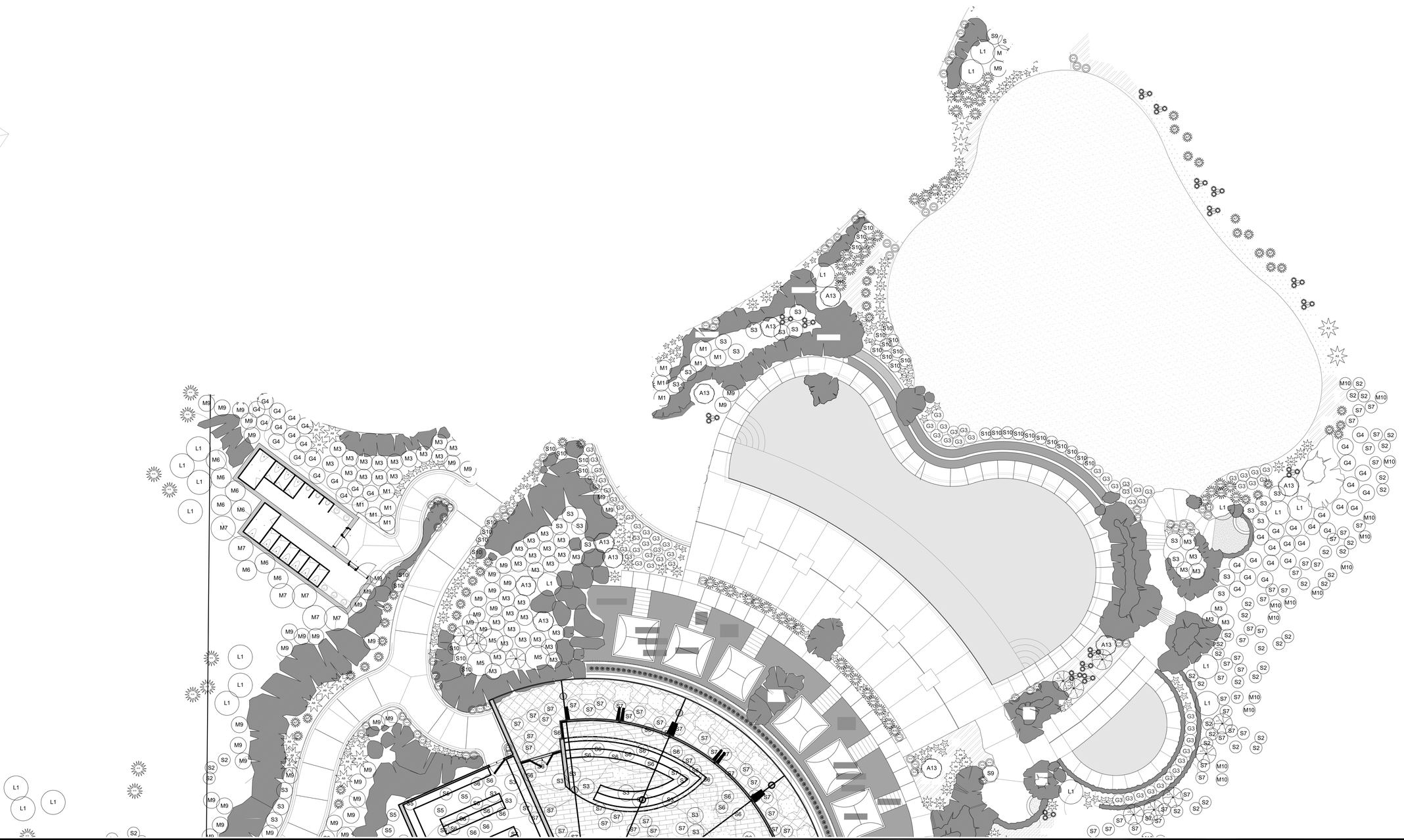
N

SCALE 1:10 0 5 10 1 5 20

SEE SHEET LR-02 FOR PLANT LEGEND, SIZE AND QUANTITIES

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Sheet Title:

# SHRUB PLAN - SKY MESA
## CONCEPT PLAN SUBMITTAL

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|---|---|
| | |

Sheet Title:

SHRUB PLAN

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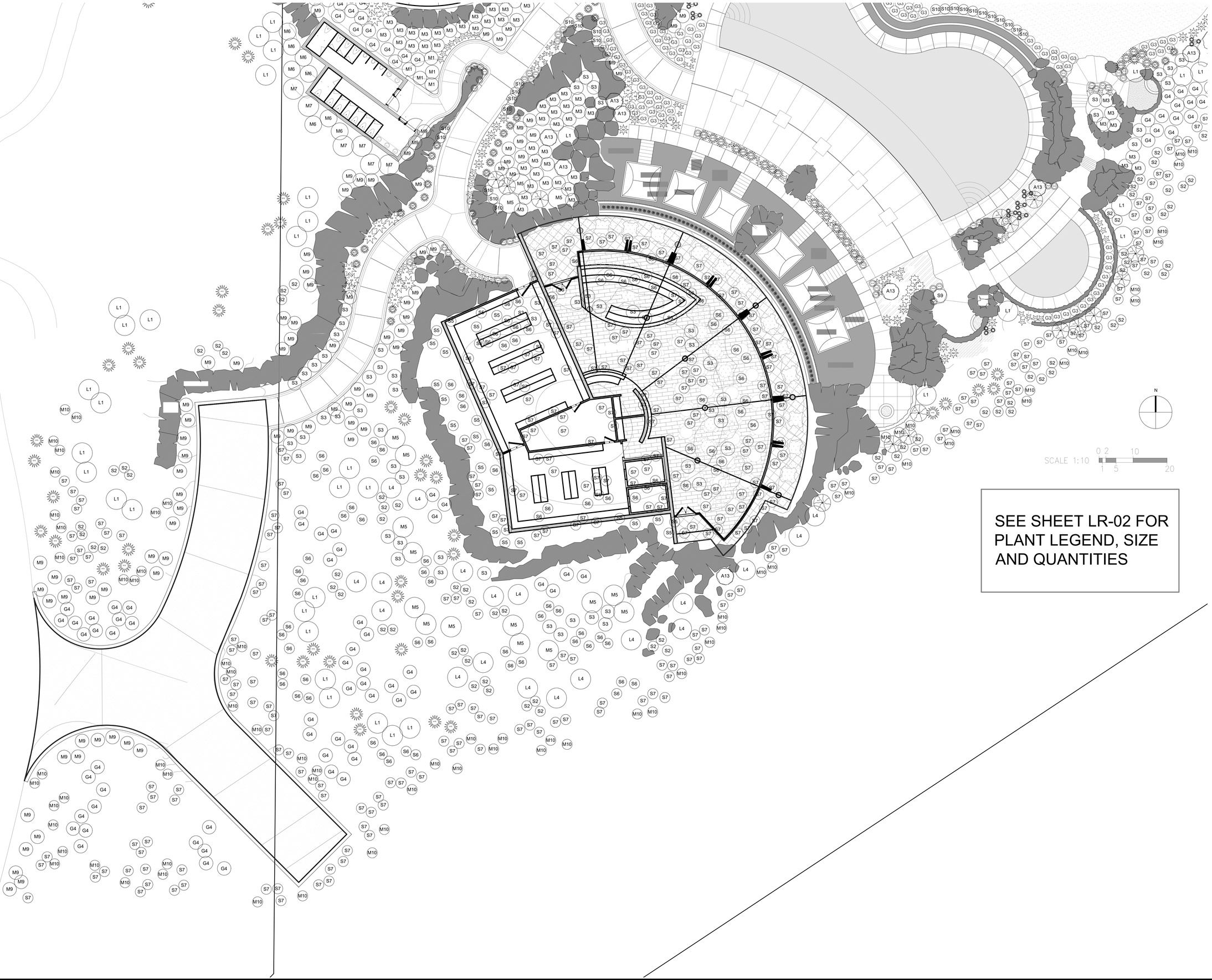


SEE SHEET LR-02 FOR PLANT LEGEND, SIZE AND QUANTITIES

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Architect:

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Sheet Title:

# SHRUB PLAN - SKY MESA
## CONCEPT PLAN SUBMITTAL

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Sheet Title:

SHRUB PLAN

Sheet Reference:

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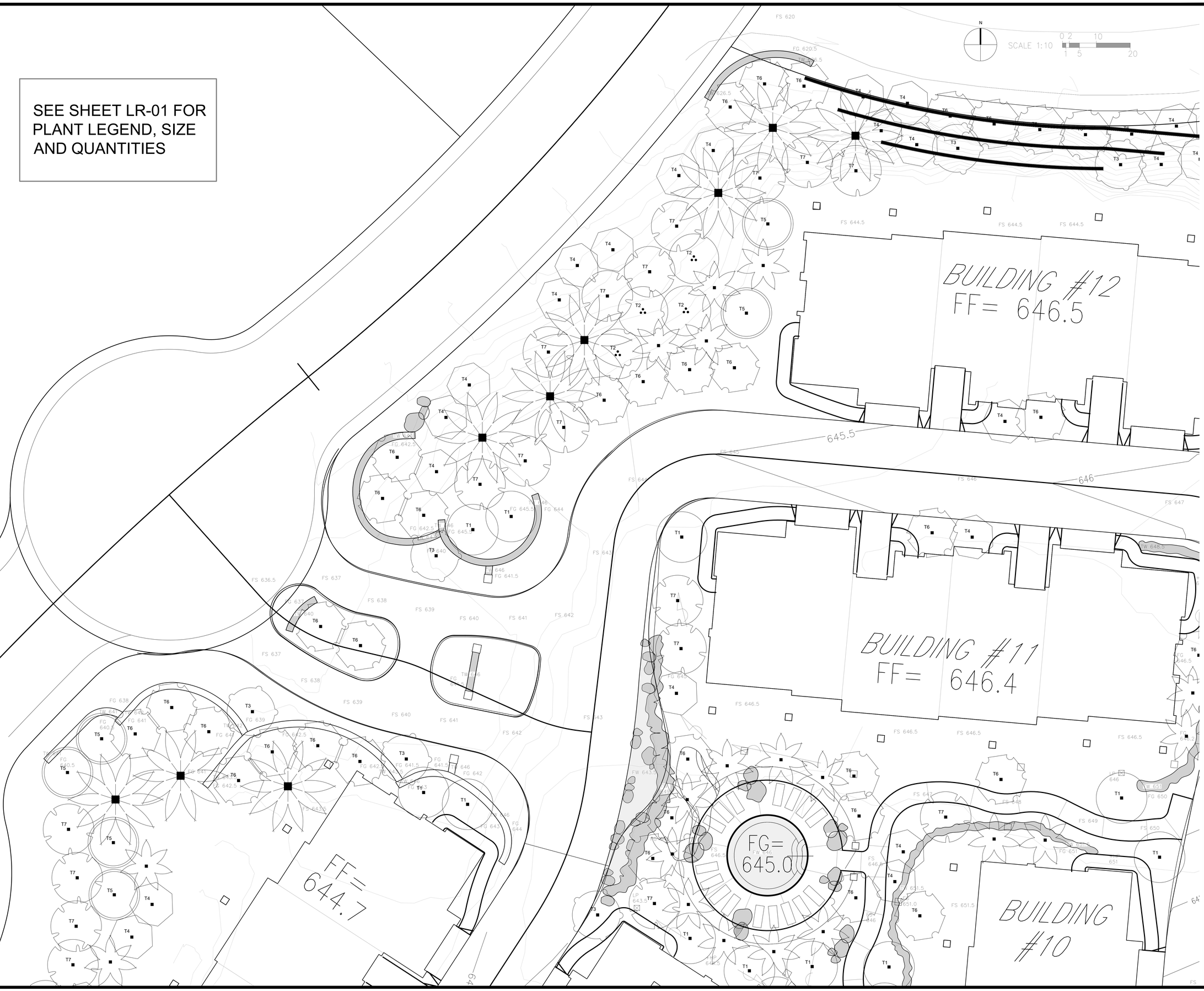


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Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|
| | |

Sheet Title:

TREE PLAN

Sheet Reference:

LT-01

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SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

N

SCALE 1:10 0 2 10 / 1 5 20

THE VENUE
FF=628.0
GF=618.0 (P3)

RESIDENTIAL
FF=650.0 (L1)
FF=640.0 (P1)
FF=628.0 (P2)
GF=

648.0

FW 625.5
FG 628.5
FG 633
FG 630.5
FG 626.5
FG 635
FG 649.5
FG 648.5
FS 630
FS 629
FS 628
FS 627
FS 626
FS 644.5
FS 647
FS 648
FS 649.5

T2 T3 T4 T5 T6 T7

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Sheet Title:
TREE PLAN - RESIDENCES
CONCEPT PLAN SUBMITTAL

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Sheet Title:
TREE PLAN

Sheet Reference:
LT-02

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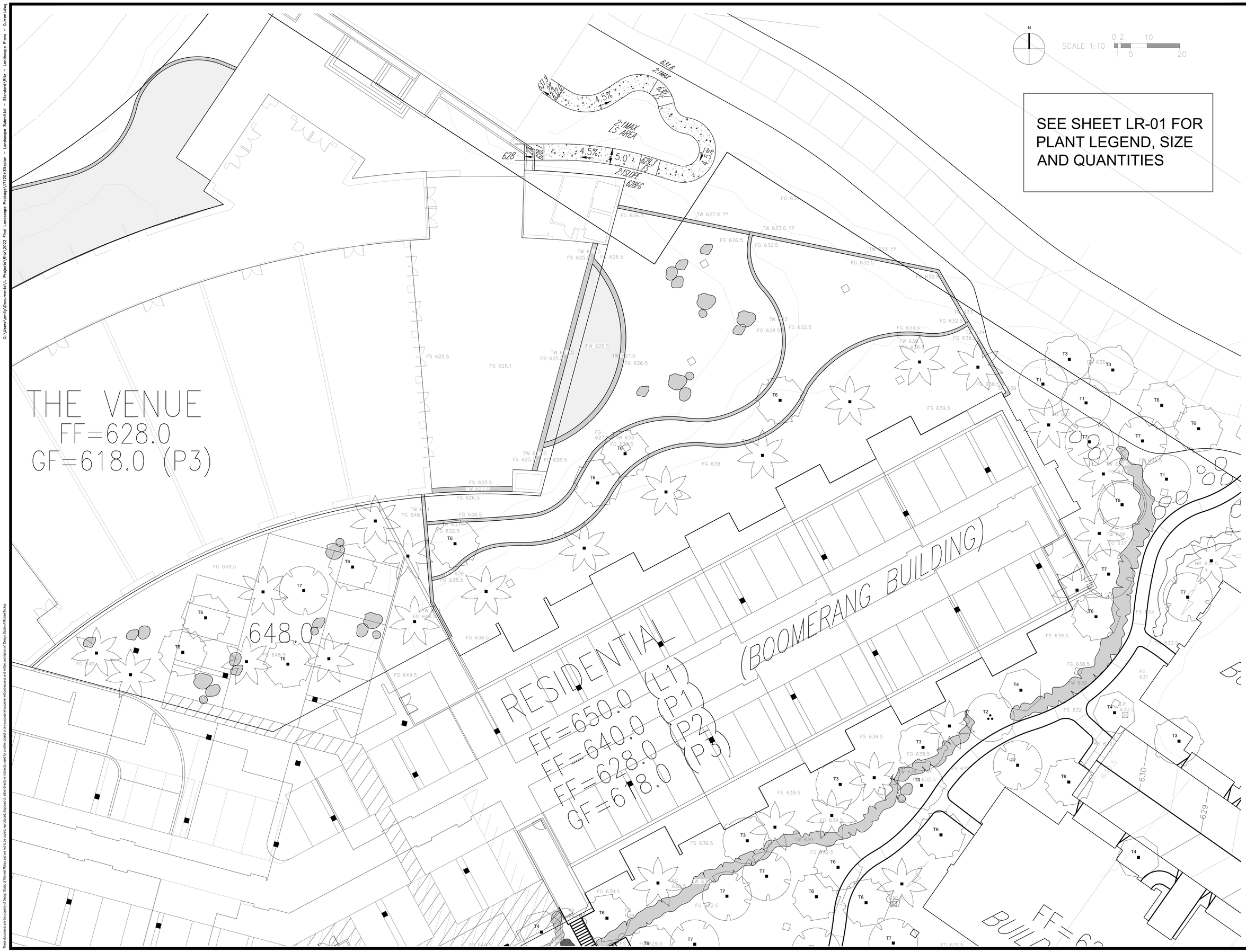


SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

Design Studio of Michael McKay
Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:



Project Site

Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:

TREE PLAN

Sheet Reference:

LT-03

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Design Studio of Michael McKay
Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:

TREE PLAN

Sheet Reference:

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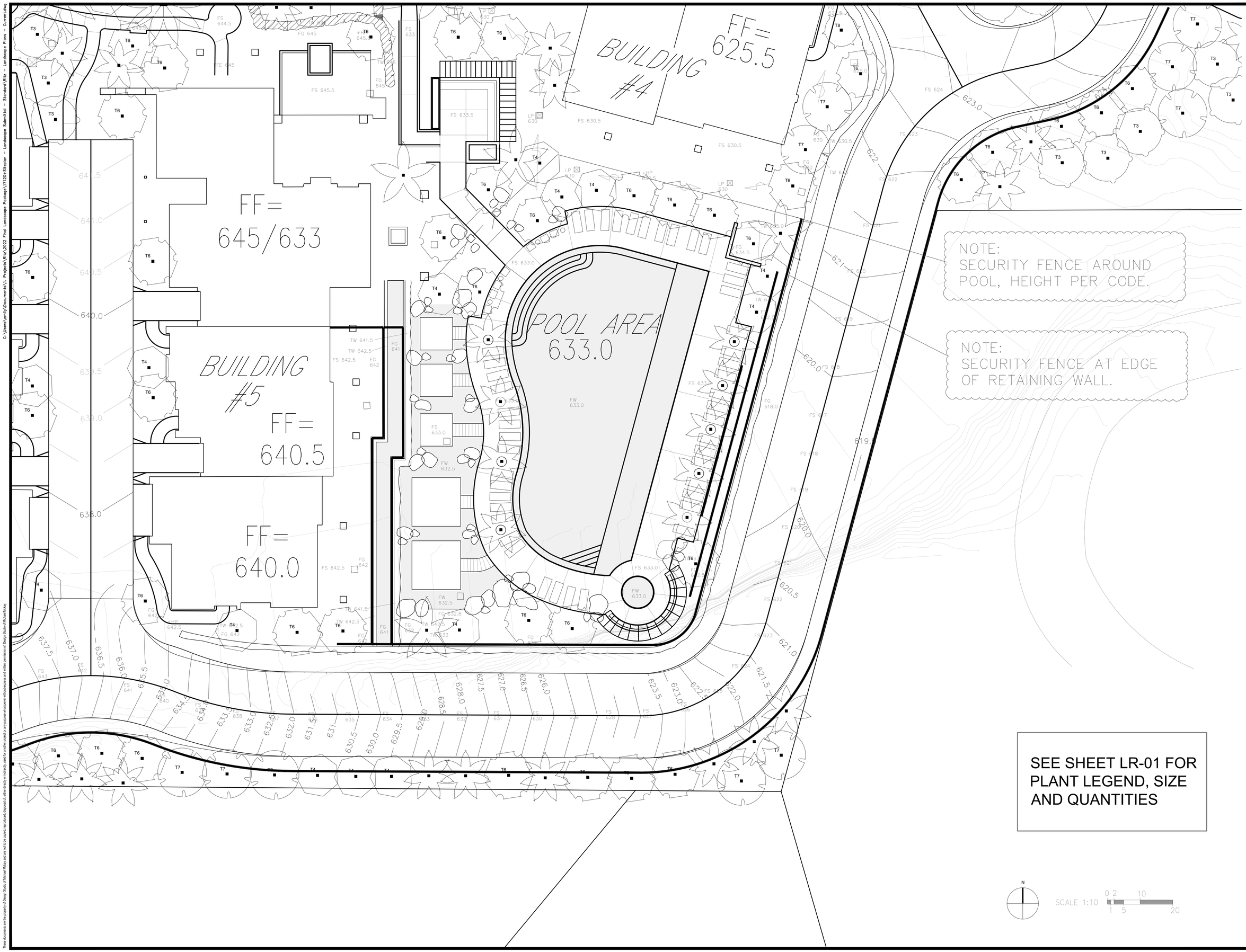


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Design Studio of Michael McKay
Landscape Architecture & Planning Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS: EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:
TREE PLAN - RESIDENCES
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:
TREE PLAN

Sheet Reference:
LT-05

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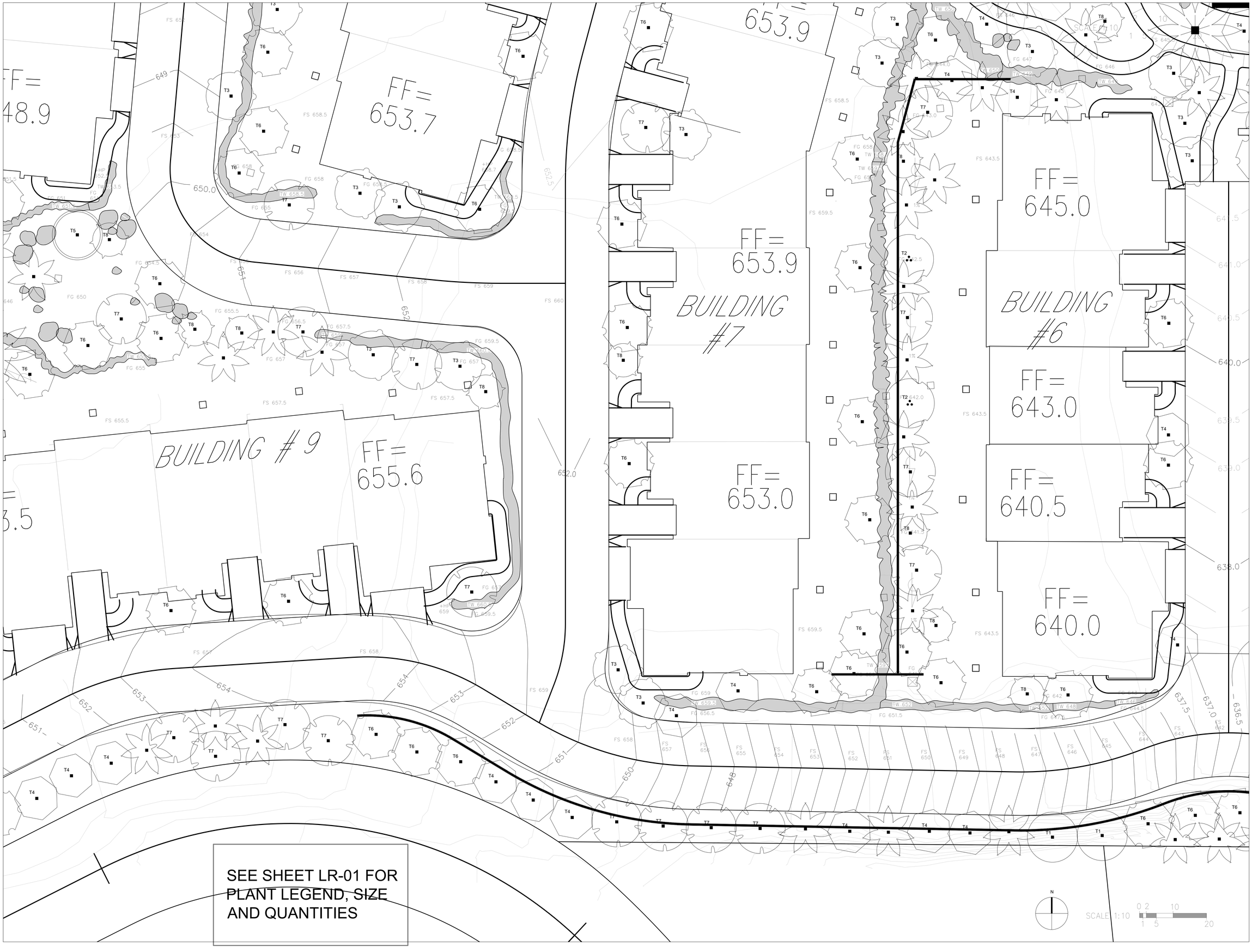


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Design Studio of Michael McKay
Landscape Architecture & Environmental Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

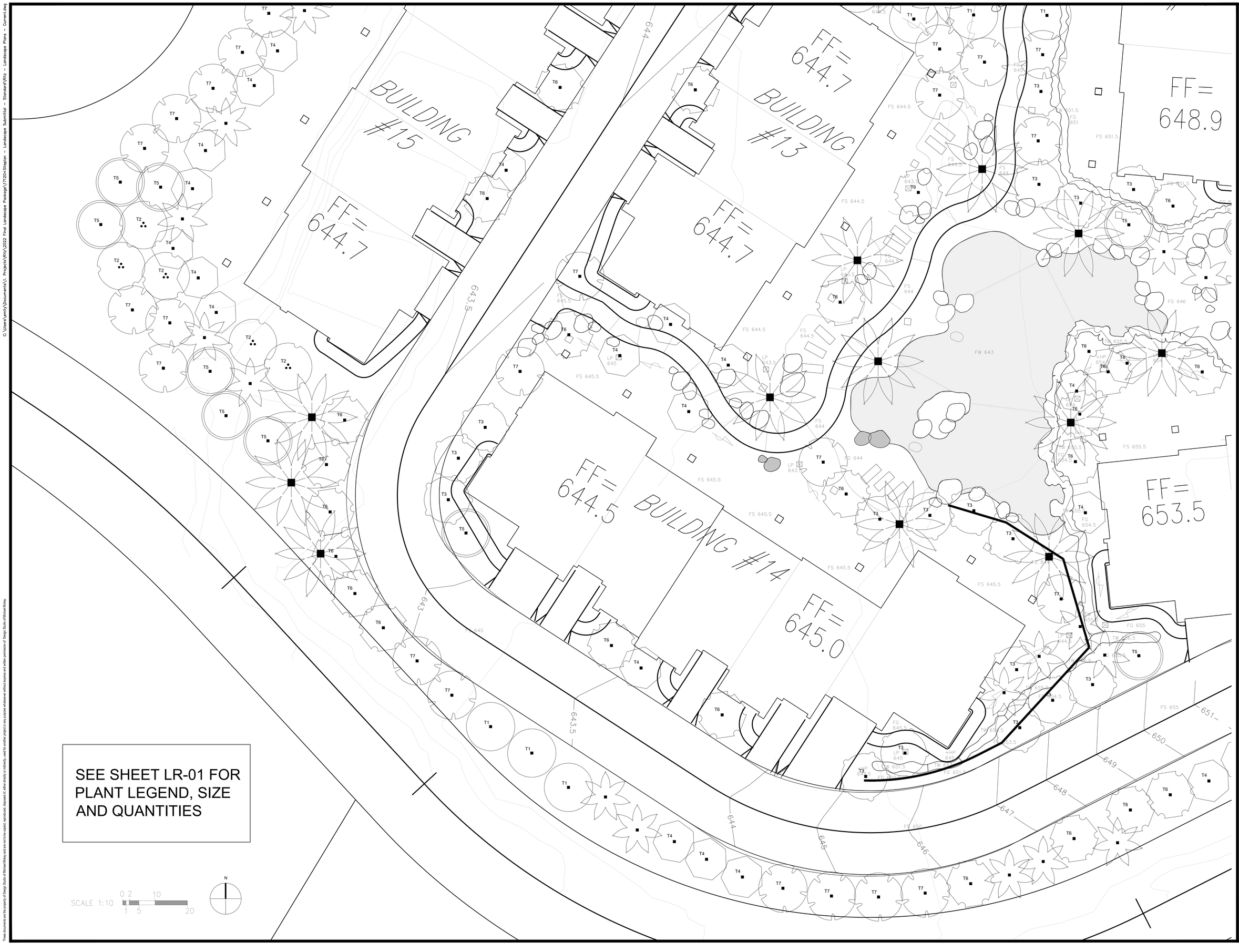
| Date: | Description: |
|---|---|

Sheet Title:

TREE PLAN

Sheet Reference:

LT-06




SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

Design Studio of Michael McKay
Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

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TREE PLAN

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LT-07

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SCALE 1:10 0 2 10 / 1 5 20

N

SEE SHEET LR-01 FOR PLANT LEGEND, SIZE AND QUANTITIES

RESIDENTIAL
FF=650.0 (L1)
FF=640.0 (P1)
FF=628.0 (P2)
GF=618.0 (P3)
(BOOMERANG BUILDING)

BUILDING #8

FF= 653.7

FF= 653.9

FF= 645.0

648.0

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Design Studio of Michael McKay
Landscape Architecture & Environmental Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title: TREE PLAN - RESIDENCES
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title: TREE PLAN

Sheet Reference: LT-08

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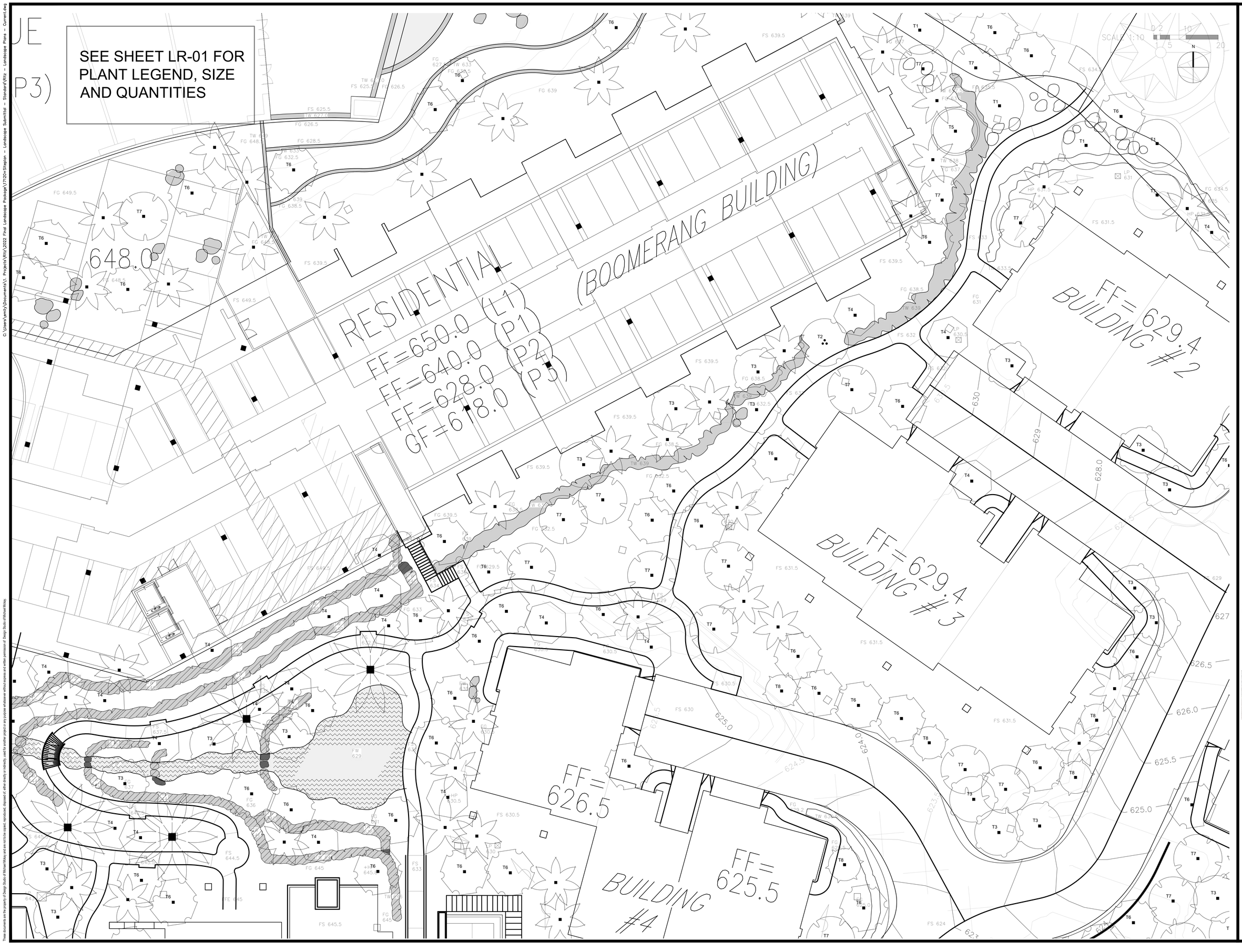


Design Studio of Michael McKay
Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - RESIDENCES
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:

TREE PLAN

Sheet Reference:

LT-09

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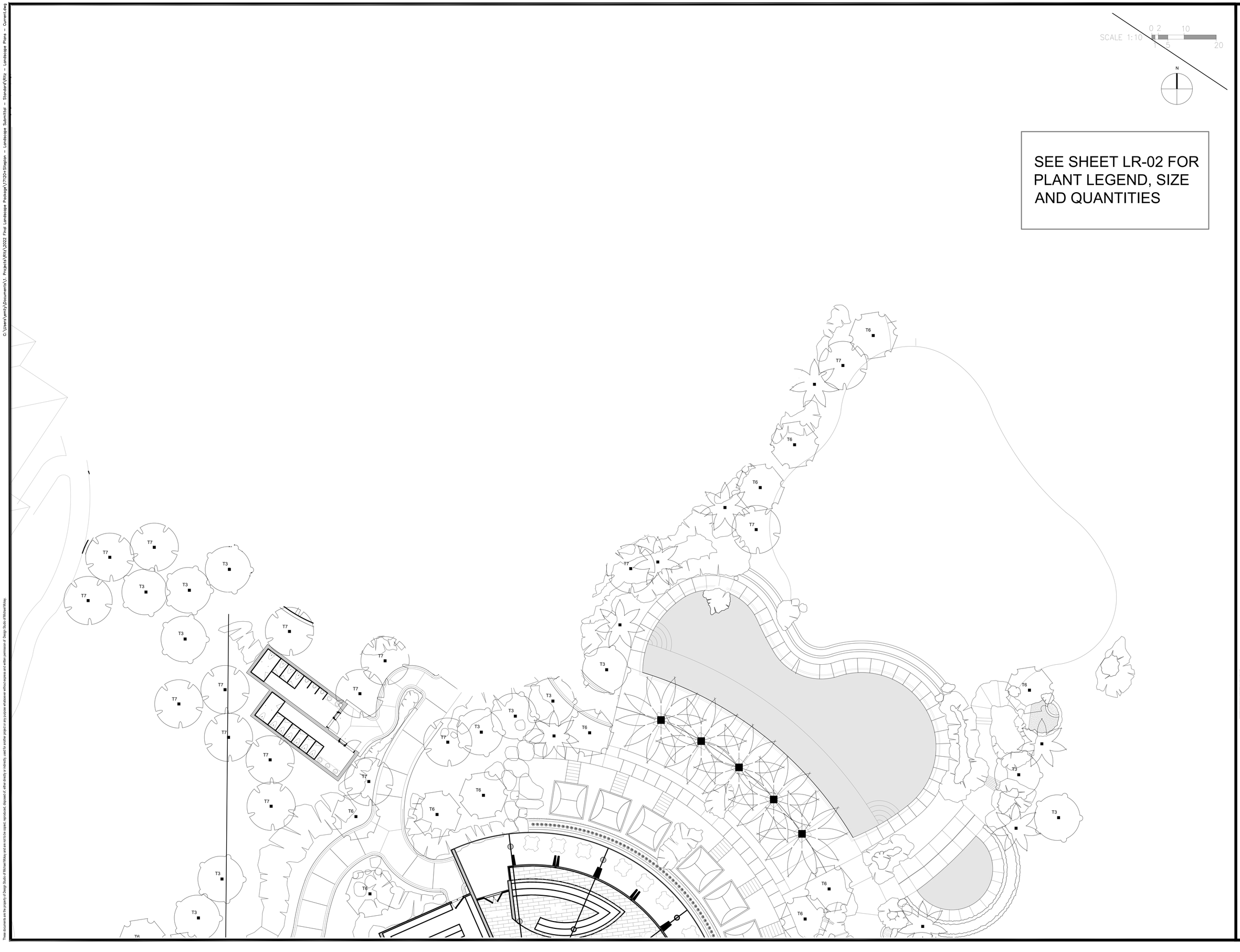


SEE SHEET LR-02 FOR PLANT LEGEND, SIZE AND QUANTITIES

Design Studio of Michael McKay
Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:

# TREE PLAN - SKY MESA
## CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:

TREE PLAN

Sheet Reference:

LT-11

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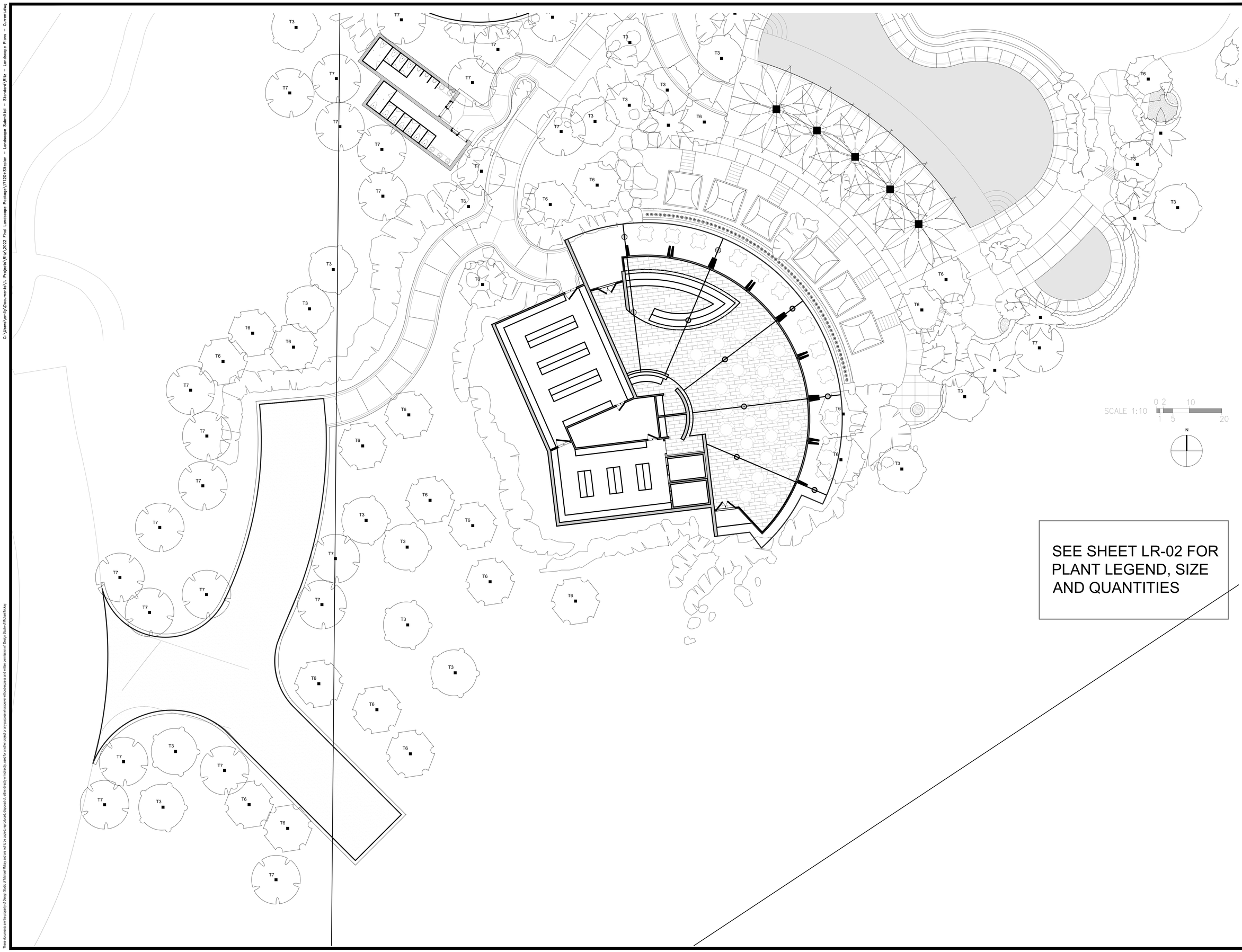


SEE SHEET LR-02 FOR PLANT LEGEND, SIZE AND QUANTITIES

Design Studio of Michael McKay
Landscape Architecture & Planning Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GP2-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title:
# TREE PLAN - SKY MESA
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
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Sheet Title:
TREE PLAN

Sheet Reference:
LT-12

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# CONCEPTUAL PLANTING NOTES

1. All landscape areas shall have positive drainage (minimum 2% grade in planting areas) away from all structures and terminating in an approved drainage system.
2. All plantings at entries, along roadways, driveways, and pedestrian crossings shall be installed and maintained to avoid obstructing motorists' views per City standards.
3. All trees located within five (5) feet of public sidewalk or other hardscape to have root barriers installed per City standards.
4. No trees will be located within a public utility easement, above or near utilities, per City standards.
5. All species listed on the plant legend are drought tolerant and listed in the CVWD Recommended Plant List and Robert Perry's Landscape Plants for California Gardens book of recommended desert species.
6. No plant substitutions shall be made without written authorization of the project landscape architect.
7. All plants shall be delivered to the site and inspected by project landscape for approval and acceptance prior to installation.
8. All plants shall be placed on site per the plans and adjusted in the field by the project landscape architect prior to installation.
9. A 3" layer of crushed rock mulch shall be applied on all exposed soil surfaces per City standards.
10. Irrigation shall be designed for mature plants, comprised of drip systems, grouped into proper hydrozones, and segregated into separate systems for trees, palms, shrubs, and ground cover areas. Turf shall be artificial.

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Design Studio of Michael McKay
Landscape Architecture, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title: LANDSCAPE NOTES
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:

LANDSCAPE
NOTES

Sheet Reference:

LN-01

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LANDSCAPE ILLUSTRATIVE PLAN - REFERENCE ONLY
SEE SUBMITTAL SHEET INDEX FOR SPECIFIC SUBMITTAL EXHIBITS

## LANDSCAPE FEATURES NOTES

1. Entry monumentation walls with gated entry and key activated sliding gates.
2. All hardscape areas within the project limits are concrete surfaces with light broom finish and Scofield integral color - Sand Buff. Hardscape includes the common walkways, patios and terrace areas around pools and under shade structures.
3. Water features provide aesthetic, visual and auditory complements to the landscape areas.
4. Community Clubhouse - with main pool and spa recreation area, sunning terraces, cabanas, pool enclosure security fencing (see example below), and seating areas
4B. Cabanas and pool furniture of a neutral color, are to be selected and coordinated with interior design consultant
5. Secondary recreation area - large spa dipping pool with surrounding terraces and pool enclosure security fencing.
6. Central Canyon Oasis water cascade and Desert Garden - terracing rock cascades. Re-circulating water feature - with subterranean mechanical equipment room.
7. Neighborhood pond and water cascade over artificial rockwork to accommodate grade transition from upper Villas to lower pond area.
8. Venue arrival water feature with bubbling jets at arrival drive and internal venue water feature.
9. Terracing walls to transition from Villas to lower venue terraces - see Engineers grading plans.
10. Drought tolerant landscape gardens with rock mulch throughout development, see planting plans.
11. Desert Garden walkways with adjacent rockwork features, matching local rock, to create natural appearing retaining wall transitions from higher Villas to lower areas. See Engineers grading plans.
12. See Engineers plans for all grading and drainage.

## CONCEPTUAL LANDSCAPE LIGHTING

NOTES:

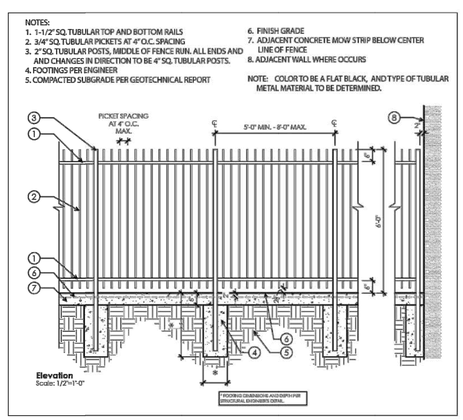
LANDSCAPE LIGHTING WILL BE CAREFULLY SELECTED TO MEET DARK SKY CRITERIA, PROVIDING COMFORTABLE DOWNWARD ORIENTED LIGHTING ALONG WALKWAYS AND RAMPS TO FACILITATE PEDESTRIAN ACCESS THROUGHOUT THE SITE.

THERE WILL NOT BE ANY LANDSCAPE UPLIGHTS INTO TREES. LIGHTS IN PALMS IN POOL AREAS WILL BE MOUNTED ON THE TRUNKS WITH LOW VOLTAGE LED UPWARD LIGHTING TO THE CLOSE ADJACENT FRONTS AND DOWNLIGHTS CASTING LIGHT TO THE TERRACES AND PATIOS BELOW.

CONCEPT WALKWAY-ADJACENT FIXTURE SELECTION WILL BE A BRONZE FINISH, PROVIDED BY SPJ LIGTING, SEE BELOW FOR EXAMPLE.

NOTES:
1. 1-1/2" SQ. TUBULAR TOP AND BOTTOM RAILS
2. 3/4" SQ. TUBULAR PICKETS AT 4" O.C. SPACING
3. 2" SQ. TUBULAR POSTS, MIDDLE OF FENCE RUN. ALL ENDS AND AND CHANGES IN DIRECTION TO BE 4" SQ. TUBULAR POSTS.
4. FOOTINGS PER ENGINEER
5. COMPACTED SUBGRADE PER GEOTECHNICAL REPORT
6. FINISH GRADE
7. ADJACENT CONCRETE MOW STRIP BELOW CENTER LINE OF FENCE
8. ADJACENT WALL WHERE OCCURS

NOTE: COLOR TO BE A FLAT BLACK, AND TYPE OF TUBULAR METAL MATERIAL TO BE DETERMINED.




**POOL FENCE ENCLOSURE - TYP DETAIL**

SPJ LIGHTING Inc.
ARCHITECTURAL LANDSCAPE & OUTDOOR LIGHTING



Model: **SPJ402**
Finish: Matte Bronze

**SPJ402**

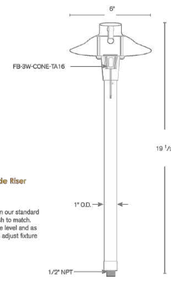
**SPECIFICATION FEATURES**

| | |
|---|---|
| **Finish:** | Our naturally etched finishes will withstand the test of time. All finishes are individually treated insuring consistency. Our meticulous application results in a fixture that truly becomes "a one of a kind". |
| **Electrical:** | Available in 8-15V |
| **Labels:** | ETL Standard Wet Label<br>C-ETL |

**Path / Area Light**

**DESCRIPTION**

| | |
|---|---|
| **Model#:** | SPJ402 |
| **Material:** | Solid Brass |
| **Electrical:** | 8-15V |
| **Engine:** | FB-3W-Cone-TA16 |
| **Lumens:** | 200 |
| **Color Temp:** | 2700k |
| **Options:** | 2700-FL, RGBW, 2000K-6500K |
| **Mounting:** | 1/2" NPT, Dual Fin Spike Incl. |
| **LED:** | Nichia |




**Option:**

Extends up to 19" above grade

1" Dia. Riser

3 Set Screws

**Adjustable Below Grade Riser**

Model#: SPJ19-03-RBBG
Shown: Matte Bronze
Desc: Solid brass top fits on our standard perma-post with finish to match. Install fixture at grade level and as the landscape grows adjust fixture height as needed.

**Wet Listed**

| SPJ Approval | Customer Approval |
|---|---|
| | |

**ORDERING INFORMATION**

| Model# | Finishes | Wattage | Lumens | Color Temp. | Electrical |
|---|---|---|---|---|---|
| SPJ402 | MBR | 3W | 200 | 2700K | 8-15V |

V = Verde GM = Gun Metal
M = Moss B = Black
AG = Aged Brass R = Rusty
MBR = Matte Bronze PVDP = PVD Polished
RC = Raw Copper PVDS = PVD Satin

3W
200
3000K
2700K
4000K
5000K
6500K
RGBW
8-15V

www.spjlighting.com

**CONCEPT WALKWAY LIGHT FIXTURE**

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Design Studio of Michael McKay
Landscape Architecture, Planners + Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Sheet Title: LANDSCAPE FEATURES PLAN - RESIDENCES
CONCEPT PLAN SUBMITTAL

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|
| | |

Sheet Title:
CONCEPTUAL LANDSCAPE FEATURES PLAN

Sheet Reference:
LF-01




LANDSCAPE ILLUSTRATIVE PLAN - REFERENCE ONLY

SEE SUBMITTAL SHEET INDEX FOR SPECIFIC SUBMITTAL EXHIBITS

## LANDSCAPE FEATURES NOTES

1. Five Star Restaurant by Architects - built into natural hillside, with rooftop desert garden. Curving dining terrace overlooking gardens, oasis pool and the distant desert views.
2. Restroom Facility by Architects - built into natural hillside with rooftop desert garden.
3. Curving resort oasis pool with infinity edge, and shallow sunning ledge in pool.
4. Spa with infinity edge overlooking the desert views.
5. Cabanas at pool level, set in shallow water pond with water cascading from 10' high rocks. Cabanas and pool furniture of a neutral color, are to be selected and coordinated with interior design consultant
6. Large event lawn on lower level.
7. Fire lane access, 10% slope, 120' in length and 20' wide with 70' back up area. Hydrant located at top of fire lane.
8. Sunning terraces.
9. Cascading fountain feature from pool level to event lawn level.
10. Natural rock and constructed rock outcrops to enhance natural setting and surroundings.
11. Lush desert landscape adjacent to activity areas.
12. Natural desert areas surrounding site.
13. Existing Ritz Carlton Hotel.

## CONCEPTUAL LANDSCAPE LIGHTING

NOTES:

LANDSCAPE LIGHTING WILL BE CAREFULLY SELECTED TO MEET DARK SKY CRITERIA, PROVIDING COMFORTABLE DOWNWARD ORIENTED LIGHTING ALONG WALKWAYS AND RAMPS TO FACILITATE PEDESTRIAN ACCESS THROUGHOUT THE SITE.

THERE WILL NOT BE ANY LANDSCAPE UPLIGHTS INTO TREES. LIGHTS IN PALMS IN POOL AREAS WILL BE MOUNTED ON THE TRUNKS WITH LOW VOLTAGE LED UPWARD LIGHTING TO THE CLOSE ADJACENT FRONTS AND DOWNLIGHTS CASTING LIGHT TO THE TERRACES AND PATIOS BELOW.

CONCEPT WALKWAY-ADJACENT FIXTURE SELECTION WILL BE A BRONZE FINISH, PROVIDED BY SPJ LIGTING, SEE BELOW FOR EXAMPLE.



Model: **SPJ402**
Finish: Matte Bronze

**SPJ** LIGHTING Inc.
ARCHITECTURAL LANDSCAPE & OUTDOOR LIGHTING

**SPJ402**

**SPECIFICATION FEATURES**

**Finish:** Our naturally etched finishes will withstand the test of time. All finishes are individually treated insuring consistency. Our meticulous application results in a fixture that truly becomes "a one of a kind".

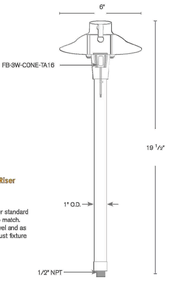
**Electrical:** Available in 8-15V

**Labels:** ETL Standard Wet Label
C-ETL

**Path / Area Light**

**DESCRIPTION**

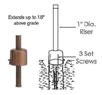
**Model#:** SPJ402
**Material:** Solid Brass
**Electrical:** 8-15V
**Engine:** FB-3W-Cone-TA16
**Lumens:** 200
**Color Temp:** 2700k
**Options:** 2700-FL, RGBW, 2000K-6500K
**Mounting:** 1/2" NPT. Dual Fin Spike Incl.
**LED:** Nichia




**Option:**

**Adjustable Below Grade Riser**

Model: SRJ19-03-RBBG
Shown: Matte Bronze
Desc: Solid brass top fits on our standard perma-post with finish to match. Install fixture at grade level and as the landscape grows adjust fixture height as needed.




**Wet Listed**

| SPJ Approval | Customer Approval |
|---|---|
| | |

**ORDERING INFORMATION**

| Model# | Finishes | Wattage | Lumens | Color Temp. | Electrical |
|---|---|---|---|---|---|
| SPJ402 | MBR | 3W | 200 | 2700K | 8-15V |

V = Verde, M = Moss, AG = Aged Brass, MBR = Matte Bronze, RC = Raw Copper, GM = Gun Metal, B = Black, R = Rusty, PVD*= PVD Polished, PVDS = PVD Satin

2000K, 2700K, 4000K, 5000K, 6500K, RGBW

www.spjlighting.com

## CONCEPT WALKWAY LIGHT FIXTURE

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Design Studio of Michael McKay
Landscape Architect, Planners + Consultants

Architect:

LCRA ARCHITECTS

Sheet Title: LANDSCAPE FEATURES PLAN - SKY MESA
CONCEPT PLAN SUBMITTAL

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|
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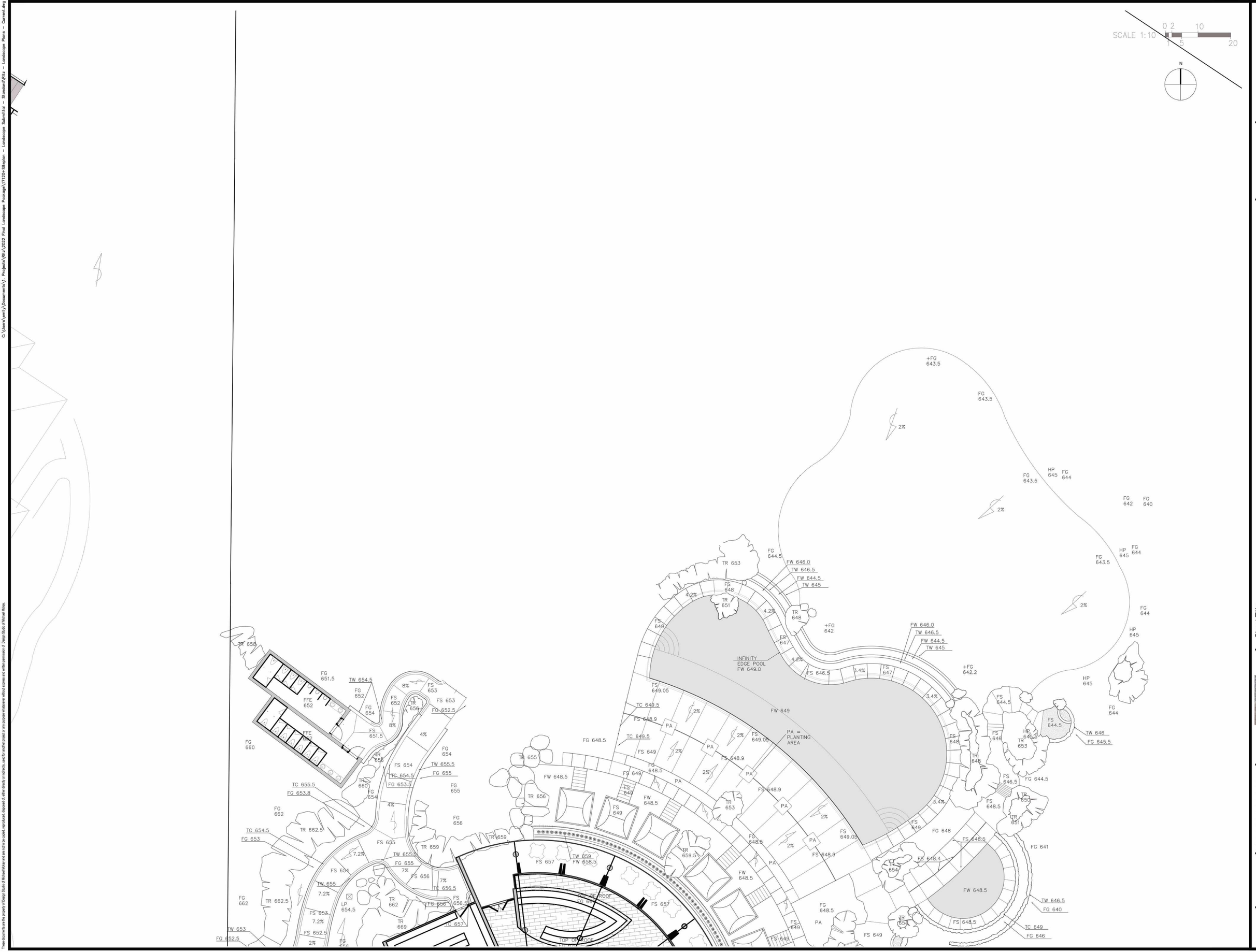
Sheet Title:
CONCEPTUAL LANDSCAPE FEATURES PLAN

Sheet Reference:
LF-02

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Landscape Architects, Planners + Consultants

Architect:

LCRA ARCHITECTS

Sheet Title:

# LANDSCAPE FEATURES PLAN - SKY MESA

## CONCEPT PLAN SUBMITTAL

PROJECT: RITZ CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|

Sheet Title:

CONCEPTUAL LANDSCAPE FEATURES PLAN

Sheet Reference:

LF-04

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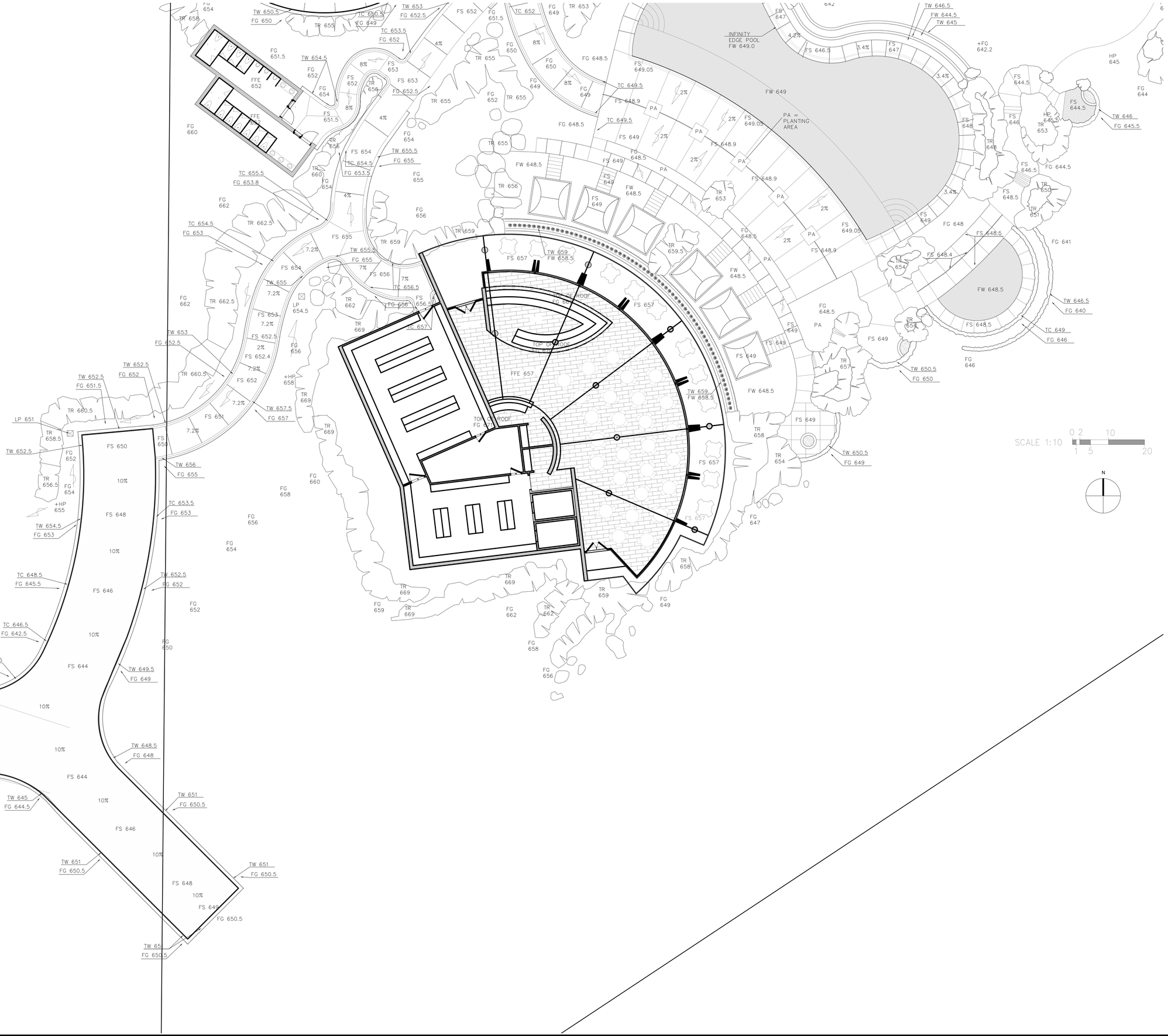
C:\Users\emily\Documents\1. Projects\Ritz\2022 Final Landscape Package\17120+Siteplan - Landscape Submittal - Standard\Ritz - Landscape Plans - Current.dwg

C:\Users\emily\Documents\1. Projects\Ritz\2022 Final Landscape Package\17120+Siteplan – Landscape Submittal – Standard\Ritz – Landscape Plans – Current.dwg

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Design Studio of Michael McKay
Landscape Architecture & Planning Consultants

Architect:

LCRA ARCHITECTS

PROJECT: RITZ-CARLTON EXPANSION
CASE NUMBERS EA21-0002, GPZ-MA21-0001
'MOD21-0004, DA21-0002
68900 FRANK SINATRA DRIVE,
RANCHO MIRAGE, CALIFORNIA 92270

# LANDSCAPE FEATURES PLAN - SKY MESA
## CONCEPT PLAN SUBMITTAL

Sheet Title:

Viscinity Map:




Typical Revisions:

| Date: | Description: |
|---|---|
| | |

Sheet Title:

CONCEPTUAL LANDSCAPE FEATURES PLAN

Sheet Reference:

LF-05

# CONCEPTUAL GRADING PLAN
## RITZ VARLTON RANCHO MIRAGE
## CITY OF RANCHO MIRAGE, STATE OF CALIFORNIA

## GENERAL NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD PLANS OF THE CITY OF RANCHO MIRAGE AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION, AND OTHER STANDARD PLANS AS SPECIFIED IN THE PLANS.
2. NOTHING IN THESE PLANS SHALL RELIEVE THE CONTRACTOR FROM OBTAINING PERMITS AS REQUIRED BY THE CITY OF RANCHO MIRAGE MUNICIPAL CODE.
3. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO LOCATED AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL, REPLACEMENT, PROTECTION, OR RELOCATION OF ALL REGULATORY, WARNING,A AND GUIDE SIGNS STRIPPING AND PAVEMENT LEGENDS.
5. STREET NAME SIGNS AND TRAFFIC CONTROL SIGNS, TYPE AND LOCATION SHALL BE APPROVED BY THE CITY ENGINEER, TRAFFIC STRIPING, LEGENDS AND PAVEMENT MARKERS, TYPE AND LOCATIONS SHALL BE APPROVED BY THE CITY ENGINEER.
6. PRIOR TO GRADING OPERATIONS ALL PROPERTY BOUNDARIES SHALL BE VISIBLY MARKED BY SETTING WITNESS STAKES AT FOUND PROPERTY MONUMENTS. FOUND MONUMENTS SHALL BE NOTED OF THE PLANS. RESETTING OF MISSING MONUMENTS OF ANY REMOVAL / REPLACEMENT OF EXISTING MONUMENTS SHALL BE DONE BY AN R.C.E. BELOW 33985 OF L.S. ONLY. THE CONTRACTOR SHALL NOT DISTURB EXISTING MONUMENTS NOTED ON PLANS OR FOUND DURING CONSTRUCTION.
7. ALL STREET SECTIONS ARE TENTATIVE. THE MINIMUM SECTION IS 3" A.C / 4" A.B. ADDITIONAL SOIL TEST MAY BE TAKEN AFTER ROUGH GRADING TO DETERMINE EXACT SECTION REQUIREMENTS.
8. LOCATIONS OF FIELD DENSITY TEST SHALL BE DETERMINED BY THE CITY OF APPROVED TESTING AGENCY AND SHALL BE SUFFICIENT IN BOTH HORIZONTAL AND VERTICAL PLACEMENT TO PROVIDE REPRESENTATIVE TESTING OF ALL FILL PLACED. TESTING IN AREAS OF A CRITICAL NATURE OR SPECIAL. EMPHASES SHALL BE IN ADDITION TO THE NORMAL REPRESENTATIVE SAMPLINGS.
9. ALL UNDERGROUND FACILITIES, WITH LATERALS, SHALL BE IN PLACE AND INSPECTED PRIOR TO PAVING. INCLUDING, BUT NOT LIMITED TO THE FOLLOWING: SEWER, WATER, ELECTRIC, GAS, TELEPHONE AND DRAINAGE.
10. THE DESIGN CIVIL ENGINEER SHALL EXERCISE SUFFICIENT CONTROL OF THE CONSTRUCTION TO ENSURE COMPLIANCE WITH PLANS, SPECIFICATIONS AND CITY CODES.
11. THE FINAL UTILITY LINE BACKFILL REPORT FROM THE PROJECT SOIL ENGINEER SHALL INCLUDE AN APPROVAL STATEMENT THAT THE BACKFILL IS SUITABLE FOR THE INTENDED USE.
12. THE FINAL COMPACTION REPORT AND APPROVAL FROM THE SOILS ENGINEER SHALL CONTAIN THE TYPE OF FIELD TESTING PERFORMED. EACH TEST SHALL BE IDENTIFIED WITH THE METHOD OF OBTAINING THE IN-PLACE DENSITY, WHETHER SAND CONE OR DRIVE RING AND SHALL BE PERFORMED TO VERIFY THE ACCURACY OF THE MAXIMUM DENSITY CURVES B THE FIELD TECHNICIAN.
13. ALL CONSTRUCTION AREAS SHALL BE PROPERLY POSTED AND LIGHTED IN CONFORMANCE WITH THE STATE MANUAL OF WARNING SIGNS, LIGHTS AND DEVICES FOR USE IN THE PERFORMANCE OF WORK UPON HIGHWAYS, IN ORDER TO ELIMINATE ANY HAZARDS.
14. AT NO TIME WILL PRIVATE PROPERTY BE USED IN CONJUNCTION WITH THE PROJECT UNLESS PROPERTY OWNER APPROVAL IS OBTAINED IN WRITING AND GIVEN TO THE CITY FOR APPROVAL.
15. ANY CHANGES CONTEMPLATED IN: DRAINAGE, ELEVATIONS OR STRUCTURES SHOWN ON THESE PLANS MUCH BE REVIEWED BY THE CITY TO DETERMINE IF REVISED PLANS SHOULD BY SUBMITTED. NONCOMPLYING CONSTRUCTION MAY BE SUBJECT TO PENALTIES AND/OR REMOVAL. "AS-BUILT" PLANS MUST BE SUBMITTED PRIOR TO ANY RELEASE OF SECURITIES AND / OR ISSUANCE OF CERTIFICATE OF USE.

## PAVING NOTES:

1. ALL UNDERGROUND FACILITIES, INCLUDING LATERALS, SHALL BE IN PLACE, AND ALL TRENCHS COMPACTED AND TESTED PRIOR TO PAVING.
2. ALL EXISTING OR NEW IMPROVEMENTS, INCLUDING CURB AND GUTTERS, SIDEWALKS, ASPHALT CONCRETE OR P.C.C. PAVING, WHICH ARE BEING JOINED OR MATCHED IN CONNECTION WITH THIS PROJECT SHALL BE JOINED OR MATCHED IN A MANNER SATISFACTORY TO THE CITY ENGINEER, INCLUDING NECESSARY SAW CUTTING, REMOVAL, REPLACEMENT AND CAPPING.
3. NEW CURB AND GUTTER SHALL BE MARKED AT EVERY 10-FEET WITH A SCORE LINE AND EXPANSION JOINS AS REQUIRED.
4. NEW OR EXISTING CURB AND GUTTER SHALL BE JOINED, MATCHED, OR REPLACED IF DAMAGED, TO S SAW CUT LINE SUCH THAT A MINIMUM LENGTH OF 7-FEET OF CURB AND GUTTER REMAINS IN PLACE AT ALL LOCATIONS.
5. A "TACK COAT" SHALL BE APPLIED BETWEEN PAVEMENT LAYERS, CONCRETE SURFACES AND ON EXISTING PAVEMENT TO BE RESURFACED AT THE RATE OF 0.10 GAL/YD. THE TACK COAT SHALL BE TYPE SS1 ASPHALTIC EMULSION WITH A 6-=70 GRADE LIQUID ASPHALT.
6. THE VISCOSITY GRADE OF PAVING ASPHALT SHALL BE PG 70-10 OR AS DETERMINED BY THE CITY ENGINEER AT THE TIME OF PAVING.
7. THE FINAL OR SURFACE LAYER OF ASPHALT CONCRETE SHALL BE BE PLACED UNTIL ALL ON-SITE IMPROVEMENTS HAVE BEEN COMPLETED , INCLUDING ALL EARTHWORK GRADING.
8. MANHOLES AND VALVE BOX FRAMES SHALL BE ADJUSTED TO FINISHED GRADES AFTER COMPLETION OF CONSTRUCTION TO THE STANDARDS OF THE FACILITY OWNER.
9. ALL EXISTING PAVEMENT WITHIN AND ADJOINING THIS PROJECT SHALL BE EITHER REMOVED OR STRUCTURALLY TESTED TO VERIFY THAT THE STRUCTURAL CAPABILITIES ARE ACCEPTABLE. ALL RESULTS SHALL BE APPROVED BY THE CITY ENGINEER.
10. THE CURB SHALL BE "ETCHED" SHOWN LATERAL LOCATION: "S" FOR SEWER, "G" FOR GAS, AND "E" FOR ELECTRICAL.
11. ALL PERMANENT ROADWAY TRAFFIC STRIPING, LEGENDS AND PAVEMENT MARKERS SHALL BE INSTALLED AFTER PERMANENT PAVING. THE TYPE AND LOCATIONS SHALL BE INSTALLED PER PLAN OR AS DIRECTED BY THE CITY ENGINEER.
12. TEMPORARY ROADWAY STRIPING SHALL BE INSTALLED ON ALL UNFINISHED ROADWAY SURFACES AS DIRECTED BY THE CITY ENGINEER.
13. THE AGGREGATE BASE MATERIAL SPECIFIED IN THE PLANS SHALL BE COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION WITH THE TOP FOOT OF MATERIAL UNDER PAVING. THE DEEPER SUBGRADE MUST BE COMPACTED TO AT LEAST 90% OF MAXIMUM RELATIVE DENSITY. TESTING WILL BE REQUIRED BY A SOIL ENGINEER.
14. JUST BEFORE PAVING, A SOIL STERILANT SHALL BE APPLIED TO THE COMPACTED BASE MATERIAL FOR ALL ASPHALT PAVING SEE THE CITY'S STANDARD "SPECIAL PROVISIONS TO THE STANDARD SPECIFICATIONS" FOR THE SOIL STERILENT REQUIREMENTS

## GRADING NOTES:

1. ALL WORK SHALL CONFORM TO CITY OF RANCHO MIRAGE GRADING ORDINANCE NO. 398, THE CITY ENGINEER, AND ANY SPECIAL PROVISIONS OF THE PERMIT.
2. GRADING SHALL BE IN ACCORDANCE WITH THE ENGINEERED GRADING REQUIREMENTS OF A SOIL REPORT PREPARED BY _____ NO. _____ DATED _____ TELEPHONE # _____
3. THE CONTRACTOR SHALL NOTIFY THE CITY PUBLIC WORKS INSPECTION LINE (760-324-8271) 24 HOURS PRIOR TO ANY GRADING, BRUSHING OR CLEARING, EACH PHASE OF CONSTRUCTION, AND ANY OTHER WORK REQUIRING INSPECTION.
4. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURE, TEMPORARY DRAINAGE CONTROL SHALL BE PROVIDED TO PREVENT PONDING WATER, EROSION AND DAMAGE TO ADJACENT PROPERTY.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN EFFECTIVE MEANS OF DUST CONTROL WHICH SHALL INCLUDE PREVISIONS FOR ADEQUATE WATERING DURING THE GRADING PROCESS AND PROVISIONS FOR CONTINUANCE OF DUST CONTROL AFTER THE GRADING. DUST CONTROL SHALL CONTINUE UNTIL SUCH TIME THAT THE GRADED SURFACE PRESENTS SUFFICIENT PROTECTIVE COVER AGAINST WIND OR WATER EROSION AS DETERMINED BY THE CITY ENGINEER. SEE THE ATTACHED LOCAL AIR QUALITY MANAGEMENT PLAN FOR DETAILS OF EXPECTED DUST CONTROL METHODS.
6. AREAS OF FUTURE CONSTRUCTION AND ALL CUT AND FILL SLOPE FACES SHALL BE PLANTED WITH A CITY APPROVED LANDSCAPE MATERIAL.
7. GRADING OPERATIONS AND MAINTENANCE OF EQUIPMENT WITHIN ONE HALF MILE OF HUMAN OCCUPANCY SALL NOT BE CONDUCTED BETWEEN THE HOUR OF 5"00 P.M. AND 8:00 A.M. OR ANYTIME ON A SUNDAY OF FEDERAL HOLIDAY PER CITY CODE: 15.04.020 (A).
8. PRIOR TO ANY GRADING OPERATIONS, ALL FILL AREAS SHALL BE CLEARED OF ORGANIC MATERIAL AND THE EXISTING GROUND SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 12" OR AS RECOMMENDED BY THE SOIL REPORT.
9. MAXIMUM CUT AND FILL SLOPES SHALL BE NO STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL.
10. ALL BUILDING PADS SHALL BE COMPACTED TO A MINIMUM OF 90% RELATIVE DENSITY IN ACCORDANCE WITH CITY ORDINANCE NO. 398 AND ABOVE MENTIONED SOIL REPORT.
11. ALL FILLS SHALL BE COMPACTED TO A MINIMUM OF 90% RELATIVE DENSITY IN ACCORDANCE WITH CITY ORDINANCE NO. 398. FIELD DENSITY SHALL BE DETERMINED IN ACCORDANCE WITH CITY GRADING ORDINANCE NO. 398.
12. MINIMUM BUILDING PAD AND DRAINAGE SLOPE=0.50%. DRAINAGE SWALES SHALL BE A MINIMUM OF 0.5 FEE DEEP, 5 FEET WIDE, AND BE CONSTRUCTED A MINIMUM OF 2 FEET FROM THE TOP OF CUT OR FILL SLOPE. A 1-FOOT HIGH BERM SHALL BE PLACED AT THE TOP OF ALL SLOPES WHICH EXCEED 5:1 UNLESS PROTECTED WITH APPROVED EROSION CONTROL.
13. ALL TRAVELED WAYS MUCH BE CLEANED DAILY OF ALL DIRT, MUD AND DEBRIS DEPOSITED ON THEM AS A RESULT OF THE GRADING OPERATION. CLEANING IS TO BE DONE TO THE SATISFACTION OF THE CITY ENGINEER.
14. BLOCK WALLS ARE NOT PART OF THE GRADING PERMIT. SUBMIT FOR SEPARATE BUILDING PERMIT.
15. THE SOILS ENGINEER, ENGINEERING GEOLOGIST AND DESIGN CIVIL ENGINEER SHALL, DURING GRADING, ENSURE COMPLIANCE WITH THE PLANS, SPECIFICATIONS AND CODES WITHIN THEIR PURVIEW.
16. PRIOR TO FINAL ACCEPTANCE OF GRADING, THE SOILS ENGINEER AND DESIGN ENGINEER SHALL SUBMIT (ON CITY FORMS) VERIFICATION THAT ALL WORK HAS CONFORMED TO THE GRADING PLAN, CITY STANDARD AND THE RECOMMENDATIONS OF THE SOILS REPORT.
17. ANY PUBLIC ROADWAY WHICH IS INTENDED TO BE USED TO CONDUCT ANY ASPECT OF THE GRADING FOR THE PROJECT SHALL BE COVERED BY A CITY ENCROACHMENT PERMIT AND SUBJECT TO PERMIT CONDITIONS.
18. THE CITY OF RANCHO MIRAGE IS IN A QUARANTINE AREA FOR THE RED IMPORTED FIRE ANT. PRIOR TO ANY MOMENT OF SOIL WITHIN THE SITE, OR FORM THE SITE, YOU MUST SCHEDULE AN INSPECTION AT 760-776-8208 WITH THE R.I.F.A. INSPECTOR AT LEAST 24 HOURS IN ADVANCE AND SUBMIT CERTIFICATION OF CLEARANCE TO THE CITY.

## CITY OF RANCHO MIRAGE-UTILITIES NOTIFICATION LIST

CITY OF RANCHO MIRAGE
69-825 HIGHWAY 111
RANCHO MIRAGE, CA 92270
PHONE: (760) 324-8830

WATER AND SEWER:
COACHELLA VALLEY WATER DISTRICT
P O BOX 1058
COACHELLA, CA 92236
PHONE: (760) 398-2651

ELECTRIC:
EDISON INTERNATIONAL
PHONE: (760) 202-4291

GAS:
THE GAS COMPANY
PHONE: (800) 227-2800

TELEPHONE:
VERIZON
PHONE: (760) 323-1231

CABLE TV:
TIME WARNER
PHONE: (800) 340-1312

DIG ALERT
USA UNDERGROUND ALERT
PHONE: (811)

## LEGAL DESCRIPTION

PARCEL NO. 1:

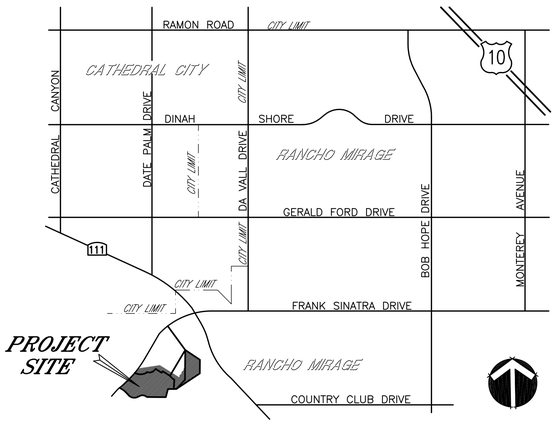
A PORTION OF LOTS 1 AND 2 OF TRACT NO. 34640-1, IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA AS PER MAP RECORDED IN BOOK 443 PAGES 11 THROUGH 16, INCLUSIVE OF MAP IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE OF RIVERSIDE COUNTY, CALIFORNIA.

PARCEL NO. 2:

A PORTION OF PARCEL 2 OF LOT LINE ADJUSTMENT NO. LLA 06-07 IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA AS PER INSTRUMENT NO. 2007-0480660 RECORDED IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE OF RIVERSIDE COUNTY, CALIFORNIA.

PARCEL NO. 3:

PARCEL IN THE CITY OF RANCHO MIRAGE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA AS PER INSTRUMENT NO. 1995-405421, RECORDED ON DECEMBER 6, 1995 IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE OF RIVERSIDE COUNTY, CALIFORNIA.




VICINITY MAP
TG: 817-F2 NTS

## SHEET INDEX:


SHEET 1: TITLE SHEET
SHEET 2: SECTIONS
SHEET 3: PRELIMINARY SITE GRADING - GROUND LEVEL - 40 SCALE
SHEET 4: PRELIMINARY SITE GRADING - P2 LEVEL - 40 SCALE
SHEET 5: PRELIMINARY SITE GRADING - P3 LEVEL - 40 SCALE
SHEET 6: PRELIMINARY SITE GRADING - SKY MESA RECREATION AREA
SHEET 7: SITE GRADING-GROUND LEVEL-NW CORNER - 20 SCALE
SHEET 8: SITE GRADING-GROUND LEVEL-NE CORNER - 20 SCALE
SHEET 9: SITE GRADING-GROUND LEVEL-SW CORNER - 20 SCALE
SHEET 10: SITE GRADING-GROUND LEVEL-SE CORNER - WO SCALE
SHEET 11: SITE YARD DRAINAGE PLAN - WESTERLY PORTION
SHEET 12: SITE YARD DRAINAGE PLAN - EASTERLY PORTION
SHEET 13: RETAINING WALL LOCATION AND SECTIONS PLAN - WALLS "A" AND "B"
SHEET 14: RETAINING WALL LOCATION AND SECTIONS PLAN - WALLS "C", "D" AND "E"
SHEET 15: RETAINING WALL LOCATION AND SECTIONS PLAN - WALLS "F"


## SOURCE OF SURVEYING DATA:

EXISTING FIELD DATE SHOWN ON THIS PLAN WAS PROVIDED BY PROJECT ARCHITECT'S OFFICE ON SEPTEMBER 2017.

NOTE:
SECTION 4216/4217 OF THE GOVERNMENT CODE REQUIRES A DIG ALERT IDENTIFICATION NUMBER BE ISSUED BEFORE A PERMIT TO EXCAVATE WILL BE VALID. FOR YOUR DIG ALERT ID NUMBER CALL UNDERGROUND SERVICE ALERT **TOLL FREE "811"** TWO WORKING DAYS BEFORE YOU DIG.

DIGALERT
DIAL BEFORE YOU DIG
TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 811
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

## LEGEND:

| | | | |
|---|---|---|---|
| TC | TOP OF CURB | | RETAINING WALL |
| FL | FLOW LINE | (120) | EXISTING ELEVATION OR DATA |
| FS | FINISHED SURFACE | 120 | PROPOSED ELEVATION OR DATA |
| FG | FINISHED GRADE | TBM | TEMPORY BENCH MARK |
| FF | FINISHED FLOOR | BM | BENCH MARK |
| GF | GARAGE FLOOR | C | CUT |
| PAD | PAD | F | FILL |
| TW | TOP OF WALL | N | NATURAL |
| TF | TOP OF FOOTING | | PROPERTY LINE |
| H | HEIGHT | | EXISTING CONTOURS |
| L | LENGTH | | PROPOSED CONTOURS |
| ℄ | PROPERTY LINE | | LIMIT OF OVEREXCAVATION |
| R/W | RIGHT-OF-WAY | | CUT/FILL DAYLIGHT LINE |
| ☼ | PARKING AREA LIGHT | | TRENCH DRAIN W/FILTER INLET |
| ⊠ | GRATE INLET WITH FILTER | | |

DRAFT PRINT

BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

BENCH MARK
2 1/2" BRASS DISK STAMPED "COUNTY OF RIVERSIDE PD-21, DEC. 1963" SET IN HEADWALL ON SOUTH SIDE OF HWY 111, 360 FEET NW OF FRANK SINATRA DRIVE


OWNER:
KAM SANG COMPANY, INC.
411 E. HUNTINGTON DRIVE, #305
ARCADIA, CA 91006
TEL: (626) 446-2988
FAX: (626) 446-3392
E-MAIL: www.kamsangcompany.com

ARCHITECT:
LCRA
ARCHITECTURE & PLANNING
35 HUGUS ALLEY, SUITE 220
PASADENA, CA 91103
TEL. (626) 449-9698
E-MAIL: www.lcra-architects.com

PREPARED BY:
FOCUS ENGINEERING, INC.
8 CORPORATE PARK, SUITE 300
IRVINE, CA 92606
TEL: (949) 450-0590
E-MAIL: focusengring@sbcglobal.net


REGISTERED PROFESSIONAL ENGINEER
GUIA LIN LIU
No. 41497
EXP. 12/31/23
CIVIL
STATE OF CALIFORNIA

PRINT: 2020/08/18

REVISIONS

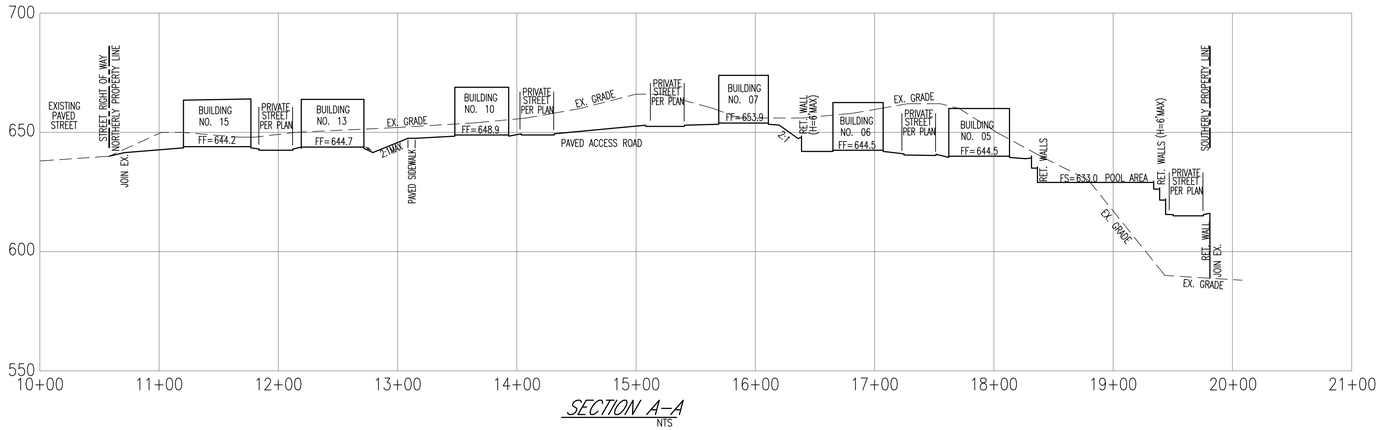
| NO. | DATE | DESCRIPTION |
|---|---|---|
| | | |

CITY OF RANCHO MIRAGE

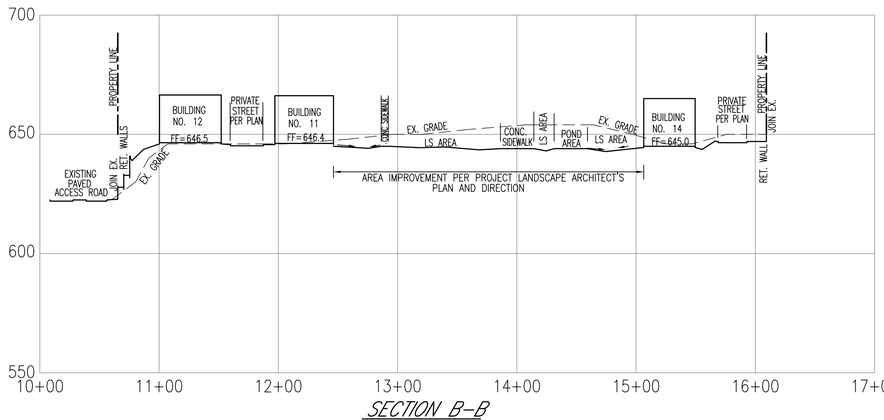
CONCEPTUAL GRADING STUDY FOR RANCHO MIRAGE - RITZ II

TITLE SHEET

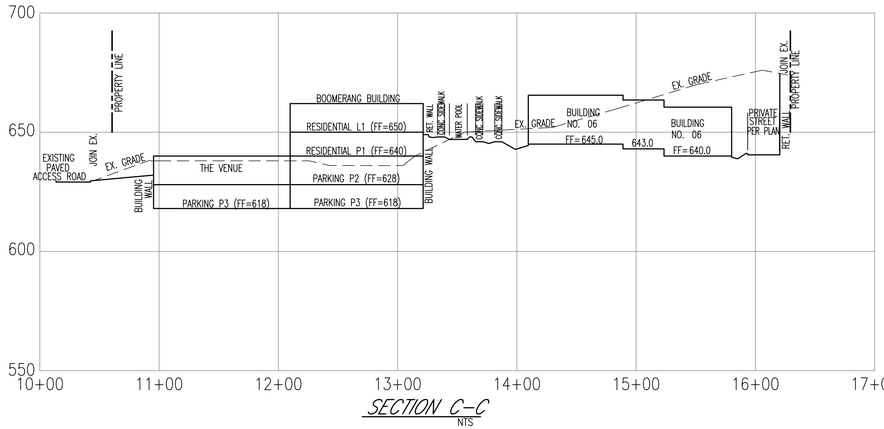
SHEET 1 OF 15




SECTION A–A
NTS




SECTION B–B
NTS




SECTION C–C
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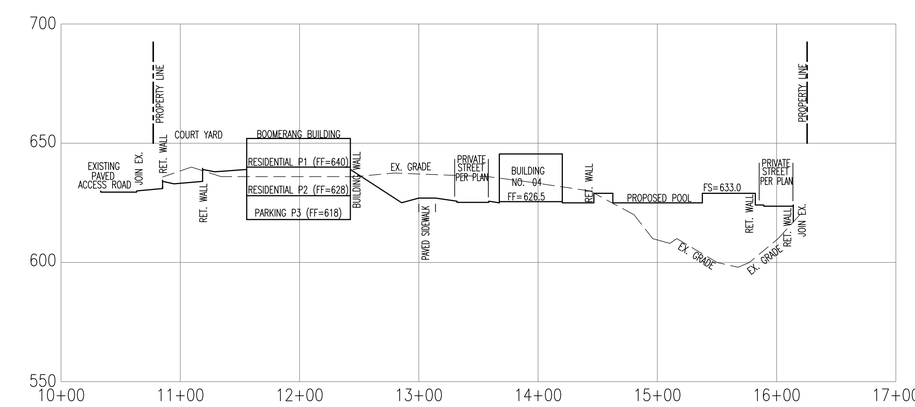
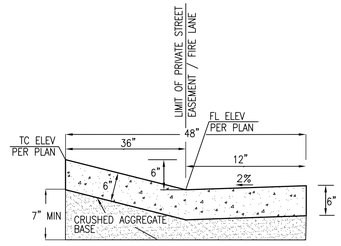
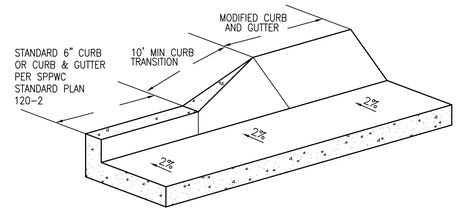



SECTION D–D
NTS

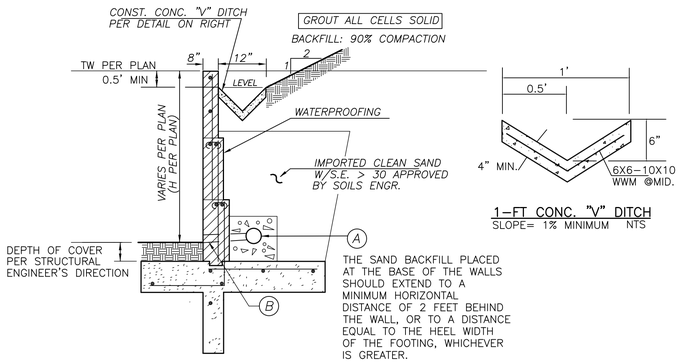



MODIFIED CURB & GUTTER
TYPICAL SECTION
SCALE: NONE

NOTES:
1. CONCRETE SHALL BE CLASS 520–C–2500.
2. WEAKENED PLANE JOINTS ARE REQUIRED AT 20' INTERVALS AND ON BOTH SIDES OF DRIVEWAY APPROACHES.
3. EXPANSION JOINTS ARE REQUIRED AT ALL CURB RETURNS AND AT DRAINAGE STRUCTURES.
4. CURB REPAIR SHALL BE AS DIRECTED BY THE CITY ENGINEER.
5. ALL EXPOSED CORNERS TO BE ROUNDED WITH 3/4" R.




CURB TRANSITION DETAIL
SCALE: NONE

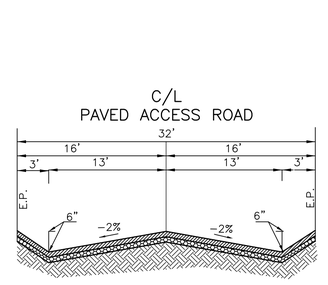



TYPICAL RETAINING WALL SECTION
W/2:1 BACKFILL — RETAINING WALL CONSTRUCTION PER STRUCTURAL ENGINEER'S DIRECTION — N.T.S.

Ⓐ — 4" PERFORATED PVC SCH. 40 PIPE W/MIN. 1 CF/LF OF OPEN GRADED GRAVEL WRAPPED IN MIRAFI 140N, OR EQUAL FILTER FABRIC.
Ⓑ — 2" PVC SCH. 40 PIPE @ 10' O.C. FOR SUBDRAIN OUTLET




1–FT CONC. "V" DITCH
SLOPE= 1% MINIMUM NTS




TYPICAL PRIVATE ACCESS ROAD SECTION
N.T.S.

DRAFT PRINT

BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

BENCH MARK
2 1/2" BRASS DISK STAMPED "COUNTY OF RIVERSIDE PD–21, DEC. 1963" SET IN HEADWALL ON SOUTH SIDE OF HWY 111, 360 FEET NW OF FRANK SINATRA DRIVE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ARCHITECT:
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ARCHITECTURE & PLANNING
35 HUGUS ALLEY, SUITE 220
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PREPARED BY:
FOCUS ENGINEERING, INC.
8 CORPORATE PARK, SUITE 300
IRVINE, CA 92606
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E–MAIL: focusengring@sbcglobal.net


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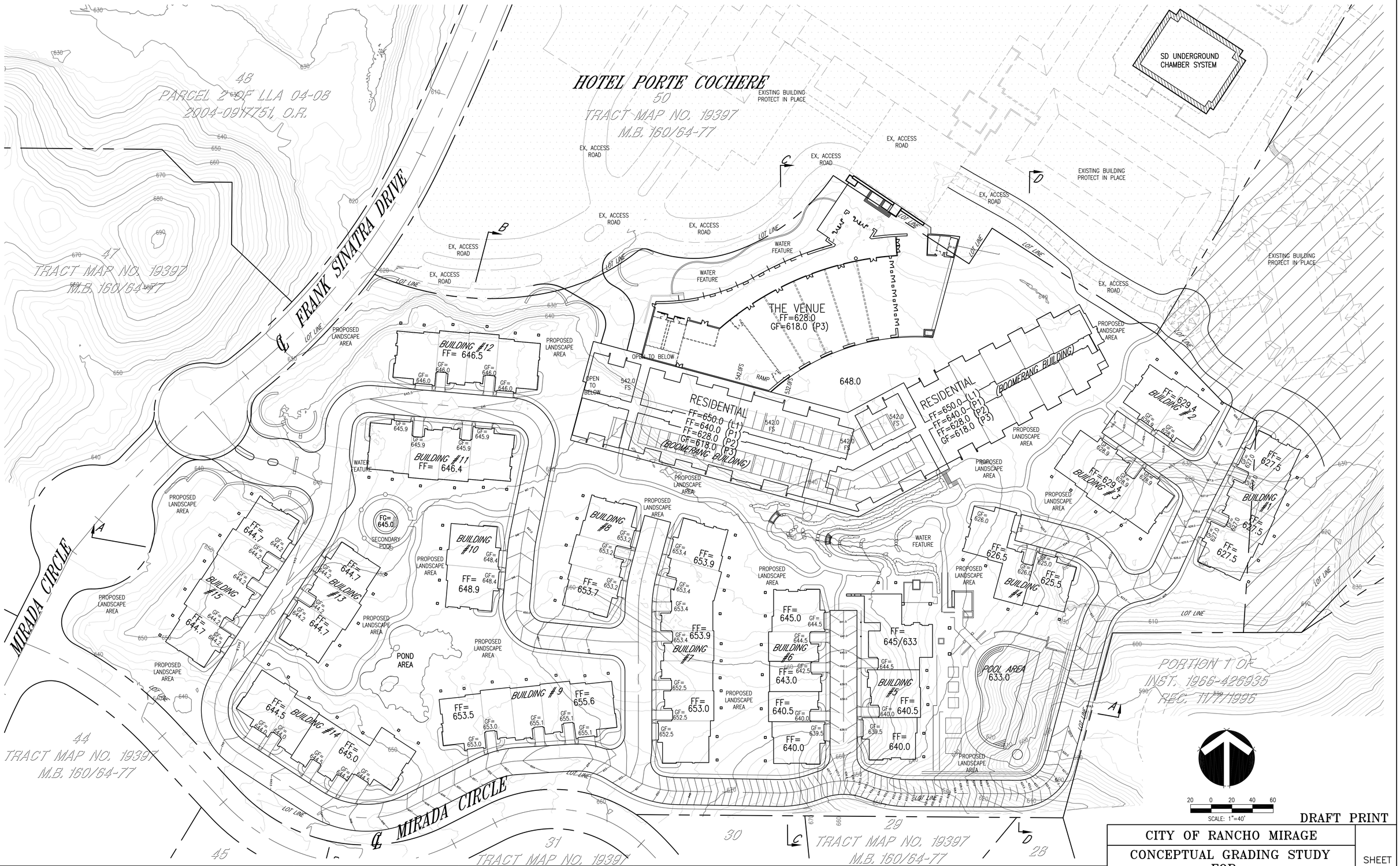
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE – RITZ II
DETAILS & TYPICAL SECTIONS

SHEET 2 OF 15

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BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

BENCH MARK
2 1/2" BRASS DISK STAMPED "COUNTY OF RIVERSIDE PD-21, DEC. 1963" SET IN HEADWALL ON SOUTH SIDE OF HWY 111, 360 FEET NW OF FRANK SINATRA DRIVE

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TEL. (626) 449-9698
E-MAIL: www.lcra-architects.com

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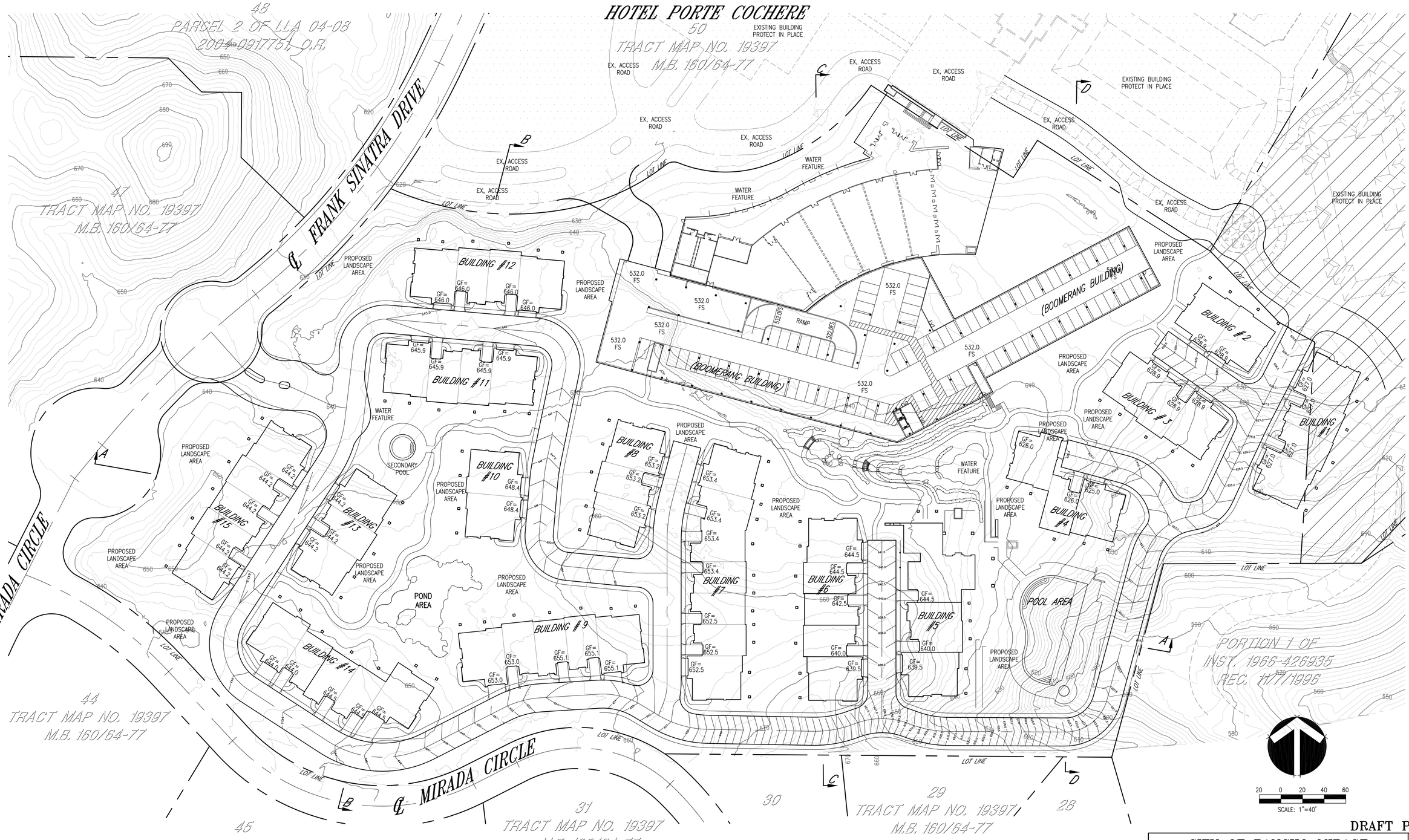
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE – RITZ II

GROUND LEVEL

SHEET 3 OF 15

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BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

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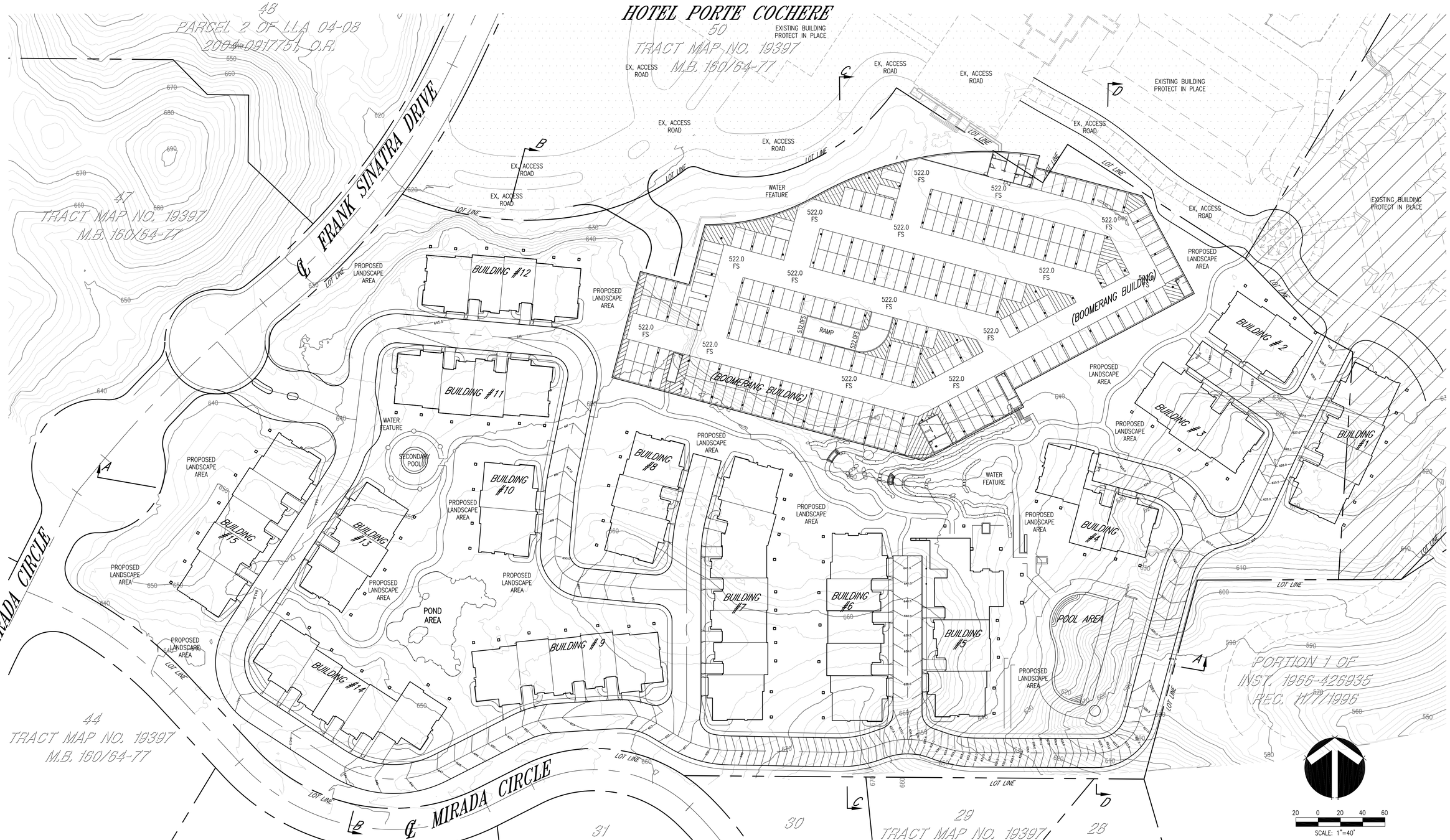
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE - RITZ II
SITE GRADING - P2 LEVEL

SHEET 4 OF 15

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THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

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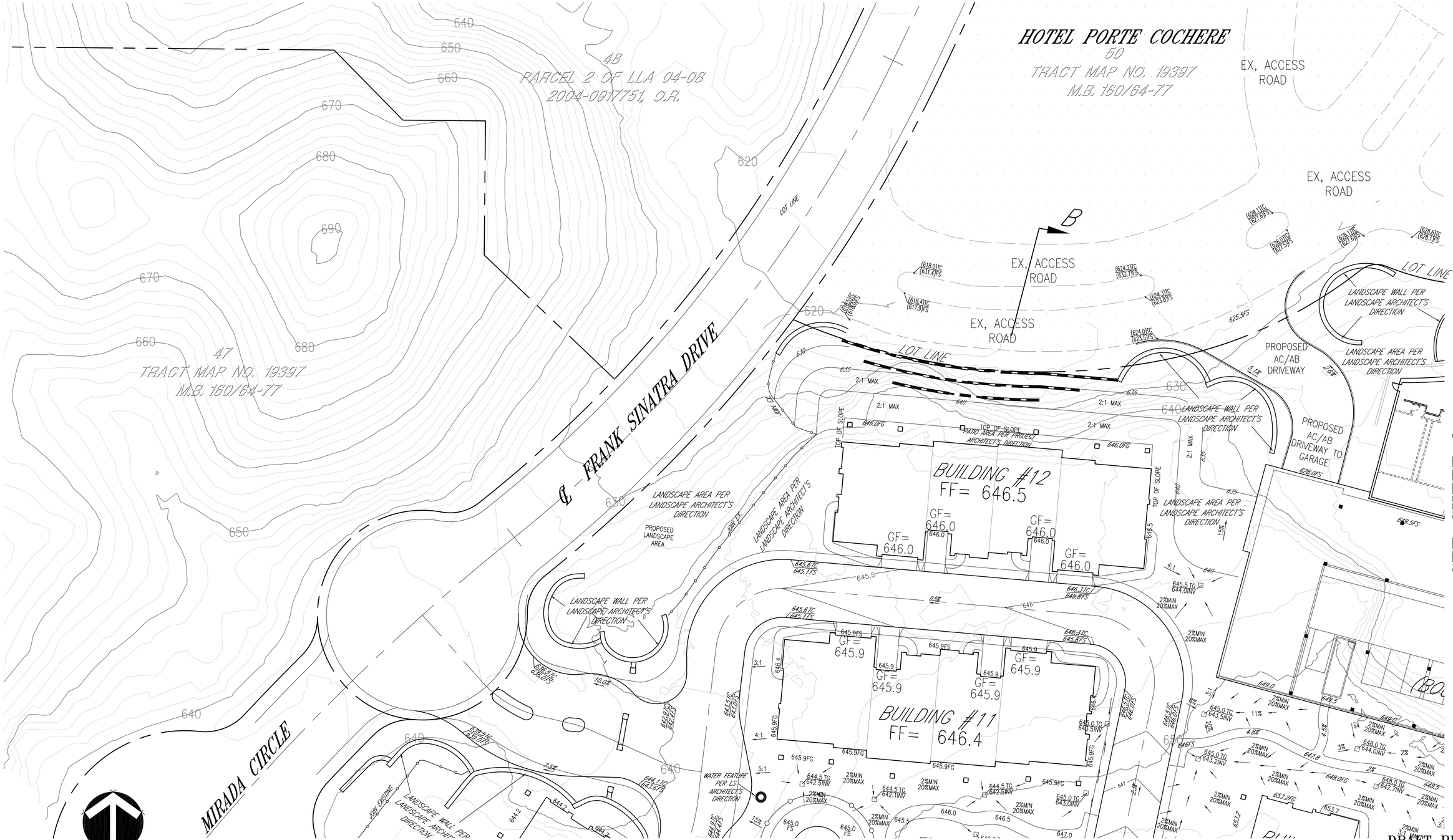
CITY OF RANCHO MIRAGE

# CONCEPTUAL GRADING STUDY FOR RANCHO MIRAGE – RITZ II

## SITE GRADING – P3 LEVEL

SHEET 5 OF 15

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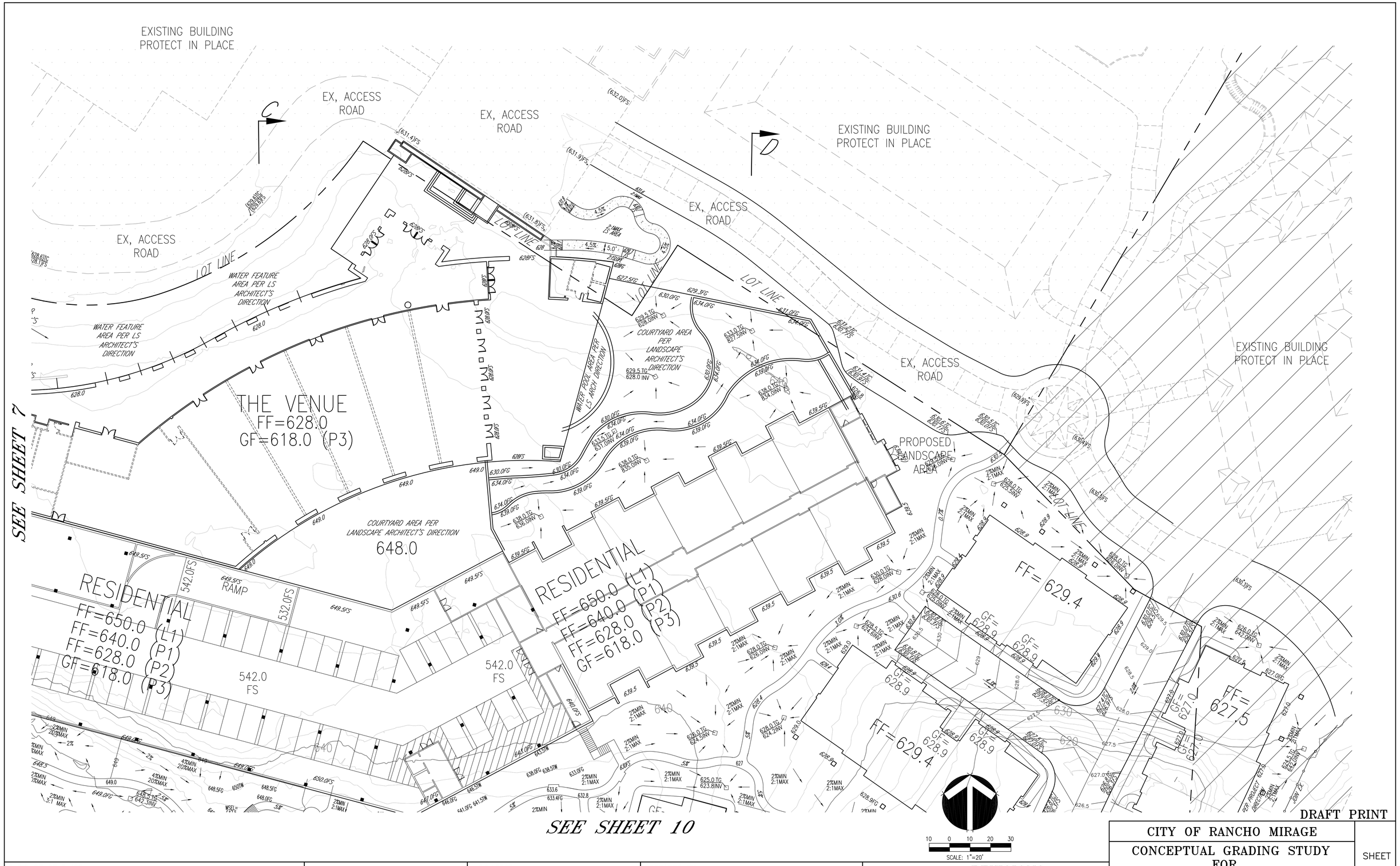
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE – RITZ II
YARD DRAIN-GROUND LEVEL-NW CORNER

SHEET 7 OF 15

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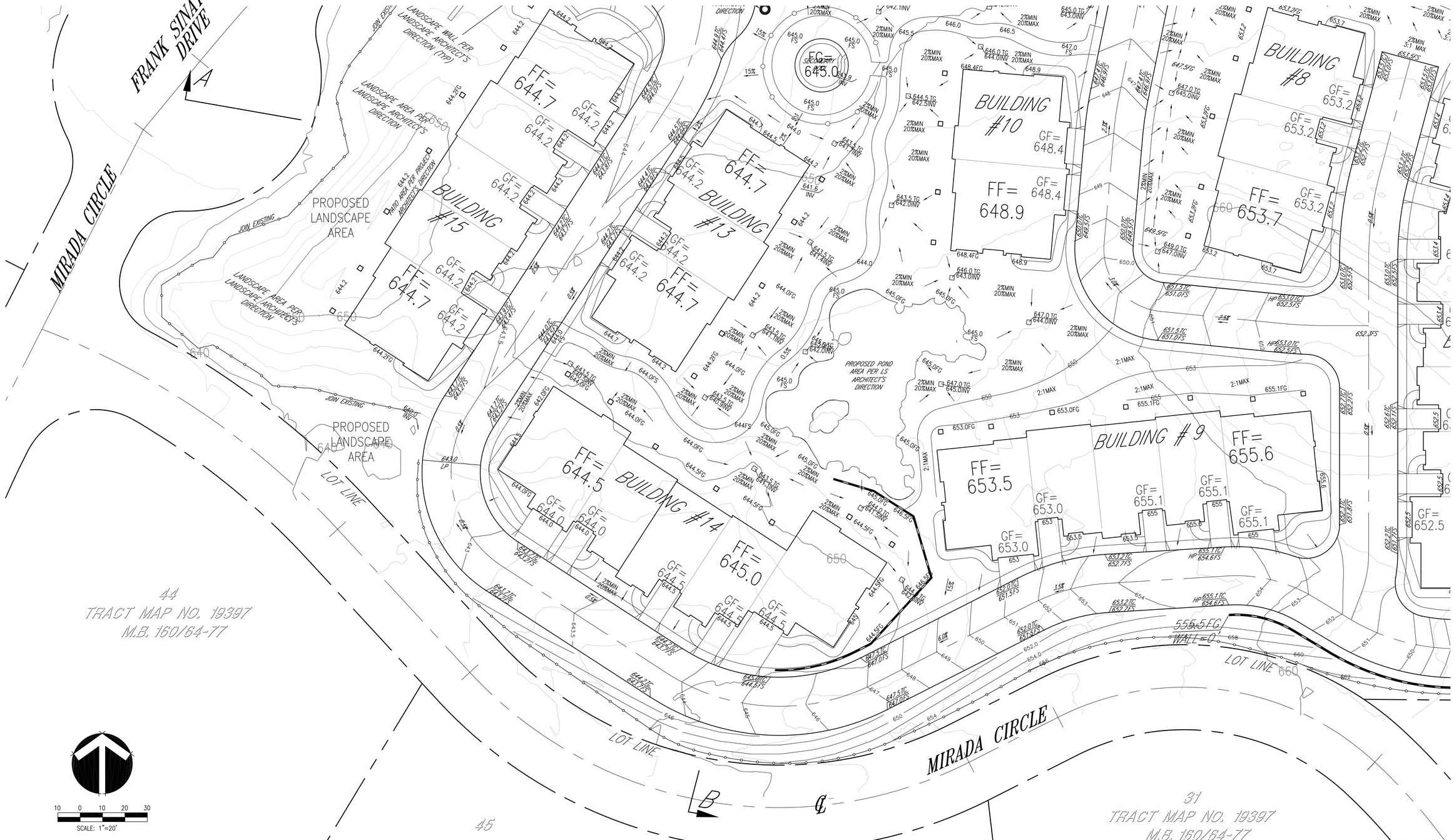
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY FOR RANCHO MIRAGE - RITZ II

YEAR DRAIN-GROUND LEVEL-NE CORNER

SHEET 8 OF 15

SEE SHEET 7




10 0 10 20 30
SCALE: 1"=20'

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BASIS OF BEARINGS:
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CITY OF RANCHO MIRAGE

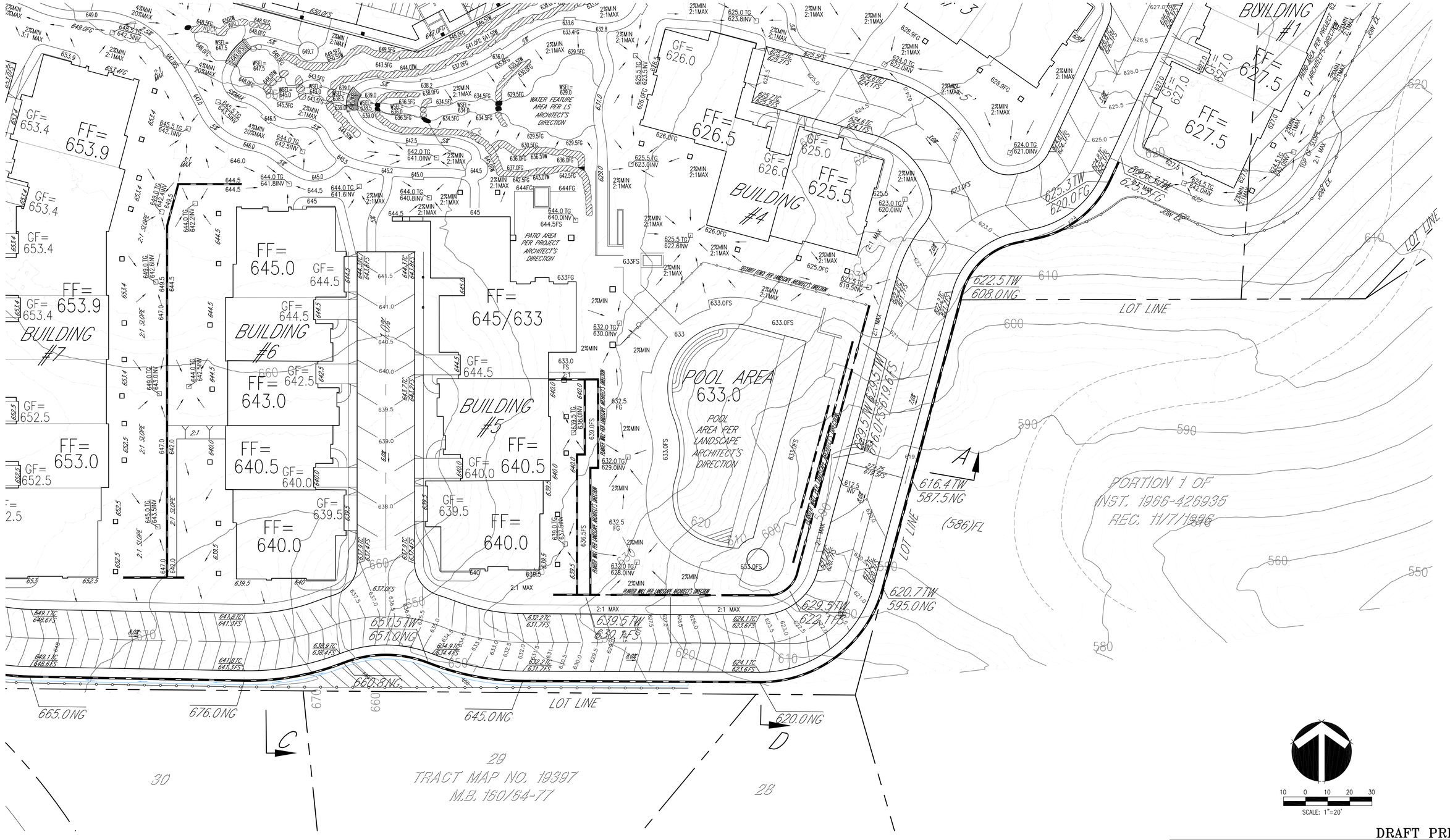
CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE - RITZ II

YARD DRAIN-GROUND LEVEL-SW CORNER

SHEET 9 OF 15

SEE SHEET 8

SEE SHEET 9

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CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE - RITZ II

YARD DRAIN-GROUND LEVEL-SE CORNER

SHEET 10 OF 15




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BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

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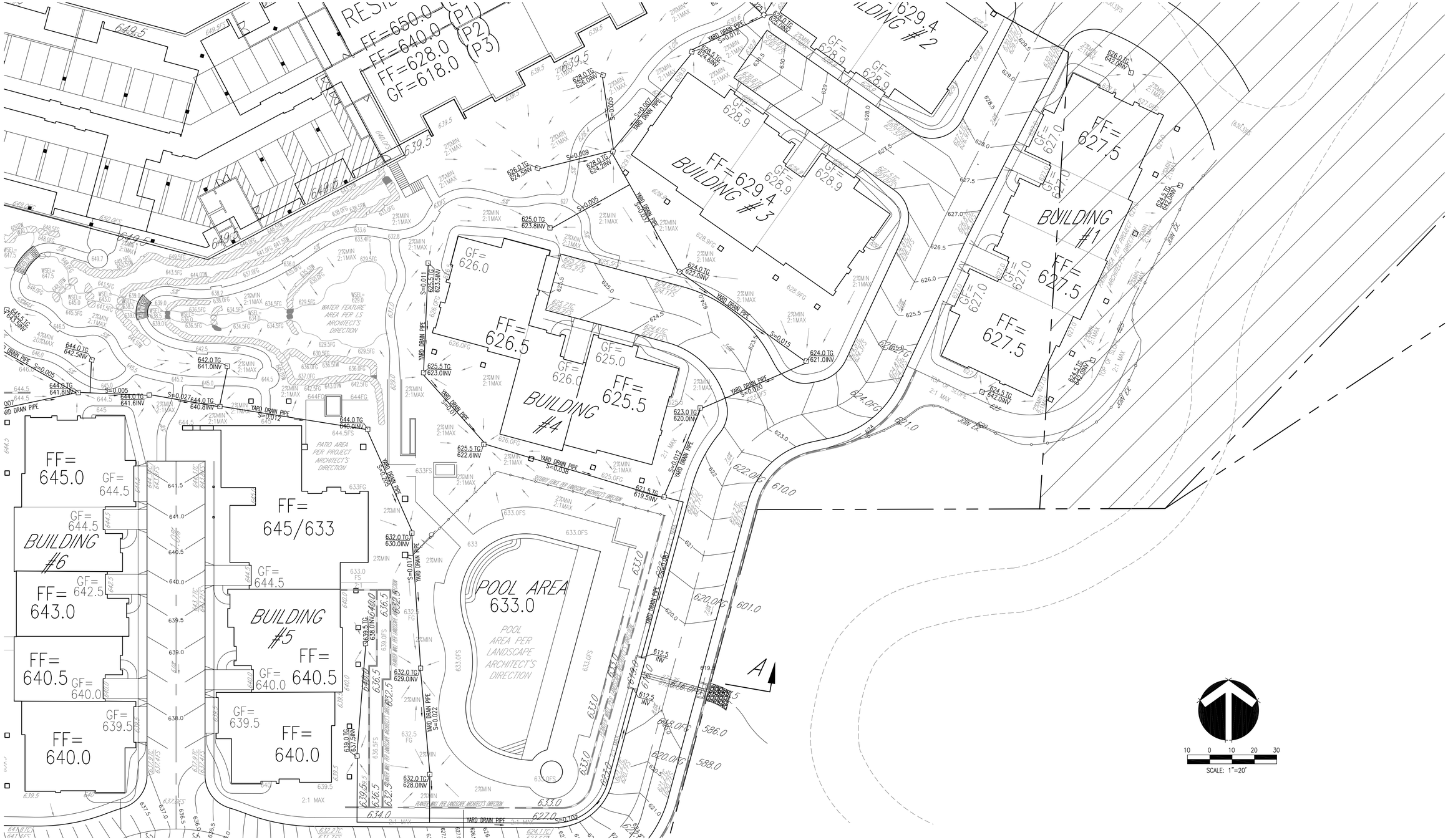
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE - RITZ II
YARD DRAIN-GROUND LEVEL-WESTERLY SITE

SHEET 11 OF 15

SEE SHEET 11

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| CITY OF RANCHO MIRAGE | |
| CONCEPTUAL GRADING STUDY FOR RANCHO MIRAGE – RITZ II | SHEET 12 OF 15 |
| YARD DRAIN-GROUND LEVEL-EASTERLY SITE | |

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THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

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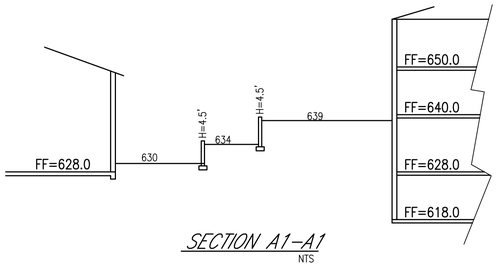


SECTION A1–A1
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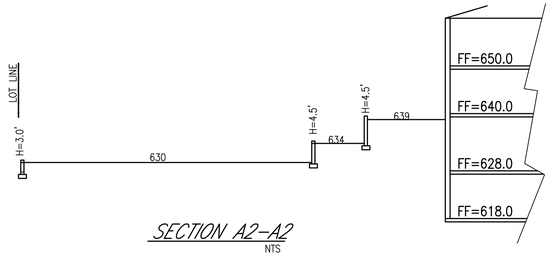


SECTION A2–A2
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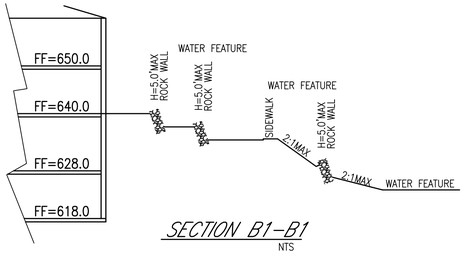


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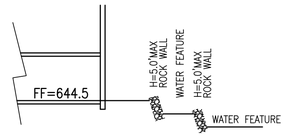


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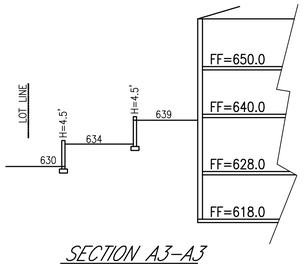


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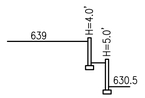


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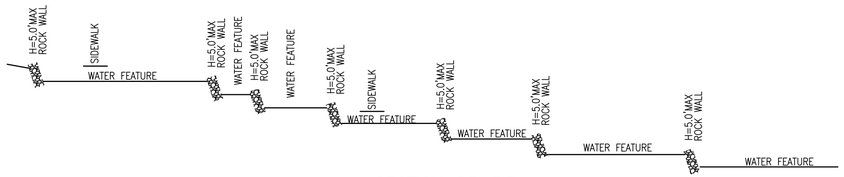


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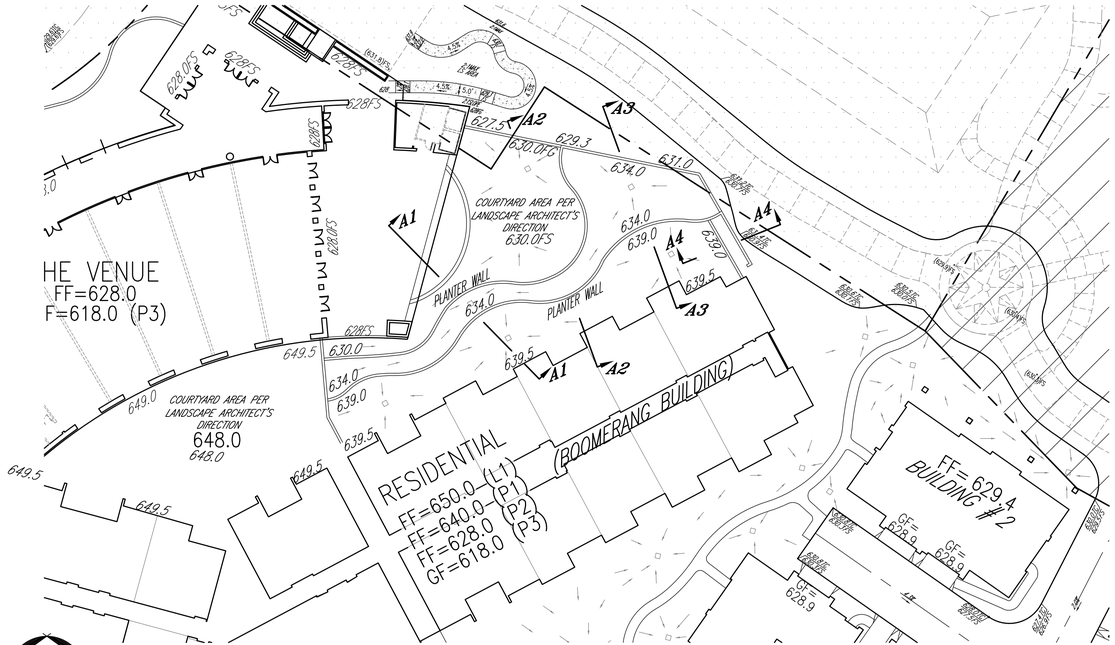


WALL NO – "A"



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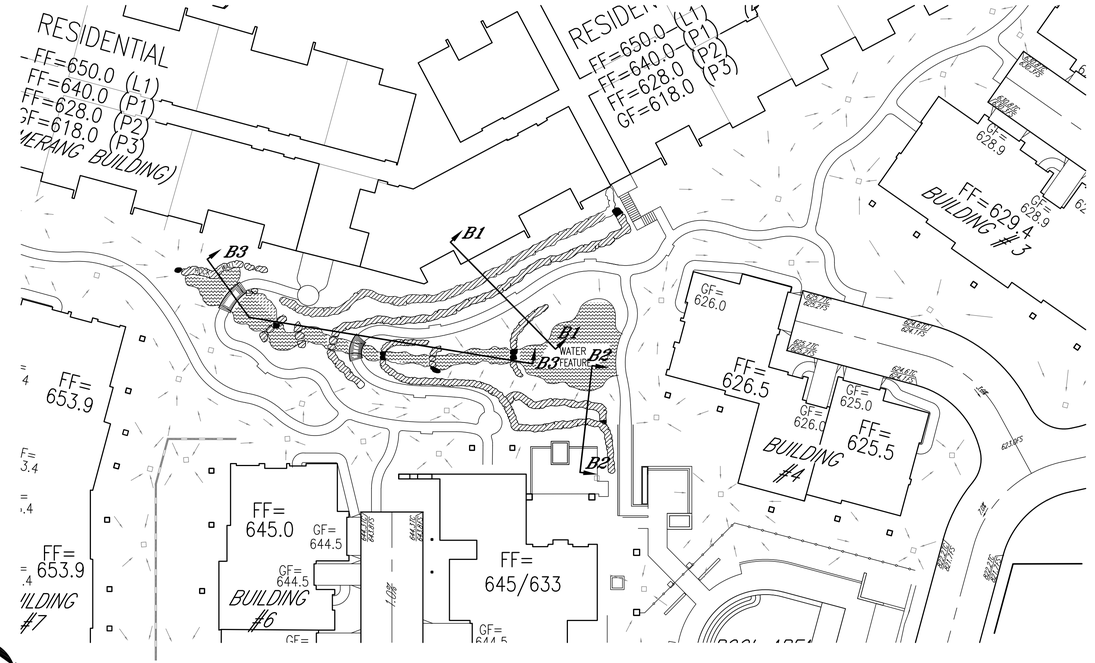
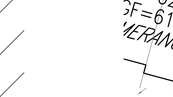



WALL NO – "B"



20 0 20 40 60
SCALE: 1"=30'

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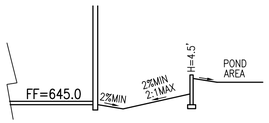
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE – RITZ II
RETAINING WALL LOCATION & SECTIONS PLAN
WALL NOs – "A" & "B"

SHEET 13 OF 15

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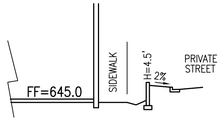


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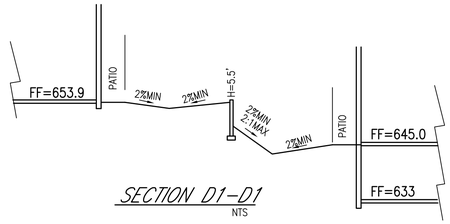


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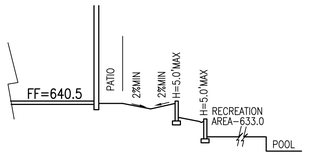


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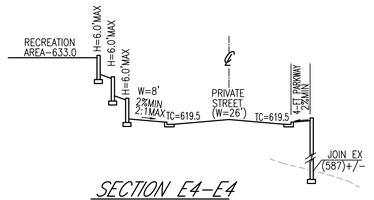


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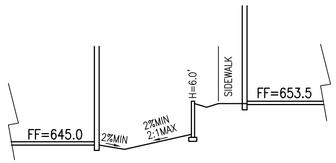


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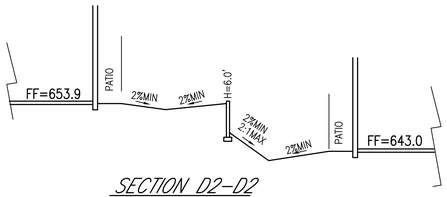


SECTION D2–D2
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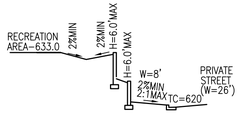
SECTION E2–E2
NTS

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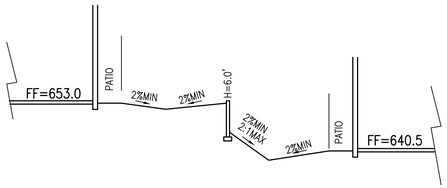


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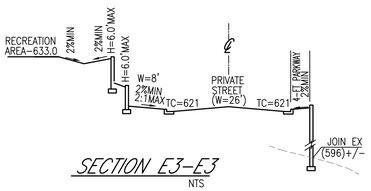


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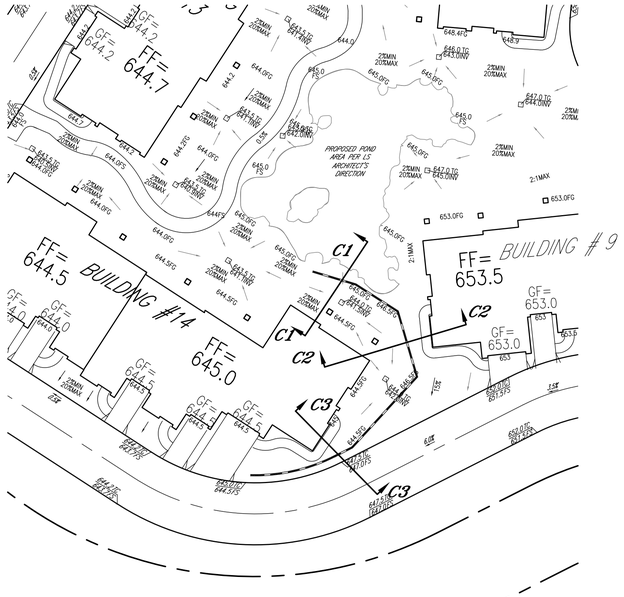
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FF=644.7
GF=644.2
GF=644.5
FF=645.0
BUILDING #14
GF=644.0
GF=644.5
GF=644.5
GF=644.5
PROPOSED POND AREA PER I.S. ARCHITECT'S DIRECTION
FF=653.5
BUILDING # 9
GF=653.0
GF=653.0
C1
C2
C3
C1
C2
C3
2%MIN 20%MAX
2:1MAX
644.0FG
645.0FG
646.0FG
647.0FG
644.5FG
645.5FG
653.0FG
644.0TC 643.0INV
645.0TC 644.0INV
647.0TC 646.0INV
641.5TC 640.5INV
641.0TC 640.0INV
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641.0TC 640.0INV
644.5TC 643.5INV
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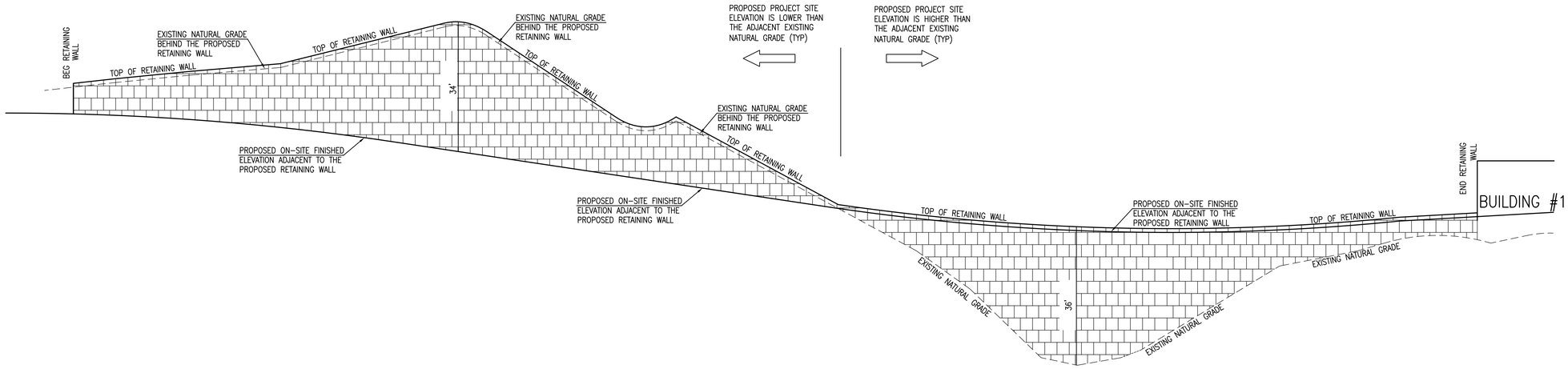


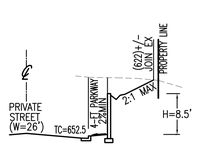


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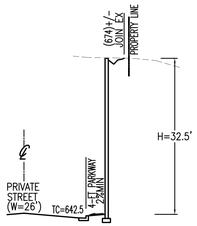


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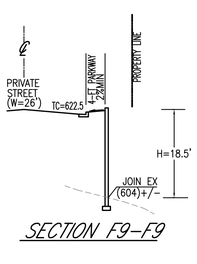


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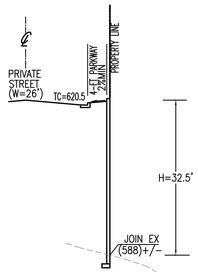


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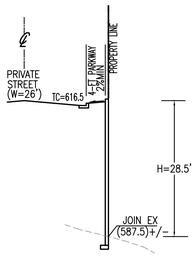


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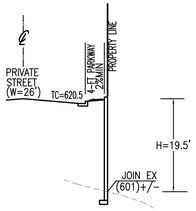


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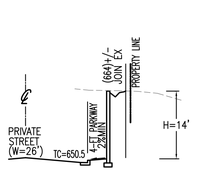


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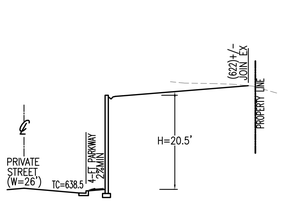


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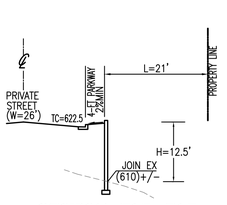


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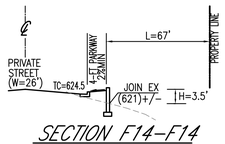


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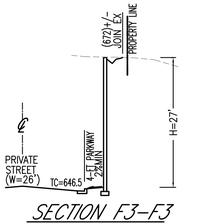


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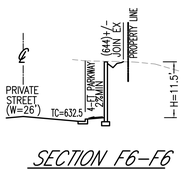


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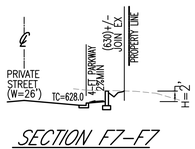


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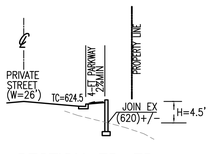


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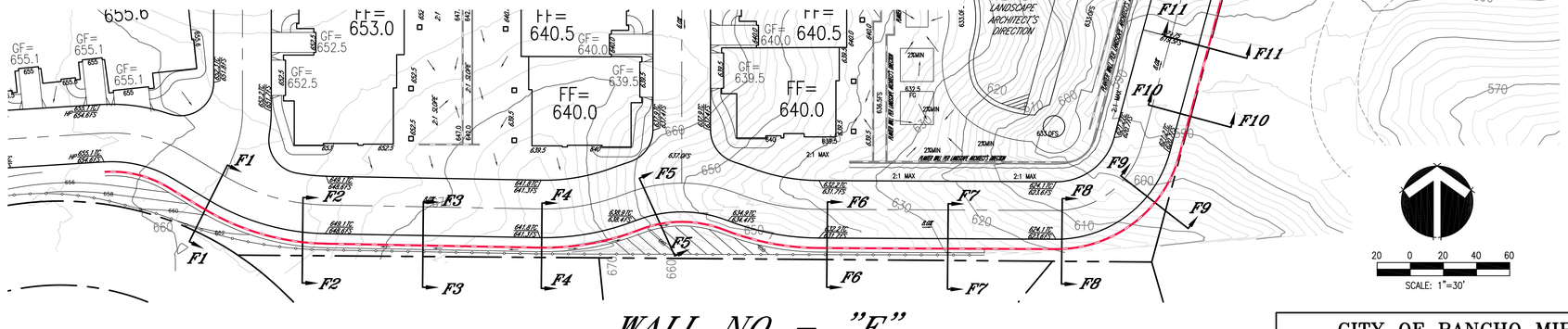



WALL NO – "F"

DRAFT PRINT

BASIS OF BEARINGS:
THE BEARINGS N 00°31'00" E OF THE EASTERLY LINE OF LOTS 50 AND 51 OF TRACT MAP 19397, AS SHOWN BY MAP ON FILE IN BOOK 160, PAGES 64 THROUGH 77, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS IS TAKEN AS THE BASIS OF BEARINGS OF THIS MAP.

BENCH MARK
2 1/2" BRASS DISK STAMPED "COUNTY OF RIVERSIDE PD–21, DEC. 1963" SET IN HEADWALL ON SOUTH SIDE OF HWY 111, 360 FEET NW OF FRANK SINATRA DRIVE

OWNER:
KAM SANG COMPANY, INC.
411 E. HUNTINGTON DRIVE, #305
ARCADIA, CA 91006
TEL: (626) 446–2988
FAX: (626) 446–3392
E–MAIL: www.kamsangcompany.com

ARCHITECT:
LCRA
ARCHITECTURE & PLANNING
35 HUGUS ALLEY, SUITE 220
PASADENA, CA 91103
TEL. (626) 449–9698
E–MAIL: www.lcra–architects.com

PREPARED BY:
FOCUS ENGINEERING, INC.
8 CORPORATE PARK, SUITE 300
IRVINE, CA 92606
TEL: (949) 450–0590
E–MAIL: focusengring@sbcglobal.net

REGISTERED PROFESSIONAL ENGINEER CHIA LIN LIU No. 41497 EXP. 12/31/23 CIVIL STATE OF CALIFORNIA

PRINT: 2020/08/18

REVISIONS

| NO. | DATE | DESCRIPTION |
|---|---|---|
| | | |

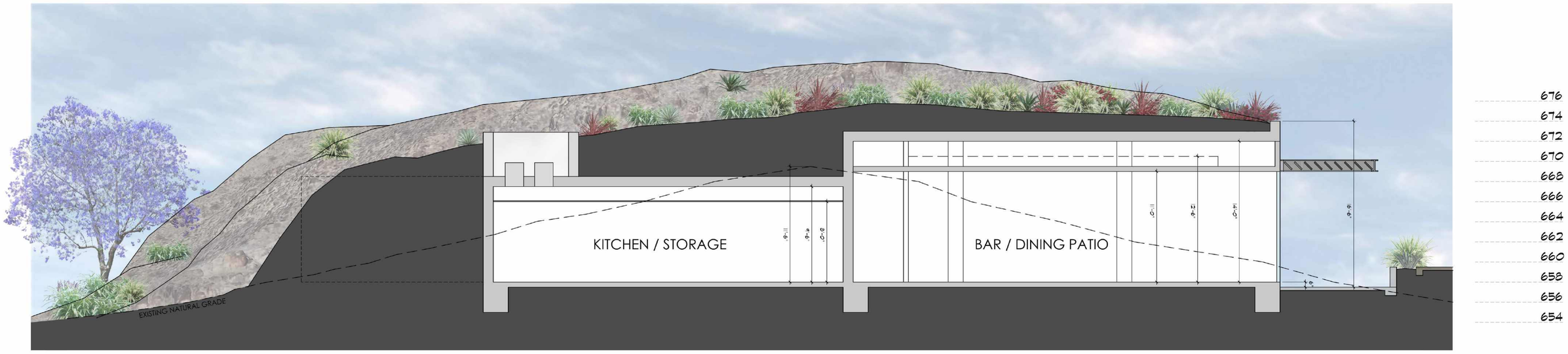
CITY OF RANCHO MIRAGE

CONCEPTUAL GRADING STUDY
FOR
RANCHO MIRAGE – RITZ II
RETAINING WALL PLAN & PROFILE
WALL – "F"

SHEET 15 OF 15




SOUTH ELEVATION




SECTION

# THE RITZ-CARLTON, RANCHO MIRAGE

Ritz Carlton
March 10, 2023

## SKY MESA ELEVATION & SECTION R-1.3

SCALE: 1/4" = 1'-0"

LCRA




# THE RITZ-CARLTON, RANCHO MIRAGE

## SKY MESA ROOF PLAN R-1.4

SCALE: 1/8" = 1'-0"

Ritz Carlton

March 10, 2023

LCRA

EXISTING HOTEL BLDG.

EXISTING CONSOLIDATED TRASH COLLECTION

EXISTING HOTEL BLDG.

EXISTING HOTEL BLDG.

EXISTING HOTEL BLDG.

GEO-MESH RETAINING WALL

A-1

B-12

B-11

B-15

B-13

B-10

B-8

B-7

B-6

B-5

B-4

B-3

B-2

B-1

B-9

B-14

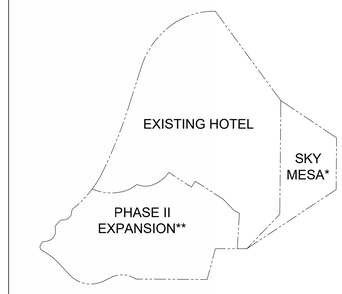
SECONDARY POOL AREA

POOL AREA

GEO-MESH RETAINING WALL

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

KEY PLAN




*SEE SHEET R-0.1 FOR MORE SITE INFO
**SEE SHEET C-0.1 FOR MORE SITE INFO

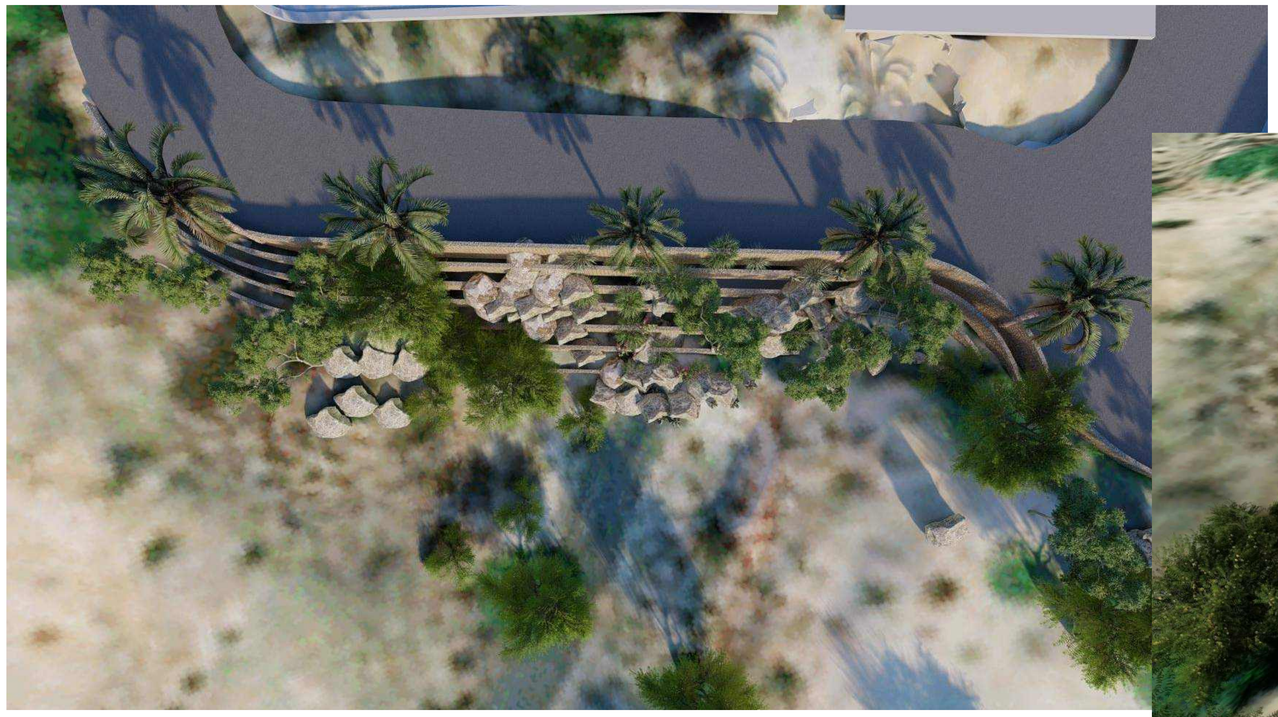
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

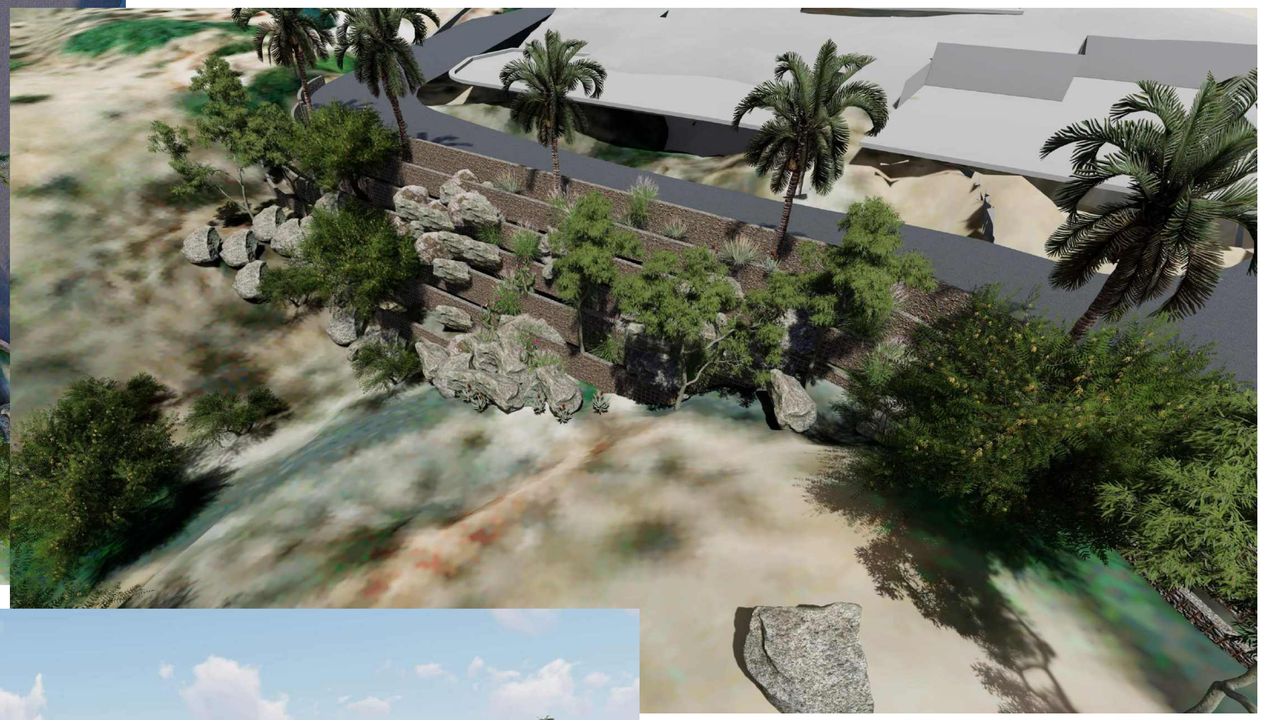
Ritz Carlton
March 10, 2023

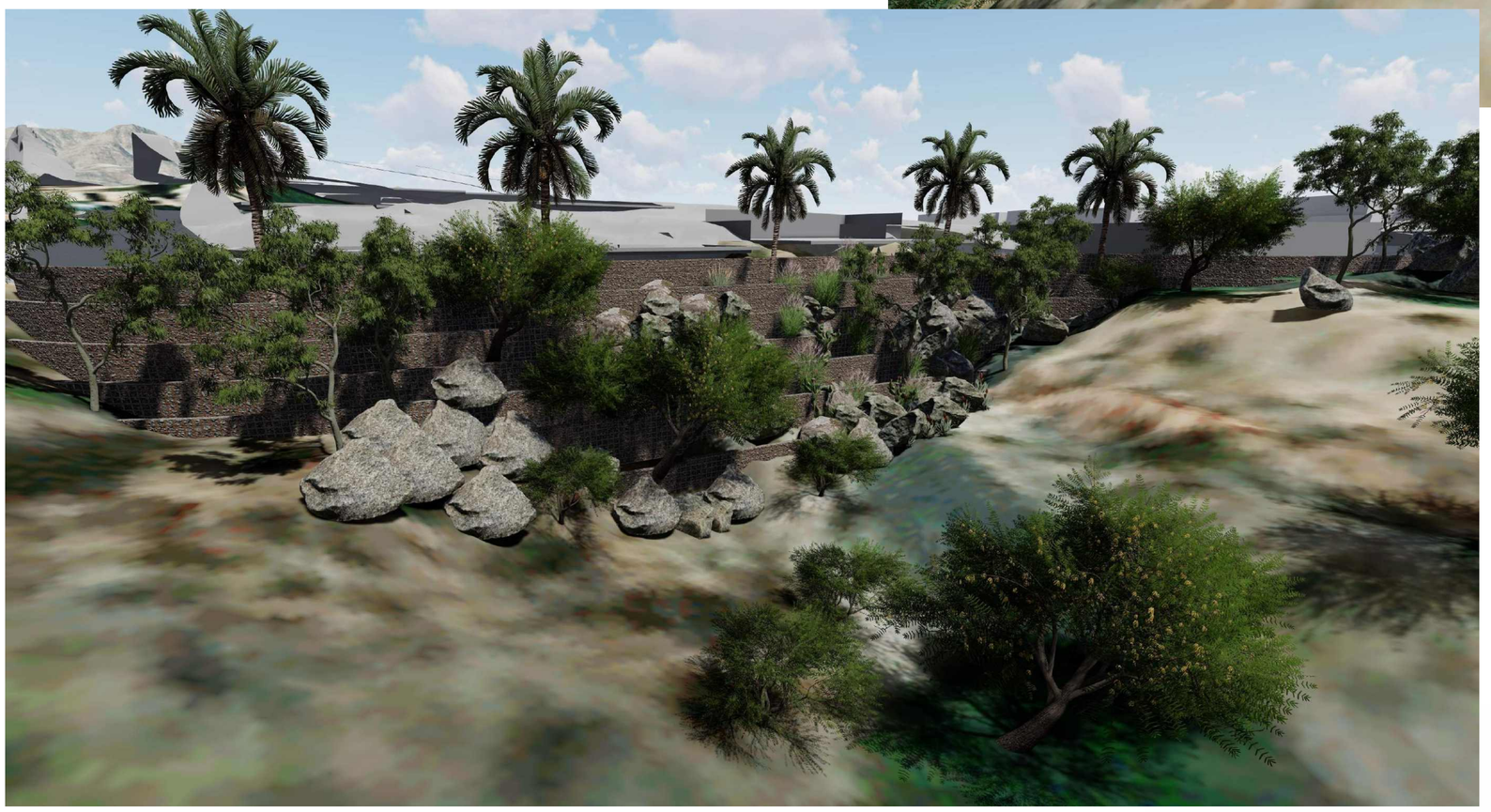
SITE PLAN AL.0.00

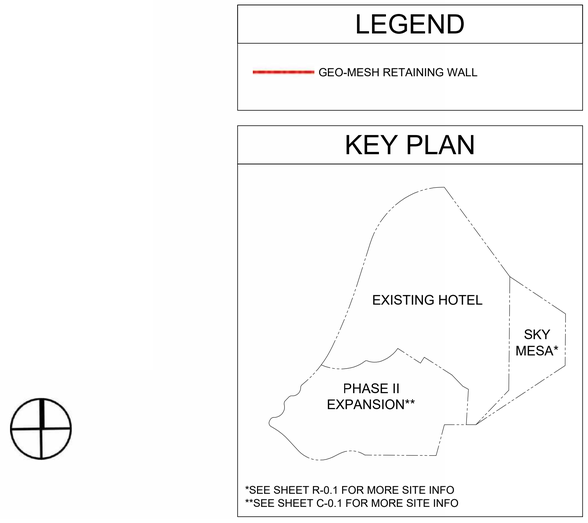
NOT TO SCALE

LCRA










# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## GEOMESH SITE PLAN GM.0.01

NOT TO SCALE

Ritz Carlton
March 10, 2023

LCRA



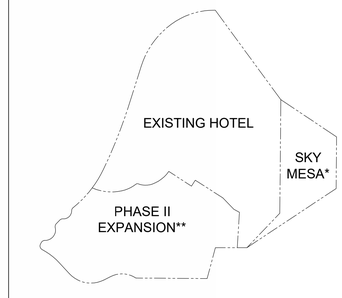




## LEGEND

GEO-MESH RETAINING WALL

## KEY PLAN




*SEE SHEET R-0.1 FOR MORE SITE INFO
**SEE SHEET C-0.1 FOR MORE SITE INFO

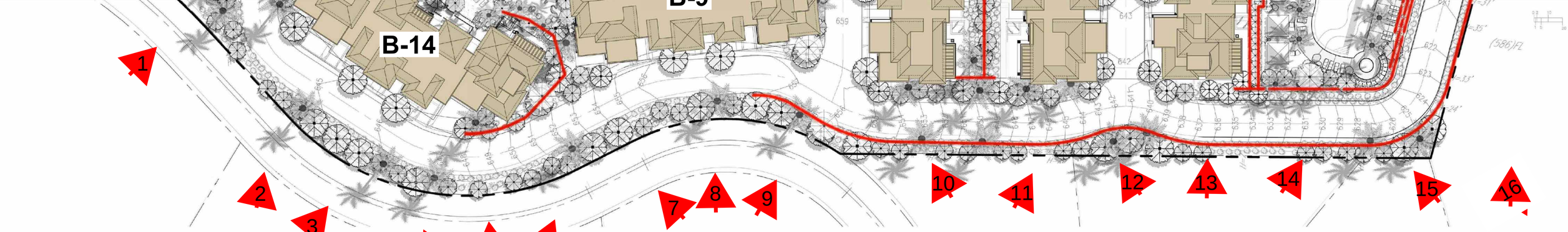
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

## GEOMESH SITE PLAN GM.0.02

NOT TO SCALE

Ritz Carlton
March 10, 2023

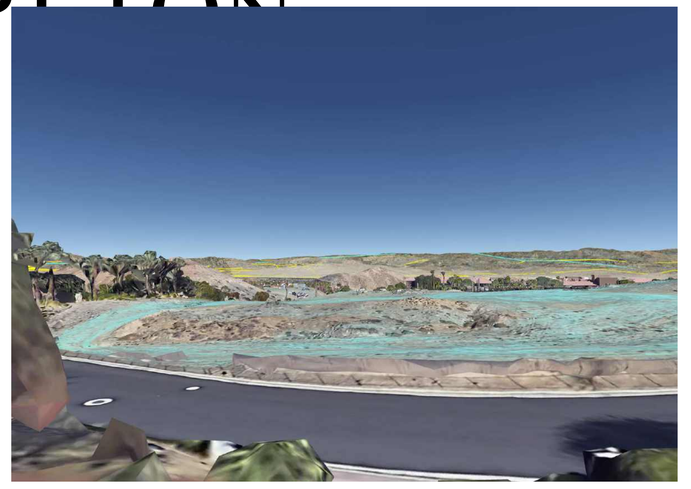
LCRA




# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE



1



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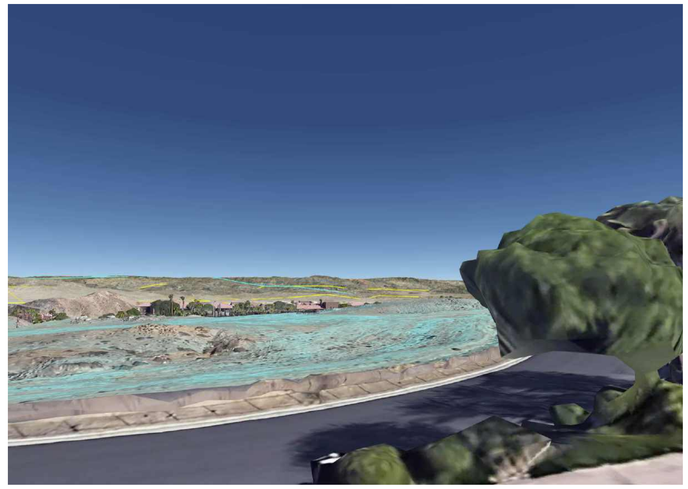

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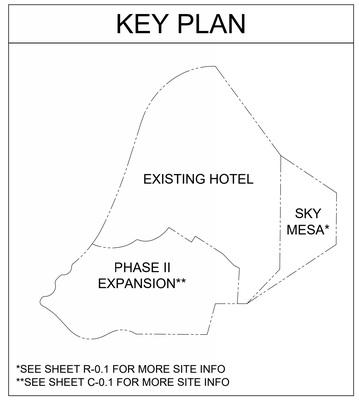
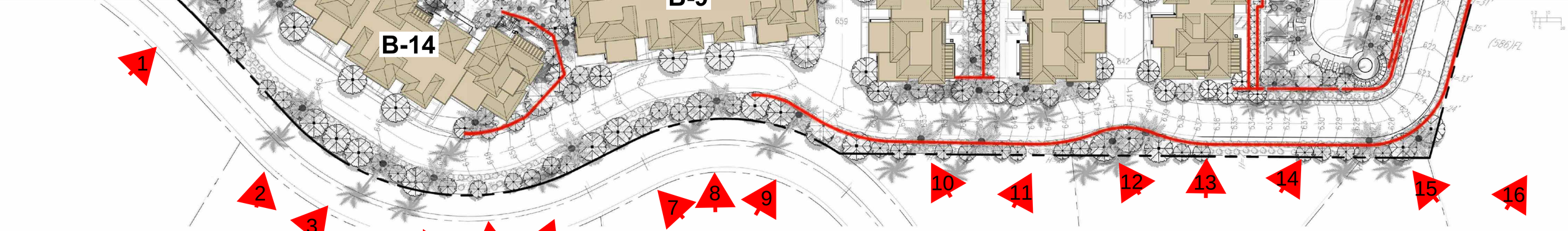



SITE VISUAL PLAN VS.0.01

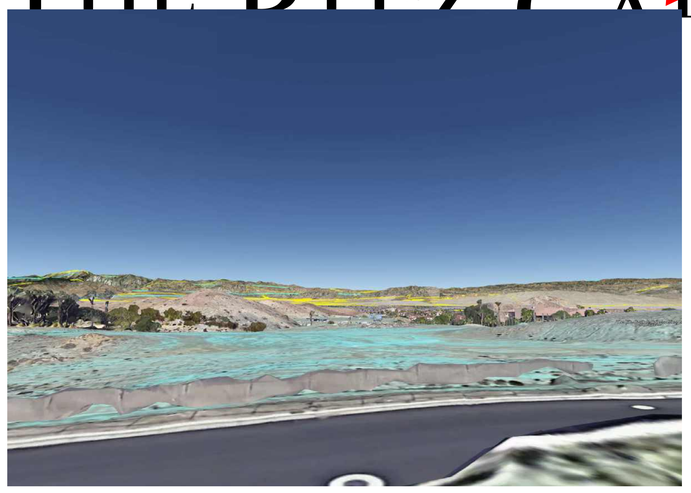
NOT TO SCALE

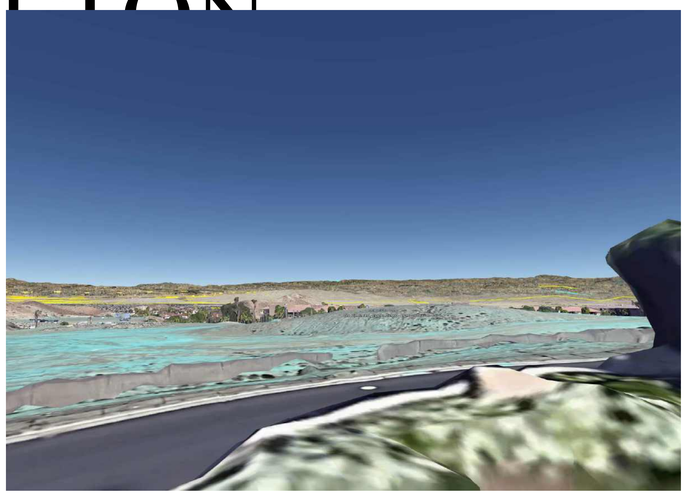
Ritz Carlton
March 10, 2023

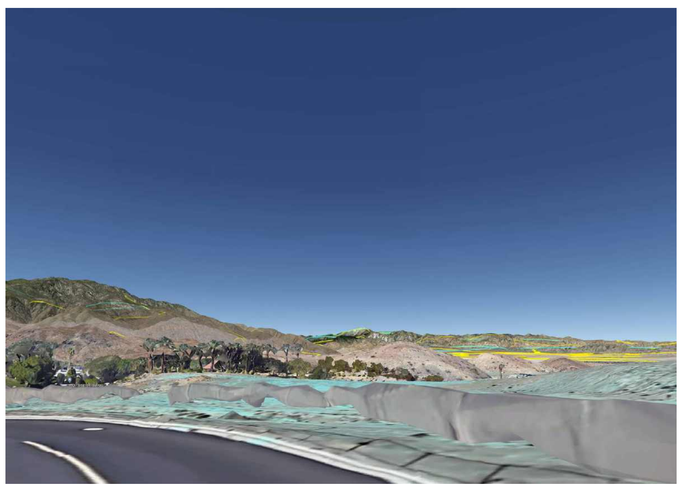
LCRA

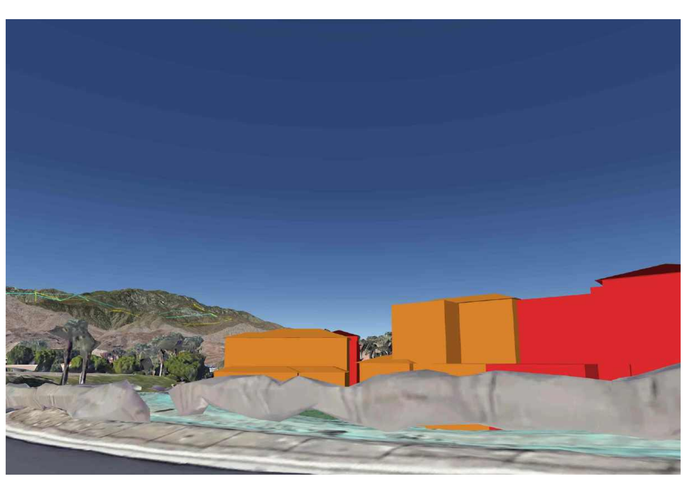



# THE RITZ-CARLTON









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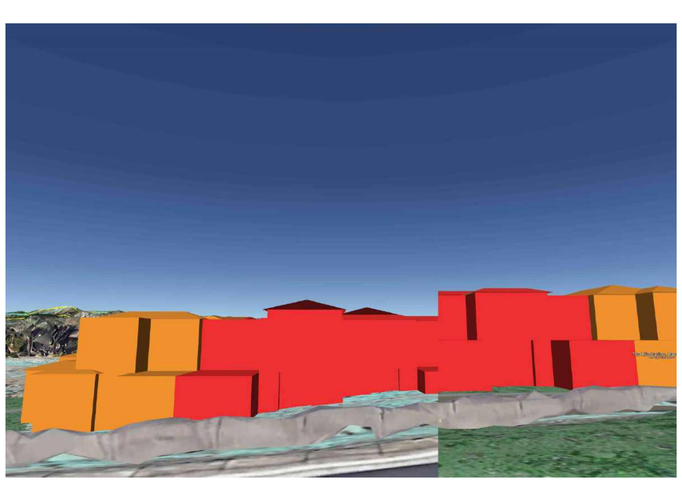

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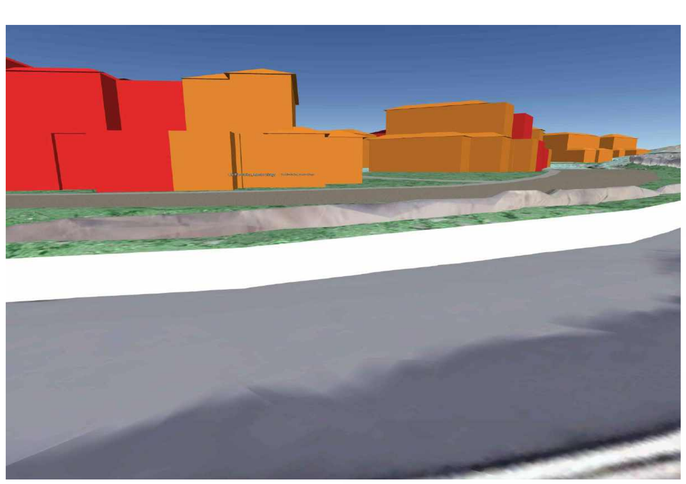
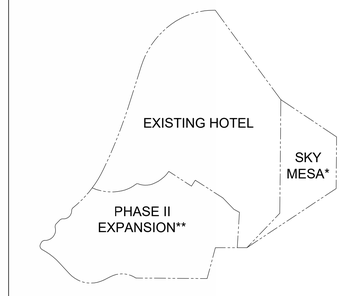


6

KEY PLAN




*SEE SHEET R-0.1 FOR MORE SITE INFO
**SEE SHEET C-0.1 FOR MORE SITE INFO

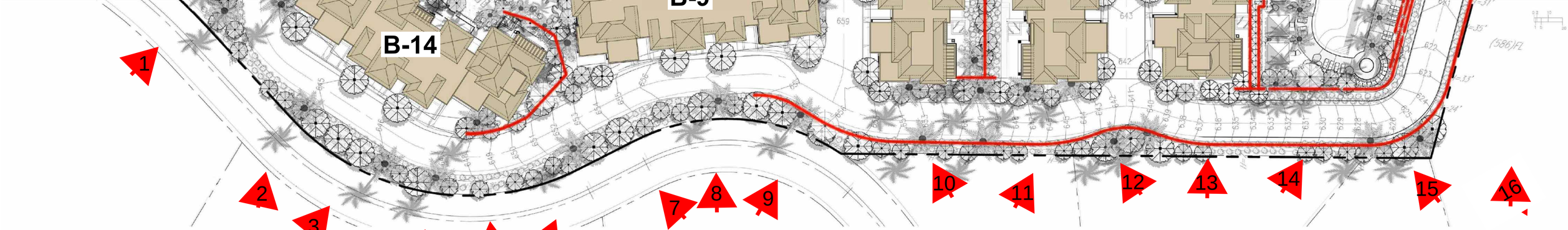
# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SITE VISUAL PLAN VS.0.02

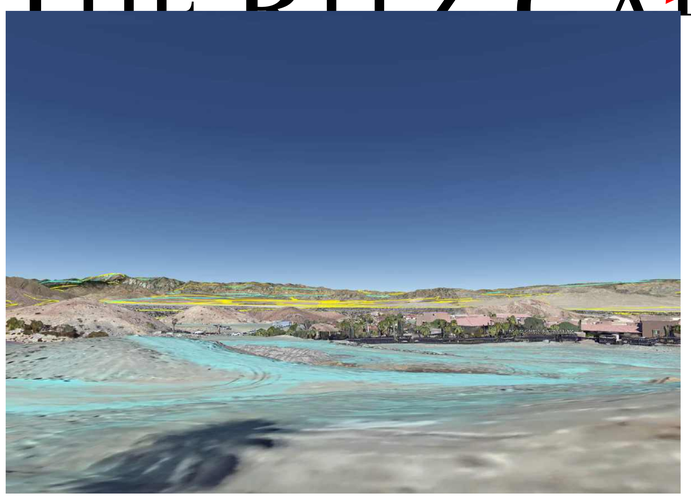
Ritz Carlton
March 10, 2023

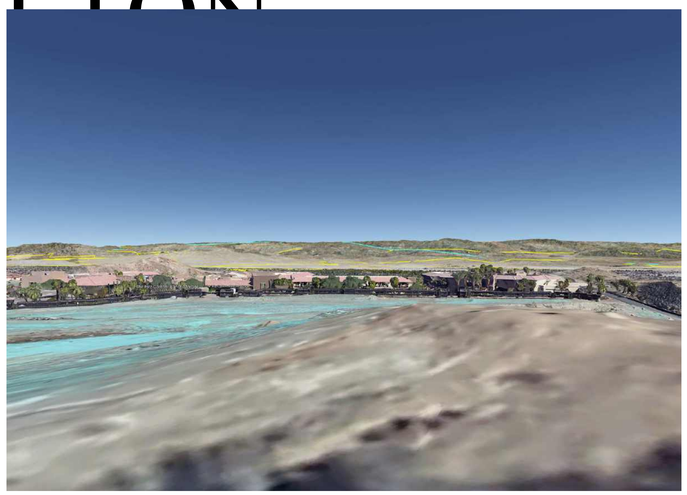
NOT TO SCALE

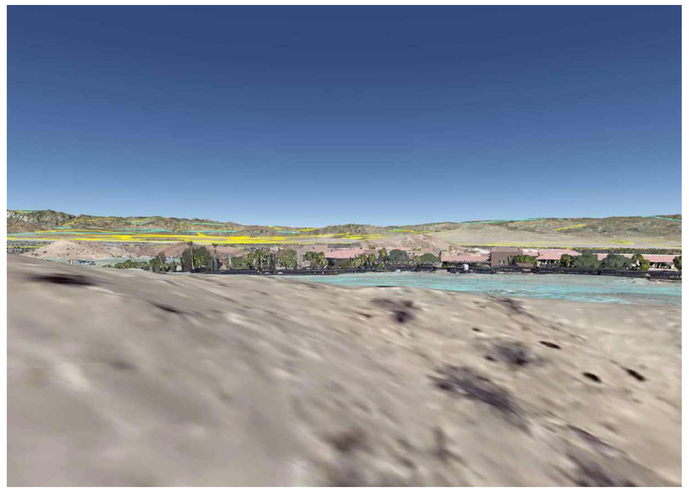
LCRA




# THE RITZ-CARLTON









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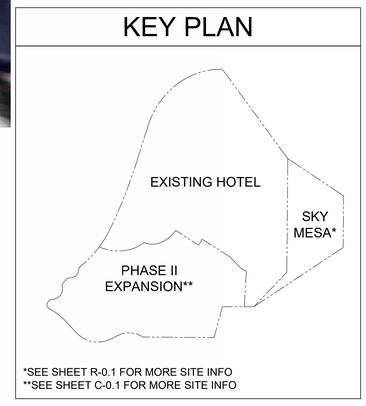



# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

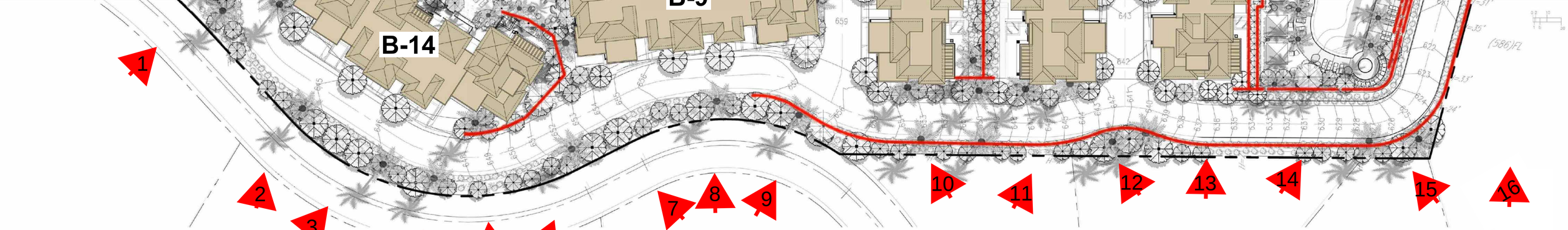
SITE VISUAL PLAN VS.0.03

NOT TO SCALE

Ritz Carlton

March 10, 2023

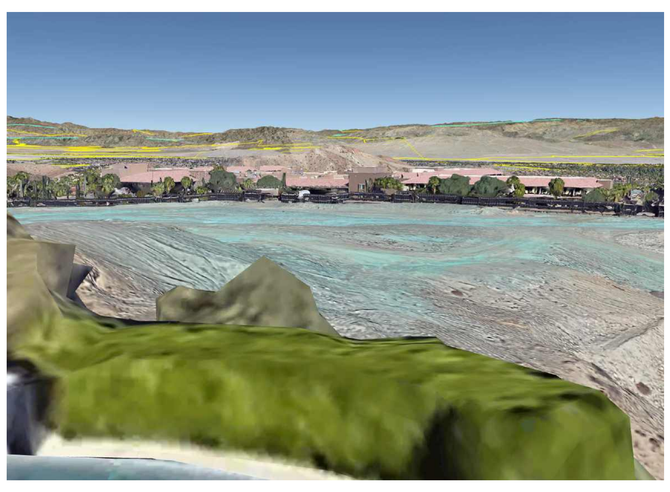
LCRA

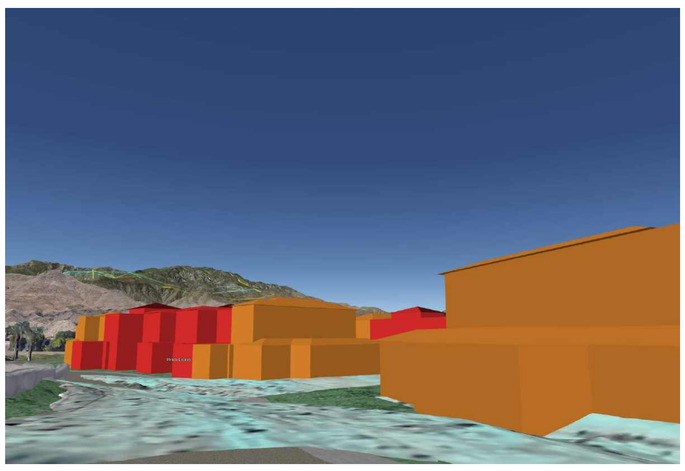



# THE RITZ-CARLTON









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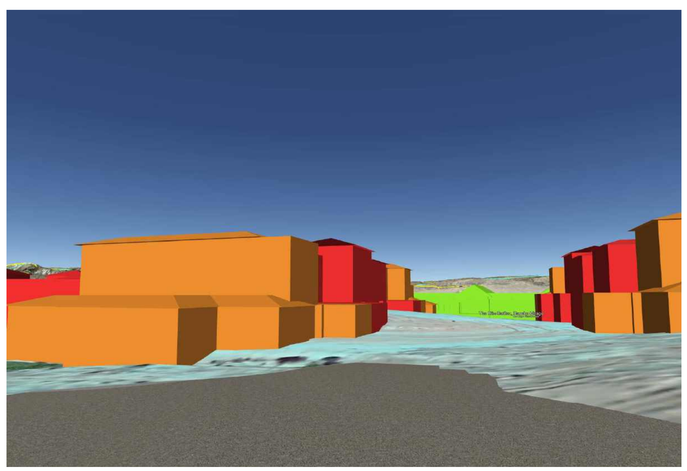

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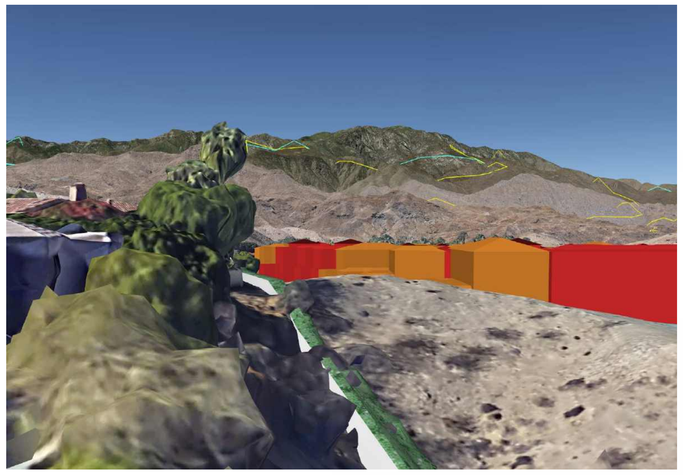

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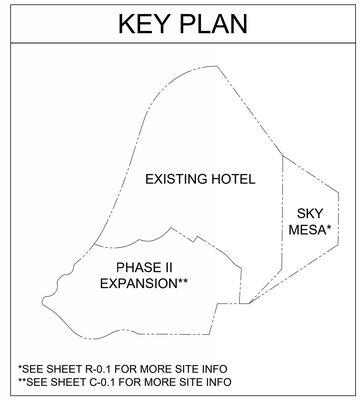


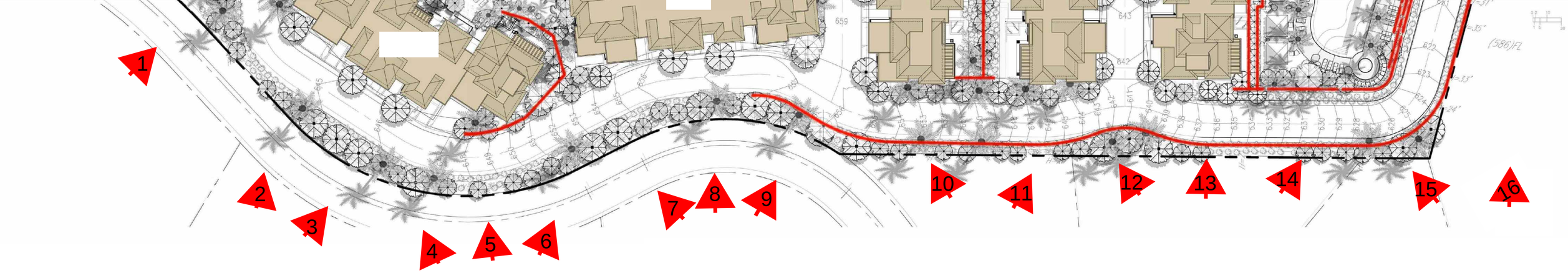

# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SITE VISUAL PLAN VS.0.04

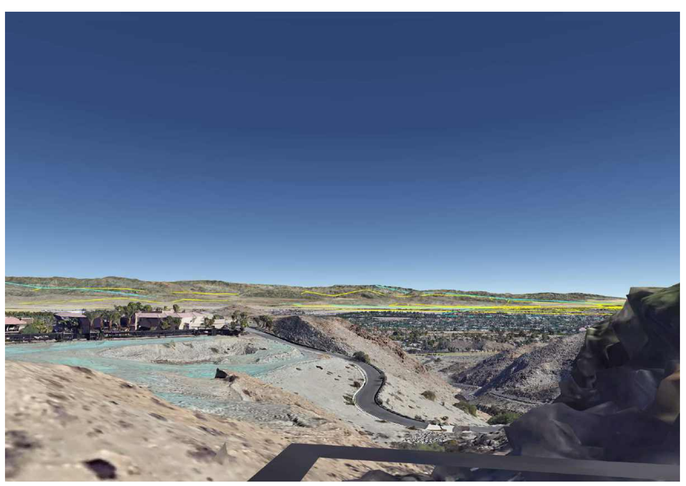
NOT TO SCALE

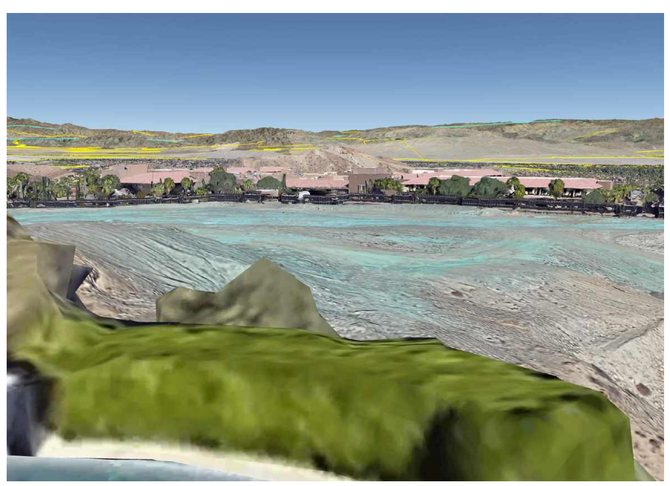
Ritz Carlton
March 10, 2023

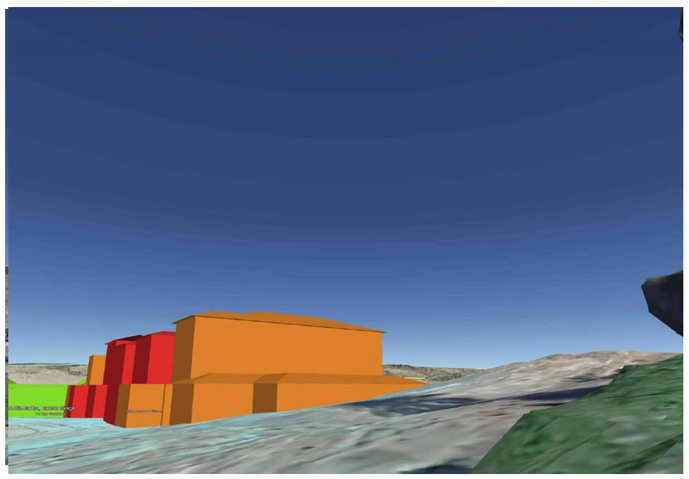
LCRA









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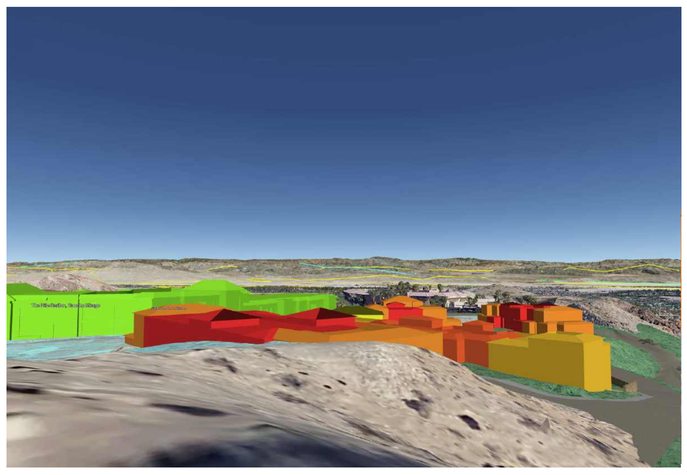

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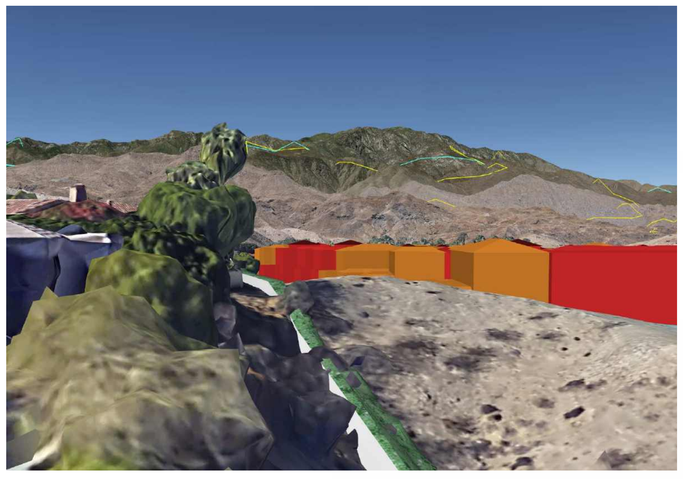

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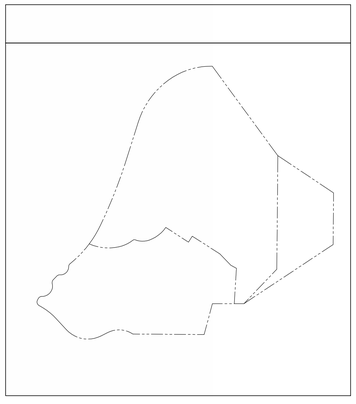
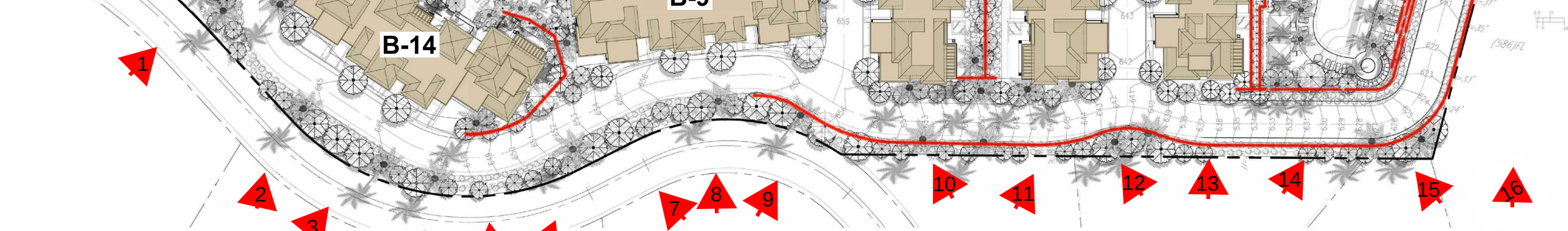


# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SITE VISUAL PLAN VS.0.05

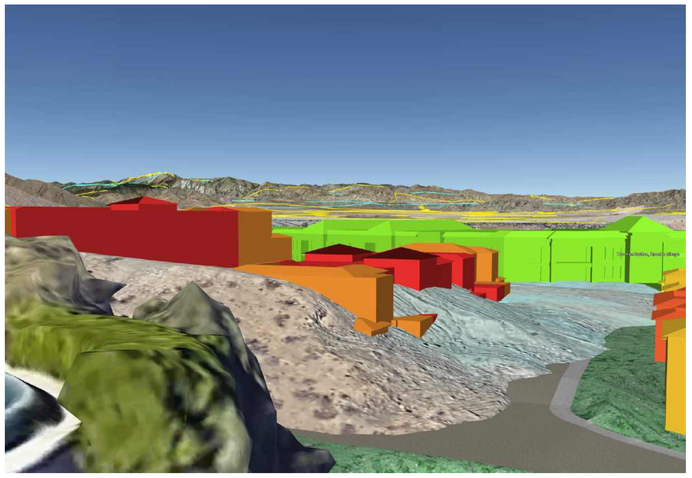
LCRA




# THE RITZ CARLTON







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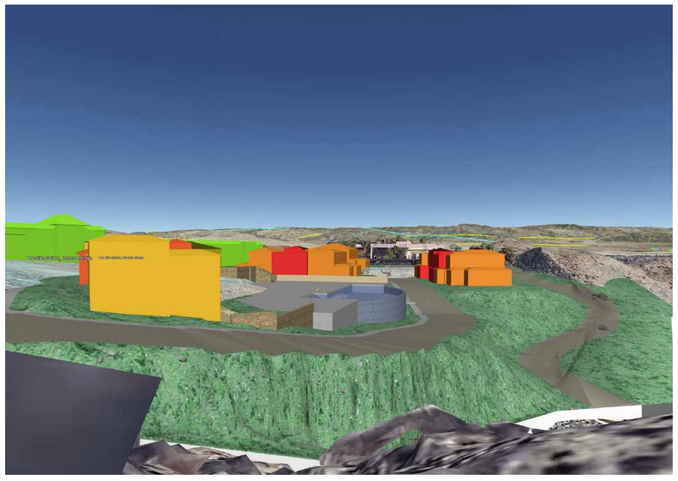

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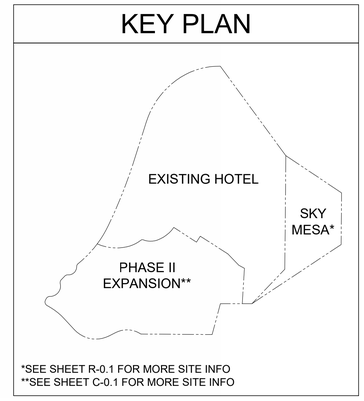


# THE RITZ-CARLTON RESIDENCES, RANCHO MIRAGE

SITE VISUAL PLAN VS.0.06

NOT TO SCALE

Ritz Carlton
March 10, 2023

LCRA

# Responses to Comment Letters Received for Public Hearing

The Draft MND was circulated for public review from March 11, 2024, through April 9, 2024, in accordance with Section 15105(a) of the California Environmental Quality Act (CEQA) Guidelines. The MND was recirculated from July 22,2024 to August 20, 2024. A total of eight written comment letters were received on the Draft MND from agencies, tribes, and organizations. Responses to these letters were included in the Final MND.

Prior to the Planning Commission Meeting for the approval of the Final MND (FMND), five comment letters were received. A list of these letters is shown in Table 1. Each of the written comment letters have been assigned an alphanumeric label, and the individual comments within each written comment letter are bracketed and numbered. For example, Comment Letter 01 contains one comment that is numbered 01-1. On January 9th, the Rancho Mirage Planning commission approved the FMND. Please note that these comment letters were received outside of the public review period. The purpose of the responses to these comments is to demonstrate that these issues were previously addressed in the FMND. Comment letters have been included as Appendix A.

### Table 1. Comment letters and Commenters

| Comment Letter | Commenter | Date Received |
|---|---|---|
| **Organization** | | |
| O1 | Western States Regional Council of Carpenters | January 9, 2025 |
| O2 | Californians Allied for a Responsible Economy | January 9, 2025 |
| **Individuals** | | |
| I1 | Dr. Deb Windham,<br>Dr Brian Herman (Chairman of Radiology at Eisenhower Medical Center)<br>Bob Greenbaum<br>Debbi Melman | January 6, 2025 |
| I2 | Dr. Deb Windham,<br>Dr Brian Herman (Chairman of Radiology at Eisenhower Medical Center) | January 6, 2025 |
| I3 | Drs Deb Windham and Brian Herman | January 2, 2025 |

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# Response to Comment Letter O1

Western States Council of Carpenters
January 9, 2025

**O1-1** The City acknowledges the comment as an introduction to comments that follow. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

**O1-2** The comment provides a summary of the project description and project location. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

**O1-3** The comment includes a brief history of the previous comments provided on the Draft MND by WRSCC and an introduction to the comments that follow regarding biological resources, cultural resources, noise, GHG emissions, energy use, and land use. Please refer to comments below addressing these topics.

**O1-4** The comment provides background information on the Western States Regional Council of Carpenters and an introduction to the comments that follow. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

**O1-5** The comment states that the project should require the use of a local workforce. Additionally, the comment states that these requirements would result in a decrease in GHG emissions and VMT.

The FMND analyzed the project's air quality, greenhouse gas, and transportation-related impacts in Section III, Air Quliaty, Section VIII, Greenhouse Gas Emissions; and Section XVII, Transportation. As discussed in these sections, the FND concluded that the project would result in less-than-significant impacts with regard to these resource topics (in the case of the project's transportation impacts, implementation of MM-TRA-1 and MM-TRA-2 are required to reduce the project's operation-related transportation impacts to less than significant). Because the project would not result in significant environmental impacts, no further mitigation is required per Section 15126.4(a)(3) of the CEQA Guidelines.

*This comment was previously addressed in Response to Comment O1-4 of the FMND.*

**O1-6** The comment makes general recommendations for the City to adopt training, certification, and safe on-site construction work practices for construction workers on any developments within the City's General Plan Area. The comment also recommends that the project include construction site designs, testing, and planning practices to prevent community spread of COVID-19 and other infectious diseases. COVID-19 is a topic outside the purview of CEQA and CEQA requires the evaluation of potential physical environmental impacts of the project on the environment. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

*This comment was previously addressed in Response to Comment O1-5 of the FMND.*

**O1-7** The comment states that the project must be approved by a two-thirds vote of the Rancho Mirage electorate in addition to the City. The comment states that the intention is to make ensure that proper approval procedures are followed. The project site is located on private land adjacent to the Santa Rosa

and San Jacinto Conservation Areas. The project site is not considered mountainous lands and would not require the project to be approved by a two-thirds vote of the electorate. As discussed in the FMND, the Sky Mesa Recreational Area is the portion of the project that is on the area zoned as Mountain Reserve and the applicant is proposing an amendment to the City's General Plan and Zoning Map that would rezone the Sky Mesa Recreational Area as Resort Hotel. Appendix G land use threshold b) asks if the project would "(c)ause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect". Conflict with the general plan designation and zoning code does not inherently result in a significant environmental impact. As concluded in the FMND, the project would not result in any significant impacts as a result of the change in land use and zoning.

*This comment was previously addressed in Response to Comment O1-20 of the FMND.*

**01-8** The comment provides background information on Environmental Impact Reports under CEQA. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

**01-9** The comment provides background information on Initial Studies, Negative Declarations, and Mitigated Negative Declarations under CEQA. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

**01-10** The comment is an introduction to general comments stating that the project is required to prepare an EIR for the project. The comment states that the FMND fails to support all of its findings with sufficient analysis and substantial evidence and fails to incorporate mitigation measures. The commenter incorrectly identifies the acreage and square footage of buildings identified in the FMND project description, see Chapter 1, Project Description. The comment also states that the project will have a significant impact on the environment and an EIR is required. The project will not have a significant effect on the environment with the proposed mitigation measures, as discussed in the FMND and therefore an EIR is not required.

**01-11** The comment states that the mitigation measures in the FMND fail to adequately analyze or mitigate the project's impacts and are improperly deferred, so an EIR is required. The FMND includes specific mitigation measures that reduce impacts to less than significant, therefore, an EIR is not required. The detailed concerns about the adequacy of mitigation measures are addressed in Responses to Comments O1-12 through O1-21.

**01-12** The comment provides background on significant effects under CEQA. The comment states that the FMND fails to provide analysis on the project's biological resource impacts and the FMND cannot conclude that the proposed mitigation measures will reduce biological resource impacts to less than significant without first conducting field surveys and subsequent analysis. The comment states that the project should be subject to a more comprehensive EIR review due to the potential occurrence of special-status species. The comment also states that at a minimum, pre-construction biological surveys specifications should be disclosed as part of the proposed mitigation measures.

As discussed in the *Biological Resources Assessment* dated *February 21, 2022*, the general reconnaissance surveys conducted provide an accurate representation of the potential for special-

status species to occur. The *Biological Resources Assessment* describes the existing conditions of special-status biological resources on the project site (proposed project footprint) and within a 500-foot buffer where access was granted (study area), quantifies impacts to special-status biological resources that would result from implementation of the project and describes those impacts in terms of biological significance under both CEQA and compliance with the CVMSHCP, and provides recommended avoidance, minimization, and mitigation measures to avoid and reduce impacts to special-status biological resources, if necessary. A species' potential to occur is decided by determining whether the project site and surrounding area include suitable habitat for that species as documented during the site visit, as well as a review of know/documented occurrences of that species as kept in the CDFW CNDDB database. A combination of these factors goes into generating the low, moderate, high or not expected potential to occur of the species. The species with potential to occur were not incidentally detected during the June 2021 survey and focused species surveys are not required by CEQA to assess the impacts to species with the potential to occur. The FMND includes MM-BIO-1, which would ensure consistency with the CVMSHCP which would mitigate impacts to CVMSHCP covered species, including the Peninsular bighorn sheep and burrowing owl to less than significant without the need for focused surveys. For species not covered under the CVMSHCP, such as the red diamondback rattlesnake, impacts would still be reduced to less than significant with the implementation of MM-BIO-2, construction best management practices. The FMND already includes pre-construction surveys for nesting birds under MM-BIO-3 and burrowing owls identified under MM-BIO-4. With the inclusion of these mitigation measures, the project would have a less than significant impact to biological resources and an EIR is not required.

*This comment was previously addressed in Response to Comment O1-11 of the FMND.*

**O1-13** The comment states that the language of MM-CUL-1 does not include pre- construction training for construction workers to be able to initially identify cultural resource and/or human remains and that the previous response to comments misunderstood WQRSCC's original point. Because of this, the comment states that the analysis as related to cultural resources is inadequate. The comment requests that MM-CUL-1 and MM-CUL-2 at a minimum be revised to adequately mitigate potential significant impacts to cultural resources.

Impacts to cultural resources would be less than significant with the application of MM-CUL-1 and MMCUL-2. Additional mitigation measures are not necessary. Additionally, pre-construction training for construction workers to properly identify sensitive cultural resources or human remains is not specifically required by CEQA. Nonetheless, the role of the construction personnel is to contact the qualified archeologist, Native American Monitor, or the County Coroner in the cases of potential discovery. It is not the role of construction personnel to make final determinations.

*This comment was previously addressed in Response to Comment O1-12 of the FMND.*

**O1-14** The comment states that an EIR must be prepared because the project may have a significant noise impact. The comment states that the FMND fails to measure ambient noise levels near the most sensitive receptors at the southern edge of the project and that the three measurement locations (L1, L2, and L3) are inadequate.

As discussed in the FMND, noise impacts are less than significant and an EIR is not required. Also as discussed in the FMND, noise measurement locations were chosen using Caltrans and FTA guidance. The recommended approach is to characterize the noise environment for clusters of sites based on the measures or estimates at representative locations in the community and the monitored levels are only used to estimate the general ambient noise levels in the area. The impact determination is based on predicted noise levels and the residential communities to the south of the project site (represented by locations R3 to R8) were analyzed using the appropriate prediction methodology. The calculated values at these locations (not the monitored locations) were used to evaluate the potential impacts.

*This comment was previously addressed in Response to Comment O1-13 of the FMND.*

**O1-15** The comment states that the FMND incorrectly concludes that there will be no significant impact to sensitive receptors and uses the 85 dBA identified in NIOSH Occupational Noise Exposure as the threshold for significant impact. The comment notes that NIOSH Occupational Noise Exposure does not provide an adequate threshold to assess external noise levels for private property. The analysis has been updated to include the FTA criteria, for which the limit would be 80 dBA Leq for residential properties, assuming there would be no nighttime construction. As identified in Table 13-3 of the FMND, the highest predicted construction noise level at any noise sensitive receptor is 70.3 dBA Leq. As stated in section 13.2 of the FMND, construction of the project would be restricted to the daytime hours between 7 am and 6 pm. Since there will be no nighttime construction activities, this complies with the FTA limit. The 15 dBA increase criterion is not relevant to construction noise. The adequacy of the survey locations is addressed in Response to Comment O1-14.

*This comment was previously addressed in Response to Comment O1-14 of the FMND.*

**O1-16** This comment identifies FTA Transit Noise and Vibration Impact Assessment as the preferred assessment for evaluating noise impacts on sensitive receptors. The comment notes that the FTA Transit Noise and Vibration Impact Assessment states that any noise increase of 15 dBA or greater for a residence is considered a severe impact. The comment states that the selected survey locations, although inadequate, have the potential to exceed thresholds using FTA standards and have a significant noise impact. The comment states that MM-NOI-1 would have little to no mitigating effect on the exposure of nearby sensitive receptors to overall project construction noise and should include provisions for noise barriers near the southern edge of the project. The comment calls for at least a revised FMND with updated mitigation measures if a full EIR is not prepared.

The analysis has been updated to include the FTA criteria, for which the limit would be 80 dBA Leq for residential properties, assuming there would be no nighttime construction. As identified in Table 13-3 of the FMND, the highest predicted construction noise level at any noise sensitive receptor is 70.3 dBA Leq. As stated in section 13.2 of the FMND, construction of the project would be restricted to the daytime hours between 7 am and 6 pm. Since there will be no nighttime construction activities, this complies with the FTA limit. The 15 dBA increase criterion is not relevant to construction noise.

MM-NOI-1 does not deal with noise and it only deals with construction vibration. Noise impacts are less than significant and additional mitigations and an EIR are not required. Implementation of MM-NOI-1 will reduce the impact of ground-borne vibration to be less than significant as intended. Other mitigation measures for ambient or ground-borne noise are not proposed because these impacts are less than

significant and mitigation is not required. Please refer to Response to Comment O1-14 regarding survey locations.

*This comment was previously addressed in Response to Comment O1-14 of the FMND.*

**O1-17** The comment states that additional measures are necessary to reduce operational GHG emissions and energy use. The comment states that the FMND is not consistent with the GBC, noting the lack of EV vehicle accommodation. The comment states that because this analysis is missing, the FMND conclusions regarding significance of impacts are flawed. The comment also states that project has the potential to result in significant impacts in the form of GHG emissions and conflicting with the 2022 CARB Scoping Plan and GBC because the project would not construct EVCS while proclaiming compliance. Additionally, the comment states that the FMND is missing an analysis of energy use and GHG emissions impacts with and without EVCS infrastructure, which results in a potentially significant impact and requires an EIR.

As identified in the FMND, the project's operation is considered more in line with a commercial hotel use than a traditional residential project, as the 106 residential suites would be treated as a condo hotel in which residents are allowed to live at the residence only during a specified time frame. As such, the CARB Scoping Plan recommendations for residential and mixed-use projects are not appropriate. Nevertheless, many of the measures and programs included in the Scoping Plan would result in the reduction of project-related GHG emissions with no action required at the project-level, including GHG emission reductions through increased energy efficiency and renewable energy production (SB 350), reduction in carbon intensity of transportation fuels (LCFS), and the accelerated efficiency and electrification of the statewide vehicle fleet (Mobile Source Strategy).

The commenter incorrectly states that because the CARB requirements are deemed not appropriate, the project would be relieved of the GBC EVCS requirements. The FMND states that the project would provide EV charging infrastructure that meets the California GBC. Further analysis of the impact of EV charging infrastructure is not required in the GHG analysis as the project would comply with California GBC and GHG impacts would be less than significant. Because impacts are less than significant, mitigation and EIR are not required. The detailed engineering project specifications and how the project meets all the applicable requirements of the GBC will be specified in the City building permit plan review and the City's departmental review will ensure compliance with GBC regulations and requirements. As such, the commenter incorrectly states that "under the current framework in the MND, the Applicant could very well construct no EVCS's whatsoever in connection with the Project…" The project will meet the requirements of GBC.

*This comment was previously addressed in Response to Comment O1-16 of the FMND.*

**O1-18** The commenter states that the FMND lacks comparative analysis of energy use and GHG emissions with and without EVCs infrastructure and claims that it would require an EIR. Please refer to Response to Comment O1-17.

*This comment was previously addressed in Response to Comment O1-16 of the FMND.*

**01-19** The comment provides background on general plans in California. The comment states the analysis regarding rezoning on significance of impact is flawed. The comment states that the biological mitigation measures do not adequately mitigate potential impacts associated with rezoning Mountain Reserve Land to Resort/Hotel use. The comment states that the only way for the rezoning impacts to be properly mitigated to less than significant is if the project creates protections for other natural lands multiple times larger than the Mountain Reserve Land targeted for development.

As discussed in the FMND, the Sky Mesa Recreational Area is the portion of the project that is on the area zoned as Mountain Reserve and the applicant is proposing an amendment to the City's General Plan and Zoning Map that would rezone the Sky Mesa Recreational Area as Resort Hotel. Appendix G land use threshold b) asks if the project would "(c)ause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect". Conflict with the general plan designation and zoning code does not inherently result in an environmental impact. As discussed in FMND Section 11.2, the project and associated discretionary actions associated with the General Plan and Zoning Map amendment, the project would not conflict with the City's land use policies, including protecting sensitive species with the incorporation of biological resource mitigation measures, and therefore does not require further mitigation. Further, if approved, it would be consistent with the general plan land use designation and zoning of the site.

*This comment was previously addressed in Response to Comment O1-17 of the FMND.*

**01-20** The comment states that project requires significant revisions and resolutions of evidence which at least calls for a revision and recirculation of the FMND if it does not prepare an EIR. The comment further states that the FMND includes significant changes to the proposed mitigation measures and includes additional impact studies. CEQA Guidelines Section 15073.5 provides the legal criteria that a lead agency is to consider when deciding whether it is required to recirculate the FMND. Recirculation is required when the document must be substantially revised after public notice of its availability. A substantial revision is defined as a new, avoidable significant effect where mitigation measures or project revisions must be added to reduce the effect to insignificant (CEQA Guidelines Section 15073.5(b)). Revisions made resulting from comments received during the public review period are not considered substantial revisions to the RMND. The updated analysis does not change the impacts of findings of the FMND Rather, new information is added to the FMND which merely clarifies, amplifies, or makes insignificant modification, which does not require Recirculation of the FMND per CEQA Guidelines Section 15073.5(c)(4). Additionally, potential impacts are less than significant with the mitigation measures proposed and an EIR is not required.

*This comment was previously addressed in Response to Comment O1-18 of the FMND.*

**01-21** The comment provides background information on project descriptions. The comment requests that the project include an adequate project description with the details listed in CEQA Guidelines Section 15124.

Section 15071 of the CEQA Guidelines provides the minimum requirements for an Initial Study and Negative Declaration or Mitigated Negative Declaration. Among these requirements are a brief description of the project, including a commonly used name for the project, if any; and the location of

the project, preferably shown on a map, and the name of the project proponent., Additional guidance regarding the contents of an EIR's project description is provided in Section 15124 (According to Section 15124, a project description shall reflect the specifics of the project, the project site, and its surroundings, but should not provide extensive detail beyond that needed for evaluating environmental impacts. Section 15124 provides the requirements for an EIR, not an FMND. However, the project Description section of the FMND includes a detailed description of the project, the project site and its surroundings, and the anticipated operational and construction characteristics of the project. The narrative project description and accompanying figures meet the specifications required by the CEQA Guidelines and provide sufficient detail to evaluate environmental impacts.

*This comment was previously addressed in Response to Comment O1-19 of the FMND.*

**O1-22** The comment provides concluding remarks and summarizes the recommendations identified earlier in the comment letter. These recommendations are addressed in Responses to Comments O1-3 through O1-19.

**O1-23** The comment provides an introduction and how they provide a report to discuss the significance of worker trips on GHG emissions and the potential for local hire to reduce travel and associated emissions. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

*This comment was previously addressed in Response to Comment O1-22 of the FMND.*

**O1-24** The comment provides background information on CalEEMod and how it is used to calculate VMT and quantify GHG Emissions, and states that vehicle running emissions can be reduced by decreasing overall trip length, by local hire or otherwise. The comment explains how local hire requirements and associated worker trip length reductions impact GHG calculations using CalEEMod. The comment assumes that the efficacy of a local hire requirement is dependent on the urbanization of the project site as well as the location. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

*This comment was previously addressed in Response to Comment O1-22 of the FMND.*

**O1-25** The comment uses the City of Claremont as an example of the impact of a local hire requirement on construction-related GHG emissions. The example project GHG emissions associated with construction work trips would decrease if a local hire provision with a 10-mile radius was implemented, but the comment states that this example does not indicate that local hire requirements would result in reduced construction-related GHG emissions for all projects. The comment does not identify specific issues with the adequacy of the FMND. No further response is required. Also, as discussed in the FMND, VMT and GHG impacts were determined to be less than significant with. No mitigation measures are required.

*This comment was previously addressed in Response to Comment O1-23 of the FMND.*

**O1-26** The comment is a disclaimer and provides concluding remarks. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**01-27** The comment includes Attachment A for Exhibit A. The comment includes supporting Air Basin and Specific Plan data for Exhibit A. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

*This comment was previously addressed in Response to Comment O1-25 of the FMND.*

**01-28** The comment includes Attachment B for Exhibit A. The comment includes Specific Plan data for Exhibit A. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

*This comment was previously addressed in Response to Comment O1-25 of the FMND.*

**01-29** The comment includes Attachment C for Exhibit A. The comment includes the change in emissions when using a local hire provision. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

*This comment was previously addressed in Response to Comment O1-25 of the FMND.*

**01-30** The comment includes the resume of Paul Rosenfeld and Matthew F. Hagemann. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

*This comment was previously addressed in Response to Comment O1-26 and O1-27 of the FMND.*

**01-31** The comment includes the Transit Noise and Vibration Impact Assessment Manual from the Federal Transit Administration as supporting information for the comment letter. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

*This comment was previously addressed in Response to Comment O1-28 of the FMND.*

**01-32** The comment includes the Conservancy Territory Map for Coachella Valley Mountain Conservancy as supporting information for the comment letter. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

*This comment was previously addressed in Response to Comment O1-29 of the FMND.*

**01-33** The comment includes the Land Use and Zoning Map for the City of Rancho Mirage as supporting information for the comment letter. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

*This comment was previously addressed in Response to Comment O1-30 of the FMND.*

# Response to Comment Letter O2

**Californians Allied for a Responsible Economy**
**January 9, 2025**

**O2-1** The City acknowledges the comment as an introduction to comments that follow. No further response is required.

**O2-2** The comment states that the MND was circulated for public review from March 11, 2024, though April 9, 2024, and recirculated from July 22, 2024, to August 2024, that Care CA has previously submitted comments stating that the project would have potentially significant impacts related to public health, air quality, energy, and transportation. The comment summarizes comments to follow. The detailed concerns are addressed in Responses to Comments O2-7 through O2-21.

**O2-3** The comment states the FMND fails to address the previous flaws in the MND identified by CARE CA's prior comments weren't addressed related to health risk impacts, noise impacts, energy, and transportation. The detailed concerns are addressed in Responses to Comments O2-7 through O2-21.

**O2-4** The comment states the project may result in a significant effect on the environment, concluding that the MND does not comply with CEQA and states that an EIR is required. As discussed in the FMND, the project will not have a significant effect on the environment with the proposed mitigation measures, therefore an EIR is not required. The detailed concerns are addressed in Responses to Comments O2-7 through O2-21.

**O2-5** The comment provides an introduction to CARE CA. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O2-6** The comment provides background information regarding CEQA and the requirements for an EIR and MND. The comment states that there is evidence that the project may result in potentially significant impacts related to noise, health risk, air quality, energy, and transportation, calling for an EIR. Please refer to Response to comment O2-4. The detailed concerns about the adequacy of analysis and mitigation measures are addressed in Responses to Comments O2-7 through O2-20.

**O2-7** The comment summarizes the noise conclusions of the FMND and states that the 85 dBA threshold was developed as a threshold for hearing loss and failed to account for ambient noise levels. The comment further states that the new threshold used in Appendix E-2 was not included in the FMND.

Additional analysis updated to include the FTA criteria in Appendix E-2 of the FMND, for which the limit would be 80 dBA Leq for residential properties, assuming there would be no nighttime construction. While the FMND was not revised to include this threshold in the noise analysis the it was determined in Appendix E-2 of the FMND that the project would still meet the 80 dBA threshold. Futher, as identified in Table 13-3 of the MND, the highest predicted construction noise level at any noise sensitive receptor is 70.3 dBA Leq. As stated in section 13.2 of the MND, construction of the project would be restricted to the daytime hours between 7 am and 6 pm. Since there will be no nighttime construction activities, this complies with the FTA limit. The 15 dBA increase criterion is not relevant to construction noise.

*This comment was previously addressed in Response to Comment O1-14 of the FMND.*

**02-8** The comment summarizes the conclusion of Appendix E-2 and states that the construction activities are barely below threshold and states that the analysis underestimates the construction noise impacts.

The comment mistakenly compares the reference noise levels (included in Table 1 of Appendix E-2) with modeled noise levels associated with project construction activities (included in Table 2 of Appendix E-2). Additionally, the comment appears to misstate the potential noise level increase of 31 dBA over the ambient noise levels by adding noise levels together. In the report, the reference noise levels are used in a model to represent several crews working simultaneously throughout the site to provide the most realistic and accurate evaluation of construction noise impacts.

**02-9** The comment states that noise impacts would be higher if blasting was required. The comment further states that the geotechnical report stated that blasting could be required during construction. The comment acknowledges that response to comment 05-13 states that blasting is not proposed but the response did not contain analysis contradicting the geotechnical report.

The Geotechnical Feasibility Report addressed the preliminary findings and recommendations for the proposed site and states that "heavy-duty may be feasible, blasting could be necessary for deeper cuts" Since the preparation of the Geotechnical Feasibility Report, project plan has a higher level of design and the project would not include blasting as part of the project.

*This comment was previously addressed in Response to Comment 05-13 of the FMND.*

**02-10** The comment states that the Appendix E-2 states that a significant impact would occur if construction noise would exceed an 80 dBA maximum or increases in noise levels by 20 dBA. The comment states that an increase of 10 dB causes a doubling of perceived loudness and a 10-fold increase in sound level could result in significant impacts. The comment states that for 20 dBA, noise would be four times louder, and 100 times increase in sound level.

The reference to the 10 dB increase being significant is to the City of Los Angeles, CEQA Thresholds Guide, pg. I.1- 3, available at: https://planning.lacity.gov/eir/CrossroadsHwd/deir/files/references/A07.pdf. However, in August 2024, the City of Los Angeles released the *Construction Noise and Vibration Updates to Threshold and Methodology*, which states, after considerable analysis of evidence and discussion, that "[f]or construction activities that occur between 7:00 a.m. and 7:00 p.m. Monday through Friday, and between 8:00 a.m. and 6:00 p.m. on Saturdays, there is no numerical threshold above ambient noise levels." As outlined in Appendix E-2, the increase of 20 dBA, not exceeding 80 dBA, is consistent with FTA recommendations. As concluded in the FMND the project would not exceed this threshold.

**02-11** The comment states that significance thresholds may assist lead agencies in determining if an impact is significant, but compliance with the threshold does not mean that it relieves a lead agency to consider substantial evidence that the project may have significant impacts. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**02-12** The comment includes a summary of court cases that discussed the use of a lead agency's thresholds being exclusively used for noise impacts. The comment further states that the evidence is stronger than in the discussed cases that the project would exceed the construction noise thresholds and an EIR must be prepared. The analysis included in Appendix E-1 and E-2 includes the rationale for adopting a multilayered threshold which is not based on a single concept of the City policies. This analysis not only uses the city policies but also the industry standard understanding of how temporary noise level increases impact people, how long-term noise level increase affect people, a relative threshold to evaluate the increase, and an absolute level to protect people from harm. As described in the FMND, the project would not exceed thresholds and would not result in significant impacts to the environment. The noise analysis included as appendix E-1 and E-2 has been prepared using the most current industry's best practices and methodologies.

**02-13** The comment states that the project would result in potentially significant impacts related to operational noise if HVAC systems were to increase the number of minutes ran per hour. The comment states that the FMND does not address or mitigate noise impacts from HVAC systems. The comment states that the assumptions for the operation time per hour are longer and would result in potentially significant impacts. This comment was previously addressed in FMND Response to Comment O5-12 however, the Table 2 included below includes the remodeled operational noise levels using 45 minutes day, evening, and night. As shown in Table 2, the operational noise levels from the project would be below city noise limits and would still be less than significant.

*This comment was previously addressed in Response to Comment O5-12 of the FMND.*

## Table 2. Operational Noise Levels Assuming 45 minute per hour HVAC Usage

| Receiver Location [1] | Project Operational Noise Level (dba Leq)[2] | | | Noise Level Standards (Dba Leq)[3] | | | Threshold Exceeded?[4] | | |
|---|---|---|---|---|---|---|---|---|---|
| | Day | Eve. | Night | Day | Eve. | Night | Day | Eve. | Night |
| R1 | 30.9 | 30.6 | 24.0 | 55 | 50 | 45 | No | No | No |
| R2 | 43.7 | 43.1 | 34.6 | 55 | 50 | 45 | No | No | No |
| R3 | 47.8 | 47.6 | 41.8 | 55 | 50 | 45 | No | No | No |
| R4 | 44.3 | 44.3 | 39.4 | 55 | 50 | 45 | No | No | No |
| R5 | 44.1 | 44.1 | 39.3 | 55 | 50 | 45 | No | No | No |
| R6 | 44.2 | 43.9 | 38.0 | 55 | 50 | 45 | No | No | No |
| R7 | 42.9 | 42.9 | 38.0 | 55 | 50 | 45 | No | No | No |
| R8 | 35.9 | 35.9 | 30.9 | 55 | 50 | 45 | No | No | No |

1 See Exhibit 8-A for the noise source and receiver locations.
2 Proposed Project operational noise level calculations included in Appendix 9.1.
3 City of Rancho Mirage exterior noise level standards for residential land use, as shown on Table 3-1.
4 Do the estimated Project operational noise source activities exceed the noise level standards?
"Day" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.

**02-14** The comment states that the project would result in a significant and unmitigated health risk from construction and operational emissions. The comment further states that SWAPE's calculated cancer risk would exceed the 10 in one million significance threshold. The comment references response to comment O2-7 of the FMND is misleading because it states that a quantitative health risk is not required because the construction activities would not generate emissions of PM10 in excess of Local Significance thresholds but the construction HRA results in significant impacts.

To clarify, per table 3-8, the analysis shows that proposed construction activities would not generate emissions of PM10 in excess of site specific LSTs. the project would still result in less than significant impacts related to construction localized significance thresholds. Disel particulate matter does not exclusively contain PM10 and the project would exceed 10 in one million cancer risk threshold without mitigation. Overall, with implementation of MM-AQ-1, the project estimated construction emissions result in a potential maximum cancer risk at the Maximally Exposed Individual Resident (MEIR) below the 10 in one million cancer risk threshold and a potential chronic hazard risk below the 1.0 Chronic Hazard Index threshold and impacts would be less than significant.

*This comment was previously addressed in Response to Comment O2-7 of the FMND.*

**02-15** The comment summarized O5-17 and states that the project would fail to address the exposure of sensitive receptors to emissions from both the construction and operation phases. As described in comment O5-17, these phases would not overlap, and therefore emission exposure would not overlap. Adding construction and operational cancer risk is not required by SCAQMD and the analysis followed applicable SCAQMD guidance.

*This comment was previously addressed in Response to Comment O2-27 and O5-17 of the FMND.*

**02-16** The comment incorrectly states that the Final IS/MND underestimates operational health risk impacts in two critical ways. First, the comment suggests that other sources of TAC emissions would include diesel trucks and other potential stationary sources and then, secondly, provides a flawed AERSCREEN analysis proposed to reflect the land use. The Final IS/MND follows regulatory guidance and industry standards to evaluate the known project stationary source, emergency generator, and follows CARB's Air Quality and Land Use Handbook: A Community Health Perspective[1] recommendation of evaluation of health risks when there are more than 100 trucks per day. As the project includes land uses of residential, event space, restaurant, and amenities, diesel trucks are less than 100 per day and as such not included in the analysis. Secondly, the comment provides a flawed AERSCREEN analysis as it extracts the total exhaust emissions from the Final IS/MND CalEEMod analysis and incorrectly considers these emissions as all DPM. The first flaw in this analysis is that the total exhaust emissions extracted from CalEEMod represent particulate emissions from passenger (gasoline), truck (diesel) vehicles, landscape equipment (gasoline), and natural gas combustion. In addition, diesel vehicles tend to make up ~5% of VMT and as such the comment provided AERSCREEN analysis is based on a vastly overestimated and incorrect DPM emissions from the project. Secondly, the particulate emissions that would be emitted by vehicles are dispersed along the length of the trip of the vehicles and not all onsite as would be assumed in AERSCREEN. For these reasons, the AERSCREEN analysis

[1]CARB handbook recommending evaluating health risk only when there are more than 100 trucks per day https://ww2.arb.ca.gov/sites/default/files/2023-05/Land%20Use%20Handbook_0.pdf

would incorrectly estimate project related impact and subsequent health risk assessment not representative of the project impacts. No further action is required.

**Table 1-1**

**Recommendations on Siting New Sensitive Land Uses Such As Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities***

| Source Category | Advisory Recommendations |
|---|---|
| | |
| Freeways and High-Traffic Roads | • Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. |
| Distribution Centers | • Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week).<br>• Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points. |
| | • Avoid siting new sensitive land uses within 1,000 feet of a major |

02-17 The comment states that the operational HRA only accounts for emissions from 50 hours of testing, not for use during an emergency. The comment claims that it would be reasonably foreseeable that the emergency generator would be used and cites caselaw about including emissions for emergency generators due to the frequency of public safety power shutoffs. The comment states that HRA underestimates emissions because it does not include generator emissions from an emergency.

The California Environmental Quality Act (CEQA) defines an “emergency” as "a sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services. "Emergency" includes such occurrences as fire, flood, earthquake, or other soil or geologic movements, as well as such occurrences as riot, accident, or sabotage."

02-18 The comment includes a conclusion to comments regarding the project’s health risks assessment. Please refer to response to comment O2-14 through O2-17.

02-19 The comment incorrectly states that the MND does not evaluate the feasibility of obtaining any equipment that would potentially be used as an alternative method under Tier 4 and is improperly deferred. The comment states that MM-A-1 does not identify a performance standard. The comment misconstrues Response to Comment O2-7 that a significant health risk impact is the same as localized

significant thresholds. As described in MM-AQ-1, Documentation using industry-standard emission estimation methodologies shall be furnished to the City demonstrating that estimated project-generated construction emissions would not exceed the applicable SCAQMD cancer risk threshold with the alternate construction method(s). If the documentation demonstrates that project-generated construction emissions will remain below the applicable SCAQMD cancer risk threshold, then the City may approve the alternate construction method(s), at the City's discretion. This analysis would only be required if the project would occur if the project applicant would not be able to use Tier 4 equipment. Further, a performance standard (SCAQMD cancer risk threshold), has been identified in the mitigation measure.

*This comment was previously addressed in Response to Comment O5-15 of the FMND.*

**02-20** The comment states that the FMND fails to include sufficient energy conservation measures and that the project fails to meet standard of Appendix F of the CEQA guidelines.

The MND analysis does not rely upon compliance with GBC standards as well. Energy consumption during project operation would be commensurate with typical commercial projects and would not use energy wastefully or inefficiently. The Ritz Carlton Rancho Mirage is enrolled in the Rancho Mirage Energy Authority. The project is an extension of the Ritz Carlton Rancho Mirage and would be subject to the requirements of the existing enrollment. Furthermore, the project would include sustainability design features to reduce potential energy and water usage, such as installation of high-efficiency lighting. Other renewable energy systems including wind turbine generation, geothermal generation, energy storage, and other renewable energy generation features are not considered technically or economically feasible and/or demonstrated for a similar project. Additionally, site constraints include limited land availability and incompatibility with land use for large-scale power generation facilities, as well as unknown interconnection feasibility and compatibility with utility provider systems. For these reasons other on-site renewable energy systems are not considered feasible for the proposed project.

The MND directly states that the project would provide EV charging infrastructure that meets the California GBC. Further analysis of the impact of EV charging infrastructure is not required in the GHG analysis and the project would comply with California GBC. As discussed in the MND, GHG impacts would be less than significant and additional mitigation and an EIR are not required.

*This comment was previously addressed in Response to Comment O2-14 through -17 of the FMND.*

**02-21** The comment states the planning commission lacks evidence required to approve the project entitlement because the project fails to make findings related to impacts to fish or wildlife or their habitat; public health; conflict easements; and compliance with CEQA. As concluded in the FMND, the project would not result in significant impacts related to biological resources, air quality, and land use with the inclusion of mitigation.

**02-22** The comment includes concluding remarks that there is supporting evidence that the project would have significant and unmitigated health risks, air quality, noise and transportation impacts. The comment also states that the project will have a significant impact on the environment and an EIR is required. The project will not have a significant effect on the environment with the proposed mitigation

measures, as discussed in the FMND and therefore an EIR is not required. Please refer to Response to Comments O2- 7 through O2-21 for more detailed responses.

**O2-23** The comment summarizes the detailed comments that follow. The comment does not identify specific issues with the adequacy of the FMND. No further response is required.

**O2-24** The comment disputes claims made in Appendix E-2 regarding allowable noise level limits in different jurisdictions in California. The comment further states that an increase in 20dBA is extreme and a 10 dBA threshold should be used. The comment further states that the project would also exceed the 20 dBA threshold and would result in an increase of 31 dBA from ambient noise levels. Please refer to Response to Comment O2-10 through -12.

**O2-25** The comment states that if the proposed HVAC units were to increase their runtime than what was assumed in the noise analysis, the project could result in potentially significant operational noise impacts. Please refer to Response to Comment O2-13.

**O2-26** The comment states concern regarding potential significant noise impacts includes a conclusion to prior comments. Please refer to Response to Comment O2-23 through -25.

**O2-27** The comment states that the MND does not analyze potential health risk impacts associated with construction and operation of the project. The commenter also notes that the health risk assessment (HRA) conducted only evaluate emissions from the emergency generator and does not account for other operational sources. Please refer to Response to Comment O2-16.

**O2-28** The comment states that EPA guidance supports using screening-level HRAs to identify potential health risks and that significant results warrant refined modeling. The commenter also notes that the response to comment relied on its own screening analysis rather than adopting their findings. Please refer to Response to Comment O2-16.

**O2-29** The comment states that the construction and operational HRAs should be summed up and compared to the SCAQMD threshold. The comment further states that an EIR should be prepared to adequately address HRA impacts. Please refer to Response to Comment O2-15.

**O2-30** The commenter recommends additional mitigation measures for construction-related DPM emissions. MM-AQ-1 has been included which requires Tier 4 engines for diesel equipment >75 hp, which reduces cancer risks to below CEQA thresholds and no further mitigation is required.

**O2-31** The comment is a disclaimer and provides concluding remarks. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

**O2-32** The comment includes the resume of Matthew F. Hagemann and Paul Rosenfed. The comment does not identify specific issues with the adequacy of the MND. No further response is required.

# Response to Comment Letter I1

**Dr. Deb Windham,
Dr Brian Herman (Chairman of Radiology at Eisenhower Medical Center)
Bob Greenbaum
Debbi Melman
January 6, 2025**

**I1-1** The comment provides an introduction to comments to follow and a summary of the project description and expresses general concern regarding potential environmental and infrastructural impacts of the proposed expansion. Please refer to Response to comment I1-2 through I1-5.

**I1-2** The comment raises concerns regarding potential traffic impacts along Frank Sinatra Drive and possible effects on emergency vehicle access, specifically given the community's elderly population. The MND includes analysis of traffic operations, queuing, and emergency access. With implementation of identified mitigation measures (MM-TRA-1 and MM-TRA-2), impacts would be less than significant.

**I1-3** The comment raises concerns regarding construction-related-noise, dust, debris and potential effects on wildlife and the surrounding environment. As described in the FMND concludes that construction air quality impacts would be less than significant with compliance of SCAQMD rules, standard of dust controls; noise and vibration impacts would be less than significant with implementation of MM-NOI-1; and biological resources impacts would be less than significant with implementation of MM-BIO-1 through MM-BIO-6.

**I1-4** The comment suggests using the existing service road behind the Ritz-Carlton for construction access to reduce impacts on Frank Sinatra Drive. The MND includes analysis of construction traffic and associated impacts and identifies mitigation measures to reduce potential traffic, noise, and safety impacts.

**I1-5** The comment requests detailed mitigation plans and community involvement. The FMND is available to the public to review and identified mitigation measures to reduce impacts to less than significant levels. The MND was available for comment during March 11, 2024, through April 9, 2024, in accordance with Section 15105(a) of the California Environmental Quality Act (CEQA) Guidelines. The MND was recirculated from July 22,2024 to August 20, 2024.

# Response to Comment Letter I2

**Dr. Deb Windham,
Dr Brian Herman (Chairman of Radiology at
Eisenhower Medical Center)
January 6, 2025**

**I2-1** The comment provides an introduction to comments to follow and a summary of the project description and expresses general concern regarding potential environmental and infrastructural impacts of the proposed expansion. Please refer to Response to comment I1-2 through I1-5.

**I2-2** The comment raises concerns regarding potential traffic impacts along Frank Sinatra Drive and possible effects on emergency vehicle access, specifically given the community's elderly population. Please refer to Response To Comment I1-2.

**I2-3** The comment raises concerns regarding construction related-noise, dust, debris and potential effects on wildlife and the surrounding environment. Please refer to Response to Comment I1-3

**I2-4** The comment suggests using the existing service road behind the Ritz-Carlton for construction access to reduce impacts on Frank Sinatra Drive. Please refer to Response to Comment I1-4.

**I2-5** The comment requests detailed mitigation plans and community involvement. The MND identifies mitigation measures to reduce impacts to less than significant levels, and the CEQA process provides opportunities for public review and input. No further response is required. Please refer to Response to Comment I1-5.

# Response to Comment Letter I3

**Drs Deb Windham and Brian Herman**
**January 2, 2025**

**I3-1** The comment expresses concerns regarding construction related traffic, noise, dust, debris and impacts to safety and access along Frank Sinatra Drive. Please refer to Response to Comment I1-2 and I1-3 above.

**I3-2** The comment recommends using the existing service road near the back of the property for construction access to reduce impacts on residents. Please refer to Response to Comment I1- 4.

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# References

SDAPCD 2022. Supplemental Guidelines for Submission of Air Toxics “Hot Spots

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# Appendix A
RTC Letters

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**VIA EMAIL**

January 9, 2025

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**RE: City of Rancho Mirage January 9, 2025, Planning Commission Meeting – Agenda Item No. 3: Ritz-Carlton Phase II Expansion Project.**

Dear Honorable Planning Commissioners, City Clerk Ramos, and Ben Torres:

On behalf of the Western States Regional Council of Carpenters ("**WSRCC**"), our firm is submitting these comments in connection with the City of Rancho Mirage's ("**City**" or "**Lead Agency**") January 9, 2025, Planning Commission hearing pertaining to the Ritz-Carlton Phase II Expansion Project (Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004) ("**Project**") and the December 2024 Final Initial Study / Mitigated Negative Declaration ("**FMND**") published in connection therewith. 01-1

The Project involves the construction of the Ritz-Carlton Residences Rancho Mirage and the Sky Mesa Recreation Center on a 16.13-acre site located at 68900 Frank Sinatra Drive, Rancho Mirage, CA 92270 (APNs: 689-330-026, -028, -031, -032, -034; 689-020-012, -014; 689-331-001, -018) in Riverside County. Nestled in the foothills of the Santa Rosa Mountains 650 feet above the Coachella Valley below, the 236,748-square-foot Project will consist of 106 residential suites and hotel villas (totaling approximately 200,474-square feet), approximately 23,840-square feet of event space, approximately 6,273-square feet of restaurant/commercial space, and approximately 5,510-square feet of amenity space. The overall Project Site includes an existing hotel 01-2

that opened as a Ritz-Carlton in 1988. The Project would provide a total of 106 new units and 499 vehicle parking spaces.

01-2 Cont.

In March 2024, the City released the first Initial Study / Mitigated Negative Declaration ("MND") for the Project. On April 9, 2024, WSRCC submitted written comments to the MND during the comment period specified by the City, and raised various concerns as to deficiencies noted in the Project's environmental review. Purportedly based on certain comments raised during the MND's comment period, in July 2024, the City released a Recirculated Initial Study / Mitigated Negative Declaration ("RMND") for the Project. On August 20, 2024, WSRCC submitted written comments to the RMND during the comment period specified by the City, which again highlighted ongoing deficiencies in the RMND and Project's environmental review.

Notwithstanding WSRCC's prior meritorious comments and concerns, the FMND does not address and resolve any of the concerns previously raised by WSRCC in its prior comments, including issues related to the Project's impacts on biological resources, cultural resources, noise, GHG emissions, energy use, land use. WSRCC expressly reiterates and incorporates its prior comments in the foregoing correspondence, and urges the City to give them full consideration as part of the CEQA environmental review process.

01-3

WSRCC is a labor union representing over 63,000 union carpenters in 10 states, including California, and has a strong interest in well-ordered land use planning and in addressing the environmental impacts of development projects. Some WSRCC members live, work, and recreate in the City and the surrounding communities and would be directly affected by the Project's environmental impacts.

WSRCC expressly reserves the right to supplement these comments at or prior to hearings on the Project, and at any later hearing and proceeding related to this Project. Gov. Code, § 65009(b); PRC, § 21177(a); see *Bakersfield Citizens for Local Control v. Bakersfield* (2004) 124 Cal.App.4th 1184, 1199-1203; see also *Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal.App.4th 1109, 1121.

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WSRCC incorporates by reference all comments raising issues regarding the Project and its environmental review and associated documents and reports (including the City's Staff Report), or lack thereof. See *Citizens for Clean Energy v. City of Woodland* (2014) 225 Cal.App.4th 173, 191 (finding that any party who has objected to the

project's environmental documentation may assert any issue timely raised by other parties).

Moreover, WSRCC requests that the City provide notice for any and all notices referring or related to the Project issued under the California Environmental Quality Act ("**CEQA**") (Public Resources Code, § 21000 et seq.), and the California Planning and Zoning Law ("**Planning and Zoning Law**") (Gov. Code, §§ 65000–65010). California Public Resources Code, sections 21092.2 and 21167, subsection (f) and California Government Code, section 65092 require agencies to mail such notices to any person who has filed a written request for them with the clerk of the agency's governing body.

O1-4 Cont.

## I. THE CITY SHOULD REQUIRE THE USE OF A LOCAL WORKFORCE TO BENEFIT THE COMMUNITY'S ECONOMIC DEVELOPMENT AND ENVIRONMENT.

The City should require that the Project be built using local workers who have graduated from a Joint Labor-Management Apprenticeship Program approved by the State of California, have at least as many hours of on-the-job experience in the applicable craft which would be required to graduate from such a program, or are registered apprentices in such a program.

Community benefits such as local hire can also be helpful to reduce environmental impacts and improve the positive economic impacts of the Project. Local hire provisions requiring that a certain percentage of workers reside within 10 miles or less of the Project site can reduce the length of vendor trips, reduce greenhouse gas emissions, and provide localized economic benefits. As environmental consultants Matt Hagemann and Paul E. Rosenfeld note:

O1-5

> [A]ny local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

March 8, 2021, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling.

Workforce requirements promote the development of skilled trades that yield sustainable economic development. As the California Workforce Development Board

and the University of California, Berkeley Center for Labor Research and Education concluded:

> [L]abor should be considered an investment rather than a cost—and investments in growing, diversifying, and upskilling California's workforce can positively affect returns on climate mitigation efforts. In other words, well-trained workers are key to delivering emissions reductions and moving California closer to its climate targets.[1]

Furthermore, workforce policies have significant environmental benefits given that they improve an area's jobs-housing balance, decreasing the amount and length of job commutes and the associated greenhouse gas ("**GHG**") emissions. In fact, on May 7, 2021, the South Coast Air Quality Management District found that that the "[u]se of a local state-certified apprenticeship program" can result in air pollutant reductions.[2]

Locating jobs closer to residential areas can have significant environmental benefits. As the California Planning Roundtable noted in 2008:

> People who live and work in the same jurisdiction would be more likely to take transit, walk, or bicycle to work than residents of less balanced communities and their vehicle trips would be shorter. Benefits would include potential reductions in both vehicle miles traveled and vehicle hours traveled.[3]

Moreover, local hire mandates and skill-training are critical facets of a strategy to reduce vehicle miles traveled ("**VMT**"). As planning experts Robert Cervero and Michael Duncan have noted, simply placing jobs near housing stock is insufficient to achieve VMT reductions given that the skill requirements of available local jobs must

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[1] California Workforce Development Board (2020) Putting California on the High Road: A Jobs and Climate Action Plan 2030 at p. ii, *available at* https://laborcenter.berkeley.edu/wp-content/uploads/2020/09/Putting-California-on-the-High-Road.pdf.

[2] South Coast Air Quality Management District (May 7, 2021) Certify Final Environmental Assessment and Adopt Proposed Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions Program, and Proposed Rule 316 – Fees for Rule 2305, Submit Rule 2305 for Inclusion Into the SIP, and Approve Supporting Budget Actions, *available at* http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-May7-027.pdf?sfvrsn=10.

[3] California Planning Roundtable (2008) Deconstructing Jobs-Housing Balance at p. 6, *available at* https://cproundtable.org/static/media/uploads/publications/cpr-jobs-housing.pdf

match those held by local residents.[4] Some municipalities have even tied local hire and other workforce policies to local development permits to address transportation issues. Cervero and Duncan note that:

> In nearly built-out Berkeley, CA, the approach to balancing jobs and housing is to create local jobs rather than to develop new housing. The city's First Source program encourages businesses to hire local residents, especially for entry- and intermediate-level jobs, and sponsors vocational training to ensure residents are employment-ready. While the program is voluntary, some 300 businesses have used it to date, placing more than 3,000 city residents in local jobs since it was launched in 1986. When needed, these carrots are matched by sticks, since the city is not shy about negotiating corporate participation in First Source as a condition of approval for development permits.

01-5 Cont.

Recently, the State of California verified its commitment towards workforce development through the Affordable Housing and High Road Jobs Act of 2022, otherwise known as Assembly Bill No. 2011 (AB2011). AB2011 amended the Planning and Zoning Law to allow ministerial, by-right approval for projects being built alongside commercial corridors that meet affordability and labor requirements.

The City should consider utilizing local workforce policies and requirements to benefit the local area economically and to mitigate GHG emissions, improve air quality, and reduce transportation impacts.

## II. THE CITY SHOULD INCORPORATE LANGUAGE IMPOSING TRAINING REQUIREMENTS FOR CONSTRUCTION ACTIVITIES TO PREVENT COMMUNITY SPREAD OF COVID-19 AND OTHER INFECTIOUS DISEASES INTO THE DEVELOPMENT AGREEMENT.

Construction work has been defined as a Lower to High-risk activity for COVID-19 spread by the Occupations Safety and Health Administration. Recently, several

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[4] Cervero, Robert and Duncan, Michael (2006) Which Reduces Vehicle Travel More: Jobs-Housing Balance or Retail-Housing Mixing? Journal of the American Planning Association 72 (4), 475-490, 482, *available at* http://reconnectingamerica.org/assets/Uploads/UTCT-825.pdf.

construction sites have been identified as sources of community spread of COVID-19.[5]

Western Carpenters recommend that the City adopt additional requirements to mitigate public health risks from various residential, commercial and mixed-use development construction activities. Western Carpenters requests that the City require safe on-site construction work practices as well as training and certification for any construction workers on residential, commercial and mixed-use developments within the City's General Plan Area.

In particular, based upon Western Carpenters' experience with safe construction site work practices, Western Carpenters recommends that the City require that while construction activities are being conducted at the proposed Project ("**Project Site**"):

**Construction Site Design:**

- The Project Site will be limited to two controlled entry points.
- Entry points will have temperature screening technicians taking temperature readings when the entry point is open.
- The Temperature Screening Site Plan shows details regarding access to the Project Site and Project Site logistics for conducting temperature screening.
- A 48-hour advance notice will be provided to all trades prior to the first day of temperature screening.
- The perimeter fence directly adjacent to the entry points will be clearly marked indicating the appropriate 6-foot social distancing position for when you approach the screening area. Please reference the Apex temperature screening site map for additional details.
- There will be clear signage posted at the project site directing you through temperature screening.

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[5] Santa Clara County Public Health (June 12, 2020) COVID-19 CASES AT CONSTRUCTION SITES HIGHLIGHT NEED FOR CONTINUED VIGILANCE IN SECTORS THAT HAVE REOPENED, *available at* https://www.sccgov.org/sites/covid19/Pages/press-release-06-12-2020-cases-at-construction-sites.aspx.

- Provide hand washing stations throughout the construction site.

**Testing Procedures:**

- The temperature screening being used are non-contact devices.
- Temperature readings will not be recorded.
- Personnel will be screened upon entering the testing center and should only take 1-2 seconds per individual.
- Hard hats, head coverings, sweat, dirt, sunscreen or any other cosmetics must be removed on the forehead before temperature screening.
- Anyone who refuses to submit to a temperature screening or does not answer the health screening questions will be refused access to the Project Site.
- Screening will be performed at both entrances from 5:30 am to 7:30 am.; main gate [ZONE 1] and personnel gate [ZONE 2]
- After 7:30 am only the main gate entrance [ZONE 1] will continue to be used for temperature testing for anybody gaining entry to the project site such as returning personnel, deliveries, and visitors.
- If the digital thermometer displays a temperature reading above 100.0 degrees Fahrenheit, a second reading will be taken to verify an accurate reading.
- If the second reading confirms an elevated temperature, DHS will instruct the individual that he/she will not be allowed to enter the Project Site. DHS will also instruct the individual to promptly notify his/her supervisor and his/her human resources (HR) representative and provide them with a copy of Annex A.

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**Planning**

- Require the development of an Infectious Disease Preparedness and Response Plan that will include basic infection prevention measures (requiring the use of personal protection equipment), policies and procedures for prompt identification and isolation of sick individuals, social distancing (prohibiting gatherings of no

more than 10 people including all-hands meetings and all-hands lunches) communication and training and workplace controls that meet standards that may be promulgated by the Center for Disease Control, Occupational Safety and Health Administration, Cal/OSHA, California Department of Public Health or applicable local public health agencies.[6]

The United Brotherhood of Carpenters and Carpenters International Training Fund has developed COVID-19 Training and Certification to ensure that Carpenter union members and apprentices conduct safe work practices. The City should require that all construction workers undergo COVID-19 Training and Certification before being allowed to conduct construction activities at the Project Site.

Western Carpenters has also developed a rigorous Infection Control Risk Assessment ("**ICRA**") training program to ensure it delivers a workforce that understands how to identify and control infection risks by implementing protocols to protect themselves and all others during renovation and construction projects in healthcare environments.[7]

ICRA protocols are intended to contain pathogens, control airflow, and protect patients during the construction, maintenance and renovation of healthcare facilities. ICRA protocols prevent cross contamination, minimizing the risk of secondary infections in patients at hospital facilities.

The City should incorporate language in the Development Agreement requiring that the Project be built using a workforce trained in ICRA protocols.

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## III. THE CITY'S RESPONSES TO COMMENTS INCORRECTLY AND CONCLUSORILY CLAIM THAT ULTIMATE APPROVAL OF THE PROJECT WOULD NOT REQUIRE A TWO-THIRDS VOTE BY THE RANCHO MIRAGE ELECTORATE.

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[6] *See also* The Center for Construction Research and Training, North America's Building Trades Unions (April 27 2020) NABTU and CPWR COVIC-19 Standards for U.S Constructions Sites, *available at* https://www.cpwr.com/sites/default/files/NABTU_CPWR_Standards_COVID-19.pdf; Los Angeles County Department of Public Works (2020) Guidelines for Construction Sites During COVID-19 Pandemic, *available at* https://dpw.lacounty.gov/building-and-safety/docs/pw_guidelines-construction-sites.pdf.

[7] For details concerning Western Carpenters' ICRA training program, *see* https://icrahealthcare.com/.

Based on the City's Responses to Comments in connection with the FMND, the City is under the mistaken impression that approval of the Project, based on its proposed rezoning and development of lands currently zoned as Mountain Reserve, would not be required to be authorized by a two-thirds vote of the Rancho Mirage electorate. (See FMND, Appendix J, Responses to Comments, Response to Comment Letter O1, p. RTC-842.) Indeed, the City's Responses to Comments baldly states "[t]he project site is not considered mountainous lands and would not require the project to be approved by a two-thirds vote of the electorate," without providing any further justification for how lands zoned as "Mountain Reserve (MR)" should not be "considered mountainous lands." (*Id.*) In taking this incorrect conclusory position without offering any substantive basis for support whatsoever, the City appears to be charting a course toward directly violating its own Code of Ordinances in pursuing the approval of the Project and its entitlements.

Notably, and as previously indicated by WSRCC, the City's Code of Ordinances § 7.06.010 provides as follows:

> All discretionary approvals, including but not limited to development agreements, general plan amendments, zone changes, development permits, grading permits and use permits approved by the city council on or after July 3, 1992 and having no building permit issued, shall require the approval of the city council, and thereafter a two-thirds vote of the electorate of the city to be considered an approved application, if the approval is an application on property located within the city "mountainous lands" area of the Santa Rosa and San Jacinto Mountains, as described within the Coachella Valley Mountains Conservancy legislative map, as of November 3, 1992.

(Rancho Mirage Code of Ordinances § 7.06.010.) Again, the Project site sits within the boundary of the Coachella Valley Mountains Conservancy territory map. (Exhibit E – Coachella Valley Mountains Conservancy Territory Map.) As confirmed in the MND, the RMDN, and the FMND, the portion of the Project proposed for parcels 689-020-012 and 689-020-014 (the Sky Mesa Recreational Area) unequivocally has a General Plan Land Use designation of "Open Space: Mountain Reserve (MR)." (See FMND, Figure 1-12, at p. 49; See also Exhibit F – Rancho Mirage Land Use and Zoning Map.) Moreover, the Rancho Mirage General Plan sets forth the following stated goal for the land use(s) applicable to the Mountain Reserve (MR) zone:

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> ***This designation is assigned to*** public lands or ***property subject to conservation easements in the Santa Rosa Mountains***. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation.

(See Rancho Mirage 2017 General Plan, p. 10.) Accordingly, given the location of the Project site, coupled with the established boundaries of the Coachella Valley Mountains Conservancy and the site's land use designation under the City's General Plan, the site falls within the definition of the "city 'mountainous lands' area of the Santa Rosa…Mountains" and is therefore subject to the approval proscriptions of Code of Ordinances § 7.06.010. The City's attempts to circumvent a conservation easement in the Santa Rosa Mountains located on the Project Site cannot be countenanced, and the City's general public cannot be denied its statutory right to vote on the proposed development contemplated by the Project.

As such, the Project as contemplated must ultimately be approved by a two-thirds vote of the Rancho Mirage electorate. WSRCC's comments in this regard should not be construed as a waiver of its other arguments regarding the inadequacies identified in the FMND and the need for the City to complete a legally-compliant EIR, nor should it be construed as a recommendation that the Project be approved via the FMND by the Planning Commission and the City Council. Rather, WSRCC is providing comments on this particular issue out of an abundance of caution to ensure that the City's proper approval procedures are followed, particularly given the Project's stated intention to re-zone and develop mountainous lands within the Santa Rosa Mountains that are currently zoned as Mountain Reserve, located within the boundaries of the Coachella Valley Mountains Conservancy, and subject to a conservation easement. WSRCC's concerns in this regard have been heightened by the flippant and unsupported refusal by the City's planning staff to acknowledge the applicability of Code of Ordinances § 7.06.010 to the Project as presently proposed.

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## IV. THE CALIFORNIA ENVIRONMENTAL QUALITY ACT.

### A. Background Concerning Environmental Impacts Reports Under CEQA.

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CEQA is a California statute designed to inform decision-makers and the public about the potential significant environmental effects of a project. 14 Cal. Code of Regulations ("**CEQA Guidelines**"), § 15002(a)(1).[8] At its core, its purpose is to "inform the public and its responsible officials of the environmental consequences of their decisions *before* they are made." *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564.

CEQA directs public agencies to avoid or reduce environmental damage, when possible, by requiring alternatives or mitigation measures. CEQA Guidelines, § 15002(a)(2)-(3); see also *Berkeley Keep Jets Over the Bay Committee v. Board of Port Comes* (2001) 91 Cal.App.4th 1344, 1354; *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553; *Laurel Heights Improvement Assn.*, 47 Cal.3d at p. 400. The Environmental Impact Report ("**EIR**") serves to provide public agencies and the public in general with information about the effect that a proposed project is likely to have on the environment and to "identify ways that environmental damage can be avoided or significantly reduced." CEQA Guidelines, § 15002, subd. (a)(2). If the project has a significant effect on the environment, the agency may approve the project only upon finding that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns" specified in Public Resources Code section 21081. See CEQA Guidelines, §§ 15092, subds. (b)(2)(A)-(B).

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While the courts review an EIR using an 'abuse of discretion' standard, the reviewing court is not to *uncritically* rely on every study or analysis presented by a project proponent in support of its position. *Berkeley Jets*, 91 Cal.App.4th at p. 1355 (quoting *Laurel Heights Improvement Assn.*, 47 Cal.3d at pp. 391, 409 fn. 12) (internal quotations omitted). A clearly inadequate or unsupported study is entitled to no judicial deference. *Id.* Drawing this line and determining whether the EIR complies with CEQA's information disclosure requirements presents a question of law subject to independent review by the courts. *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 515; *Madera Oversight Coalition, Inc. v. County of Madera* (2011) 199 Cal.App.4th 48, 102, 131. As the court stated in *Berkeley Jets*, prejudicial abuse of discretion occurs if the failure to include relevant information precludes informed decision-making and

[8] The CEQA Guidelines, codified in Title 14 of the California Code of Regulations, section 15000 et seq., are regulatory guidelines promulgated by the state Natural Resources Agency for the implementation of CEQA. PRC, § 21083. The CEQA Guidelines are given "great weight in interpreting CEQA except when . . . clearly unauthorized or erroneous." *Center for Biological Diversity v. Dept. of Fish & Wildlife* (2015) 62 Cal.4th 204, 217.

informed public participation, thereby thwarting the statutory goals of the EIR process. 91 Cal.App.4th at p. 1355 (internal quotations omitted).

The preparation and circulation of an EIR is more than a set of technical hurdles for agencies and developers to overcome. *Communities for a Better Environment v. Richmond* (2010) 184 Cal.App.4th 70, 80 (quoting *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 449-450). The EIR's function is to ensure that government officials who decide to build or approve a project do so with a full understanding of the environmental consequences and, equally important, that the public is assured those consequences have been considered. *Id.* For the EIR to serve these goals it must present information so that the foreseeable impacts of pursuing the project can be understood and weighed, and the public must be given an adequate opportunity to comment on that presentation before the decision to go forward is made. *Id.* The EIR requirement "is the heart of CEQA." CEQA Guidelines, § 15003(a).

Thus, a strong presumption in favor of requiring preparation of an EIR is built into CEQA. This presumption is reflected in what is known as the "fair argument" standard under which an EIR must be prepared whenever substantial evidence in the record supports a fair argument that a project may have a significant effect on the environment. *Quail Botanical Gardens Found., Inc. v. City of Encinitas* (1994) 29 Cal.App.4th 1597, 1602; *Friends of "B" St.* v. *City of Hayward* (1980) 106 Cal.3d 988, 1002.

The fair argument test stems from the statutory mandate that an EIR be prepared for any project that "may have a significant effect on the environment." PRC, § 21151; see *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.App.3d 68, 75; accord *Jensen v. City of Santa Rosa* (2018) 23 Cal.App.5th 877, 884. Under this test, if a proposed project is not exempt and may cause a significant effect on the environment, the lead agency must prepare an EIR. PRC, §§ 21100, subd. (a), 21151; CEQA Guidelines, §§ 15064, subds. (a)(1), (f)(1). An EIR may be dispensed with only if the lead agency finds no substantial evidence in the initial study or elsewhere in the record that the project may have a significant effect on the environment. *Parker Shattuck Neighbors v. Berkeley City Council* (2013) 222 Cal.App.4th 768, 785. In such a situation, the agency must adopt a negative declaration. PRC, § 21080, subd. (c)(1); CEQA Guidelines, §§ 15063, subd. (b)(2), 15064, subd. (f)(3).

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"Significant effect upon the environment" is defined as "a substantial or potentially substantial adverse change in the environment." PRC, § 21068; CEQA Guidelines, § 15382. A project "may" have a significant effect on the environment if there is a "reasonable probability" that it will result in a significant impact. *No Oil, Inc.*, 13 Cal.3d at p. 83 fn. 16; see *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 309. If any aspect of the project may result in a significant impact on the environment, an EIR must be prepared even if the overall effect of the project is beneficial. CEQA Guidelines, § 15063(b)(1); see *County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1580.

This standard sets a "low threshold" for preparation of an EIR. *Consolidated Irrigation Dist. v. City of Selma* (2012) 204 Cal.App.4th 187, 207; *Nelson v. County of Kern* (2010) 190 Cal.App.4th 252; *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 928; *Bowman v. City of Berkeley* (2004) 122 Cal.App.4th 572, 580; *Citizen Action to Serve All Students v. Thornley* (1990) 222 Cal.App.3d 748, 754; *Sundstrom*, 202 Cal.App.3d at p. 310. If substantial evidence in the record supports a fair argument that the project may have a significant environmental effect, the lead agency must prepare an EIR even if other substantial evidence before it indicates the project will have no significant effect. See *Jensen,* 23 Cal.App.5th at p. 886; *Clews Land & Livestock v. City of San Diego* (2017) 19 Cal.App.5th 161, 183; *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 150; *Brentwood Assn. for No Drilling, Inc. v. City of Los Angeles* (1982) 134 Cal.App.3d 491; *Friends of "B" St.*, 106 Cal.App.3d 988; CEQA Guidelines, § 15064(f)(1). Substantial evidence includes "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached." CEQA Guidelines, § 15384(a).

01-8 Cont.

### B. Background Concerning Initial Studies, Negative Declarations, and Mitigated Negative Declarations.

CEQA and CEQA Guidelines are strict and unambiguous about when an MND may be used. A lead agency may adopt an MND only if "there is no substantial evidence that the project will have a significant effect on the environment." CEQA Guidelines, § 15074(b).

01-9

Evidence supporting a fair argument of a significant environmental impact triggers preparation of an EIR regardless of whether the record contains contrary evidence. *League for Protection of Oakland's Architectural and Historical Resources v. City of Oakland*

(1997) 52 Cal.App.4th 896, 904-905. "Where the question is the sufficiency of the evidence to support a fair argument, deference to the agency's determination is not appropriate[.]" *County Sanitation*, 127 Cal.App.4th at 1579 (quoting *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th 1307, 1317-1318).

Further, it is the duty of the lead agency, not the public, to conduct the proper environmental studies. "The agency should not be allowed to hide behind its own failure to gather relevant data." *Sundstrom*, 202 Cal.App.3d at p. 311. "Deficiencies in the record may actually enlarge the scope of fair argument by lending a logical plausibility to a wider range of inferences." *Id*; see also *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1382 (lack of study enlarges the scope of the fair argument which may be made based on the limited facts in the record).

Thus, refusal to complete recommended studies lowers the already low threshold to establish a fair argument. The court may not exercise its independent judgment on the omitted material by determining whether the ultimate decision of the lead agency would have been affected had the law been followed. *Environmental Protection Information Center v. Cal. Dept. of Forestry* (2008) 44 Cal.4th 459, 486 (internal citations and quotations omitted). The remedy for this deficiency would be for the trial court to issue a writ of mandate. *Id.*

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Both the review for failure to follow CEQA's procedures and the fair argument test are questions of law, thus, the de novo standard of review applies. *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 435. "Whether the agency's record contains substantial evidence that would support a fair argument that the project may have a significant effect on the environment is treated as a question of law. *Consolidated Irrigation Dist.*, 204 Cal.App.4th at p. 207; Kostka and Zischke, Practice Under the Environmental Quality Act (2017, 2d ed.) at § 6.76.

In the MND context, courts give no deference to the agency. The agency or the court should not weigh expert testimony or decide on the credibility of such evidence—this is the EIR's responsibility. As stated in *Pocket Protectors v. City of Sacramento*:

> Unlike the situation where an EIR has been prepared, neither the lead agency nor a court may "weigh" conflicting substantial evidence to determine whether an EIR must be prepared in the first instance. Guidelines section 15064, subdivision (f)(1) provides in pertinent part: if a lead agency is presented with a fair argument that a project may have a

> significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect. Thus, as *Claremont* itself recognized, [c]onsideration is not to be given contrary evidence supporting the preparation of a negative declaration.

(2004) 124 Cal.App.4th 903, 935 (internal citations and quotations omitted).

In cases where it is not clear whether there is substantial evidence of significant environmental impacts, CEQA requires erring on the side of a "preference for resolving doubts in favor of environmental review." *Mejia v. City of Los Angeles* (2005) 130 Cal.App.4th 322, 332. "The foremost principle under CEQA is that the Legislature intended the act to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language. *Friends of Mammoth v. Bd. of Supervisors* (1972) 8 Cal.3d 247, 259.

01-9 Cont.

## IV. THE PROJECT WOULD BE APPROVED IN VIOLATION OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

### A. The City Must Prepare an Environmental Impact Report for the Project.

WSRCC reiterates that it would be unlawful for the City to approve the Project in reliance on the incomplete and flawed FMND. As explained below, the FMND continues its failure to support all of its findings with sufficient analysis and substantial evidence and fails to incorporate adequate mitigation measures. Moreover, there is substantial evidence on the face of the FMND that the Project will, in fact, have a significant impact on the surrounding environment. Indeed, the Project involves the new construction, use, and maintenance of a 150,000-square-foot structure with 106 units, subterranean parking for 381 automobiles, 28,843 square feet of event space, 6,273 square feet of restaurant space, and 5,513 square feet for amenities, and the alteration and removal of existing landscaping on a 35.07-acre site, a significant portion of which is currently zoned as protected Mountain Reserve land. Considering these details, along with the pristine and natural surroundings of the Site, the City must prepare and circulate a thorough, Project-specific EIR. As set forth in greater detail below, there is a fair argument that the Project will have a significant effect on the environment, triggering the "low threshold" standard for the City's preparation and circulation of an EIR for the Project.

01-10

1. The FMND Perpetuates the City's Failure to Adequately Analyze the Project and Omits Information

If a project has a significant effect on the environment, an agency may approve the project only upon finding that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns." CEQA Guidelines § 15092(b)(2)(A–B).

CEQA mitigation measures proposed and adopted are required to describe what actions will be taken to reduce or avoid an environmental impact. (CEQA Guidelines § 15126.4(a)(1)(B) [providing "[f]ormulation of mitigation measures should not be deferred until some future time."].) While the same Guidelines section 15126.5(a)(1)(B) acknowledges an exception to the rule against deferrals, such exception is narrowly proscribed to situations where it is impractical or infeasible to include those details during the project's environmental review.

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Here, the FMND's mitigation measures still fail to adequately analyze and/or mitigate the Project's impacts and are improperly deferred, such that an EIR is required.

*i. Biological Resources*

CEQA requires that an environmental document identify and discuss the significant effects of a Project, alternatives and how those significant effects can be mitigated or avoided. CEQA Guidelines § 15126.2; PRC §§ 21100(b)(1), 21002.1(a). An environmental document's discussion of potentially significant effects must "provide an adequate analysis to inform the public how its bare numbers translate to create potential adverse impacts, or it must adequately explain what the agency does know and why, given existing scientific constraints, it cannot translate potential [environmental] impacts further." *Sierra Club v. County of Fresno* (2018) 6 Cal. 5th 502, 521; *see also* citing *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 405; *see also* PRC §§ 21002.1(e), 21003(b). An EIR may not set an impermissibly narrow threshold of significance for biological impacts. *Endangered Habitats League, Inc. v. County of Orange* (2005) 131 Cal.App.4th 777.

01-12

Here, the FMND has still failed to provide analysis on the Project's biological resource impacts in accordance with the above, and continues to admit that, despite the documented potential for occurrence of special-status wildlife species within the vicinity of the Project Site, no focused special-status wildlife surveys were conducted.

(Appendix B to FMND, p. 9, Attachment F, pp. 1-3.) Indeed, the FMND's biological resources study found potential for the occurrence of several special status species, including Peninsular bighorn sheep (moderate potential to occur), red diamondback rattlesnake (moderate potential to occur), burrowing owl (low potential to occur), loggerhead shrike (low potential to occur), LeConte's thrasher (moderate potential to forage), and pocketed free-tailed bat (moderate potential to forage within Project site). (Appendix B to FMND, pp. 14-15.) Despite this likelihood of occurrence, the FMND still makes no provision for specific studies to confirm whether any special-status species are inhabiting the proposed Project Area. Moreover, the City's responses to comments incorrectly assert, without any legal authority or other evidence, that "…focused species surveys are not required by CEQA to assess the impacts to species with the potential to occur." (See FMND, Appendix J, Responses to Comments, Response to Comment Letter O1, p. RTC-838 - 839.) The City's own consultants have indicated the likelihood of special status species to occur on the Project Site, and they have further fashioned mitigation measures to address the potential discovery of such special-status species during the construction process. The fact that these mitigation measures have already been crafted for certain special-status species that were not identified in the initial biological survey conducted for the Project directly contradicts the position the City has now taken in its responses to comments that additional mitigation efforts (in the form of focused surveys) need not be undertaken as to species that were not identified in the that initial biological survey. The City's position on this issue is logically inconsistent and wholly unsupported. WSRCC resubmits that FMND cannot properly conclude that its proposed mitigation measures will reduce biological resource impacts to less than significant levels without first conducting field surveys and subsequent comprehensive analysis regarding these special status species.

O1-12
Cont.

Given the overall potential for the occurrence of special-status species in the proposed Project area, WSRCC maintains that the Project should be subject to more comprehensive EIR review. Again, under California law, the threshold for requiring preparation of an EIR for a project is low, and here, there is a fair argument, based on the anticipated presence of special status species on the Project Site (as documented by the City's own consultant), that the Project as proposed will have significant environmental impacts. In the alternative, and at a minimum, the pre-construction biological survey specifications that WSRCC contends should be incorporated are necessary to ensure the overall adequacy of the FMND's proposed mitigation

measures. Absent inclusion of such specifications in the Project's mitigation measures, there is a fair argument that the Project may have a significant environmental impact. 01-12 Cont.

*ii. Cultural Resources*

In order to mitigate impacts related to the inadvertent discovery of yet unknown historical/cultural resources, the FMND requires implementation of MM-CUL-1 and MM-CUL-2. (FMND at 96-97.) However, and despite other revisions made to the mitigation measures in response to other comments concerning the Project, the FMND's proposed mitigation measures still do not provide for any pre-construction training for the Project's construction workers that will otherwise permit laborers on the Project to properly identify and address any sensitive cultural resources or human remains that may be encountered during course of construction. Moreover, in response to WSRCC's prior comments on this issue, the City mistakenly asserts that the Project's construction workers and the archaeological and tribal consultants should not be tasked with developing any plans for the handling of any human remains that may be discovered on the Project Site during the course of construction. WSRCC is not advocating for any such action by the Project's construction workers to be incorporated into the mitigation measures. This discussion by the City in its response to comments misses the point, which is that the Project's construction workers must be adequately trained prior to construction in order to be able to initially identify sensitive cultural resources and/or human remains so they are not inadvertently destroyed during the construction process. As it stands, the Project's mitigation measures still fail to take this essential step, without which the efficacy of the existing mitigation measures are substantially impaired. 01-13

Accordingly, the scope of the FMND's contemplated mitigation measures is inadequate. The proposed mitigation measures MM-CUL-1 and MM-CUL-2 remain deficient in their current form and must, at a minimum, be revised to adequately mitigate against any potentially significant impacts to cultural resources.

*iii. Noise*

WSRCC resubmits that there is also a fair argument that the Project may have a significant noise impact, such that an EIR must be prepared for the Project. To that end, the FMND has maintained its failure to measure ambient noise levels near the proposed Project's most sensitive uses/receptors at the southern edge of the proposed Project Site, and no additional noise study has been performed. (See FMND, Figure 01-14

13-1, p. 156; see also FMND, p. 145-48, Table 13-2.) Instead, the FMND only measured ambient noise levels at three locations: L1 - located in a graded area where no construction work is being contemplated for the project; L2 – at the southeastern corner of the existing Ritz-Carlton hotel property; and L3 – on the central west edge of the primary villa/residences development site and adjacent to the primary roadway for the development. (*Id.*) Meanwhile, still no noise measurements have been taken along the southern border of the two parcels on the Project site designated for the resort villa development identified as the Ritz-Carlton Residences (APN 689-330-026 and 689-330-028), which are directly adjacent to numerous private residences. Thus, the FMND has inexplicably declined to measure the ambient noise levels in the area adjacent to the most sensitive uses abutting the Project area, namely, numerous private residences. (*Id.*) Based on the current land-uses proximate to this sensitive residential area, it is exceedingly likely that this zone at the southern edge of the proposed Project site would have the lowest ambient noise levels of any Project-adjacent area. In spite of these facts, however, the FMND continues to inaccurately claim that "The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the project site." (FMND at p. 145.) The City's continuing failure and refusal to update the Project's noise studies to address these deficiencies is glaring, and the City's responses to comments fail to address the lack of study of the ambient noise levels at positions closest to the Project's nearby sensitive receptors. (See FMND, Appendix J, Responses to Comments, Response to Comment Letter O1, pp. RTC-839 - 840.) The City cannot be permitted to shirk the performance of proper environmental analysis for the Project in order to conceal the Project's true impacts.

01-14 Cont.

The FMND has then continued to use this faulty and incomplete ambient noise survey data to conclude that there will be no significant impact to the surrounding sensitive receptors from the Project's construction noise. In that regard, the FMND adopts the Criteria for Recommended Standard: Occupational Noise Exposure prepared by the National Institute for Occupational Safety and Health (NIOSH) as the threshold for whether the anticipated construction noise from the Project will have a significant impact upon the Project nearby sensitive receptors. (FMND at p. 149.) The FMND then concludes that the threshold of 85 dBA Leq qualifies as an "acceptable threshold[] for construction noise at the nearby sensitive receiver locations," and the "noise sensitive residential receiver locations will satisfy the 85 dBA Leq significance

01-15

threshold," such that the Project will have a less than significant construction noise impact upon the sensitive receiver locations. (*Id.*)

WSRCC reiterates that the NIOSH Occupational Noise Exposure standard has no proper place in evaluating the significance of construction noise impacts on nearby sensitive receptors. Rather, the NIOSH standard is aimed at protecting workers/laborers exposed to noise during the course job duties and preventing occupational harm/injury from occurring. It has no bearing upon external noise levels that would be suitable for maintaining the quiet enjoyment of an individual's private property. In that regard, the selection of 85 dBA Leq by the MND, RMND, and now the FMND as an acceptable threshold of significant construction noise impact is not only arbitrary, but it is also entirely unfounded.

01-15 Cont.

The Federal Transit Administration's ("FTA") Transit Noise and Vibration Impact Assessment provides superior source of federal regulatory authority regarding a project's noise impacts and their significance on sensitive receptors. To that end, the FTA guidance on noise level impacts notes that the impacts should be assessed as a function of their increase over existing noise exposure, and that any noise increase of 15 dBA or greater for a residence is considered a "severe impact." (See Exhibit D - FTA Transit Noise and Vibration Impact Assessment, pp. 17-18, 23-31.) The MND/RMND/FMND have arbitrarily elected to use the inapplicable NIOSH standard to assess the noise impacts of the Project, without considering the widely accepted guidance on noise impacts put forth by the FTA. This added lack of study and analysis enlarges the scope of the fair argument that the Project may have significant noise impacts on the environment.

01-16

Applying the FTA noise impact guidance, WSRCC maintains that the FMND's dBA estimates for anticipated Project-attributed construction noise exposure levels at the inadequately selected survey locations (L1, L2, and L3) still have the potential to exceed an FTA guidance-based threshold of "severe impact" and thereby cause a significant noise impact in the surrounding environment. (FMND at p. 146, Table 13-2; compare FMND at p. 149, Table 13-3.) Indeed, comparison of the dBA values set forth in Table 13-2 and Table 13-3 confirm that the construction noise levels nearest to the vast majority of the Project's adjacent sensitive residential receptors are anticipated to increase by greater than 15 dBA from the ambient levels detected at L1, L2, and L3. (See *id.*) Put simply, after applying the FTA guidance to the FMND noise

data, there is a fair argument that the Project will have a significant noise impact on nearby sensitive residential receptors.

Notwithstanding these demonstrable noise impacts posed by the Project, the FMND's only mitigation measure in this category pertains to vibration, requiring that large-loaded trucks and dozers not be used within 50 feet of the southern edge of the property line, substituting instead "small rubber-tired or alternative equipment...to reduce vibration effects." The mitigation measure, on its face, appears to address primarily vibration concerns, and would have little to no mitigating effect on the exposure of nearby sensitive receptors to overall project construction noise. Indeed, the southern border of the two parcels designated for the resort villa development identified as the Ritz-Carlton Residences (APN 689-330-026 and 689-330-028) are directly adjacent to numerous private residences.

As such, the FMND provides no tangible accommodation for the burden of construction noise exposure to be borne by the Project's adjacent residential properties. In cases where construction noise impacts are anticipated to affect nearby sensitive uses (i.e., residents, schools, hospitals, etc.) noise barriers are routinely implemented as a CEQA mitigation measure during construction in order to minimize the impingement on nearby residents' use and enjoyment of their property. The Project in this case necessitates, at a minimum, the same level of consideration and accommodation for the property owners adjacent to the Project site's southern edge. Currently, however, MM-NOI-1 makes no provision for the placement of noise barriers of any kind at any location. The failure of the FMND to consider and incorporate the sensitive residential use into the scope of its noise mitigation measures is a critical deficiency that undermines any potential efficacy it may otherwise have in mitigating the Project's noise impacts, and the FMND's conclusion that the Project will have no significant noise impacts remains flawed and invalid for the reasons set forth at length above regarding the inadequate baseline study of these issues. Absent inclusion of an appropriate noise mitigation provision, the FMND remains legally inadequate as it cannot support a finding that the Project's noise impacts will not be significant.

The FMND's current lack of proper analysis and mitigation regarding construction noise impacts violates CEQA and warrants full environmental review via the preparation of an EIR. Alternatively, and at a minimum, the FMND must be further

01-16
Cont.

revised and supplemented to include noise mitigation measures that will in fact protect nearby residents from the impacts of the Project's construction noise. 01-16 Cont.

*iv. Greenhouse Gas Emissions and Energy Use*

The Project requires additional measures aimed at reducing operational GHG emissions and energy use that are not specified in the FMND. Specifically, the Project is slated to develop the second of two hotel buildings with 106 rooms and 499 vehicle parking spaces, yet the FMND still provides no specification or associated mitigation measures identifying how many or which of those parking spaces must be capable of supporting electric vehicle charging stations ("**EVCS**") and ready to be compliant with the 2022 Green Building Code ("**GBC**"). In fact, the FMND provides no specifics regarding any electric vehicle ("**EV**") accommodations to be constructed in connection with the Project. In its response to comments, the City takes the position that the Project is more akin to "commercial hotel use," such that the CARB Scoping Plan recommendations "are not appropriate." (See FMND, Appendix J, Responses to Comments, Response to Comment Letter O1, pp. RTC-841.) However, this position fails to consider, and is contradicted by, the fact that the Project, by its own proposed plans, identifies the new units to be built as "residences" and a "condominium project." (See FMND at pp. 41, 48.) The City's responses to comments still do not otherwise address whether any EVCS will be constructed in connection with the Project, and if so, how many. 01-17

The GBC, which became effective January 1, 2023, requires new buildings to designate 20% of the total number of parking spaces as EV-capable. See GBC 5.106.5.31. Therefore, if the Project develops 499 additional parking spaces, approximately 100 of those spaces must have electrical panel space and load capacity to support EV charging. Additionally, this must all be set forth in sufficient detail for the City and the public to thoroughly review, assess, and provide comments thereon.

Further, the GBC requires new buildings to designate 25% of the total number of EV-capable parking spaces as EV spaces with level 2 EV supply equipment ("**EVSE**"). *Ibid.* Hence, if the Project develops 499 additional parking spaces, 124 of those spaces must be equipped with a 208/240 volt 40-ampere branch circuit with the electric vehicle charging connectors, attachment plugs, and all other fittings, devices, and power outlets installed. The GBC also requires that new residential construction

with more than nine units be GPR certified at minimum 50 points, hold LEED Silver certification, or have Alternate Reference Standard[9] per Section 101.10.2.

The foregoing analysis was entirely absent from the MND, was also not performed for the RMND, and remains omitted from the FMND, thereby exposing the inherent flaws in the FMND's conclusions that the Project's will have a "less than significant impact" with regard to (1) the Project's generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment, (2) the Project's conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of GHGs (e.g., the 2022 GBC), (3) the Project's potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project operation, and (4) the Project's conflict with or obstruction of a state plan for renewable energy/energy efficiency. (See FMND, pp. 98, 111.) Indeed, the FMND states only in vague and inconclusive fashion that (1) the "project will be required to provide compliant … electric vehicle charging spaces" (pursuant to CAL Green Code §§ 5.106.4, 5.106.5.2, and 5.106.5.3), and (2) "[t]he Project would provide EV charging infrastructure that, meets the California Green Building Standards Code," while simultaneously concluding without justification or analysis that the Project's use will be more akin to a commercial hotel than traditional residential housing. (See Appendix A to RMND at 64; see also FMND at 120.) Upon reaching this factually and legally unsupported conclusion regarding the Project's future use, the FMND maintains its flawed determination that the EVCS guidance set forth in Appendix D to CARB's 2022 Scoping Plan is therefore "not appropriate" for the Project, and the Project should be relieved of the residential development requirements for EVCS under the GCB. (FMND at 120.)

O1-17
Cont.

These alleged findings in the FMND, and the grossly deficient information and analysis underpinning them, leave other stakeholder agencies and the general public

[9] According to Section 101.10.2 of the GBC, Applicant may request to apply an alternate green building standard for the Project in lieu of the minimum standards per Table 101.10. In making a determination in response to an application under this section, the Building Official may allow an alternate standard if they find that the proposed alternative standard complies with all of the following: (A) Addresses a comprehensive scope of green building issues including energy efficiency, water efficiency, resource efficient materials, and healthy building practices; (B) applies standards that are, when taken as a whole, as stringent as the GPR and LEED standards; (C) includes a formalized certification process that incorporates third party verification; and, (D) the project will advance the purposes of this Chapter. See Ord. 22-2245, part, 2022; Ord. 19-2193, § 2 (part), 2019.

with virtually no ability to assess the adequacy of the EVCS measures to be implemented in connection with the Project, and the City's responses to comments do nothing to address these concerns. Under the current framework in the FMND, the Applicant could very well construct no EVCS's whatsoever in connection with the Project while proclaiming it has provided "compliant…electric vehicle charging spaces" and met the Green Building Standards Code. Such an outcome has clear potential to result in significant impacts on the environment in the form of generating GHG emissions and conflict with the 2022 CARB Scoping Plan and the GBC.

01-17 Cont.

Additionally, the FMND still provides no comparative analysis of the energy use and GHG emissions impacts of the inclusion and operation of the EVCS infrastructure in the completed Project relative to the operational energy use and GHG emissions that would arise from the omission of the EVCS infrastructure from the project. As such, and absent revision of the Project to incorporate an impact analysis of the inclusion and omission of the EVCS infrastructure, the Project as currently proposed violates the 2022 GBC and therefore result in a potentially significant impact on the issue of GHG emissions. In that regard, an EIR for the Project is currently required to be prepared and circulated before any approval by the City can ultimately be granted.

01-18

In sum, allowing the Project to commence without consideration and analysis of the EVCS issue and its associated energy use and GHG emissions considerations would result in significant and unavoidable impacts on the local community and environment as well as on global climate change due to cumulative GHG emissions from vehicle exhaust. Further, the Project would be out of compliance with the 2022 GBC and could provoke extensive litigation and unnecessary turbulence for both the Applicant and the City.

*v. Land Use and Planning*

Each California city and county must adopt a comprehensive, long-term general plan governing development. *Napa Citizens for Honest Gov. v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 352, *citing* Gov. Code §§ 65030, 65300. The general plan sits at the top of the land use planning hierarchy and serves as a "constitution" or "charter" for all future development. *DeVita v. County of Napa* (1995) 9 Cal.4th 763, 773; *Lesher Communications, Inc. v. City of Walnut Creek* (1990) 52 Cal.3d 531, 540.

01-19

General plan consistency is "the linchpin of California's land use and development laws; it is the principle which infused the concept of planned growth with the force of

law." *Debottari v. Norco City Council* (1985) 171 Cal.App.3d 1204, 1213. It is well established that development projects may not be approved if they interfere with, or frustrate, the general plan's policies and objectives. *See Napa Citizens*, 91 Cal.App.4th at 378-79; *see also Lesher*, 52 Cal.3d at 544.

Here, the FMND continues to admit the Project's direct conflict with the land use consistency prescribed by the City's General plan, in that the Project continues to call for approximately 4.5 acres of dedicated Mountain Reserve Land to be re-zoned and re-purposed for Resort/Hotel use. (FMND at p. 139-140.) Despite that, the FMND then maintains the perfunctory conclusion that the proposed development's conflict with the existing land use plan will not have significant environmental impacts because of the biological resources mitigation measures already proposed in the FMND. This conclusion is wholly unsupported, the analysis underpinning it is irreparably flawed, and the City's responses to comments wholly fail to dispose of this concern.

The FMND's rationale is misplaced and unsupported for purposes of CEQA analysis, as the City cannot properly justify the repurposing and destruction of natural reserve lands by claiming that its biological mitigation measures have already ameliorated any environmental impacts such that the land use impacts are "less than significant." By taking this position in the MND, RMND, and FMND, the City is acknowledging that, in fact, the re-zoning does have a significant impact that requires EIR review and substantial mitigation. Moreover, the City cannot permissibly conflate its mitigation measures aimed at limiting destruction of biological resources with preservation and/or creation of additional mountain reserve lands. Rather, the FMND cannot support a claim of no significant impact without the Project first creating protections for other comparable natural lands multiple times larger than the Mountain Reserve lands being targeted for development. Only then could the land use planning impacts of the development of the Mountain Reserve lands in question be properly mitigated to a less than significant level.

01-19 Cont.

**B. The City Must, at a Minimum, Further Revise and Recirculate the FMND.**

Section 15073.5 of the CEQA Guidelines provides that a negative declaration must be recirculated whenever the document must be substantially revised. A substantial revision includes the identification of new, avoidable significant effects requiring mitigation measures or project revisions to be added to reduce the effect to less than

01-20

significant levels or upon the agency determining that a proposed mitigation measure or project change would not reduce a potential impact to insignificance. *Id.*

Additionally, when new information is brought to light showing that an impact previously discussed in an MND and found to be insignificant with or without mitigation in the MND's analysis has the potential for a significant environmental impact supported by substantial evidence, the MND must consider and resolve the conflict in the evidence. See *Visalia Retail, L.P. v. City of Visalia* (2018) 20 Cal. App. 5th 1, 13, 17; see also *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal. App. 4th 1099, 1109.

Considering the FMND's ongoing failure to substantiate all of its findings, provide adequate mitigation measures, and fully analyze and assess all relevant factors as discussed in detail above, WSRCC reiterates that, at a minimum, the Project requires significant revisions and resolution of conflicts in evidence. Moreover, the FMND, which purports to have been prepared in December 2024, contains significant changes to the Project's proposed mitigation measures and adds incorporates new and additional impact studies in furtherance of the mitigation measures currently listed in the FMND. Meanwhile, and despite these significant changes, the City never circulated the FMND for further public review and comment, as required by CEQA. Therefore, even if the City refuses to prepare an EIR for the Project against WSRCC's objections, the City must at least further revise and recirculate the FMND if it does not prepare an EIR for the Project.

01-20 Cont.

## V. THE PROJECT APPLICATION MATERIALS MUST INCLUDE AN ADEQUATE DESCRIPTION OF THE PROJECT.

A project description must be stable and finite in order to afford a lead agency and the public an adequate opportunity to assess and comment on the project and its impacts. "[A]n accurate, stable and finite project description is the sine qua non of an informative and legally sufficient" environmental document. *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 200. "A curtailed or distorted project description may stultify the objectives of the reporting process" as an accurate, stable, and finite project description is necessary to allow "affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance. *Ibid.* at pp. 192-93.

01-21

CEQA Guidelines, § 15124 requires that a description describe the project in enough detail to allow for evaluation of its potential environmental impacts: (a) the project's precise location and boundaries; (b) a clearly written statement of objectives sought by the proposed project; (c) a description of the project's technical, economic, and environmental characteristics; and, (d) a statement describing a list of agencies, permits, and approval which the project expects to use.

Here, WSRCC respectfully resubmits that the Project application must include an adequate and compliant Project description with the details listed above. Should the materials fail to comply with the CEQA Guidelines, the City should demand that the Applicant resubmit its application materials with CEQA-compliant parameters.

01-21 Cont.

## VI. CONCLUSION.

In sum, WSRCC reiterates its requests that the City require a local workforce, that the City impose training requirements for the Project's construction activities to prevent community spread of COVID-19 and other infectious diseases, and that the City prepare and circulate a thorough EIR for the Project or, at a minimum, further revise and recirculate the RMND for the Project to address the aforementioned concerns. Should the City have any questions regarding this correspondence, please do not hesitate to contact our office.

01-22

Sincerely,

Jeremy Herwitt
Attorneys for Western States
Regional Council of Carpenters

Attached:

March 8, 2021, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling (Exhibit A);

Air Quality and GHG Expert Paul Rosenfeld CV (Exhibit B);

Air Quality and GHG Expert Matt Hagemann CV (Exhibit C);

FTA Transit Noise and Vibration Impact Assessment (Exhibit D);

Coachella Valley Mountains Conservancy Territory Map (Exhibit E); and

City of Rancho Mirage Land Use and Zoning Map (Exhibit F).

# EXHIBIT A

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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March 8, 2021

Mitchell M. Tsai
155 South El Molino, Suite 104
Pasadena, CA 91101

**Subject: Local Hire Requirements and Considerations for Greenhouse Gas Modeling**

Dear Mr. Tsai,

Soil Water Air Protection Enterprise ("SWAPE") is pleased to provide the following draft technical report explaining the significance of worker trips required for construction of land use development projects with respect to the estimation of greenhouse gas ("GHG") emissions. The report will also discuss the potential for local hire requirements to reduce the length of worker trips, and consequently, reduced or mitigate the potential GHG impacts.

01-23

## Worker Trips and Greenhouse Gas Calculations

The California Emissions Estimator Model ("CalEEMod") is a "statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects."[1] CalEEMod quantifies construction-related emissions associated with land use projects resulting from off-road construction equipment; on-road mobile equipment associated with workers, vendors, and hauling; fugitive dust associated with grading, demolition, truck loading, and on-road vehicles traveling along paved and unpaved roads; and architectural coating activities; and paving.[2]

01-24

The number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[3]

[1] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[2] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[3] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.

Specifically, the number and length of vehicle trips is utilized to estimate the vehicle miles travelled ("VMT") associated with construction. Then, utilizing vehicle-class specific EMFAC 2014 emission factors, CalEEMod calculates the vehicle exhaust, evaporative, and dust emissions resulting from construction-related VMT, including personal vehicles for worker commuting.[4]

Specifically, in order to calculate VMT, CalEEMod multiplies the average daily trip rate by the average overall trip length (see excerpt below):

> "$VMT_d = \Sigma(\text{Average Daily Trip Rate}_i * \text{Average Overall Trip Length}_i)_n$
>
> Where:
>
> n = Number of land uses being modeled."[5]

Furthermore, to calculate the on-road emissions associated with worker trips, CalEEMod utilizes the following equation (see excerpt below):

> "$\text{Emissions}_{pollutant} = VMT * EF_{running,pollutant}$
>
> Where:
>
> $\text{Emissions}_{pollutant}$ = emissions from vehicle running for each pollutant
>
> VMT = vehicle miles traveled
>
> $EF_{running,pollutant}$ = emission factor for running emissions."[6]

Thus, there is a direct relationship between trip length and VMT, as well as a direct relationship between VMT and vehicle running emissions. In other words, when the trip length is increased, the VMT and vehicle running emissions increase as a result. Thus, vehicle running emissions can be reduced by decreasing the average overall trip length, by way of a local hire requirement or otherwise.

01-24 Cont.

## Default Worker Trip Parameters and Potential Local Hire Requirements

As previously discussed, the number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[7] In order to understand how local hire requirements and associated worker trip length reductions impact GHG emissions calculations, it is important to consider the CalEEMod default worker trip parameters. CalEEMod provides recommended default values based on site-specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California Environmental Quality Act ("CEQA") requires that such changes be justified by substantial evidence.[8] The default number of construction-related worker trips is calculated by multiplying the

01-25

[4] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14-15.
[5] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 23.
[6] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[7] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[8] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 1, 9.

number of pieces of equipment for all phases by 1.25, with the exception of worker trips required for the building construction and architectural coating phases.[9] Furthermore, the worker trip vehicle class is a 50/25/25 percent mix of light duty autos, light duty truck class 1 and light duty truck class 2, respectively."[10] Finally, the default worker trip length is consistent with the length of the operational home-to-work vehicle trips.[11] The operational home-to-work vehicle trip lengths are:

> "[B]ased on the *location* and *urbanization* selected on the project characteristic screen. These values were *supplied by the air districts or use a default average for the state*. Each district (or county) also assigns trip lengths for urban and rural settings" (emphasis added). [12]

Thus, the default worker trip length is based on the location and urbanization level selected by the User when modeling emissions. The below table shows the CalEEMod default rural and urban worker trip lengths by air basin (see excerpt below and Attachment A).[13]

| Worker Trip Length by Air Basin | | |
|---|---|---|
| **Air Basin** | **Rural (miles)** | **Urban (miles)** |
| Great Basin Valleys | 16.8 | 10.8 |
| Lake County | 16.8 | 10.8 |
| Lake Tahoe | 16.8 | 10.8 |
| Mojave Desert | 16.8 | 10.8 |
| Mountain Counties | 16.8 | 10.8 |
| North Central Coast | 17.1 | 12.3 |
| North Coast | 16.8 | 10.8 |
| Northeast Plateau | 16.8 | 10.8 |
| Sacramento Valley | 16.8 | 10.8 |
| Salton Sea | 14.6 | 11 |
| San Diego | 16.8 | 10.8 |
| San Francisco Bay Area | 10.8 | 10.8 |
| San Joaquin Valley | 16.8 | 10.8 |
| South Central Coast | 16.8 | 10.8 |
| South Coast | 19.8 | 14.7 |
| **Average** | **16.47** | **11.17** |
| **Minimum** | **10.80** | **10.80** |
| **Maximum** | **19.80** | **14.70** |
| **Range** | **9.00** | **3.90** |

01-25 Cont.

[9] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[10] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[11] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14.
[12] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 21.
[13] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-84 – D-86.

As demonstrated above, default rural worker trip lengths for air basins in California vary from 10.8- to 19.8-miles, with an average of 16.47 miles. Furthermore, default urban worker trip lengths vary from 10.8- to 14.7-miles, with an average of 11.17 miles. Thus, while default worker trip lengths vary by location, default urban worker trip lengths tend to be shorter in length. Based on these trends evident in the CalEEMod default worker trip lengths, we can reasonably assume that the efficacy of a local hire requirement is especially dependent upon the urbanization of the project site, as well as the project location.

## Practical Application of a Local Hire Requirement and Associated Impact

To provide an example of the potential impact of a local hire provision on construction-related GHG emissions, we estimated the significance of a local hire provision for the Village South Specific Plan ("Project") located in the City of Claremont ("City"). The Project proposed to construct 1,000 residential units, 100,000-SF of retail space, 45,000-SF of office space, as well as a 50-room hotel, on the 24-acre site. The Project location is classified as Urban and lies within the Los Angeles-South Coast County. As a result, the Project has a default worker trip length of 14.7 miles.[14] In an effort to evaluate the potential for a local hire provision to reduce the Project's construction-related GHG emissions, we prepared an updated model, reducing all worker trip lengths to 10 miles (see Attachment B). Our analysis estimates that if a local hire provision with a 10-mile radius were to be implemented, the GHG emissions associated with Project construction would decrease by approximately 17% (see table below and Attachment C).

| **Local Hire Provision Net Change** | |
|---|---|
| **Without Local Hire Provision** | |
| Total Construction GHG Emissions (MT $CO_2e$) | 3,623 |
| Amortized Construction GHG Emissions (MT $CO_2e$/year) | 120.77 |
| **With Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,024 |
| Amortized Construction GHG Emissions (MT $CO_2e$/year) | 100.80 |
| ***% Decrease in Construction-related GHG Emissions*** | ***17%*** |

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As demonstrated above, by implementing a local hire provision requiring 10 mile worker trip lengths, the Project could reduce potential GHG emissions associated with construction worker trips. More broadly, any local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

This serves as an example of the potential impacts of local hire requirements on estimated project-level GHG emissions, though it does not indicate that local hire requirements would result in reduced construction-related GHG emission for all projects. As previously described, the significance of a local hire requirement depends on the worker trip length enforced and the default worker trip length for the project's urbanization level and location.

[14] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-85.

## Disclaimer

SWAPE has received limited discovery. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

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Sincerely,



Matt Hagemann, P.G., C.Hg.



Paul E. Rosenfeld, Ph.D.

| Location Type | Location Name | Rural H-W (miles) | Urban H-W (miles) |
|---|---|---|---|
| Air Basin | Great Basin | 16.8 | 10.8 |
| Air Basin | Lake County | 16.8 | 10.8 |
| Air Basin | Lake Tahoe | 16.8 | 10.8 |
| Air Basin | Mojave Desert | 16.8 | 10.8 |
| Air Basin | Mountain | 16.8 | 10.8 |
| Air Basin | North Central | 17.1 | 12.3 |
| Air Basin | North Coast | 16.8 | 10.8 |
| Air Basin | Northeast | 16.8 | 10.8 |
| Air Basin | Sacramento | 16.8 | 10.8 |
| Air Basin | Salton Sea | 14.6 | 11 |
| Air Basin | San Diego | 16.8 | 10.8 |
| Air Basin | San Francisco | 10.8 | 10.8 |
| Air Basin | San Joaquin | 16.8 | 10.8 |
| Air Basin | South Central | 16.8 | 10.8 |
| Air Basin | South Coast | 19.8 | 14.7 |
| Air District | Amador County | 16.8 | 10.8 |
| Air District | Antelope Valley | 16.8 | 10.8 |
| Air District | Bay Area AQMD | 10.8 | 10.8 |
| Air District | Butte County | 12.54 | 12.54 |
| Air District | Calaveras | 16.8 | 10.8 |
| Air District | Colusa County | 16.8 | 10.8 |
| Air District | El Dorado | 16.8 | 10.8 |
| Air District | Feather River | 16.8 | 10.8 |
| Air District | Glenn County | 16.8 | 10.8 |
| Air District | Great Basin | 16.8 | 10.8 |
| Air District | Imperial County | 10.2 | 7.3 |
| Air District | Kern County | 16.8 | 10.8 |
| Air District | Lake County | 16.8 | 10.8 |
| Air District | Lassen County | 16.8 | 10.8 |
| Air District | Mariposa | 16.8 | 10.8 |
| Air District | Mendocino | 16.8 | 10.8 |
| Air District | Modoc County | 16.8 | 10.8 |
| Air District | Mojave Desert | 16.8 | 10.8 |
| Air District | Monterey Bay | 16.8 | 10.8 |
| Air District | North Coast | 16.8 | 10.8 |
| Air District | Northern Sierra | 16.8 | 10.8 |
| Air District | Northern | 16.8 | 10.8 |
| Air District | Placer County | 16.8 | 10.8 |
| Air District | Sacramento | 15 | 10 |

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| | | | |
|---|---|---|---|
| Air District | San Diego | 16.8 | 10.8 |
| Air District | San Joaquin | 16.8 | 10.8 |
| Air District | San Luis Obispo | 13 | 13 |
| Air District | Santa Barbara | 8.3 | 8.3 |
| Air District | Shasta County | 16.8 | 10.8 |
| Air District | Siskiyou County | 16.8 | 10.8 |
| Air District | South Coast | 19.8 | 14.7 |
| Air District | Tehama County | 16.8 | 10.8 |
| Air District | Tuolumne | 16.8 | 10.8 |
| Air District | Ventura County | 16.8 | 10.8 |
| Air District | Yolo/Solano | 15 | 10 |
| County | Alameda | 10.8 | 10.8 |
| County | Alpine | 16.8 | 10.8 |
| County | Amador | 16.8 | 10.8 |
| County | Butte | 12.54 | 12.54 |
| County | Calaveras | 16.8 | 10.8 |
| County | Colusa | 16.8 | 10.8 |
| County | Contra Costa | 10.8 | 10.8 |
| County | Del Norte | 16.8 | 10.8 |
| County | El Dorado-Lake | 16.8 | 10.8 |
| County | El Dorado- | 16.8 | 10.8 |
| County | Fresno | 16.8 | 10.8 |
| County | Glenn | 16.8 | 10.8 |
| County | Humboldt | 16.8 | 10.8 |
| County | Imperial | 10.2 | 7.3 |
| County | Inyo | 16.8 | 10.8 |
| County | Kern-Mojave | 16.8 | 10.8 |
| County | Kern-San | 16.8 | 10.8 |
| County | Kings | 16.8 | 10.8 |
| County | Lake | 16.8 | 10.8 |
| County | Lassen | 16.8 | 10.8 |
| County | Los Angeles- | 16.8 | 10.8 |
| County | Los Angeles- | 19.8 | 14.7 |
| County | Madera | 16.8 | 10.8 |
| County | Marin | 10.8 | 10.8 |
| County | Mariposa | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Merced | 16.8 | 10.8 |
| County | Modoc | 16.8 | 10.8 |
| County | Mono | 16.8 | 10.8 |
| County | Monterey | 16.8 | 10.8 |
| County | Napa | 10.8 | 10.8 |

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Cont.

| | | | |
|---|---|---|---|
| County | Nevada | 16.8 | 10.8 |
| County | Orange | 19.8 | 14.7 |
| County | Placer-Lake | 16.8 | 10.8 |
| County | Placer-Mountain | 16.8 | 10.8 |
| County | Placer- | 16.8 | 10.8 |
| County | Plumas | 16.8 | 10.8 |
| County | Riverside- | 16.8 | 10.8 |
| County | Riverside- | 19.8 | 14.7 |
| County | Riverside-Salton | 14.6 | 11 |
| County | Riverside-South | 19.8 | 14.7 |
| County | Sacramento | 15 | 10 |
| County | San Benito | 16.8 | 10.8 |
| County | San Bernardino- | 16.8 | 10.8 |
| County | San Bernardino- | 19.8 | 14.7 |
| County | San Diego | 16.8 | 10.8 |
| County | San Francisco | 10.8 | 10.8 |
| County | San Joaquin | 16.8 | 10.8 |
| County | San Luis Obispo | 13 | 13 |
| County | San Mateo | 10.8 | 10.8 |
| County | Santa Barbara- | 8.3 | 8.3 |
| County | Santa Barbara- | 8.3 | 8.3 |
| County | Santa Clara | 10.8 | 10.8 |
| County | Santa Cruz | 16.8 | 10.8 |
| County | Shasta | 16.8 | 10.8 |
| County | Sierra | 16.8 | 10.8 |
| County | Siskiyou | 16.8 | 10.8 |
| County | Solano- | 15 | 10 |
| County | Solano-San | 16.8 | 10.8 |
| County | Sonoma-North | 16.8 | 10.8 |
| County | Sonoma-San | 10.8 | 10.8 |
| County | Stanislaus | 16.8 | 10.8 |
| County | Sutter | 16.8 | 10.8 |
| County | Tehama | 16.8 | 10.8 |
| County | Trinity | 16.8 | 10.8 |
| County | Tulare | 16.8 | 10.8 |
| County | Tuolumne | 16.8 | 10.8 |
| County | Ventura | 16.8 | 10.8 |
| County | Yolo | 15 | 10 |
| County | Yuba | 16.8 | 10.8 |
| Statewide | Statewide | 16.8 | 10.8 |

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Cont.

| Worker Trip Length by Air Basin | | |
|---|---|---|
| **Air Basin** | **Rural (miles)** | **Urban (miles)** |
| Great Basin Valleys | 16.8 | 10.8 |
| Lake County | 16.8 | 10.8 |
| Lake Tahoe | 16.8 | 10.8 |
| Mojave Desert | 16.8 | 10.8 |
| Mountain Counties | 16.8 | 10.8 |
| North Central Coast | 17.1 | 12.3 |
| North Coast | 16.8 | 10.8 |
| Northeast Plateau | 16.8 | 10.8 |
| Sacramento Valley | 16.8 | 10.8 |
| Salton Sea | 14.6 | 11 |
| San Diego | 16.8 | 10.8 |
| San Francisco Bay Area | 10.8 | 10.8 |
| San Joaquin Valley | 16.8 | 10.8 |
| South Central Coast | 16.8 | 10.8 |
| South Coast | 19.8 | 14.7 |
| **Average** | **16.47** | **11.17** |
| **Mininum** | **10.80** | **10.80** |
| **Maximum** | **19.80** | **14.70** |
| **Range** | **9.00** | **3.90** |

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# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

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### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

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| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

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Cont.

## 2.0 Emissions Summary

## 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1713 | 1.8242 | 1.1662 | 2.4000e-003 | 0.4169 | 0.0817 | 0.4986 | 0.1795 | 0.0754 | 0.2549 | 0.0000 | 213.1969 | 213.1969 | 0.0601 | 0.0000 | 214.6993 |
| 2022 | 0.6904 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.6826 | 1,721.6826 | 0.1294 | 0.0000 | 1,724.9187 |
| 2023 | 0.6148 | 3.3649 | 5.6747 | 0.0178 | 1.1963 | 0.0996 | 1.2959 | 0.3203 | 0.0935 | 0.4138 | 0.0000 | 1,627.5295 | 1,627.5295 | 0.1185 | 0.0000 | 1,630.4925 |
| 2024 | 4.1619 | 0.1335 | 0.2810 | 5.9000e-004 | 0.0325 | 6.4700e-003 | 0.0390 | 8.6300e-003 | 6.0400e-003 | 0.0147 | 0.0000 | 52.9078 | 52.9078 | 8.0200e-003 | 0.0000 | 53.1082 |
| **Maximum** | **4.1619** | **4.1142** | **6.1625** | **0.0189** | **1.3058** | **0.1201** | **1.4259** | **0.3460** | **0.1128** | **0.4588** | **0.0000** | **1,721.6826** | **1,721.6826** | **0.1294** | **0.0000** | **1,724.9187** |

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## 2.1 Overall Construction

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1713 | 1.8242 | 1.1662 | 2.4000e-003 | 0.4169 | 0.0817 | 0.4986 | 0.1795 | 0.0754 | 0.2549 | 0.0000 | 213.1967 | 213.1967 | 0.0601 | 0.0000 | 214.6991 |
| 2022 | 0.6904 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.6823 | 1,721.6823 | 0.1294 | 0.0000 | 1,724.9183 |
| 2023 | 0.6148 | 3.3648 | 5.6747 | 0.0178 | 1.1963 | 0.0996 | 1.2959 | 0.3203 | 0.0935 | 0.4138 | 0.0000 | 1,627.5291 | 1,627.5291 | 0.1185 | 0.0000 | 1,630.4921 |
| 2024 | 4.1619 | 0.1335 | 0.2810 | 5.9000e-004 | 0.0325 | 6.4700e-003 | 0.0390 | 8.6300e-003 | 6.0400e-003 | 0.0147 | 0.0000 | 52.9077 | 52.9077 | 8.0200e-003 | 0.0000 | 53.1082 |
| **Maximum** | **4.1619** | **4.1142** | **6.1625** | **0.0189** | **1.3058** | **0.1201** | **1.4259** | **0.3460** | **0.1128** | **0.4588** | **0.0000** | **1,721.6823** | **1,721.6823** | **0.1294** | **0.0000** | **1,724.9183** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| 1 | 9-1-2021 | 11-30-2021 | 1.4103 | 1.4103 |
| 2 | 12-1-2021 | 2-28-2022 | 1.3613 | 1.3613 |
| 3 | 3-1-2022 | 5-31-2022 | 1.1985 | 1.1985 |
| 4 | 6-1-2022 | 8-31-2022 | 1.1921 | 1.1921 |
| 5 | 9-1-2022 | 11-30-2022 | 1.1918 | 1.1918 |
| 6 | 12-1-2022 | 2-28-2023 | 1.0774 | 1.0774 |
| 7 | 3-1-2023 | 5-31-2023 | 1.0320 | 1.0320 |
| 8 | 6-1-2023 | 8-31-2023 | 1.0260 | 1.0260 |

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| | | | | |
|---|---|---|---|---|
| **9** | **9-1-2023** | **11-30-2023** | 1.0265 | 1.0265 |
| **10** | **12-1-2023** | **2-29-2024** | 2.8857 | 2.8857 |
| **11** | **3-1-2024** | **5-31-2024** | 1.6207 | 1.6207 |
| | | **Highest** | 2.8857 | 2.8857 |

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

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## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

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| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

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**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

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Cont.

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

### 3.1 Mitigation Measures Construction

01-28
Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0012** | **51.0012** | **0.0144** | **0.0000** | **51.3601** |

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.7000e-004 | 7.5000e-004 | 8.5100e-003 | 2.0000e-005 | 2.4700e-003 | 2.0000e-005 | 2.4900e-003 | 6.5000e-004 | 2.0000e-005 | 6.7000e-004 | 0.0000 | 2.2251 | 2.2251 | 7.0000e-005 | 0.0000 | 2.2267 |
| **Total** | **2.9000e-003** | **0.0641** | **0.0233** | **2.0000e-004** | **6.4100e-003** | **2.1000e-004** | **6.6200e-003** | **1.7300e-003** | **2.0000e-004** | **1.9300e-003** | **0.0000** | **19.6816** | **19.6816** | **1.2800e-003** | **0.0000** | **19.7136** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0011** | **51.0011** | **0.0144** | **0.0000** | **51.3600** |

01-28 Cont.

### 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.7000e-004 | 7.5000e-004 | 8.5100e-003 | 2.0000e-005 | 2.4700e-003 | 2.0000e-005 | 2.4900e-003 | 6.5000e-004 | 2.0000e-005 | 6.7000e-004 | 0.0000 | 2.2251 | 2.2251 | 7.0000e-005 | 0.0000 | 2.2267 |
| **Total** | **2.9000e-003** | **0.0641** | **0.0233** | **2.0000e-004** | **6.4100e-003** | **2.1000e-004** | **6.6200e-003** | **1.7300e-003** | **2.0000e-004** | **1.9300e-003** | **0.0000** | **19.6816** | **19.6816** | **1.2800e-003** | **0.0000** | **19.7136** |

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Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7061** |

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |
| **Total** | **7.7000e-004** | **6.0000e-004** | **6.8100e-003** | **2.0000e-005** | **1.9700e-003** | **2.0000e-005** | **1.9900e-003** | **5.2000e-004** | **1.0000e-005** | **5.4000e-004** | **0.0000** | **1.7801** | **1.7801** | **5.0000e-005** | **0.0000** | **1.7814** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7060** |

### 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |
| **Total** | **7.7000e-004** | **6.0000e-004** | **6.8100e-003** | **2.0000e-005** | **1.9700e-003** | **2.0000e-005** | **1.9900e-003** | **5.2000e-004** | **1.0000e-005** | **5.4000e-004** | **0.0000** | **1.7801** | **1.7801** | **5.0000e-005** | **0.0000** | **1.7814** |

01-28 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3776 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5405** | **103.5405** | **0.0335** | **0.0000** | **104.3776** |

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |
| **Total** | **1.6400e-003** | **1.2700e-003** | **0.0144** | **4.0000e-005** | **4.1600e-003** | **3.0000e-005** | **4.2000e-003** | **1.1100e-003** | **3.0000e-005** | **1.1400e-003** | **0.0000** | **3.7579** | **3.7579** | **1.1000e-004** | **0.0000** | **3.7607** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5403** | **103.5403** | **0.0335** | **0.0000** | **104.3775** |

### 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |
| **Total** | **1.6400e-003** | **1.2700e-003** | **0.0144** | **4.0000e-005** | **4.1600e-003** | **3.0000e-005** | **4.2000e-003** | **1.1100e-003** | **3.0000e-005** | **1.1400e-003** | **0.0000** | **3.7579** | **3.7579** | **1.1000e-004** | **0.0000** | **3.7607** |

01-28 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |
| **Total** | **2.8000e-004** | **2.1000e-004** | **2.4400e-003** | **1.0000e-005** | **7.7000e-004** | **1.0000e-005** | **7.7000e-004** | **2.0000e-004** | **1.0000e-005** | **2.1000e-004** | **0.0000** | **0.6679** | **0.6679** | **2.0000e-005** | **0.0000** | **0.6684** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

### 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |
| **Total** | **2.8000e-004** | **2.1000e-004** | **2.4400e-003** | **1.0000e-005** | **7.7000e-004** | **1.0000e-005** | **7.7000e-004** | **2.0000e-004** | **1.0000e-005** | **2.1000e-004** | **0.0000** | **0.6679** | **0.6679** | **2.0000e-005** | **0.0000** | **0.6684** |

01-28 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1324** | **293.1324** | **0.0702** | **0.0000** | **294.8881** |

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.4088 | 0.3066 | 3.5305 | 0.0107 | 1.1103 | 8.8700e-003 | 1.1192 | 0.2949 | 8.1700e-003 | 0.3031 | 0.0000 | 966.8117 | 966.8117 | 0.0266 | 0.0000 | 967.4773 |
| **Total** | **0.4616** | **2.0027** | **3.9885** | **0.0152** | **1.2243** | **0.0121** | **1.2363** | **0.3278** | **0.0112** | **0.3390** | **0.0000** | **1,408.7952** | **1,408.7952** | **0.0530** | **0.0000** | **1,410.1208** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1321** | **293.1321** | **0.0702** | **0.0000** | **294.8877** |

### 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.4088 | 0.3066 | 3.5305 | 0.0107 | 1.1103 | 8.8700e-003 | 1.1192 | 0.2949 | 8.1700e-003 | 0.3031 | 0.0000 | 966.8117 | 966.8117 | 0.0266 | 0.0000 | 967.4773 |
| **Total** | **0.4616** | **2.0027** | **3.9885** | **0.0152** | **1.2243** | **0.0121** | **1.2363** | **0.3278** | **0.0112** | **0.3390** | **0.0000** | **1,408.7952** | **1,408.7952** | **0.0530** | **0.0000** | **1,410.1208** |

01-28 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2789** | **286.2789** | **0.0681** | **0.0000** | **287.9814** |

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.3753 | 0.2708 | 3.1696 | 0.0101 | 1.0840 | 8.4100e-003 | 1.0924 | 0.2879 | 7.7400e-003 | 0.2957 | 0.0000 | 909.3439 | 909.3439 | 0.0234 | 0.0000 | 909.9291 |
| **Total** | **0.4135** | **1.5218** | **3.5707** | **0.0144** | **1.1953** | **9.8700e-003** | **1.2051** | **0.3200** | **9.1400e-003** | **0.3292** | **0.0000** | **1,327.3369** | **1,327.3369** | **0.0462** | **0.0000** | **1,328.4916** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2785** | **286.2785** | **0.0681** | **0.0000** | **287.9811** |

### 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.3753 | 0.2708 | 3.1696 | 0.0101 | 1.0840 | 8.4100e-003 | 1.0924 | 0.2879 | 7.7400e-003 | 0.2957 | 0.0000 | 909.3439 | 909.3439 | 0.0234 | 0.0000 | 909.9291 |
| **Total** | **0.4135** | **1.5218** | **3.5707** | **0.0144** | **1.1953** | **9.8700e-003** | **1.2051** | **0.3200** | **9.1400e-003** | **0.3292** | **0.0000** | **1,327.3369** | **1,327.3369** | **0.0462** | **0.0000** | **1,328.4916** |

01-28 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |
| **Total** | **3.7000e-004** | **2.7000e-004** | **3.1200e-003** | **1.0000e-005** | **1.0700e-003** | **1.0000e-005** | **1.0800e-003** | **2.8000e-004** | **1.0000e-005** | **2.9000e-004** | **0.0000** | **0.8963** | **0.8963** | **2.0000e-005** | **0.0000** | **0.8968** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

### 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |
| **Total** | **3.7000e-004** | **2.7000e-004** | **3.1200e-003** | **1.0000e-005** | **1.0700e-003** | **1.0000e-005** | **1.0800e-003** | **2.8000e-004** | **1.0000e-005** | **2.9000e-004** | **0.0000** | **0.8963** | **0.8963** | **2.0000e-005** | **0.0000** | **0.8968** |

01-28 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |
| **Total** | **5.9000e-004** | **4.1000e-004** | **4.9200e-003** | **2.0000e-005** | **1.8100e-003** | **1.0000e-005** | **1.8200e-003** | **4.8000e-004** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **1.4697** | **1.4697** | **4.0000e-005** | **0.0000** | **1.4706** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

### 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |
| **Total** | **5.9000e-004** | **4.1000e-004** | **4.9200e-003** | **2.0000e-005** | **1.8100e-003** | **1.0000e-005** | **1.8200e-003** | **4.8000e-004** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **1.4697** | **1.4697** | **4.0000e-005** | **0.0000** | **1.4706** |

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### 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |
| **Total** | **0.0101** | **6.9900e-003** | **0.0835** | **2.8000e-004** | **0.0307** | **2.3000e-004** | **0.0309** | **8.1500e-003** | **2.2000e-004** | **8.3700e-003** | **0.0000** | **24.9407** | **24.9407** | **6.1000e-004** | **0.0000** | **24.9558** |

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**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |
| **Total** | **0.0101** | **6.9900e-003** | **0.0835** | **2.8000e-004** | **0.0307** | **2.3000e-004** | **0.0309** | **8.1500e-003** | **2.2000e-004** | **8.3700e-003** | **0.0000** | **24.9407** | **24.9407** | **6.1000e-004** | **0.0000** | **24.9558** |

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Cont.

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Unmitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |

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### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

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Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| NaturalGas Mitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |
| NaturalGas Unmitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |

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### 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

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### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

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### 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

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### 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

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## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Unmitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

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Cont.

### 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

01-28 Cont.

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Unmitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |

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Cont.

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

01-28 Cont.

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

01-28 Cont.

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Unmitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |

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Cont.

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

01-28 Cont.

### 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

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### 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

### 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

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Cont.

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

01-28 Cont.

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

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| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

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Cont.

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2769 | 46.4588 | 31.6840 | 0.0643 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,234.7974 | 6,234.7974 | 1.9495 | 0.0000 | 6,283.5352 |
| 2022 | 5.3304 | 38.8967 | 49.5629 | 0.1517 | 9.8688 | 1.6366 | 10.7727 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 15,251.5674 | 15,251.5674 | 1.9503 | 0.0000 | 15,278.5288 |
| 2023 | 4.8957 | 26.3317 | 46.7567 | 0.1472 | 9.8688 | 0.7794 | 10.6482 | 2.6381 | 0.7322 | 3.3702 | 0.0000 | 14,807.5269 | 14,807.5269 | 1.0250 | 0.0000 | 14,833.1521 |
| 2024 | 237.1630 | 9.5575 | 15.1043 | 0.0244 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,361.3989 | 2,361.3989 | 0.7177 | 0.0000 | 2,379.3421 |
| **Maximum** | **237.1630** | **46.4588** | **49.5629** | **0.1517** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **15,251.5674** | **15,251.5674** | **1.9503** | **0.0000** | **15,278.5288** |

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## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2769 | 46.4588 | 31.6840 | 0.0643 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,234.7974 | 6,234.7974 | 1.9495 | 0.0000 | 6,283.5352 |
| 2022 | 5.3304 | 38.8967 | 49.5629 | 0.1517 | 9.8688 | 1.6366 | 10.7727 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 15,251.5674 | 15,251.5674 | 1.9503 | 0.0000 | 15,278.5288 |
| 2023 | 4.8957 | 26.3317 | 46.7567 | 0.1472 | 9.8688 | 0.7794 | 10.6482 | 2.6381 | 0.7322 | 3.3702 | 0.0000 | 14,807.5269 | 14,807.5269 | 1.0250 | 0.0000 | 14,833.1520 |
| 2024 | 237.1630 | 9.5575 | 15.1043 | 0.0244 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,361.3989 | 2,361.3989 | 0.7177 | 0.0000 | 2,379.3421 |
| **Maximum** | **237.1630** | **46.4588** | **49.5629** | **0.1517** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **15,251.5674** | **15,251.5674** | **1.9503** | **0.0000** | **15,278.5288** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

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## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

01-28 Cont.

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

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**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

### 3.1 Mitigation Measures Construction

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Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0643 | 0.0442 | 0.6042 | 1.7100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 170.8155 | 170.8155 | 5.0300e-003 | | 170.9413 |
| **Total** | **0.1916** | **4.1394** | **1.5644** | **0.0136** | **0.4346** | **0.0139** | **0.4485** | **0.1176** | **0.0133** | **0.1309** | | **1,463.0568** | **1,463.0568** | **0.0927** | | **1,465.3750** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

### 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0643 | 0.0442 | 0.6042 | 1.7100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 170.8155 | 170.8155 | 5.0300e-003 | | 170.9413 |
| **Total** | **0.1916** | **4.1394** | **1.5644** | **0.0136** | **0.4346** | **0.0139** | **0.4485** | **0.1176** | **0.0133** | **0.1309** | | **1,463.0568** | **1,463.0568** | **0.0927** | | **1,465.3750** |

01-28 Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| **Total** | **0.0772** | **0.0530** | **0.7250** | **2.0600e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **204.9786** | **204.9786** | **6.0400e-003** | | **205.1296** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

### 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| **Total** | **0.0772** | **0.0530** | **0.7250** | **2.0600e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **204.9786** | **204.9786** | **6.0400e-003** | | **205.1296** |

01-28 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0857 | 0.0589 | 0.8056 | 2.2900e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 6.7100e-003 | | 227.9217 |
| **Total** | **0.0857** | **0.0589** | **0.8056** | **2.2900e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **227.7540** | **227.7540** | **6.7100e-003** | | **227.9217** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

### 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0857 | 0.0589 | 0.8056 | 2.2900e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 6.7100e-003 | | 227.9217 |
| **Total** | **0.0857** | **0.0589** | **0.8056** | **2.2900e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **227.7540** | **227.7540** | **6.7100e-003** | | **227.9217** |

01-28 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 6.0600e-003 | | 219.8941 |
| **Total** | **0.0803** | **0.0532** | **0.7432** | **2.2100e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **219.7425** | **219.7425** | **6.0600e-003** | | **219.8941** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

### 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 6.0600e-003 | | 219.8941 |
| **Total** | **0.0803** | **0.0532** | **0.7432** | **2.2100e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **219.7425** | **219.7425** | **6.0600e-003** | | **219.8941** |

01-28 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 3.2162 | 2.1318 | 29.7654 | 0.0883 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,800.6857 | 8,800.6857 | 0.2429 | | 8,806.7582 |
| **Total** | **3.6242** | **15.3350** | **33.1995** | **0.1247** | **9.8688** | **0.0949** | **9.9637** | **2.6381** | **0.0883** | **2.7263** | | **12,697.2339** | **12,697.2339** | **0.4665** | | **12,708.8966** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

### 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 3.2162 | 2.1318 | 29.7654 | 0.0883 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,800.6857 | 8,800.6857 | 0.2429 | | 8,806.7582 |
| **Total** | **3.6242** | **15.3350** | **33.1995** | **0.1247** | **9.8688** | **0.0949** | **9.9637** | **2.6381** | **0.0883** | **2.7263** | | **12,697.2339** | **12,697.2339** | **0.4665** | | **12,708.8966** |

01-28 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 3.0203 | 1.9287 | 27.4113 | 0.0851 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 8,478.4408 | 8,478.4408 | 0.2190 | | 8,483.9160 |
| **Total** | **3.3229** | **11.9468** | **30.5127** | **0.1203** | **9.8688** | **0.0797** | **9.9485** | **2.6381** | **0.0738** | **2.7118** | | **12,252.3170** | **12,252.3170** | **0.4172** | | **12,262.7460** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

01-28 Cont.

### 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 3.0203 | 1.9287 | 27.4113 | 0.0851 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 8,478.4408 | 8,478.4408 | 0.2190 | | 8,483.9160 |
| **Total** | **3.3229** | **11.9468** | **30.5127** | **0.1203** | **9.8688** | **0.0797** | **9.9485** | **2.6381** | **0.0738** | **2.7118** | | **12,252.3170** | **12,252.3170** | **0.4172** | | **12,262.7460** |

01-28 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0566 | 0.0361 | 0.5133 | 1.5900e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |
| **Total** | **0.0566** | **0.0361** | **0.5133** | **1.5900e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **158.7723** | **158.7723** | **4.1000e-003** | | **158.8748** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

01-28 Cont.

### 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0566 | 0.0361 | 0.5133 | 1.5900e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |
| **Total** | **0.0566** | **0.0361** | **0.5133** | **1.5900e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **158.7723** | **158.7723** | **4.1000e-003** | | **158.8748** |

01-28 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0535 | 0.0329 | 0.4785 | 1.5400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |
| **Total** | **0.0535** | **0.0329** | **0.4785** | **1.5400e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **153.8517** | **153.8517** | **3.7600e-003** | | **153.9458** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

01-28 Cont.

### 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0535 | 0.0329 | 0.4785 | 1.5400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |
| **Total** | **0.0535** | **0.0329** | **0.4785** | **1.5400e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **153.8517** | **153.8517** | **3.7600e-003** | | **153.9458** |

01-28 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5707 | 0.3513 | 5.1044 | 0.0165 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.0852 | 1,641.0852 | 0.0401 | | 1,642.0886 |
| **Total** | **0.5707** | **0.3513** | **5.1044** | **0.0165** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,641.0852** | **1,641.0852** | **0.0401** | | **1,642.0886** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5707 | 0.3513 | 5.1044 | 0.0165 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.0852 | 1,641.0852 | 0.0401 | | 1,642.0886 |
| **Total** | **0.5707** | **0.3513** | **5.1044** | **0.0165** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,641.0852** | **1,641.0852** | **0.0401** | | **1,642.0886** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

01-28 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| Unmitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |

01-28 Cont.

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

01-28
Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

01-28 Cont.

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

01-28 Cont.

### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

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## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

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Cont.

### 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

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## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

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Cont.

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

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### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

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| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

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Cont.

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2865 | 46.4651 | 31.6150 | 0.0642 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,221.4937 | 6,221.4937 | 1.9491 | 0.0000 | 6,270.2214 |
| 2022 | 5.7218 | 38.9024 | 47.3319 | 0.1455 | 9.8688 | 1.6366 | 10.7736 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 14,630.3099 | 14,630.3099 | 1.9499 | 0.0000 | 14,657.2663 |
| 2023 | 5.2705 | 26.4914 | 44.5936 | 0.1413 | 9.8688 | 0.7800 | 10.6488 | 2.6381 | 0.7328 | 3.3708 | 0.0000 | 14,210.3424 | 14,210.3424 | 1.0230 | 0.0000 | 14,235.9160 |
| 2024 | 237.2328 | 9.5610 | 15.0611 | 0.0243 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,352.4178 | 2,352.4178 | 0.7175 | 0.0000 | 2,370.3550 |
| **Maximum** | **237.2328** | **46.4651** | **47.3319** | **0.1455** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **14,630.3099** | **14,630.3099** | **1.9499** | **0.0000** | **14,657.2663** |

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## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2865 | 46.4651 | 31.6150 | 0.0642 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,221.4937 | 6,221.4937 | 1.9491 | 0.0000 | 6,270.2214 |
| 2022 | 5.7218 | 38.9024 | 47.3319 | 0.1455 | 9.8688 | 1.6366 | 10.7736 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 14,630.3099 | 14,630.3099 | 1.9499 | 0.0000 | 14,657.2663 |
| 2023 | 5.2705 | 26.4914 | 44.5936 | 0.1413 | 9.8688 | 0.7800 | 10.6488 | 2.6381 | 0.7328 | 3.3708 | 0.0000 | 14,210.3424 | 14,210.3424 | 1.0230 | 0.0000 | 14,235.9160 |
| 2024 | 237.2328 | 9.5610 | 15.0611 | 0.0243 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,352.4178 | 2,352.4178 | 0.7175 | 0.0000 | 2,370.3550 |
| **Maximum** | **237.2328** | **46.4651** | **47.3319** | **0.1455** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **14,630.3099** | **14,630.3099** | **1.9499** | **0.0000** | **14,657.2663** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

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## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

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**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

01-28 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

01-28 Cont.

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

### 3.1 Mitigation Measures Construction

01-28
Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0715 | 0.0489 | 0.5524 | 1.6100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 160.8377 | 160.8377 | 4.7300e-003 | | 160.9560 |
| **Total** | **0.2019** | **4.1943** | **1.5706** | **0.0133** | **0.4346** | **0.0141** | **0.4487** | **0.1176** | **0.0135** | **0.1311** | | **1,430.6932** | **1,430.6932** | **0.0955** | | **1,433.0812** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

### 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0715 | 0.0489 | 0.5524 | 1.6100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 160.8377 | 160.8377 | 4.7300e-003 | | 160.9560 |
| **Total** | **0.2019** | **4.1943** | **1.5706** | **0.0133** | **0.4346** | **0.0141** | **0.4487** | **0.1176** | **0.0135** | **0.1311** | | **1,430.6932** | **1,430.6932** | **0.0955** | | **1,433.0812** |

01-28 Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| **Total** | **0.0858** | **0.0587** | **0.6629** | **1.9400e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **193.0052** | **193.0052** | **5.6800e-003** | | **193.1472** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

01-28 Cont.

### 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| **Total** | **0.0858** | **0.0587** | **0.6629** | **1.9400e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **193.0052** | **193.0052** | **5.6800e-003** | | **193.1472** |

01-28 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |
| **Total** | **0.0954** | **0.0652** | **0.7365** | **2.1500e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **214.4502** | **214.4502** | **6.3100e-003** | | **214.6080** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

### 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |
| **Total** | **0.0954** | **0.0652** | **0.7365** | **2.1500e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **214.4502** | **214.4502** | **6.3100e-003** | | **214.6080** |

01-28 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0896 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |
| **Total** | **0.0896** | **0.0589** | **0.6784** | **2.0800e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **206.9139** | **206.9139** | **5.7000e-003** | | **207.0563** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

### 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0896 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |
| **Total** | **0.0896** | **0.0589** | **0.6784** | **2.0800e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **206.9139** | **206.9139** | **5.7000e-003** | | **207.0563** |

01-28 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 3.5872 | 2.3593 | 27.1680 | 0.0832 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,286.9013 | 8,286.9013 | 0.2282 | | 8,292.6058 |
| **Total** | **4.0156** | **15.5266** | **30.9685** | **0.1186** | **9.8688** | **0.0957** | **9.9645** | **2.6381** | **0.0891** | **2.7271** | | **12,075.9763** | **12,075.9763** | **0.4663** | | **12,087.6341** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

### 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 3.5872 | 2.3593 | 27.1680 | 0.0832 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,286.9013 | 8,286.9013 | 0.2282 | | 8,292.6058 |
| **Total** | **4.0156** | **15.5266** | **30.9685** | **0.1186** | **9.8688** | **0.0957** | **9.9645** | **2.6381** | **0.0891** | **2.7271** | | **12,075.9763** | **12,075.9763** | **0.4663** | | **12,087.6341** |

01-28 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 3.3795 | 2.1338 | 24.9725 | 0.0801 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 7,983.7318 | 7,983.7318 | 0.2055 | | 7,988.8683 |
| **Total** | **3.6978** | **12.1065** | **28.3496** | **0.1144** | **9.8688** | **0.0803** | **9.9491** | **2.6381** | **0.0743** | **2.7124** | | **11,655.1325** | **11,655.1325** | **0.4151** | | **11,665.5099** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

### 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 3.3795 | 2.1338 | 24.9725 | 0.0801 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 7,983.7318 | 7,983.7318 | 0.2055 | | 7,988.8683 |
| **Total** | **3.6978** | **12.1065** | **28.3496** | **0.1144** | **9.8688** | **0.0803** | **9.9491** | **2.6381** | **0.0743** | **2.7124** | | **11,655.1325** | **11,655.1325** | **0.4151** | | **11,665.5099** |

01-28 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |
| **Total** | **0.0633** | **0.0400** | **0.4677** | **1.5000e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **149.5081** | **149.5081** | **3.8500e-003** | | **149.6043** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

01-28 Cont.

### 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |
| **Total** | **0.0633** | **0.0400** | **0.4677** | **1.5000e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **149.5081** | **149.5081** | **3.8500e-003** | | **149.6043** |

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Cont.

### 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0601 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |
| **Total** | **0.0601** | **0.0364** | **0.4354** | **1.4500e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **144.8706** | **144.8706** | **3.5300e-003** | | **144.9587** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

### 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0601 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |
| **Total** | **0.0601** | **0.0364** | **0.4354** | **1.4500e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **144.8706** | **144.8706** | **3.5300e-003** | | **144.9587** |

01-28 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.6406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2262 |
| **Total** | **0.6406** | **0.3886** | **4.6439** | **0.0155** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,545.2860** | **1,545.2860** | **0.0376** | | **1,546.2262** |

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**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.6406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2262 |
| **Total** | **0.6406** | **0.3886** | **4.6439** | **0.0155** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,545.2860** | **1,545.2860** | **0.0376** | | **1,546.2262** |

01-28 Cont.

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| Unmitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |

01-28 Cont.

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

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Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

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## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

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### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

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## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

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Cont.

### 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

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## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

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Cont.

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

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### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

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| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

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## 2.0 Emissions Summary

## 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1704 | 1.8234 | 1.1577 | 2.3800e-003 | 0.4141 | 0.0817 | 0.4958 | 0.1788 | 0.0754 | 0.2542 | 0.0000 | 210.7654 | 210.7654 | 0.0600 | 0.0000 | 212.2661 |
| 2022 | 0.5865 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.6554 | 1,418.6554 | 0.1215 | 0.0000 | 1,421.6925 |
| 2023 | 0.5190 | 3.2850 | 4.7678 | 0.0147 | 0.8497 | 0.0971 | 0.9468 | 0.2283 | 0.0912 | 0.3195 | 0.0000 | 1,342.4412 | 1,342.4412 | 0.1115 | 0.0000 | 1,345.2291 |
| 2024 | 4.1592 | 0.1313 | 0.2557 | 5.0000e-004 | 0.0221 | 6.3900e-003 | 0.0285 | 5.8700e-003 | 5.9700e-003 | 0.0118 | 0.0000 | 44.6355 | 44.6355 | 7.8300e-003 | 0.0000 | 44.8311 |
| **Maximum** | **4.1592** | **4.0240** | **5.1546** | **0.0155** | **0.9509** | **0.1175** | **1.0683** | **0.2518** | **0.1103** | **0.3621** | **0.0000** | **1,418.6554** | **1,418.6554** | **0.1215** | **0.0000** | **1,421.6925** |

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## 2.1 Overall Construction

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1704 | 1.8234 | 1.1577 | 2.3800e-003 | 0.4141 | 0.0817 | 0.4958 | 0.1788 | 0.0754 | 0.2542 | 0.0000 | 210.7651 | 210.7651 | 0.0600 | 0.0000 | 212.2658 |
| 2022 | 0.5865 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.6550 | 1,418.6550 | 0.1215 | 0.0000 | 1,421.6921 |
| 2023 | 0.5190 | 3.2850 | 4.7678 | 0.0147 | 0.8497 | 0.0971 | 0.9468 | 0.2283 | 0.0912 | 0.3195 | 0.0000 | 1,342.4409 | 1,342.4409 | 0.1115 | 0.0000 | 1,345.2287 |
| 2024 | 4.1592 | 0.1313 | 0.2557 | 5.0000e-004 | 0.0221 | 6.3900e-003 | 0.0285 | 5.8700e-003 | 5.9700e-003 | 0.0118 | 0.0000 | 44.6354 | 44.6354 | 7.8300e-003 | 0.0000 | 44.8311 |
| **Maximum** | **4.1592** | **4.0240** | **5.1546** | **0.0155** | **0.9509** | **0.1175** | **1.0683** | **0.2518** | **0.1103** | **0.3621** | **0.0000** | **1,418.6550** | **1,418.6550** | **0.1215** | **0.0000** | **1,421.6921** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| 1 | 9-1-2021 | 11-30-2021 | 1.4091 | 1.4091 |
| 2 | 12-1-2021 | 2-28-2022 | 1.3329 | 1.3329 |
| 3 | 3-1-2022 | 5-31-2022 | 1.1499 | 1.1499 |
| 4 | 6-1-2022 | 8-31-2022 | 1.1457 | 1.1457 |
| 5 | 9-1-2022 | 11-30-2022 | 1.1415 | 1.1415 |
| 6 | 12-1-2022 | 2-28-2023 | 1.0278 | 1.0278 |
| 7 | 3-1-2023 | 5-31-2023 | 0.9868 | 0.9868 |
| 8 | 6-1-2023 | 8-31-2023 | 0.9831 | 0.9831 |

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| | | | | |
|---|---|---|---|---|
| **9** | **9-1-2023** | **11-30-2023** | 0.9798 | 0.9798 |
| **10** | **12-1-2023** | **2-29-2024** | 2.8757 | 2.8757 |
| **11** | **3-1-2024** | **5-31-2024** | 1.6188 | 1.6188 |
| | | **Highest** | 2.8757 | 2.8757 |

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

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## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

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**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

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Cont.

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

### 3.1 Mitigation Measures Construction

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Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0012** | **51.0012** | **0.0144** | **0.0000** | **51.3601** |

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 5.3000e-004 | 6.0900e-003 | 2.0000e-005 | 1.6800e-003 | 1.0000e-005 | 1.6900e-003 | 4.5000e-004 | 1.0000e-005 | 4.6000e-004 | 0.0000 | 1.5281 | 1.5281 | 5.0000e-005 | 0.0000 | 1.5293 |
| **Total** | **2.6500e-003** | **0.0639** | **0.0209** | **2.0000e-004** | **5.6200e-003** | **2.0000e-004** | **5.8200e-003** | **1.5300e-003** | **1.9000e-004** | **1.7200e-003** | **0.0000** | **18.9847** | **18.9847** | **1.2600e-003** | **0.0000** | **19.0161** |

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**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0011** | **51.0011** | **0.0144** | **0.0000** | **51.3600** |

### 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 5.3000e-004 | 6.0900e-003 | 2.0000e-005 | 1.6800e-003 | 1.0000e-005 | 1.6900e-003 | 4.5000e-004 | 1.0000e-005 | 4.6000e-004 | 0.0000 | 1.5281 | 1.5281 | 5.0000e-005 | 0.0000 | 1.5293 |
| **Total** | **2.6500e-003** | **0.0639** | **0.0209** | **2.0000e-004** | **5.6200e-003** | **2.0000e-004** | **5.8200e-003** | **1.5300e-003** | **1.9000e-004** | **1.7200e-003** | **0.0000** | **18.9847** | **18.9847** | **1.2600e-003** | **0.0000** | **19.0161** |

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Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7061** |

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3500e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |
| **Total** | **5.8000e-004** | **4.3000e-004** | **4.8700e-003** | **1.0000e-005** | **1.3400e-003** | **1.0000e-005** | **1.3500e-003** | **3.6000e-004** | **1.0000e-005** | **3.7000e-004** | **0.0000** | **1.2225** | **1.2225** | **4.0000e-005** | **0.0000** | **1.2234** |

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**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7060** |

### 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3500e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |
| **Total** | **5.8000e-004** | **4.3000e-004** | **4.8700e-003** | **1.0000e-005** | **1.3400e-003** | **1.0000e-005** | **1.3500e-003** | **3.6000e-004** | **1.0000e-005** | **3.7000e-004** | **0.0000** | **1.2225** | **1.2225** | **4.0000e-005** | **0.0000** | **1.2234** |

01-28 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3776 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5405** | **103.5405** | **0.0335** | **0.0000** | **104.3776** |

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8600e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |
| **Total** | **1.2200e-003** | **9.0000e-004** | **0.0103** | **3.0000e-005** | **2.8300e-003** | **2.0000e-005** | **2.8600e-003** | **7.5000e-004** | **2.0000e-005** | **7.8000e-004** | **0.0000** | **2.5808** | **2.5808** | **8.0000e-005** | **0.0000** | **2.5828** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5403** | **103.5403** | **0.0335** | **0.0000** | **104.3775** |

### 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8600e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |
| **Total** | **1.2200e-003** | **9.0000e-004** | **0.0103** | **3.0000e-005** | **2.8300e-003** | **2.0000e-005** | **2.8600e-003** | **7.5000e-004** | **2.0000e-005** | **7.8000e-004** | **0.0000** | **2.5808** | **2.5808** | **8.0000e-005** | **0.0000** | **2.5828** |

01-28 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |
| **Total** | **2.1000e-004** | **1.5000e-004** | **1.7400e-003** | **1.0000e-005** | **5.2000e-004** | **0.0000** | **5.3000e-004** | **1.4000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4587** | **0.4587** | **1.0000e-005** | **0.0000** | **0.4590** |

01-28
Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

### 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |
| **Total** | **2.1000e-004** | **1.5000e-004** | **1.7400e-003** | **1.0000e-005** | **5.2000e-004** | **0.0000** | **5.3000e-004** | **1.4000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4587** | **0.4587** | **1.0000e-005** | **0.0000** | **0.4590** |

01-28 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1324** | **293.1324** | **0.0702** | **0.0000** | **294.8881** |

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.3051 | 0.2164 | 2.5233 | 7.3500e-003 | 0.7557 | 6.2300e-003 | 0.7619 | 0.2007 | 5.7400e-003 | 0.2065 | 0.0000 | 663.9936 | 663.9936 | 0.0187 | 0.0000 | 664.4604 |
| **Total** | **0.3578** | **1.9125** | **2.9812** | **0.0119** | **0.8696** | **9.4100e-003** | **0.8790** | **0.2336** | **8.7800e-003** | **0.2424** | **0.0000** | **1,105.9771** | **1,105.9771** | **0.0451** | **0.0000** | **1,107.1039** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1321** | **293.1321** | **0.0702** | **0.0000** | **294.8877** |

### 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.3051 | 0.2164 | 2.5233 | 7.3500e-003 | 0.7557 | 6.2300e-003 | 0.7619 | 0.2007 | 5.7400e-003 | 0.2065 | 0.0000 | 663.9936 | 663.9936 | 0.0187 | 0.0000 | 664.4604 |
| **Total** | **0.3578** | **1.9125** | **2.9812** | **0.0119** | **0.8696** | **9.4100e-003** | **0.8790** | **0.2336** | **8.7800e-003** | **0.2424** | **0.0000** | **1,105.9771** | **1,105.9771** | **0.0451** | **0.0000** | **1,107.1039** |

01-28 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2789** | **286.2789** | **0.0681** | **0.0000** | **287.9814** |

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.2795 | 0.1910 | 2.2635 | 6.9100e-003 | 0.7377 | 5.9100e-003 | 0.7436 | 0.1960 | 5.4500e-003 | 0.2014 | 0.0000 | 624.5363 | 624.5363 | 0.0164 | 0.0000 | 624.9466 |
| **Total** | **0.3177** | **1.4420** | **2.6646** | **0.0112** | **0.8490** | **7.3700e-003** | **0.8564** | **0.2281** | **6.8500e-003** | **0.2349** | **0.0000** | **1,042.5294** | **1,042.5294** | **0.0392** | **0.0000** | **1,043.5090** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2785** | **286.2785** | **0.0681** | **0.0000** | **287.9811** |

### 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.2795 | 0.1910 | 2.2635 | 6.9100e-003 | 0.7377 | 5.9100e-003 | 0.7436 | 0.1960 | 5.4500e-003 | 0.2014 | 0.0000 | 624.5363 | 624.5363 | 0.0164 | 0.0000 | 624.9466 |
| **Total** | **0.3177** | **1.4420** | **2.6646** | **0.0112** | **0.8490** | **7.3700e-003** | **0.8564** | **0.2281** | **6.8500e-003** | **0.2349** | **0.0000** | **1,042.5294** | **1,042.5294** | **0.0392** | **0.0000** | **1,043.5090** |

01-28 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |
| **Total** | **2.8000e-004** | **1.9000e-004** | **2.2300e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.6156** | **0.6156** | **2.0000e-005** | **0.0000** | **0.6160** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

### 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |
| **Total** | **2.8000e-004** | **1.9000e-004** | **2.2300e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.6156** | **0.6156** | **2.0000e-005** | **0.0000** | **0.6160** |

01-28
Cont.

### 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |
| **Total** | **4.4000e-004** | **2.9000e-004** | **3.5100e-003** | **1.0000e-005** | **1.2300e-003** | **1.0000e-005** | **1.2400e-003** | **3.3000e-004** | **1.0000e-005** | **3.4000e-004** | **0.0000** | **1.0094** | **1.0094** | **3.0000e-005** | **0.0000** | **1.0100** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

### 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |
| **Total** | **4.4000e-004** | **2.9000e-004** | **3.5100e-003** | **1.0000e-005** | **1.2300e-003** | **1.0000e-005** | **1.2400e-003** | **3.3000e-004** | **1.0000e-005** | **3.4000e-004** | **0.0000** | **1.0094** | **1.0094** | **3.0000e-005** | **0.0000** | **1.0100** |

01-28 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |
| **Total** | **7.4800e-003** | **4.9300e-003** | **0.0596** | **1.9000e-004** | **0.0209** | **1.6000e-004** | **0.0211** | **5.5500e-003** | **1.5000e-004** | **5.7000e-003** | **0.0000** | **17.1287** | **17.1287** | **4.3000e-004** | **0.0000** | **17.1394** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |
| **Total** | **7.4800e-003** | **4.9300e-003** | **0.0596** | **1.9000e-004** | **0.0209** | **1.6000e-004** | **0.0211** | **5.5500e-003** | **1.5000e-004** | **5.7000e-003** | **0.0000** | **17.1287** | **17.1287** | **4.3000e-004** | **0.0000** | **17.1394** |

01-28 Cont.

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Unmitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |

01-28 Cont.

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

01-28 Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| NaturalGas Mitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |
| NaturalGas Unmitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |

01-28 Cont.

### 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

01-28 Cont.

### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

01-28 Cont.

### 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

01-28 Cont.

### 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

01-28 Cont.

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Unmitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

01-28
Cont.

### 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

01-28 Cont.

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Unmitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |

01-28
Cont.

### 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

01-28 Cont.

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

01-28 Cont.

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Unmitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |

01-28
Cont.

### 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

01-28 Cont.

### 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

01-28 Cont.

### 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

### 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

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Cont.

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

01-28 Cont.

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

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| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

01-28 Cont.

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2561 | 46.4415 | 31.4494 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,163.4166 | 6,163.4166 | 1.9475 | 0.0000 | 6,212.1039 |
| 2022 | 4.5441 | 38.8811 | 40.8776 | 0.1240 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,493.4403 | 12,493.4403 | 1.9485 | 0.0000 | 12,518.5707 |
| 2023 | 4.1534 | 25.7658 | 38.7457 | 0.1206 | 7.0088 | 0.7592 | 7.7679 | 1.8799 | 0.7136 | 2.5935 | 0.0000 | 12,150.4890 | 12,150.4890 | 0.9589 | 0.0000 | 12,174.4615 |
| 2024 | 237.0219 | 9.5478 | 14.9642 | 0.0239 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,313.1808 | 2,313.1808 | 0.7166 | 0.0000 | 2,331.0956 |
| **Maximum** | **237.0219** | **46.4415** | **40.8776** | **0.1240** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,493.4403** | **12,493.4403** | **1.9485** | **0.0000** | **12,518.5707** |

01-28 Cont.

## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2561 | 46.4415 | 31.4494 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,163.4166 | 6,163.4166 | 1.9475 | 0.0000 | 6,212.1039 |
| 2022 | 4.5441 | 38.8811 | 40.8776 | 0.1240 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,493.4403 | 12,493.4403 | 1.9485 | 0.0000 | 12,518.5707 |
| 2023 | 4.1534 | 25.7658 | 38.7457 | 0.1206 | 7.0088 | 0.7592 | 7.7679 | 1.8799 | 0.7136 | 2.5935 | 0.0000 | 12,150.4890 | 12,150.4890 | 0.9589 | 0.0000 | 12,174.4615 |
| 2024 | 237.0219 | 9.5478 | 14.9642 | 0.0239 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,313.1808 | 2,313.1808 | 0.7166 | 0.0000 | 2,331.0955 |
| **Maximum** | **237.0219** | **46.4415** | **40.8776** | **0.1240** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,493.4403** | **12,493.4403** | **1.9485** | **0.0000** | **12,518.5707** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

01-28 Cont.

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

01-28 Cont.

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

01-28 Cont.

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

01-28
Cont.

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

### 3.1 Mitigation Measures Construction

01-28
Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0487 | 0.0313 | 0.4282 | 1.1800e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 117.2799 | 117.2799 | 3.5200e-003 | | 117.3678 |
| **Total** | **0.1760** | **4.1265** | **1.3884** | **0.0131** | **0.3810** | **0.0135** | **0.3946** | **0.1034** | **0.0129** | **0.1163** | | **1,409.5212** | **1,409.5212** | **0.0912** | | **1,411.8015** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

### 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0487 | 0.0313 | 0.4282 | 1.1800e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 117.2799 | 117.2799 | 3.5200e-003 | | 117.3678 |
| **Total** | **0.1760** | **4.1265** | **1.3884** | **0.0131** | **0.3810** | **0.0135** | **0.3946** | **0.1034** | **0.0129** | **0.1163** | | **1,409.5212** | **1,409.5212** | **0.0912** | | **1,411.8015** |

01-28 Cont.

### 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |
| **Total** | **0.0584** | **0.0375** | **0.5139** | **1.4100e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **140.7359** | **140.7359** | **4.2200e-003** | | **140.8414** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

### 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |
| **Total** | **0.0584** | **0.0375** | **0.5139** | **1.4100e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **140.7359** | **140.7359** | **4.2200e-003** | | **140.8414** |

01-28 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 156.3732 | 156.3732 | 4.6900e-003 | | 156.4904 |
| **Total** | **0.0649** | **0.0417** | **0.5710** | **1.5700e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **156.3732** | **156.3732** | **4.6900e-003** | | **156.4904** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

### 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 156.3732 | 156.3732 | 4.6900e-003 | | 156.4904 |
| **Total** | **0.0649** | **0.0417** | **0.5710** | **1.5700e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **156.3732** | **156.3732** | **4.6900e-003** | | **156.4904** |

01-28 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0607 | 0.0376 | 0.5263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |
| **Total** | **0.0607** | **0.0376** | **0.5263** | **1.5100e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **150.8754** | **150.8754** | **4.2400e-003** | | **150.9813** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

### 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0607 | 0.0376 | 0.5263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |
| **Total** | **0.0607** | **0.0376** | **0.5263** | **1.5100e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **150.8754** | **150.8754** | **4.2400e-003** | | **150.9813** |

01-28 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 2.4299 | 1.5074 | 21.0801 | 0.0607 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 6,042.5585 | 6,042.5585 | 0.1697 | | 6,046.8000 |
| **Total** | **2.8378** | **14.7106** | **24.5142** | **0.0971** | **7.0087** | **0.0741** | **7.0828** | **1.8799** | **0.0691** | **1.9490** | | **9,939.1067** | **9,939.1067** | **0.3933** | | **9,948.9384** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

### 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 2.4299 | 1.5074 | 21.0801 | 0.0607 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 6,042.5585 | 6,042.5585 | 0.1697 | | 6,046.8000 |
| **Total** | **2.8378** | **14.7106** | **24.5142** | **0.0971** | **7.0087** | **0.0741** | **7.0828** | **1.8799** | **0.0691** | **1.9490** | | **9,939.1067** | **9,939.1067** | **0.3933** | | **9,948.9384** |

01-28 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 2.2780 | 1.3628 | 19.4002 | 0.0584 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,821.4028 | 5,821.4028 | 0.1529 | | 5,825.2254 |
| **Total** | **2.5807** | **11.3809** | **22.5017** | **0.0936** | **7.0088** | **0.0595** | **7.0682** | **1.8799** | **0.0552** | **1.9350** | | **9,595.2790** | **9,595.2790** | **0.3511** | | **9,604.0554** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

01-28 Cont.

### 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 2.2780 | 1.3628 | 19.4002 | 0.0584 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,821.4028 | 5,821.4028 | 0.1529 | | 5,825.2254 |
| **Total** | **2.5807** | **11.3809** | **22.5017** | **0.0936** | **7.0088** | **0.0595** | **7.0682** | **1.8799** | **0.0552** | **1.9350** | | **9,595.2790** | **9,595.2790** | **0.3511** | | **9,604.0554** |

01-28 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0427 | 0.0255 | 0.3633 | 1.0900e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |
| **Total** | **0.0427** | **0.0255** | **0.3633** | **1.0900e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **109.0150** | **109.0150** | **2.8600e-003** | | **109.0866** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

### 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0427 | 0.0255 | 0.3633 | 1.0900e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |
| **Total** | **0.0427** | **0.0255** | **0.3633** | **1.0900e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **109.0150** | **109.0150** | **2.8600e-003** | | **109.0866** |

01-28 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0403 | 0.0233 | 0.3384 | 1.0600e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |
| **Total** | **0.0403** | **0.0233** | **0.3384** | **1.0600e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **105.6336** | **105.6336** | **2.6300e-003** | | **105.6992** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

### 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0403 | 0.0233 | 0.3384 | 1.0600e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |
| **Total** | **0.0403** | **0.0233** | **0.3384** | **1.0600e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **105.6336** | **105.6336** | **2.6300e-003** | | **105.6992** |

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### 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,126.7583 | 1,126.7583 | 0.0280 | | 1,127.4583 |
| **Total** | **0.4296** | **0.2481** | **3.6098** | **0.0113** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,126.7583** | **1,126.7583** | **0.0280** | | **1,127.4583** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,126.7583 | 1,126.7583 | 0.0280 | | 1,127.4583 |
| **Total** | **0.4296** | **0.2481** | **3.6098** | **0.0113** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,126.7583** | **1,126.7583** | **0.0280** | | **1,127.4583** |

01-28 Cont.

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| Unmitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |

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### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

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Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

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## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

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### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

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## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

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Cont.

### 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

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## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

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Cont.

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

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### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

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| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

01-28 Cont.

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2621 | 46.4460 | 31.4068 | 0.0635 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,154.3377 | 6,154.3377 | 1.9472 | 0.0000 | 6,203.0186 |
| 2022 | 4.7966 | 38.8851 | 39.6338 | 0.1195 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,035.3440 | 12,035.3440 | 1.9482 | 0.0000 | 12,060.6013 |
| 2023 | 4.3939 | 25.8648 | 37.5031 | 0.1162 | 7.0088 | 0.7598 | 7.7685 | 1.8799 | 0.7142 | 2.5940 | 0.0000 | 11,710.4080 | 11,710.4080 | 0.9617 | 0.0000 | 11,734.4497 |
| 2024 | 237.0656 | 9.5503 | 14.9372 | 0.0238 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,307.0517 | 2,307.0517 | 0.7164 | 0.0000 | 2,324.9627 |
| **Maximum** | **237.0656** | **46.4460** | **39.6338** | **0.1195** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,035.3440** | **12,035.3440** | **1.9482** | **0.0000** | **12,060.6013** |

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## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2621 | 46.4460 | 31.4068 | 0.0635 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,154.3377 | 6,154.3377 | 1.9472 | 0.0000 | 6,203.0186 |
| 2022 | 4.7966 | 38.8851 | 39.6338 | 0.1195 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,035.3440 | 12,035.3440 | 1.9482 | 0.0000 | 12,060.6013 |
| 2023 | 4.3939 | 25.8648 | 37.5031 | 0.1162 | 7.0088 | 0.7598 | 7.7685 | 1.8799 | 0.7142 | 2.5940 | 0.0000 | 11,710.4080 | 11,710.4080 | 0.9617 | 0.0000 | 11,734.4497 |
| 2024 | 237.0656 | 9.5503 | 14.9372 | 0.0238 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,307.0517 | 2,307.0517 | 0.7164 | 0.0000 | 2,324.9627 |
| **Maximum** | **237.0656** | **46.4460** | **39.6338** | **0.1195** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,035.3440** | **12,035.3440** | **1.9482** | **0.0000** | **12,060.6013** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

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## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

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**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

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Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

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Cont.

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

### 3.1 Mitigation Measures Construction

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Cont.

### 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

### 3.2 Demolition - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0532 | 0.0346 | 0.3963 | 1.1100e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 110.4707 | 110.4707 | 3.3300e-003 | | 110.5539 |
| **Total** | **0.1835** | **4.1800** | **1.4144** | **0.0128** | **0.3810** | **0.0137** | **0.3948** | **0.1034** | **0.0131** | **0.1165** | | **1,380.3262** | **1,380.3262** | **0.0941** | | **1,382.6791** |

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**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

### 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0532 | 0.0346 | 0.3963 | 1.1100e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 110.4707 | 110.4707 | 3.3300e-003 | | 110.5539 |
| **Total** | **0.1835** | **4.1800** | **1.4144** | **0.0128** | **0.3810** | **0.0137** | **0.3948** | **0.1034** | **0.0131** | **0.1165** | | **1,380.3262** | **1,380.3262** | **0.0941** | | **1,382.6791** |

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### 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

### 3.3 Site Preparation - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0638 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |
| **Total** | **0.0638** | **0.0415** | **0.4755** | **1.3300e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **132.5649** | **132.5649** | **3.9900e-003** | | **132.6646** |

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**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

### 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0638 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |
| **Total** | **0.0638** | **0.0415** | **0.4755** | **1.3300e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **132.5649** | **132.5649** | **3.9900e-003** | | **132.6646** |

01-28 Cont.

### 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

### 3.4 Grading - 2021

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |
| **Total** | **0.0709** | **0.0462** | **0.5284** | **1.4800e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **147.2943** | **147.2943** | **4.4300e-003** | | **147.4051** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

### 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |
| **Total** | **0.0709** | **0.0462** | **0.5284** | **1.4800e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **147.2943** | **147.2943** | **4.4300e-003** | | **147.4051** |

01-28 Cont.

### 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

### 3.4 Grading - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |
| **Total** | **0.0665** | **0.0416** | **0.4861** | **1.4300e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **142.1207** | **142.1207** | **4.0000e-003** | | **142.2207** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

### 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |
| **Total** | **0.0665** | **0.0416** | **0.4861** | **1.4300e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **142.1207** | **142.1207** | **4.0000e-003** | | **142.2207** |

01-28 Cont.

### 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

### 3.5 Building Construction - 2022

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 2.6620 | 1.6677 | 19.4699 | 0.0571 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 5,691.9354 | 5,691.9354 | 0.1602 | | 5,695.9408 |
| **Total** | **3.0904** | **14.8350** | **23.2704** | **0.0926** | **7.0087** | **0.0749** | **7.0836** | **1.8799** | **0.0699** | **1.9498** | | **9,481.0104** | **9,481.0104** | **0.3984** | | **9,490.9691** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

### 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 2.6620 | 1.6677 | 19.4699 | 0.0571 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 5,691.9354 | 5,691.9354 | 0.1602 | | 5,695.9408 |
| **Total** | **3.0904** | **14.8350** | **23.2704** | **0.0926** | **7.0087** | **0.0749** | **7.0836** | **1.8799** | **0.0699** | **1.9498** | | **9,481.0104** | **9,481.0104** | **0.3984** | | **9,490.9691** |

01-28 Cont.

### 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

### 3.5 Building Construction - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 2.5029 | 1.5073 | 17.8820 | 0.0550 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,483.7974 | 5,483.7974 | 0.1442 | | 5,487.4020 |
| **Total** | **2.8211** | **11.4799** | **21.2591** | **0.0893** | **7.0088** | **0.0601** | **7.0688** | **1.8799** | **0.0557** | **1.9356** | | **9,155.1981** | **9,155.1981** | **0.3538** | | **9,164.0437** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

01-28 Cont.

### 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 2.5029 | 1.5073 | 17.8820 | 0.0550 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,483.7974 | 5,483.7974 | 0.1442 | | 5,487.4020 |
| **Total** | **2.8211** | **11.4799** | **21.2591** | **0.0893** | **7.0088** | **0.0601** | **7.0688** | **1.8799** | **0.0557** | **1.9356** | | **9,155.1981** | **9,155.1981** | **0.3538** | | **9,164.0437** |

01-28 Cont.

### 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

### 3.6 Paving - 2023

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |
| **Total** | **0.0469** | **0.0282** | **0.3349** | **1.0300e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **102.6928** | **102.6928** | **2.7000e-003** | | **102.7603** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

### 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |
| **Total** | **0.0469** | **0.0282** | **0.3349** | **1.0300e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **102.6928** | **102.6928** | **2.7000e-003** | | **102.7603** |

01-28 Cont.

### 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | | lb/day | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

### 3.6 Paving - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0444 | 0.0257 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |
| **Total** | **0.0444** | **0.0257** | **0.3114** | **1.0000e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **99.5045** | **99.5045** | **2.4700e-003** | | **99.5663** |

01-28 Cont.

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

### 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0444 | 0.0257 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |
| **Total** | **0.0444** | **0.0257** | **0.3114** | **1.0000e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **99.5045** | **99.5045** | **2.4700e-003** | | **99.5663** |

01-28 Cont.

### 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,061.3818 | 1,061.3818 | 0.0264 | | 1,062.0410 |
| **Total** | **0.4734** | **0.2743** | **3.3220** | **0.0107** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,061.3818** | **1,061.3818** | **0.0264** | | **1,062.0410** |

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

01-28 Cont.

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,061.3818 | 1,061.3818 | 0.0264 | | 1,062.0410 |
| **Total** | **0.4734** | **0.2743** | **3.3220** | **0.0107** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,061.3818** | **1,061.3818** | **0.0264** | | **1,062.0410** |

01-28 Cont.

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| Unmitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |

01-28 Cont.

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

01-28
Cont.

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

01-28 Cont.

### 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | | lb/day | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

01-28 Cont.

### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

01-28 Cont.

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

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Cont.

### 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

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## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

01-28 Cont.

Attachment C

| Local Hire Provision Net Change | |
|---|---|
| **Without Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,623 |
| Amortized (MT CO2e/year) | 120.77 |
| **With Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,024 |
| Amortized (MT CO2e/year) | 100.80 |
| ***% Decrease in Construction-related GHG Emissions*** | ***17%*** |

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# EXHIBIT B

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

**SOIL WATER AIR PROTECTION ENTERPRISE**
2656 29th Street, Suite 201
Santa Monica, California 90405
Attn: Paul Rosenfeld, Ph.D.
Mobil: (310) 795-2335
Office: (310) 452-5555
Fax: (310) 452-5550
**Email:** prosenfeld@swape.com

# *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**Risk Assessment & Remediation Specialist**

## Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

## Professional Experience

Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from unconventional oil drilling operations, oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, and many other industrial and agricultural sources. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at dozens of sites and has testified as an expert witness on more than ten cases involving exposure to air contaminants from industrial sources.

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## Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex $H_2O$ Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

## Publications:


Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P**., (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

**Rosenfeld, P.E**. & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health*. 73(6), 34-46.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry*. Amsterdam: Elsevier Publishing.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution,* 123 (17), 319-327.


01-30 Cont.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

**Rosenfeld, P.E.,** J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

**Rosenfeld, P. E.,** M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities.* Boston Massachusetts: Elsevier Publishing

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

**Rosenfeld P. E.,** J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004.* New Orleans, October 2-6, 2004.

**Rosenfeld, P.E.,** and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49( 9), 171-178.

**Rosenfeld, P. E**., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

**Rosenfeld, P.E.,** Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

**Rosenfeld, P.E**., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

**Rosenfeld, P.E.,** and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality.* 29, 1662-1668.

**Rosenfeld, P.E.,** C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

**Rosenfeld, P.E.,** and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

**Rosenfeld, P.E.,** and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

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Cont.

Chollack, T. and **P. Rosenfeld. (**1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

**Rosenfeld, P. E.** (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

**Rosenfeld, P. E.** (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

**Rosenfeld, P. E. (**1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

**Rosenfeld, P. E.** (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

**Rosenfeld, P. E. (**1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

## Presentations:

**Rosenfeld, P.E.,** Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society.* Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution.* Lecture conducted from Boston, MA.

O1-30
Cont.

**Rosenfeld, P.E**. (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

**Rosenfeld, P.E.** (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

**Rosenfeld, P. E.** (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water.* Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld P. E.** (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

**Rosenfeld P. E.** (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting.* Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition.* Lecture conducted from Boston Massachusetts.

**Paul Rosenfeld Ph.D**. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference.* Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference.* Lecture conducted from Hilton Hotel in Irvine, California.

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Cont.

**Paul Rosenfeld Ph.D**. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference.* Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

**Paul Rosenfeld Ph.D**. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference.* Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

**Paul Rosenfeld, Ph.D.** (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

**Paul Rosenfeld, Ph.D.** (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

**Rosenfeld, P. E**., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

**Paul Rosenfeld, Ph.D.** (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

**Paul Rosenfeld, Ph.D**. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

**Rosenfeld, P.E**. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conferenc*e. Lecture conducted from Indianapolis, Maryland.

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Cont.

**Rosenfeld. P.E.** (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

**Rosenfeld. P.E. (**October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

**Rosenfeld, P.E. (**2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

**Rosenfeld, P.E.**, C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

**Rosenfeld, P.E,** C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

## Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

O1-30
Cont.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

## Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

## Deposition and/or Trial Testimony:

In the United States District Court For The District of New Jersey
Duarte et al, *Plaintiffs,* vs. United States Metals Refining Company et. al. *Defendant.*
Case No.: 2:17-cv-01624-ES-SCM
Rosenfeld Deposition. 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk, *Plaintiffs,* vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" *Defendant.*
Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No.: No. BC615636
Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No.: No. BC646857
Rosenfeld Deposition, 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiff vs. The 3M Company et al., Defendants
Case: No 1:16-cv-02531-RBJ
Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No 1923
Rosenfeld Deposition, 11-17-2017

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In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No C12-01481
Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 8-23-2017

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No.: LC102019 (c/w BC582154)
Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., *Plaintiffs,* vs. Meritor Inc., et al., *Defendants*
Case Number: 4:16-cv-52-DMB-JVM
Rosenfeld Deposition: July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No.: No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial, March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No.: RG14711115
Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No.: LALA002187
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Jerry Dovico, et al., Plaintiffs vs. Valley View Sine LLC, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Doug Pauls, et al.,, et al., Plaintiffs vs. Richard Warren, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action N0. 14-C-30000
Rosenfeld Deposition, June 2015

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In The Third Judicial District County of Dona Ana, New Mexico
Betty Gonzalez, et al. Plaintiffs vs. Del Oro Dairy, Del Oro Real Estate LLC, Jerry Settles and Deward DeRuyter, Defendants
Rosenfeld Deposition: July 2015

In The Iowa District Court For Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No 4980
Rosenfeld Deposition: May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case Number CACE07030358 (26)
Rosenfeld Deposition: December 2014

In the United States District Court Western District of Oklahoma
Tommy McCarty, et al., Plaintiffs, v. Oklahoma City Landfill, LLC d/b/a Southeast Oklahoma City Landfill, et al. Defendants.
Case No. 5:12-cv-01152-C
Rosenfeld Deposition: July 2014

In the County Court of Dallas County Texas
Lisa Parr et al, *Plaintiff*, vs. Aruba et al, *Defendant.*
Case Number cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial: April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., *Plaintiffs,* vs. Republic Services, Inc., et al., *Defendants*
Case Number: 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition: October 2012

In the United States District Court of Southern District of Texas Galveston Division
Kyle Cannon, Eugene Donovan, Genaro Ramirez, Carol Sassler, and Harvey Walton, each Individually and on behalf of those similarly situated, *Plaintiffs,* vs. BP Products North America, Inc., *Defendant.*
Case 3:10-cv-00622
Rosenfeld Deposition: February 2012
Rosenfeld Trial: April 2013

In the Circuit Court of Baltimore County Maryland
Philip E. Cvach, II et al., *Plaintiffs* vs. Two Farms, Inc. d/b/a Royal Farms, Defendants
Case Number: 03-C-12-012487 OT
Rosenfeld Deposition: September 2013

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Cont.

# EXHIBIT C

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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**Matthew F. Hagemann, P.G., C.Hg., QSD, QSP**

**Geologic and Hydrogeologic Characterization**
**Industrial Stormwater Compliance**
**Investigation and Remediation Strategies**
**Litigation Support and Testifying Expert**
**CEQA Review**

**Education:**

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

**Professional Certifications:**

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

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Cont.

**Professional Experience:**

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2014;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

**Senior Regulatory and Litigation Support Analyst:**

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 100 environmental impact reports since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, Valley Fever, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Manager of a project to provide technical assistance to a community adjacent to a former Naval shipyard under a grant from the U.S. EPA.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

O1-30 Cont.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.

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Cont.

- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

**Executive Director:**

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

**Hydrogeology:**

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

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Cont.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

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**Policy:**

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

**Geology:**

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

**Teaching:**

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

01-30 Cont.

Matt taught physical geology (lecture and lab and introductory geology at Golden West College in Huntington Beach, California from 2010 to 2014.

**Invited Testimony, Reports, Papers and Presentations:**

**Hagemann, M.F**., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

**Hagemann, M.F**., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

**Hagemann, M.F.,** 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

**Hagemann, M.F.**, 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

**Hagemann, M.F.,** 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

**Hagemann, M.F**., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

**Hagemann, M.F**., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

**Hagemann, M.F**., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

**Hagemann, M.F**., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

**Hagemann, M.F**., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

**Hagemann, M.F**., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

**Hagemann, M.F**., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

**Hagemann, M.F**., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

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**Hagemann, M.F**., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

**Hagemann, M.F**., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

**Hagemann, M.F**., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

**Hagemann, M.F**., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

**Hagemann, M.F**., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

**Hagemann, M.F**., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

**Hagemann, M.F**., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

**Hagemann, M. F**., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

**Hagemann, M.F**., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

**Hagemann, M.F**. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

**Hagemann, M.F**., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

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**Hagemann, M.F**., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

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Cont.

**Other Experience:**

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.

# EXHIBIT D

FTA

FEDERAL TRANSIT ADMINISTRATION

# Transit Noise and Vibration Impact Assessment Manual

SEPTEMBER 2018

FTA Report No. 0123
Federal Transit Administration

**PREPARED BY**
John A. Volpe National Transportation Systems Center

01-31



U.S. Department of Transportation
**Federal Transit Administration**

## COVER PHOTO

*Courtesy of Edwin Adilson Rodriguez, Federal Transit Administration*

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# Transit Noise and Vibration Impact Assessment Manual

SEPTEMBER 2018
FTA Report No. 0123

PREPARED BY

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Office of Planning and Environment
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

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## Metric Conversion Table

| SYMBOL | WHEN YOU KNOW | MULTIPLY BY | TO FIND | SYMBOL |
|---|---|---|---|---|
| | | **LENGTH** | | |
| **in** | inches | 25.4 | millimeters | mm |
| **ft** | feet | 0.305 | meters | m |
| **yd** | yards | 0.914 | meters | m |
| **mi** | miles | 1.61 | kilometers | km |
| | | **VOLUME** | | |
| **fl oz** | fluid ounces | 29.57 | milliliters | mL |
| **gal** | gallons | 3.785 | liters | L |
| **$ft^3$** | cubic feet | 0.028 | cubic meters | $m^3$ |
| **$yd^3$** | cubic yards | 0.765 | cubic meters | $m^3$ |
| | | NOTE: volumes greater than 1000 L shall be shown in $m^3$ | | |
| | | **MASS** | | |
| **oz** | ounces | 28.35 | grams | g |
| **lb** | pounds | 0.454 | kilograms | kg |
| **T** | short tons (2000 lb) | 0.907 | megagrams (or "metric ton") | Mg (or "t") |
| | | **TEMPERATURE (exact degrees)** | | |
| **°F** | Fahrenheit | 5 (F-32)/9 or (F-32)/1.8 | Celsius | °C |

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**14. ABSTRACT**

This report is the third edition of a guidance manual originally issued in 1995. It includes clarifications to existing policy and updates to outdated references where applicable. Topics presented in this manual include procedures for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. Additional topics include descriptions of noise and vibration mitigation measures, construction noise and vibration, and how to present these analyses in the Federal Transit Administration's environmental documents. This guidance is for technical specialists who conduct the analyses, as well as project sponsor staff, Federal agency reviewers, and members of the general public who may be affected by the projects.

**15. SUBJECT TERMS**
Transit noise and vibration analysis, noise and vibration impact criteria, noise and vibration mitigation measures, environmental impact assessment, Nation Environmental Policy Act compliance.

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## Abstract

This report is the third edition of a guidance manual originally issued in 1995. It includes clarifications to existing policy and updates to outdated references where applicable. Topics presented in this manual include procedures for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. Additional topics include descriptions of noise and vibration mitigation measures, construction noise and vibration, and how to present these analyses in the Federal Transit Administration's environmental documents. This guidance is for technical specialists who conduct the analyses, as well as project sponsor staff, Federal agency reviewers, and members of the general public who may be affected by the projects.

## Acknowledgments

The original 1995 version of this manual was developed by the firm Harris Miller Miller & Hanson Inc. (HMMH) and peer-reviewed by a group of specialists in the fields of acoustics and environmental planning and analysis. HMMH updated the original manual in 2006.

The updates for this current version were provided by the John A. Volpe National Transportation Systems Center, Cross Spectrum Acoustics, and FTA, and it was peer-reviewed by a panel of experts.

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SECTION 1

# Introduction

## 1.1 Purpose

The Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of the National Environmental Policy Act of 1969 (NEPA)[1,2] require that a federally-funded project be assessed for its impact on the human and natural environment prior to implementation. The Federal Transit Administration (FTA), in conjunction with the Federal Highway Administration (FHWA), has issued detailed regulations implementing NEPA for transit and highway projects. The regulations are codified in part 771 of title 23, Code of Federal Regulations, and are titled "Environmental Impact and Related Procedures." (23 CFR part 771).[3]

The Federal Transit Administration (FTA) provides financial assistance for a range of public transportation projects from new rail rapid transit (RRT) systems to bus maintenance facilities and vehicle purchases. As required by NEPA and its implementing regulations, each project must undergo environmental review.

Noise and vibration are sometimes among the major concerns regarding the effects of a transit project on the surrounding community and are key elements of the environmental impact assessment process for public transportation projects. A transit system is often placed near population centers by necessity and may cause noise and vibration at nearby residences and other sensitive types of land use.

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This manual provides technical guidance for conducting noise and vibration analyses for transit projects, as well as direction regarding preparation of the information for FTA's environmental documents. Some situations may not be explicitly covered in this manual; the exercise of professional judgment may be required to extend the basic methods in these cases and frequent consultation with FTA staff is important to ensure the methods used meet the requirements for environmental reviews. See Appendix G for information on using non-standard modeling procedures.

In general, the noise and vibration impact assessment process for projects includes the following steps:

1. Determine appropriate impact criteria (Section 4.1).
2. Conduct screening and determine appropriate level of noise analysis, analyze project noise impacts, and evaluate mitigation options if appropriate (Sections 4.2–4.5).
3. Determine appropriate level of vibration analysis, analyze project vibration impacts, and evaluate mitigation options if appropriate (Sections 6.1–6.5).
4. Analyze construction noise and vibration impacts (Section 7).
5. Document findings (Section 8).

## 1.2 Organization of the Manual

This guidance manual is organized by the following recommended analysis workflow. A glossary of terms used throughout this manual is available in Appendix A. Detailed information on the fundamentals of noise, noise impact criteria, clustering receivers, determining existing noise, computing source levels from measurements, and using non-standard methodology is available in the appendices.

**Section 2: Project Class of Action and Planning** – This section describes the first step in the analysis process that is applicable to both noise and vibration analyses.

**Section 3: Transit Noise** – This section provides the reader with background information specific to transit noise.

**Section 4: Noise Impact Analysis** – This section provides a general outline of the entire noise impact analysis process: guidelines on determining noise impact criteria, methods for choosing the appropriate level of noise analysis ("Screening," "General," or "Detailed"), steps for evaluating noise impacts with the Noise Screening Procedure (a simplified method of evaluating the potential for noise impact from transit projects), steps for evaluating noise impact with the General Noise Assessment procedure (a simplified assessment method to estimate noise impact and compare alternatives for transit projects), and steps for evaluating noise impact with the Detailed Noise Analysis procedure (a comprehensive assessment method to produce the most accurate estimates of noise impact intended for certain major public transportation projects).

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**Section 5: Transit Vibration** – This section contains background information specific to transit vibration.

**Section 6: Vibration Impact Analysis –** This section provides a general outline of the entire vibration impact analysis process: guidelines on determining vibration impact criteria, methods for choosing the appropriate level of vibration analysis ("Screening," "General," or "Detailed"), steps for evaluating vibration impact with the vibration screening procedure (a simplified method of evaluating the potential for vibration impact from transit projects), steps for evaluating vibration impact with the general vibration assessment procedure (a simplified assessment method to estimate vibration impact and compare alternatives for transit projects), and steps for evaluating vibration impact with the detailed vibration analysis procedure (a comprehensive assessment method to produce the most accurate estimates of vibration impact intended for certain major public transportation projects).

**Section 7: Noise and Vibration During Construction** – This section presents the process of assessing noise and vibration impact during construction, including determination of level of assessment, source levels, impact criteria, and mitigation.

**Section 8: Documentation of Noise and Vibration Assessment** – This section includes guidance for documenting the noise and vibration assessment in technical reports and environmental documents.

SECTION 2

# Project Class of Action and Planning

The level of environmental analysis and review depends on the significance of any potential associated environmental impacts, which in turn depends in part on the scope and complexity of the proposed project. The goals of a transit noise and vibration impact assessment are to:

1. Determine existing noise and vibration levels.
2. Assess project noise and vibration for potential impact.
3. Evaluate the effect of mitigation options on impacts.

The class of action determination will inform the required level of analysis. The FTA Regional office[i] determines the class of action based on project information provided by the project sponsor. The following types of information can assist the FTA Regional office in an initial class of action determination for a project:

- Project description
- Project-specific graphics, including:
  - Project location/sizes
  - Known land use and environmental features
- Additional information, as appropriate:
  - Summary of prior planning
  - Draft purpose and need statement

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Project classes of action are described in Section 2.1. Project planning and development guidelines are presented in Section 2.2.

## 2.1 Project Class of Action

FTA's environmental regulations classify projects by level of environmental analysis. The class of action will determine the appropriate level of analysis and documentation for a project. Details of each class are described in the following sections. For more information, review FTA's environmental impact and related procedures at 23 CFR part 771.

**Environmental Impact Statements**
Environmental impact statements (EISs) apply to projects that are expected to cause significant environmental effects in the NEPA context. Typical examples include new or extensions of fixed-guideway projects, such as heavy rail, light rail, commuter rail, and automated guideway transit (AGT) systems that are not located within existing transportation right-of-way (ROW). It is likely that for major infrastructure projects requiring an EIS, the most detailed treatment of noise and vibration impacts will often be required.

**Categorical Exclusions**
Categorical exclusions (CEs) cover actions that are excluded from requiring an EIS or environmental assessment (EA) because FTA has determined that they do

[i] http://www.fta.dot.gov/12926.html.

not routinely cause significant environmental impacts. FTA's CEs are located at 23 CFR §§ 771.118(c) and (d), commonly referred to as the c-list and d-list, respectively. Examples of projects that would normally be CEs include vehicle purchases, maintenance of equipment, vehicles, or facilities, and ROW acquisition.
In general, CEs for transit capital construction projects often require at least a screening of noise impacts.

**Environmental Assessments**
When a proposed project is presented to FTA and it is uncertain whether the project requires an EIS or qualifies for a CE, FTA will normally direct the project sponsor to prepare an environmental assessment (EA) to assist in making the determination. An EA may be prepared for any type of project if uncertainty exists about the magnitude or extent of the impacts. Generally, an EA is selected over a CE if FTA determines that several types of potential impacts require further investigation, for example, air quality, noise, wetlands, historic sites, and/or traffic, but FTA's environmental regulation does not list typical projects that require EAs.
Experience shows that most of the EAs prepared for transit projects require at least a general assessment of noise impacts.

## 2.2 Project Planning and Development

Capital transit projects are ordinarily developed initially from a comprehensive transportation planning process conducted in metropolitan areas (see 23 CFR § 450.300).[4] The metropolitan planning process often includes some early consideration of social, economic, and environmental effects of proposed major infrastructure improvements. At this stage, environmental effects are usually considered on a broad scale—for example, overall development patterns, impacts on green space, and regional air quality. Noise and vibration assessments are not typically performed at this stage because the proposed infrastructure improvements lack the necessary detail.

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Once the need for a capital transit project in a corridor is established in the metropolitan transportation plan, the transit mode and general alignment best suited for the corridor are identified. The Screening and General noise assessment procedures and the vibration screening procedure described in this manual may be used to compare noise and vibration effects among different transit modes and alignments at an early stage of the project planning. The analysis that results is documented through the environmental review process.

NEPA establishes a broad policy regarding mitigation as a means of accomplishing its environmental objectives. Other Federal laws, such as Section 4(f) (49 U.S.C. 303) and Section 404 (33 U.S.C. 1344), have explicit mitigation requirements for certain resources. The decision to include noise or vibration mitigation for a project is made by FTA and the project sponsor after public review of the environmental document, as appropriate. If mitigation measures are deemed necessary to protect the environment or to satisfy statutory requirements, they will be incorporated as an integral part of the project and subsequent grant documents will reference these measures as contractual obligations on the part of the project sponsor. Through that process, FTA

ensures that the project sponsor complies with all design and mitigation commitments contained in the environmental record.

Once the project enters construction, noise or vibration may need to be reassessed in some circumstances. Some large construction projects in densely populated residential areas may require noise monitoring to ensure agreed-upon noise limits are not exceeded. Vibration testing may be needed in the final stages of construction to determine whether vibration control measures have the predicted effect.

Considering that transit projects must be located amid or very close to concentrations of people, noise and vibration impacts can be a concern throughout the environmental review process, design, and construction phases. This manual offers the flexibility to address noise and vibration at different stages in the development of a project and in different levels of detail.

## 2.3 Mitigation Policy Considerations

Because noise is frequently among the greatest environmental concerns of planned transit projects, FTA and the project sponsor should make reasonable efforts to reduce predicted noise to levels considered acceptable for affected noise-sensitive land uses. The need for noise mitigation is determined based on the magnitude of impact and consideration of factors specifically related to the proposed project and affected land uses.

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The goal of providing noise mitigation is to gain substantial noise reduction, not simply to reduce the predicted levels to just below the "severe" impact threshold. For FTA to determine whether the mitigation is reasonable, the evaluation of specific mitigation measures should include the noise reduction potential, the cost, the effect on transit operations and maintenance, and any other relevant factors, such as any new environmental impacts that may be caused by the implementation of a noise reduction measure. A thorough evaluation enables FTA to make the findings required by NEPA and other statutes, such as Section 4(f) or Section 106 requirements and their implementing regulations.

Severe impacts have the greatest adverse impact on the community, and mitigation should be strongly considered. Areas with "moderate" impacts also have potential for effects on the community and therefore should also include consideration and possible adoption of mitigation measures when considered reasonable.

Since reasonableness is not strictly defined, FTA recommends that project sponsors work with the affected public and FTA staff during the environmental review process to decide appropriate mitigation strategies. A project sponsor may also consider developing and formally adopting a mitigation policy to aid in the determination of appropriate and applicable mitigation measures for current and proposed projects and anticipated impacts. Having such a policy in place can aid in the project planning up front and help to expedite mitigation decisions.

The following considerations can assist in determining circumstances that trigger the need for mitigation and include examples of how they can be applied in a noise mitigation policy:

- **Number of Noise-Sensitive Sites Affected**
  A row or cluster of residences adjacent to a rail transit line establishes a greater need for mitigation than one or several isolated residences in a mixed-use area. Single residences may not be able to meet a cost-effectiveness criterion for mitigation.

  ***Example Mitigation Policy Consideration:*** Set a minimum number of noise-sensitive sites as a threshold, combined with a reference to a cost-effectiveness criterion.

- **Increase over Existing Noise Levels**
  Since the noise impact criteria are delineated as bands or ranges, project noise can vary 5 to 7 decibels (dB) within the band of moderate impact at any specific ambient noise level. If the project and ambient noise plot falls just below the severe range, the need for mitigation is strongest for a moderate impact. Similarly, if the plot falls within the moderate range just above the no impact threshold, the impacts are expected to be less, so the justification for mitigation would not be as strong.

  ***Example Mitigation Policy Consideration:*** Set a strong need for mitigation when a moderate impact is 2 dB (for example) over the no impact threshold.

- **Noise Sensitivity of the Property**
  Section 4.1 includes a comprehensive list of noise-sensitive land uses, yet there can be differences in noise sensitivity depending on individual circumstances. For example, parks and recreational areas vary in their sensitivity depending on the type of use they experience (active vs. passive recreation) and the settings in which they are located.

  ***Example Mitigation Policy Consideration:*** Cite the use of the property as a determination of sensitivity for parks and recreational areas.

- **Effectiveness of the Mitigation Measure(s)**
  Determine the magnitude of the noise reduction that can be achieved, and consider whether there are conditions that limit effectiveness, such as noise barrier effectiveness for a multi-story apartment building.

  ***Example Mitigation Policy Consideration:*** Set a minimum reduction in noise level to be considered effective. A 5-dB reduction is typically considered an effective reduction from mitigation.

- **Feasibility of the Mitigation Measure(s)**
  Determine if the mitigation measure is feasible from an engineering, operations or safety perspective. In some cases, it may not be possible to construct mitigation (noise barriers) due to physical or structural limitations

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or because of safety concerns, especially related to sight lines for pedestrians and vehicles.

***Example Mitigation Policy Consideration:*** State that the engineering design of the mitigation must be feasible, that it must be implementable in light of operations, and that mitigation must not compromise safety.

- **Fairness and Equity of the Mitigation Measure(s)**
  Ensure that mitigation measures are applied in a fair and equitable manner. In many cases, small differences in distances or operations can result in small differences in projected noise levels. For example, all the residences in a row could have a projected moderate impact except for one residence at the end of the row that falls just under the moderate criteria due to being set slightly further back from the alignment. In a case like this, mitigation should be applied for the entire row of residences if possible.

  ***Example Mitigation Policy Consideration:*** State that mitigation should be applied equitably.

- **Existing Transportation Noise**
  Neighborhoods with ambient noise levels already heavily influenced by transportation noise, especially the same type of noise source as the project, should be considered. Often adding a new similar noise source will not add to the ambient noise levels or only slightly increase it to within acceptable levels. Whereas, impacts would be more likely, if the new noise was added to a neighborhood with minimal transportation noise. However, it is important to note that per (Section 4.1, Step 3) the higher the existing noise, the lower the allowable noise increase from new sources. A new cumulative noise environment may be very objectionable because people will not be compartmentalizing the existing noise versus the new noise and reacting only to the new noise. In this circumstance, impacts predicted in the moderate range could be treated as if they were severe.

  ***Example Mitigation Policy Consideration:*** Set a policy that moderate impacts under these circumstances be treated as severe and cite the potential for reducing noise from existing transportation noise, as well as from project noise.

- **Community Views**
  This manual provides the methodology to make an objective assessment of the need for noise mitigation. However, the views of the community should be considered where there are potential noise impacts predicted through this manual. The NEPA compliance process provides the framework for hearing the community's concerns about a proposed project and then making a good-faith effort to address those concerns. Many projects can be expected to have projected noise levels within the moderate impact range and, where possible, decisions regarding mitigation should be made after considering input from the affected public, relevant government agencies, and community organizations. There have been cases where the solution to the noise problem, a noise barrier, was not preferable to community members because of perceived adverse visual effects.

01-31
Cont.

***Example Mitigation Policy Consideration:*** State that community input in determining the need for mitigation will be included whenever possible.

- **Implementation Cost**
  Cost is an important consideration in reaching decisions about noise mitigation measures. One guideline for gauging the reasonableness of the cost of mitigation is the state DOT's procedures on the subject. Many states have established their own cost threshold per benefited residence for determining whether installation of noise barriers for noise reduction is a reasonable expenditure. Several airport authorities have placed limits on the costs they will incur for sound insulation per residence for homes, and FTA assesses cost in a similar manner by benefited residence. Higher costs may be justified depending on the specific set of circumstances of a project.

  ***Example Mitigation Policy Consideration:*** State the adopted cost threshold per benefited receiver for typical circumstances.

O1-31
Cont.

SECTION 3

# Transit Noise

This section presents the basic concepts of transit noise as background for computation methods and transit noise assessment procedures presented in Section 4. An overview of fundamental noise topics, including amplitude, frequency, time pattern, and decibel addition, is presented in Appendix B.

The Source-Path-Receiver framework for noise illustrated in Figure 3-1 is central to all environmental noise studies. Each transit source generates noise that depends upon the type of source and its operating characteristics. Along the propagation path, between all sources and receivers, noise levels can be reduced (attenuated) by distance depending on ground type, intervening obstacles, and other factors. Finally, noise combines from multiple sources at each receiver and potentially interferes with activities at that location.

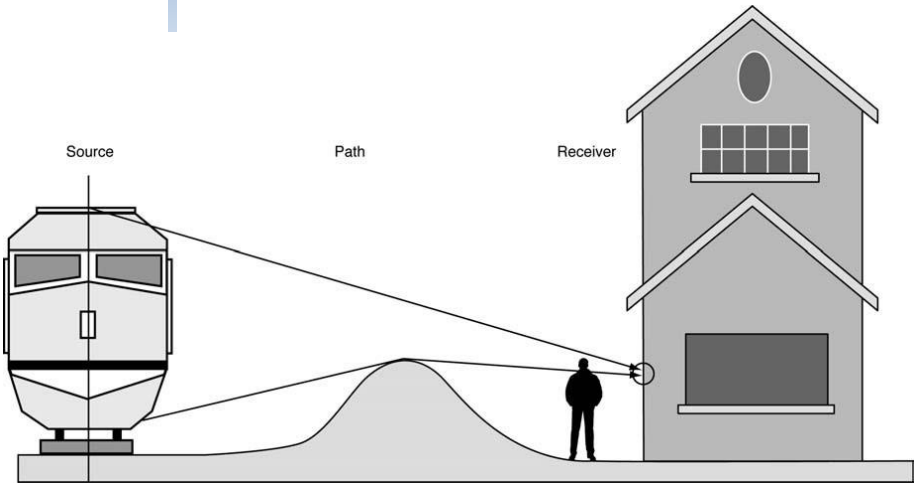


**Figure 3-1 Source-Path-Receiver Framework**

This section contains the following:

- Section 3.1 presents the noise metrics used in this manual.
- Section 3.2 provides an overview of transit noise sources, including a listing of major sources and a discussion of noise-generation mechanisms.
- Section 3.3 provides an overview of noise paths, including a discussion of the various attenuating mechanisms on the path between source and receiver.
- Section 3.4 provides an overview of receiver response to transit noise, including a discussion of the technical background for transit noise criteria and the distinction between absolute and relative noise impact.

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## 3.1 Noise Metrics

This manual uses the noise metrics outlined in Table 3-1 for transit noise measurements, computations, and assessment. The terminology is consistent with common usage in the United States. All of these noise metrics are expressed in units of A-weighted decibels (dBA). A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This is the basic noise unit for transit noise analyses.

**Table 3-1 Noise Metrics**

| Metric | Abbreviation | Definition |
|---|---|---|
| A-weighted Sound Level | dBA | A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This is expressed as A-weighted decibels (dBA), the basic noise unit for transit noise analyses. |
| Sound Exposure Level | *SEL* | SEL is the cumulative noise exposure from a single noise event, normalized to one second. SEL contains the same overall sound energy as the actual varying sound energy during the event. It is the primary metric for the measurement of transit vehicle noise emissions, and is an intermediate metric in the measurement and calculation of both $L_{eq(t)}$ and $L_{dn}$. |
| Equivalent Sound Level | $L_{eq(t)}$ | The equivalent sound level $L_{eq(t)}$ describes a receiver's cumulative noise exposure from all events normalized to a specified period of time "t". $L_{eq(t)}$ represents a hypothetical, constant sound level and contains the same overall sound energy as the actual varying sound energy during the time period "t". For transit noise impact assessments, the equivalent sound level metric is A-weighted and all events are normalized over a one-hour time period, $L_{eq(1hr)}$. For transit noise assessments, this metric is appropriate for non-residential land uses and is computed for the loudest hour of project related activity during hours of noise sensitivity. |
| Day-Night Sound Level | $L_{dn}$ | $L_{dn}$ describes a receiver's cumulative noise exposure from all events over 24 hours. Events between 10 p.m. and 7 a.m. are increased by 10 dB to account for humans' greater nighttime sensitivity to noise. $L_{dn}$ is used to assess transit noise for residential land uses. |
| Maximum Sound Level | $L_{max}$ | The maximum level describes the maximum noise level reached during a single noise event. For transit noise impact assessments, it is appropriate to consider the A-weighted maximum level ($L_{max}$ ) to understand the full context of the scenario. It is not appropriate to use this metric for transit noise impact assessments. This metric is commonly used in vehicle noise specifications and commonly measured for individual vehicles. |

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The noise metrics, including their application to transit noise and vibration impact assessment, are described in more detail in Appendix B.1.4. Mathematical definitions and graphic illustrations are presented to facilitate understanding and the interrelationships among metrics.

## 3.2 Sources of Transit Vehicle Noise

This section discusses major characteristics of the sources of transit noise. Transit noise can be generated by transit vehicles in motion, stationary transit

vehicles, and fixed-transit facilities. Procedures for computing nearby noise levels for major sources as a function of operating parameters such as vehicle speed are given in Sections 4.4 and 4.5.

**Transit Vehicles in Motion**

Transit vehicles most noticeably create noise when in motion. Noise from transit vehicles in motion can come from multiple sources, including the propulsion unit (i.e., the engine and engine components), the interaction of the wheels and/or tires and the running surface, and warning bells and horns.

Vehicle propulsion units generate:

- Whine from electric control systems and traction motors that propel rapid transit cars
- Diesel-engine exhaust noise from both diesel-electric locomotives and transit buses
- Air-turbulence noise generated by cooling fans
- Gear noise

Noise is also generated by the interaction of wheels and/or tires with their running surfaces. Tire noise from rubber-tired vehicles is generated at normal operating speeds. The interaction of steel wheels and rails generates:

- Rolling noise due to continuous rolling contact
- Impact noise when a wheel encounters a discontinuity in the running surface such as a rail joint, turnout or crossover (where the train or rail vehicle switches off one track and onto another)
- Impact noise from the wheel and running surface if the wheel is not completely round (wheel flat) or if the running surface is not completely flat
- Squeal generated by friction between wheels and rail on tight curves

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Transit vehicles are equipped with horns and bells for use in emergency situations and as a general audible warning to track workers and trespassers within the ROW, pedestrians, and motor vehicles at highway grade crossings. Horns and bells on the moving transit vehicle combined with stationary bells at-grade crossings can generate high noise levels for nearby residents and are often sources of complaints.

For many noise sources, such as transit vehicles, the sound level is dependent on the speed of the noise source. In other cases, such as for stationary sources or horns mounted on vehicles, the sound level is not dependent on speed. Figure 3-2 illustrates sound level dependence on speed for a diesel-powered commuter rail train and an electric-powered transit train assuming all other parameters, such as weight, are equal. Plotted vertically in this figure is a notional indication of the maximum sound level during a passby. Speed dependence is strong for electric-powered transit trains because wheel/rail noise is the dominant noise source and noise from this type of source increases strongly with speed. Diesel-powered commuter rail train noise is dominated by the locomotive exhaust noise at slower speeds. As speed increases, wheel-rail

noise becomes the dominant noise source and diesel- and electric-powered trains generate similar noise levels. Similarly, speed dependence is also strong for automobiles, city buses (two-axle), and non-accelerating highway buses (three-axle), because tire/pavement noise is the dominant noise source for these vehicles. Accelerating highway bus noise is dominated by exhaust noise.

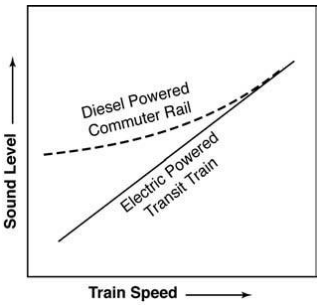


**Figure 3-2 Sound Level Dependence on Speed**

Sound levels close to the source are also dependent on vehicle acceleration, vehicle length, running surface type, and running surface condition. For high-speed rail vehicles (vehicles with an operating speed of 90–250 mph are typically beyond the scope of this manual), air turbulence can also be a source of noise. In addition, for an elevated structure, the guideway can radiate noise as it vibrates in response to the dynamic loading of the moving vehicle.

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Cont.

**Stationary Transit Vehicles**

Noise can be generated by transit vehicles even when they are stationary. For example, auxiliary equipment such as cooling fans on motors, radiator fans, plus hydraulic, pneumatic, and air-conditioning pumps, often continue to run when vehicles are stationary. Transit buses are also often left idling in stations or storage yards.

**Fixed-transit Facilities**

Noise can also be generated by sources at fixed-transit facilities. Such sources include ventilation fans in transit stations, subway tunnels, and electric power substations, as well as equipment in chiller plants, and many activities within maintenance facilities and shops.

**Common Noise Sources**

Table 3-2 summarizes common sources of transit noise by vehicle and facility type.

**Table 3-2 Sources of Transit Noise**

| Vehicle or Facility* | Dominant Components | Comments |
|---|---|---|
| RRT or Light Rail Transit (LRT) on exclusive ROW | Wheel/rail interaction and guideway amplification | Depends on condition of wheels and rails |
| | Propulsion system | When accelerating and at higher speeds |
| | Brakes | When stopping |
| | Auxiliary equipment | When stopped |
| | Wheel squeal | On tight curves |
| | *In general* | Noise increases with speed and train length |
| LRT in Mixed Traffic | Wheel squeal | On tight curves |
| | Auxiliary equipment | When stopped |
| | Horns and crossing bells | At-grade crossings and stations |
| | *In general* | Traveling at lower speeds in mixed traffic produces less noise than when traveling at higher speeds in exclusive ROW |
| Commuter Rail | Diesel exhaust | On diesel-hauled trains |
| | Cooling fans | On both diesel and electric-powered trains |
| | Wheel/rail interaction | Depends on condition of wheels and rails |
| | Horns and crossing gate bells | At-grade crossings and stations |
| | *In general* | Noise is usually dominated by locomotives and horns/bells at-grade crossings |
| Low and Intermediate Capacity Transit | Propulsion systems, including speed controllers | At low speeds |
| | Ventilation systems | At low speeds |
| | Tire/guideway interaction | For rubber-tired vehicles, including monorails |
| | Wheel/rail interaction | Depends on condition of wheels and rails |
| | *In general* | Wide range of vehicles: monorail, rubber-tired, steel-wheeled, linear induction. Noise characteristics depend upon type |
| Diesel Buses | Cooling fans | While idling |
| | Engine casing | While idling |
| | Diesel exhaust | At low speeds and while accelerating |
| | Tire/roadway interaction | At moderate and high speeds |
| | *In general* | Includes city buses (generally two-axle) and commuter buses (generally three-axle) |
| Electric Buses and Trackless Trolleys | Tire/roadway interaction | At moderate speeds |
| | Electric traction motors | At moderate speeds |
| | *In general* | Much quieter than diesel buses |
| Bus Storage Yards | Buses starting up | Usually most disruptive in the early morning |
| | Buses accelerating | Usually near entrances/exits and/or locations that require buses to accelerate (tight turns) |
| | Buses idling | Warm-up areas |
| | *In general* | Site specific: often peak periods with considerable noise |
| Rail Transit Storage Yards | Wheel squeal | On tight curves |
| | Wheel impacts | On joints and switches |
| | Wheel rolling noise | On tangent track |
| | Auxiliary equipment | Throughout day and night; includes air-break release noise |
| | Coupling/uncoupling | On storage tracks |
| | Signal horns | Throughout yard site |
| | *In general* | Site specific: often early morning and peak periods with considerable noise |

01-31 Cont.

| | | |
|---|---|---|
| Maintenance Facilities | Signal horns | Throughout facility |
| | Intercoms | Throughout facility |
| | Impact tools | Shop buildings |
| | Car/bus washers/driers | Wash facility |
| | Vehicle activity | Throughout facility |
| | *In general* | Site specific: considerable activity throughout day and night, some outside. |
| Stations | Automobiles | Patron arrival/departure, especially in early morning |
| | Buses idling | Bus loading zone |
| | Intercoms | Platform area |
| | Locomotive idling | At commuter rail terminal stations |
| | Auxiliary systems | At terminal stations and layover facilities |
| | Horns | At stations, if applicable |
| | *In general* | Site specific, with peak activity periods |
| Subways | Fans | Noise through vent shafts/structures |
| | Buses/trains in tunnels | Noise through vent shafts/structures |
| | *In general* | Noise is not a problem, except in the immediate vicinity of vent shafts/structures. |

* Refer to Appendix A for additional information.

## 3.3 Paths of Transit Noise from Source to Receiver

01-31 Cont.

This section contains a qualitative overview of noise-path characteristics from source to receiver, including attenuation along these paths. Equations for specific noise-level attenuations along source-receiver paths are included in Sections 4.4 and 4.5.

Sound paths from source to receiver are predominantly through the air. Along these paths, sound reduces with distance due to divergence, absorption/diffusion, and shielding. These mechanisms of sound attenuation are discussed below.

**Divergence**

Sound levels naturally attenuate with distance, as shown in Figure 3-3. The plot shows attenuation at the receiver relative to the sound level 50 ft from the source. This type of attenuation is called divergence and is dependent upon source configuration (line or point source) or other source-emission characteristics. Localized sources (point sources) grouped closely together attenuate greatly with distance at a rate of approximately 6 dB per doubling of distance. Examples of point sources include highway grade-crossing signals along rail corridors, intercoms in maintenance yards and other closely grouped sources of noise. Vehicles passing along a track or roadway forming a line are called line sources. Line sources attenuate less than point sources with distance. Rate of attenuation for line sources varies depending on the noise metric. $L_{eq(1hr)}$ and $L_{dn}$ noise levels attenuate at a rate of 3 dB per doubling of distance and $L_{max}$ noise levels attenuate at a rate of 3 to 6 dBs per doubling of distance.

Figure 3-3 illustrates approximate attenuation with distance between the source and receiver for point and line sources. The line source curve for the $L_{max}$ noise

metric separates into three curves because it is dependent on the length of the line source. Equations for the curves in Figure 3-3 are included in Section 4.5.

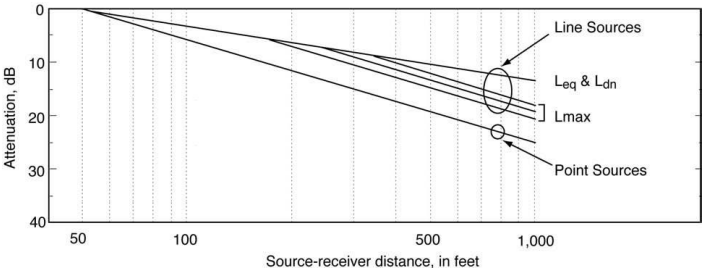


**Figure 3-3 Attenuation Due to Distance (Divergence)**

**Absorption/Diffusion**

In addition to distance, sound levels can be attenuated depending on the type of ground between the source and receiver. A portion of the sound energy is absorbed by the ground and only the remaining energy travels to the source. How much energy the ground absorbs is dependent on the ground type (characterized as acoustically "hard" or "soft") and geometry. Example absorptive ground types include freshly-plowed or vegetation-covered ground. Figure 3-4 illustrates approximate attenuation due to ground type by source to receiver path distance and height. Ground attenuation can be as large as 5 dB over a path distance of several hundred ft. At very large distances, wind and temperature gradients could modify the expected ground attenuation. However, these variable atmospheric effects are not included in this manual because they generally occur beyond the range of typical transit-noise impact. Equations for the curves in this figure are included in Section 4.5.

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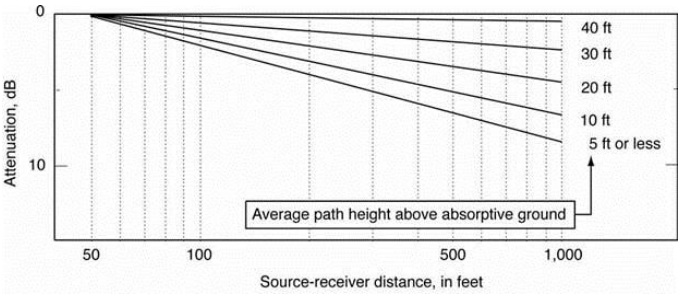


**Figure 3-4 Attenuation due to Soft Ground**

**Shielding**

Sound paths are sometimes interrupted by terrain, human-constructed noise barriers, rows of buildings, or other objects. Noise barriers are one of the most effective means of mitigating noise (Section 4.5, Step 7). A noise barrier reduces sound levels at a receiver by breaking the direct line-of-sight between source and receiver with a solid wall (in contrast to vegetation which hides the source from view but does not reduce sound levels substantially over short distances). Sound energy reaches the receiver only by bending (diffracting) over the top of

the barrier, as shown in Figure 3-5. This diffraction over the barrier reduces the sound level that reaches the receiver. One important consideration in using noise barriers to mitigate noise impacts is safety. Noise barriers, if not designed and sited carefully, can reduce visibility of trains for pedestrians and motorists, leading to less safe conditions. It is important to consult with safety experts when choosing and siting a noise barrier.

Noise barriers for transportation systems are typically used to attenuate noise at the receiver, potentially reducing received sound levels by 5 to 15 dB, depending upon barrier height, length, and distance from both source and receiver. Barriers on structures close to the transportation noise source may provide less attenuation than barriers located farther from the source due to reverberation (multiple reflections) between the barrier and the body of the vehicle or noise source. This reverberation can be offset by increased barrier height and/or acoustical absorption on the source side of the barrier. Further discussion and equations on acoustical absorption and barrier attenuation is provided in Section 4.5.

Source-to-receiver sound paths may not always travel through the air, but rather through the ground or through structural components of the receiver's building. Discussion of such ground-borne and structure-borne propagation is included in Section 5.

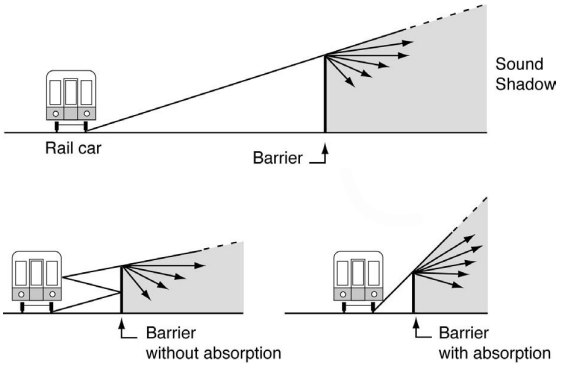


**Figure 3-5 Noise Barrier Geometry**

## 3.4 Receiver Response to Transit Noise

This section contains an overview of human receiver response to noise. It serves as background information for the noise impact criteria in Section 4.1.

Noise can interrupt ongoing activities causing community annoyance, especially in residential areas. In general, most residents become highly annoyed when noise interferes considerably with activities such as sleeping, talking, noise-sensitive work, and audio entertainment. In addition, some land uses, such as outdoor concert pavilions, are inherently incompatible with high noise levels.

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Annoyance from noise has been investigated and approximate dose-response relationships have been quantified by the U.S. Environmental Protection Agency (EPA).[5] The selection of noise metrics in this manual is largely based upon this EPA work. Beginning in the 1970s, the EPA undertook a number of research and synthesis studies relating to community noise of all types. Results of these studies have been widely published, discussed, and refereed by many professionals in acoustics. Basic conclusions of these studies have been adopted by the Federal Interagency Committee on Noise (FICON),[ii] the U.S. Department of Housing and Urban Development (HUD), the American National Standards Institute, and even internationally[6][7][8][9]. Conclusions from this seminal EPA work remain scientifically relevant today.

Figure 3-6 contains a synthesis of actual case studies of community reaction to newly introduced sources of noise in a residential urban neighborhood.[10] Plotted horizontally in the figure is the increase in noise from new sources above existing noise levels expressed as Day-Night Sound Levels, $L_{dn}$, discussed in Appendix B.1.4.5. Plotted vertically is the community reaction to this newly introduced noise. As shown in the figure, community reaction varies from no reaction to vigorous action for newly introduced noises averaging from 10 dB below existing to 25 dB above existing. Note the assumptions included in the graphic are associated with the specific data points from the study. These assumptions are generally appropriate to give context to most transit projects, but community reaction may differ for conditions specific to each project.

In many community attitudinal surveys, transportation noise has been ranked among the greatest causes of community dissatisfaction. A synthesis of many such surveys on annoyance is shown in Figure 3-7.[11][12] Noise exposure levels are plotted against the percentage of people who are highly annoyed by the particular level of neighborhood noise. As shown in the figure, the percentage of high annoyance is approximately 0 percent at 45 dB, 10 percent around 60 dB, and increases quite rapidly to approximately 70 percent around 85 dB. The scatter about the synthesis line is due to community variation and wording differences in the surveys. An update of the original research containing additional railroad, transit and street traffic noise surveys generally follows the shape of the original response curve shown in Figure 3-7.[12][13]

As indicated by Figure 3-6 and Figure 3-7, introduction of certain levels of transit noise into a community may have two undesirable effects. First, it may substantially increase noise levels above existing noise levels in a community. This effect is called a relative noise impact. Evaluation of this effect compares new noise levels to the existing levels. Criteria for a relative noise impact evaluation are based upon noise increases above existing levels. Second, newly introduced transit noise may interfere with community activities independent of existing noise levels. For example, it may be too loud to converse or sleep. This effect is called absolute noise impact and is expressed as a fixed level threshold that is not to be exceeded. The fixed level threshold is determined independently of existing noise levels. Relative and absolute noise impacts are discussed in terms of transit noise criteria in Section 4.1, Step 3.

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[ii] The Federal Interagency Committee on Aviation Noise (FICAN) is the current version of this group.

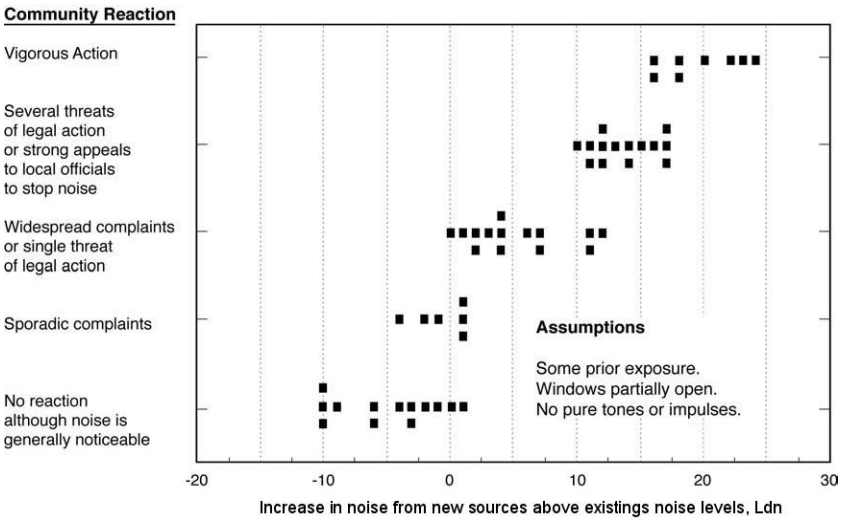


**Figure 3-6 Community Reaction to New Noise, Relative to Existing Noise in a Residential Urban Environment**

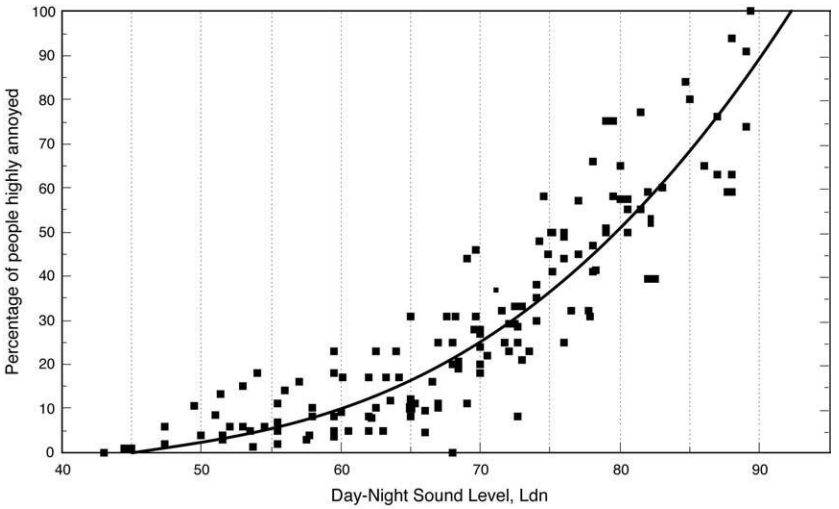


**Figure 3-7 Community Annoyance Due to Noise**

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SECTION 4

# Noise Impact Analysis

The FTA noise impact analysis process is a multi-step process used to evaluate the project for potential noise impacts for FTA NEPA approvals. If impact is determined, measures necessary to mitigate adverse impacts must be considered for incorporation into the project.[4] It is recommended that project sponsors develop and formally adopt a policy for determining the need for mitigation for situations that are loosely covered by the impact criteria. Considerations for mitigation policies are included in Section 2.3. The FTA noise impact analysis steps are summarized as follows and are described in the subsequent subsections:

**4.1:** Determine noise impact criteria.
- **Step 1:** Identify the type of project/dominant noise source (transit or multimodal).
- **Step 2:** Choose land use category for FTA criteria.

**4.2:** Determine the highest appropriate level of noise analysis for the current stage of project planning or development.

**4.3:** Evaluate for the potential of impact according to the Noise Screening Procedure.
- **Step 1:** Identify project type.
- **Step 2:** Determine the screening distance.
- **Step 3:** Identify the study area.
- **Step 4:** Locate noise-sensitive land uses.

**4.4:** Evaluate impact according to the General Noise Assessment and evaluate preliminary mitigation options if impact is found.
- **Step 1:** Identify noise-sensitive receivers.
- **Step 2:** Determine the project noise source reference levels.
- **Step 3:** Estimate project noise exposure by distance.
- **Step 4:** Combine noise exposure from all sources.
- **Step 5**: Measure existing noise exposure.
- **Step 6:** Inventory noise impacts.
- **Step 7:** Determine noise mitigation needs.

**4.5:** Evaluate for impact according to the Detailed Noise Analysis and evaluate mitigation options if impact is found.
- **Step 1:** Identify noise-sensitive receivers.
- **Step 2:** Determine noise source levels for detailed analysis.
- **Step 3:** Calculate project noise exposure by distance.
- **Step 4:** Combine noise exposure from all sources.
- **Step 5:** Determine existing noise exposure.
- **Step 6:** Assess noise impact.
- **Step 7:** Determine noise mitigation measures.

In addition to analyzing for potential noise impacts, analyze the project for potential vibration impacts according to the process presented in Section 6. After both the noise and vibration analyses have been completed, assess

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construction noise and vibration according to Section 7 and document findings according to Section 8.

## 4.1 Determine Noise Impact Criteria

This section describes the procedure for determining the appropriate criteria for assessing project noise impact based on the type of project and project noise source. Project noise is the new noise or change in noise introduced by the project. Noise impact criteria may vary for different segments of the project. Project segments can be portions of a project with similar characteristics.

The procedure to determine the appropriate impact criteria is described in this section and shown more simply as a flow chart in Figure 4-1. If there is uncertainty in how to determine the appropriate criteria, contact the FTA Regional office.

The selected criteria are used in the analysis procedures discussed in Sections 4.3, 4.4, and 4.5 to identify potential impacts and the level of impact.

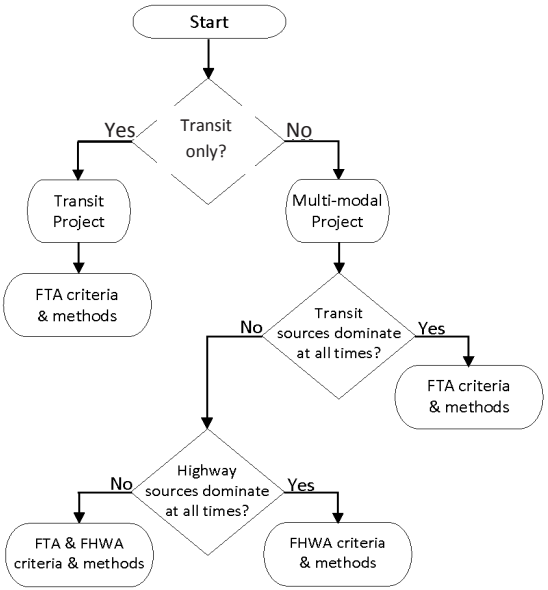


**Figure 4-1 Noise Impact Criteria Flow Chart by Project Segment**

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## Step 1: Identify Project Type

*Identify the type of project as transit, multimodal (transit and highway), or other multimodal according to the dominant noise source.*

**Option A: Transit Project (Transit Noise Only) –** The transit project category includes all transit projects where the project noise is exclusively due to new transit sources, no changes are made to the highway or to existing highway noise barriers, and the existing noise levels generated by roadway sources will not change because of the project. For these transit projects, FTA is the lead agency conducting the environmental review in cooperation with the transit agency.

Typical examples of transit projects include:

- RRT, LRT, commuter rail, and AGT
- Rail projects built within an existing highway or railroad corridor that do not alter the existing noise levels generated by roadway sources
- Bus facility projects with operations on local streets and highways used to access the facility, where the project does not include roadway construction or modification that changes roadway capacity substantially
- Fixed facilities including storage and maintenance yards, passenger stations and terminals, parking facilities, and substations
- Portions of transit projects not adjacent to highway corridors

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*FTA impact criteria are appropriate for transit projects, proceed to Step 2.*

**Option B: Multimodal Project (Transit and Highway Noise) –** In this manual, "multimodal" refers to projects that include changes to both transit and highway components, resulting in project noise comprised of both highway and transit noise sources.

Typical examples of multimodal projects include:

- New highway construction providing general-purpose lanes as well as dedicated bus and high occupancy vehicle (HOV) lanes
- Rail transit projects that involve changes to the highway travel lanes or existing highway noise barriers

Evaluate multimodal projects for impact according to the project noise source by project segment. FHWA's noise assessment methods are used to inform FTA's NEPA evaluation only for segments where highway noise levels change due to the transit project. These projects are not necessarily subject to FHWA's procedures at 23 CFR part 772 *(see call out box below)*. For segments of the project outside the highway corridor, use FTA's criteria and methods. Use Table 4-1 to determine multimodal project noise.

Once the project noise source(s) is identified**,** determine the appropriate assessment method according to Table 4-2.

Note that a separate noise analysis may be required for FHWA approval of a multimodal project pursuant to 23 CFR part 772. For these projects, it is important to work with FHWA early in the environmental review process to determine how a noise assessment will be completed where FHWA approval is needed for the project.

The determination of whether a project is subject to FHWA procedures at 23 CFR part 772 depends upon the specific circumstances of a project. A proposed transit project that would share an existing highway ROW is not necessarily a FHWA-defined multimodal project. A transit project that meets all three of the following criteria is not considered a multimodal project subject to 23 CFR part 772:

- FTA is the lead agency in the NEPA process and FHWA's limited participation is as a cooperating agency.
- The main transportation purpose of the project, as stated in the purpose and need statement of the environmental document, is transit-related and not highway-related.
- No Federal-aid highway funds are being used to fund the project.

**Table 4-1 Multimodal Project Noise Factors**

| Factor | Description |
|---|---|
| Volume of Traffic | Major freeways and interstate highways often carry large volumes of traffic throughout the day and night such that the highway noise dominates at all times. Transit noise in this case may be unimportant by comparison, but must still be evaluated using FTA's noise criteria for a potential impact. |
| Traffic Patterns | Some highways and arterials serve primarily as commuter routes such that nighttime traffic diminishes considerably, while transit systems continue to operate well into the late hours. Here the dominant noise source at times of maximum sensitivity may be transit. |
| Type of Traffic | Some highways and arterials may serve commuters during the daytime hours, but provide access to business centers by trucks at night. In this case, the roadway noise would likely continue to dominate. |
| Alignment Configuration | Elevation of the transit mode in the median or beside a busy highway may result in transit noise contributing more noise to nearby neighborhoods than a highway that may be partially shielded by rows of buildings adjacent to the ROW. In this case, both transit and highway noise may be considered dominant. |

**Table 4-2 Multimodal Project Assessment Methods**

| Dominant Noise Source | Assessment Method |
|---|---|
| Transit, at All Times | Use FTA criteria and methods. *Proceed to Step 2.* |
| Highway, at All Times | Use FHWA criteria and methods to inform FTA's NEPA evaluation. *Contact FHWA directly for assistance using FHWA noise analysis methods and FHWA noise impact criteria.* |
| Transit and Highway at Different Times | Use both the FHWA and FTA methods to determine if one, both, or neither method determines impact due to the project noise for these segments. Note that the project noise includes both highway and transit sources associated with the project. Both methods are used because the FTA methods consider nighttime sensitivity while the FHWA methods consider the peak traffic hour. *Proceed to Step 2 for FTA criteria. Contact FHWA directly for assistance using FHWA noise analysis methods and FHWA noise impact criteria.* |

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**Option C: Other Multimodal Projects –** For projects with components from other modes, contact the FTA Regional office. Additional information on high-speed rail vibration and noise can be found in the Federal Railroad Administration (FRA) "High-Speed Ground Transportation Noise and Vibration Impact Assessment" guidance manual.[14]

## Step 2: Choose Land Use Category for FTA Criteria

*Determine the appropriate noise-sensitive land use category for the project segment using Table 4-3 and the descriptions below then, proceed to Step 3. FTA criteria are presented by land use.*

**Table 4-3 Land Use Categories and Metrics for Transit Noise Impact Criteria**

| Land Use Category | Land Use Type | Noise Metric, dBA | Description of Land Use Category |
|---|---|---|---|
| 1 | High Sensitivity | Outdoor $L_{eq(1hr)}$* | Land where quiet is an essential element of its intended purpose. Example land uses include preserved land for serenity and quiet, outdoor amphitheaters and concert pavilions, and national historic landmarks with considerable outdoor use. Recording studios and concert halls are also included in this category. |
| 2 | Residential | Outdoor $L_{dn}$ | This category is applicable all residential land use and buildings where people normally sleep, such as hotels and hospitals. |
| 3 | Institutional | Outdoor $L_{eq(1hr)}$* | This category is applicable to institutional land uses with primarily daytime and evening use. Example land uses include schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities are also included in this category. |

* $L_{eq(1hr)}$ for the loudest hour of project-related activity during hours of noise sensitivity.

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Noise-sensitive land use categories are described in in order of sensitivity. Most commercial or industrial uses are not considered noise-sensitive because activities within these buildings are generally compatible with higher noise levels. Business can be considered noise-sensitive if low noise levels are an important part of operations, such as sound and motion picture recording studios.

For residential land use (category 2), apply the noise criteria at the nearest façade of the occupied portion of the building, e.g., not at a garage or porch. The residential criteria should be applied at locations with nighttime sensitivity. For major noise-sensitive outdoor use at non-residential locations, apply the noise criteria at the point of noise-sensitive use nearest the noise source.

Land use categories are evaluated using noise metrics that reflect the noise-sensitive time of day:

- **Categories 1 and 3** – The noise metric, $L_{eq(1hr)}$ is used for all category 1 and 3 land uses where nighttime sensitivity is not a factor. Category 3 land uses are considered less noise-sensitive than category 1 land uses. For transit analyses, $L_{eq(1hr)}$ is computed for the noisiest hour of transit-

related activity during which human activities occur at the noise-sensitive location. See Appendix B.1.4.4 for more information on this metric.

- **Category 2** – The noise metric $L_{dn}$ is a used for all category 2 land uses where nighttime sensitivity is a factor. This noise metric includes a 10-dB penalty for nighttime noise. See Appendix B.1.4.5 for more information on this metric.

**Land Use Categories: Special Cases**

Historic sites, parks, indoor-only land use, and undeveloped land require special consideration. In addition to NEPA, noise impacts may need to be considered under other environmental laws such as Section 106[15] or Section 4(f).[16] Indoor-only use and undeveloped land should be evaluated on a case-by-case basis to determine noise sensitivity based on how each facility is used or the reason it is protected under the applicable requirement.

**Historic Sites** – Section 106 requires Federal agencies to evaluate potential effects from projects on historic properties. Per the regulations at 36 CFR part 800,[17] historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for the National Register of Historic Places (NRHP). An adverse effect determination under Section 106 is made when a project may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

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Under FTA environmental reviews, some structures may be evaluated as noise-sensitive resources per this noise manual and evaluated as historic properties under Section 106. However, because this manual and Section 106 regulations have different criteria for effect, identifying a severe noise impact for a structure under this manual does not necessarily mean there would be an adverse effect under Section 106. It is important to thoroughly document the characteristics of historic properties that qualify for inclusion in the NRHP for evaluation of effect under Section 106.

If a property, for example, is listed on the NRHP under criterion C because the structure possesses high artistic values, but lacks integrity of setting, feeling, or association, it is unlikely that a change in the noise environment would affect the features that qualify the property for listing or eligibility for inclusion in the NRHP.

In the assessment of effects on historic properties, consideration should be given to not just the proposed transit project, but any associated mitigation measures with the transit project. For example, if a transit project would involve noise walls or berms as mitigation, the effect of those structures on the visual setting may need to be considered in a Section 106 analysis.

**Parks** – Most parks used primarily for active recreation such as sports complexes and bike or running paths are not considered noise-sensitive.

However, some parks (even some in dense urban areas) are primarily used for passive recreation such as reading, conversation, or meditation. These places, which may be valued as havens from the noise and rapid pace of everyday city life, are treated as noise-sensitive, and are included in land use category 3. Consult the state or local agency with jurisdiction over the park on questions about how the park is used, and visit the park to observe its use, if possible.

**Indoor-Only Use** – The land use categories described in this section correspond with noise impact criteria that provide protection for both outdoor and indoor land uses. For locations where noise impact will be evaluated but there is no outdoor land use such as apartment buildings, hotels or upper levels of multi-story buildings, indoor criteria can be used. In these cases, the criterion for indoor noise levels from project sources is a $L_{dn}$ of 45 dBA.[18] This criterion is consistent with the Federal Aviation Administration (FAA). See Section 4.5 for more information on how indoor criteria apply to noise mitigation consideration.

**Undeveloped Land –** Undeveloped land may also need to be considered for noise impact assessment and mitigation if plans are under way to develop the land for noise-sensitive use. The policy for considering such land for assessment and mitigation should be determined on a project-specific basis by the project sponsor in consultation with the FTA Regional office.

## Step 3: Determine Appropriate FTA Criteria Presentation

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FTA criteria for noise impact were developed specifically for transit noise sources operating on fixed-guideways or at fixed facilities in urban areas. These criteria are based on well-documented research on human response to community noise and represent a reasonable balance between community benefit and project costs. These criteria do not reflect specific community attitudinal factors. See Appendix C for additional background information on the development of FTA noise criteria.

The criteria specify a comparison of future project noise with existing noise. Note that projections of future noise exposure without the project (no-build scenario) are not included in this analysis. The criteria also consider land use which is an important factor that reflects noise sensitivity based on activity and time period of concern. The criteria are defined with the expectation that communities already exposed to high levels of noise can only tolerate a small increase. In contrast, if the existing noise levels are low, it is reasonable to allow a greater change in the community noise.

The levels of impact are described in Table 4-4. The criteria at which the levels of impact occur are presented in two ways depending on the relationship of project and existing noise sources.

*If the project noise source is a new source of transit noise in the community, such as a new project in an area currently without transit, use the criteria as presented in Option A. If the project noise adds to or changes existing transit noise in the community, use the criteria as presented in Option B.*

**Table 4-4 Levels of Impact**

| Level of Impact | Description |
|---|---|
| No Impact | Project-generated noise is not likely to cause community annoyance. Noise projections in this range are considered acceptable by FTA and mitigation is not required. |
| Moderate Impact | Project-generated noise in this range is considered to cause impact at the threshold of measurable annoyance. Moderate impacts serve as an alert to project planners for potential adverse impacts and complaints from the community. Mitigation should be considered at this level of impact based on project specifics and details concerning the affected properties. |
| Severe Impact | Project-generated noise in this range is likely to cause a high level of community annoyance. The project sponsor should first evaluate alternative locations/alignments to determine whether it is feasible to avoid severe impacts altogether. In densely populated urban areas, evaluation of alternative locations may reveal a trade-off of affected groups, particularly for surface rail alignments. Projects that are characterized as point sources rather than line sources often present greater opportunity for selecting alternative sites. This guidance manual and FTA's environmental impact regulations both encourage project sites which are compatible with surrounding development when possible. If it is not practical to avoid severe impacts by changing the location of the project, mitigation measures must be considered. |

**Option A: Project Noise Impact Criteria Presentation –** The impact criteria presentation for evaluating existing noise independently to project noise is presented in this option.

01-31 Cont.

The noise levels at which impacts occur are presented in Figure 4-2 and Table 4-5. Equations for the impact criteria are presented in Appendix C. If impact is determined, measures necessary to mitigate impacts are to be considered for incorporation into the project.[3]

Figure 4-2 presents the existing noise exposure on the horizontal axis and project noise on the vertical axis. Category 1 and 2 land uses have the same criteria for project noise and are on the primary vertical axis. Category 3 land use criteria are presented on the secondary vertical axis. Note that project noise for category 1 and 3 land uses is expressed as $L_{eq(1hr)}$, whereas project noise for category 2 land use is expressed as $L_{dn}$. Also, note that project noise criteria are 5 dB higher for category 3 land uses in Figure 4-2 since these types of land use are less noise-sensitive than those in categories 1 and 2.

Note that for projects in locations with existing noise levels below 55 dBA, the project noise exposure is allowed some increase over the existing noise exposure before it is considered to cause impact. For category 1 and 2 land uses, the maximum project noise level to be considered to cause no impact is 65 dBA ($L_{eq(1hr)}$ or $L_{dn}$) regardless of the existing noise. Note that no impact at 65 dBA aligns with other Federal agencies in that a $L_{dn}$ of 65 dBA is a standard limit for an acceptable living environment among some Federal agencies.[19] [20] Project noise levels above the top curve are considered to cause severe impact. The upper limit of the severe impact range is 75 dBA for category 1 and 2 land uses. The upper limit of 75 dBA is associated with an unacceptable living environment. Project noise between the two curves is considered to have moderate impact on the community.

The criteria are also tabulated in Table 4-5. Figure 4-2 and the equations that correspond with this figure in Appendix C are the precise definition of the criteria. The values in Table 4-5 can be used for illustrative purposes and should only be used if all numbers are rounded up to the nearest decibel.

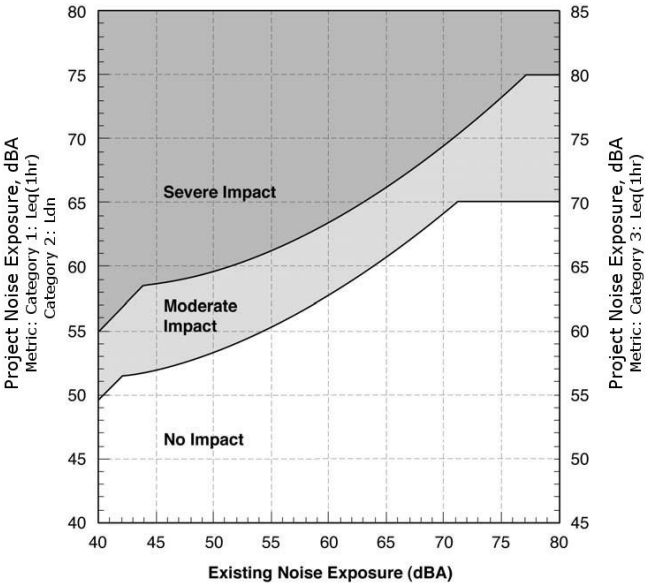


**Figure 4-2 Noise Impact Criteria for Transit Projects**

O1-31
Cont.

**Table 4-5 Noise Levels Defining Impact for Transit Projects**

| Existing Noise Exposure, dBA | Project Noise Impact Exposure, dBA | | | | | |
|---|---|---|---|---|---|---|
| | Category 1 ($L_{eq(1hr)}$) or 2 ($L_{dn}$) Sites | | | Category 3 Sites ($L_{eq(1hr)}$) | | |
| $L_{eq(1hr)}$ or $L_{dn}$ | No Impact | Moderate Impact | Severe Impact | No Impact | Moderate Impact | Severe Impact |
| <43 | < Ambient+10 | Ambient +10 to 15 | > Ambient+15 | < Ambient+15 | Ambient +15 to 20 | > Ambient+20 |
| 43 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 44 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 45 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 46 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 47 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 48 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 49 | <54 | 54-59 | >59 | <59 | 59-64 | >64 |
| 50 | <54 | 54-59 | >59 | <59 | 59-64 | >64 |
| 51 | <54 | 54-60 | >60 | <59 | 59-65 | >65 |
| 52 | <55 | 55-60 | >60 | <60 | 60-65 | >65 |
| 53 | <55 | 55-60 | >60 | <60 | 60-65 | >65 |
| 54 | <55 | 55-61 | >61 | <60 | 60-66 | >66 |
| 55 | <56 | 56-61 | >61 | <61 | 61-66 | >66 |
| 56 | <56 | 56-62 | >62 | <61 | 61-67 | >67 |
| 57 | <57 | 57-62 | >62 | <62 | 62-67 | >67 |
| 58 | <57 | 57-62 | >62 | <62 | 62-67 | >67 |
| 59 | <58 | 58-63 | >63 | <63 | 63-68 | >68 |
| 60 | <58 | 58-63 | >63 | <63 | 63-68 | >68 |
| 61 | <59 | 59-64 | >64 | <64 | 64-69 | >69 |
| 62 | <59 | 59-64 | >64 | <64 | 64-69 | >69 |
| 63 | <60 | 60-65 | >65 | <65 | 65-70 | >70 |
| 64 | <61 | 61-65 | >65 | <66 | 66-70 | >70 |
| 65 | <61 | 61-66 | >66 | <66 | 66-71 | >71 |
| 66 | <62 | 62-67 | >67 | <67 | 67-72 | >72 |
| 67 | <63 | 63-67 | >67 | <68 | 68-72 | >72 |
| 68 | <63 | 63-68 | >68 | <68 | 68-73 | >73 |
| 69 | <64 | 64-69 | >69 | <69 | 69-74 | >74 |
| 70 | <65 | 65-69 | >69 | <70 | 70-74 | >74 |
| 71 | <66 | 66-70 | >70 | <71 | 71-75 | >75 |
| 72 | <66 | 66-71 | >71 | <71 | 71-76 | >76 |
| 73 | <66 | 66-71 | >71 | <71 | 71-76 | >76 |
| 74 | <66 | 66-72 | >72 | <71 | 71-77 | >77 |
| 75 | <66 | 66-73 | >73 | <71 | 71-78 | >78 |
| 76 | <66 | 66-74 | >74 | <71 | 71-79 | >79 |
| 77 | <66 | 66-74 | >74 | <71 | 71-79 | >79 |
| >77 | <66 | 66-75 | >75 | <71 | 71-80 | >80 |

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### Option B: Cumulative Noise Impact Criteria Presentation

*The impact criteria presentation for evaluating existing noise to project noise cumulatively is presented in this option.*

In certain cases, the cumulative form of the noise criteria shown in Figure 4-3 can be used. These cases involve projects where changes are proposed to an existing transit system, as opposed to a new project in an area previously without transit. Such changes might include operations of a new type of vehicle, modifications of track alignments within existing transit corridors, or changes in facilities that dominate existing noise levels. In these cases, the existing noise

sources change because of the project, and so it is not possible to define project noise separately from existing noise. An example would be a commuter rail corridor where the existing noise along the alignment is dominated by diesel locomotive-hauled trains, and where the project involves electrification with the resulting replacement of some of the diesel-powered locomotives with electric trains operating at increased frequency of service and higher speeds on the same tracks. In this case, the existing noise can be determined and a new future noise can be calculated, but it is not possible to describe what constitutes the "project noise." For example, if the existing noise dominated by trains was measured to be an $L_{dn}$ of 63 dBA at a particular location, and the new combination of diesel and electric trains is projected to be an $L_{dn}$ of 65 dBA, the change in the noise exposure due to the project would be 2 dB. Referring to Figure 4-3, a 2-dB increase with an existing noise exposure of 63 dBA would be rated as a moderate impact. Normally the project noise is added to the existing noise to come up with a new cumulative noise, but in this case, the existing noise was dominated by a source that changed due to the project, so it would be incorrect to add the project noise to the existing noise. Consequently, the existing noise determined by measurement is compared with a new calculated future noise, but a description of what constitutes the actual project is complex.

Another example would be a rail corridor where a track is added and grade crossings are closed, potentially resulting in a change in train location and horn operation. Here the "project noise" results from moving some trains closer to some receivers, away from others, and elimination of horns. In this case, the change in noise level is more readily determined than the noise from the actual project elements. In all cases, Figures 4-3 and 4-4 for changes in a transit system results in the same assessment of impact as Figure 4-2 for development of transit facilities in a new area.

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The noise impact criteria in Figure 4-3 and Figure 4-4 are presented as an increase in cumulative noise level between the existing and project conditions. The horizontal axis represents the existing noise exposure and the vertical axis is the increase in cumulative noise level due to the transit project. Note that noise exposure is expressed as $L_{eq(1hr)}$ for category 1 and 3 land uses and $L_{dn}$ for category 2 land use. Since $L_{eq(1hr)}$ and $L_{dn}$ are measures of total acoustic energy, any new noise sources in a community will cause an increase, even if the new source level is the same or less than the existing noise level (refer to decibel addition in Appendix B). As shown in Figure 4-3, the criterion for moderate impact is a noise exposure increase of 10 dB for an existing noise exposure level of 42 dBA or less, but only a 1-dB increase when the existing noise exposure is 70 dBA.

As the existing level of ambient noise increases, the allowable level of transit noise increases, but the total amount that community noise exposure is allowed to increase is reduced. This accounts for the unexpected result that a project exposure which is less than the existing noise exposure can still cause impact. This is clearer from the examples listed in Table 4-6 which indicate the level of transit noise allowed for different existing levels of exposure. Any increase greater than shown in the table will cause moderate impact.

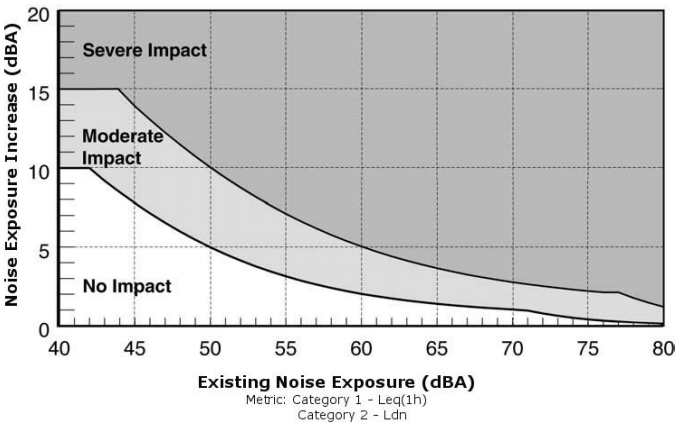


**Figure 4-3 Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 1 & 2)**

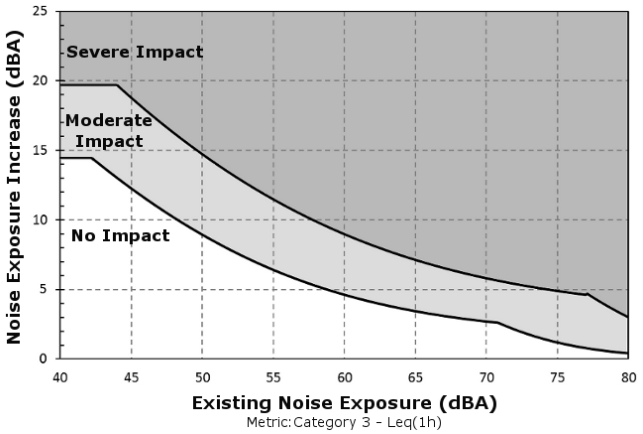


**Figure 4-4 Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 3)**

This table shows that as the existing noise exposure increases from 45 dBA to 75 dBA, the allowed project noise exposure increases from 51 dBA to 65 dBA. However, the allowed increase in the cumulative noise level decreases from 7 dB to 0 dB (rounded to the nearest whole decibel). The justification for this is that people already exposed to high levels of noise should be expected to tolerate only a small increase in the amount of noise in their community. In contrast, if the existing noise levels are quite low, it is reasonable to allow a greater change in the community noise for the equivalent difference in annoyance.

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Note that Table 4-6 was developed for illustrative purposes and the official criteria are included in Figure 4-3 and Figure 4-4 and the associated equations.

**Table 4-6 Noise Impact Criteria: Effect on Cumulative Noise Exposure**

| $L_{dn}$ or $L_{eq(1hr)}$ in dBA (rounded to nearest whole decibel) | | | |
|---|---|---|---|
| **Existing Noise Exposure** | **Allowable Project Noise Exposure Before Moderate Impact** | **Allowable Combined Total Noise Exposure** | **Allowable Noise Exposure Increase Before Moderate Impact** |
| 45 | 51 | 52 | 7 |
| 50 | 53 | 55 | 5 |
| 55 | 55 | 58 | 3 |
| 60 | 57 | 62 | 2 |
| 65 | 60 | 66 | 1 |
| 70 | 64 | 71 | 1 |
| 75 | 65 | 75 | 0 |

## 4.2 Determine Noise Analysis Level

There are three levels of analysis to evaluate noise on a transit project based on the type and scale of the project, stage of project development, and environmental setting. These levels, described below, are the Noise Screening Procedure, the General Noise Assessment and the Detailed Noise Analysis.

The Noise Screening Procedure, conducted first, defines the study area of any subsequent noise impact assessment. Where there is potential for noise impact, the General Noise Assessment and Detailed Noise Analysis procedures are used to determine the extent and severity of impact. In some cases, a General Noise Assessment may be all that is needed. However, if the proposed project is near noise-sensitive land uses, and it appears at the outset that the impact would be substantial, it is prudent to conduct a Detailed Noise Analysis.

01-31 Cont.

*Conduct the noise screening procedure and then determine the appropriate noise analysis option.*

**Noise Screening Procedure** – The Noise Screening Procedure is a simplified method of identifying study area receivers or locations where a project may have the potential for noise impacts from transit projects. This procedure accounts for impact criteria, the type of project, and noise-sensitive land uses. If no noise-sensitive land uses or receivers are present in the analysis area, then no further noise assessment is needed. If noise-sensitive receivers are identified, then proceed to conduct a General Assessment and/or a Detailed Assessment.

The Noise Screening Procedure steps are provided in Section 4.3.

**General Noise Assessment** – The General Noise Assessment is used to examine potentially impacted areas identified in the screening step by examining the location and estimated severity of noise impacts. This procedure considers noise source and land use information likely to be available at an early stage in the project development process. Estimates are made of project noise levels and of existing noise conditions to model the location of a noise impact contour

that defines the outer limit of an impact corridor or area. This modeling method uses transit-specific noise and adjustment data (in tabular and graphical form) for the noise computations.

For many smaller projects, this assessment may be sufficient to define impacts and determine whether noise mitigation is necessary. The procedure can be used in conjunction with established highway noise prediction procedures to compare highway, transit, and multimodal alternatives. If an assessment is needed to inform the decision on transit mode and general alignment in a corridor, the General Noise Assessment procedures should be used, and not the Detailed Noise Analysis, which requires more detailed information.

The General Noise Assessment procedure is provided in Section 4.4. FTA has also developed an Excel spreadsheet to more simply conduct the General Noise Assessment. It is on FTA's website at http://www.fta.dot.gov/12347_2233.html.

**Detailed Noise Analysis** – The Detailed Noise Analysis procedure is a comprehensive assessment method that produces the most accurate estimates of noise impacts for a proposed project. It is important to recognize that use of the Detailed Noise Analysis methods will not provide more accurate results than the General Noise Assessment unless more detailed and case-specific input data are used.

The project must be defined to the extent that location, alignment, transit mode, hourly operational schedules during day and night, speed profiles, plan and profiles of guideways, locations of access roads, and landform topography (including terrain and building features) are determined. A detailed Noise Analysis is often accomplished at the development of the final environmental impact statement (FEIS), record of decision (ROD), or combined FEIS/ROD in the NEPA process, when the preferred alternative is undergoing refinements to mitigate its adverse impacts. However, these project details may not be available until the final design phase, requiring that the detail noise analysis be conducted after the NEPA process is complete. However, it is recommended that the detailed analysis be conducted earlier for controversial projects or projects with highly noise-sensitive sites close to tracks.

01-31
Cont.

A Detailed Noise Analysis may be warranted as part of the development of an environmental assessment (EA) if there are potentially severe impacts due to the proximity of noise-sensitive land uses.

In some cases, decisions on appropriate noise mitigation measures can be made based on the results of the General Noise Assessment. But if costly measures may be needed, it is generally recommended that a Detailed Noise Analysis be conducted to verify the need and design of the noise mitigation. The Detailed Noise Analysis is always appropriate under two sets of circumstances:

- For a major transit project with likely noise impacts after the preferred alternative has been selected.
- For any other transit project where potentially severe impacts are identified at an early stage.

Noise impacts may occur for relatively minor transit projects when the project is near noise-sensitive sites, particularly residences. In this case, completing a Detailed Noise Analysis is recommended. Some examples include:

- A terminal or station sited adjacent to a residential neighborhood
- A maintenance facility located near a school
- A storage yard adjacent to residences
- An electric substation located adjacent to a hospital

The Detailed Noise Analysis procedure is provided in Section 4.5.

## 4.3 Evaluate Impact: Noise Screening Procedure

*Identify the potential for impact using the Noise Screening Procedure described below.*

### Step 1: Identify Project Type

*Identify the project type using Table 4-7 and confirm the assumptions in Table 4-8 are appropriate for the project.*

The noise screening procedure is intended to be conservative to broadly capture the potential for impact with minimal effort. To make the procedure conservative, the project system must be assumed to be operating under relatively high-capacity conditions, which would produce more noise than normal operating conditions. In addition, the assumptions in Table 4-8 were made using the lowest threshold of impact (50 dBA) from the criteria curves in Figure 4-2. Clarification can be obtained from FTA on special cases that are not represented in this section.

01-31 Cont.

If the assumptions in Table 4-8 are not appropriate for the project, make adjustments to the screening distances in Table 4-8 according to the methodology in Section 4.4 or the FTA spreadsheet model.

### Step 2: Determine the Screening Distance

*Determine the appropriate screening distance considering the type of project and shielding from intervening buildings.*

**2a.** Determine the appropriate screening distance column in Table 4-7.

> **Option A: Buildings in the Sound Paths –** Use the screening distances in the "Intervening Buildings" column.
>
> **Option B: Buildings Not in the Sound Paths –** Use the distances in the "Unobstructed" column.

**2b.** Adjust these distances according to the methodology in Section 4.4, or the FTA spreadsheet model, if the assumptions in Table 4-8 are not appropriate for the project. The appropriate screening distance is where the project noise reaches 50 dBA for the appropriate metric. If the assumptions in Table 4-8 are not appropriate for a commuter rail grade crossing project where horns and

warning bells are used, use the FRA horn noise model available from the FRA website to develop the screening distance distance (49 CFR § 222).[21]

## Step 3: Identify Study Area

*Apply the screening distances as follows to identify the study area. The study area is intended to be sufficiently large to encompass all potentially impacted locations.*

**Option A: Fixed Guideway Transit Sources –** Apply the screening distance from the guideway centerline.

**Option B: Highway/Transit Sources (e.g., Bus) –** Apply the screening distance from the nearest ROW line on both sides of a highway or access road.

**Option C: Small Stationary Facilities –** Apply the screening distance from the center of the noise-generating activity.

**Option D: Stationary Facility Spread Over a Large Area –** Apply the screening distance from the outer boundary of the proposed project site.

## Step 4: Locate Noise-Sensitive Land Uses

*Locate all noise-sensitive land uses within the study area using Table 4-3.*

See Section 4.1 for more information on noise-sensitive land uses. Include all categories of noise-sensitive land uses in this step.

***If no noise-sensitive land uses are identified, no further noise analysis is needed. If one or more of the noise-sensitive land uses are in the study area, proceed to Section 4.4 and complete a General Noise Assessment.***

01-31 Cont.

**Table 4-7 Screening Distance for Noise Assessments**

| Project Systems | | Screening Distance, ft* | |
|---|---|---|---|
| | | Unobstructed | Intervening Buildings |
| ***Fixed-Guideway Systems*** | | | |
| Commuter Rail Mainline | | 750 | 375 |
| Commuter Rail Station | With Horn Blowing | 1,600 | 1,200 |
| | Without Horn Blowing | 250 | 200 |
| Commuter Rail Road Crossing with Horns and Bells | | 1,600 | 1,200 |
| RRT | | 700 | 350 |
| RRT Station | | 200 | 100 |
| LRT | | 350 | 175 |
| Streetcar | | 200 | 100 |
| Access Roads to Stations | | 100 | 50 |
| Low and Intermediate Capacity Transit | Steel Wheel | 125 | 50 |
| | Rubber Tire | 90 | 40 |
| | Monorail | 175 | 70 |
| Yards and Shops | | 1000 | 650 |
| Parking Facilities | | 125 | 75 |
| Access Roads to Parking | | 100 | 50 |
| Ancillary Facilities: Ventilation Shafts | | 200 | 100 |
| Ancillary Facilities: Power Substations | | 250 | 125 |
| ***Bus Systems*** | | | |
| Busway | | 500 | 250 |
| Bus Rapid Transit (BRT) on exclusive roadway | | 200 | 100 |
| Bus Facilities | Access Roads | 100 | 50 |
| | Transit Mall | 225 | 150 |
| | Transit Center | 225 | 150 |
| | Storage & Maintenance | 350 | 225 |
| | Park & Ride Lots w/Buses | 225 | 150 |
| ***Ferry Boat Terminals*** | | 300 | 150 |

*Measured from centerline of guideway for fixed-guideway sources, from the ROW on both sides of the roadway for highway/transit sources, from the center of noise-generating activity for stationary sources, or from the outer boundary of the proposed project site for fixed facilities spread out over a large area.

01-31 Cont.

**Table 4-8 Assumptions for Screening Distances for Noise Assessments**

| Type of Project | | Operations | Speeds* | Metric** |
|---|---|---|---|---|
| ***Fixed-Guideway Systems*** | | | | |
| Commuter Rail Mainline | | 66 day /12 night; 1 loco, 6 cars | 55 mph | $L_{dn}$ |
| Commuter Rail Station | With Horn Blowing | 22 day / 4 night | N/A | $L_{dn}$ |
| | Without Horn Blowing | 22 day / 4 night | N/A | $L_{dn}$ |
| Commuter Rail-Highway Crossing with Horns and Bells | | 22 day / 4 night | 55 mph | $L_{dn}$ |
| RRT | | 220 day / 24 night; 6-car trains | 50 mph | $L_{dn}$ |
| RRT Station | | 220 day / 24 night | 20 mph | $L_{dn}$ |
| LRT | | 150 day / 18 night; 2 artic veh. | 35 mph | $L_{dn}$ |
| Streetcar | | 150 day / 18 night | 25 mph | $L_{dn}$ |
| Access Roads to Stations | | 1000 cars, 12 buses | 35 mph | $L_{eq(1hr)}$ |
| Low and Intermediate Capacity Transit | Steel Wheel | 220 day / 24 night | 30 mph | $L_{dn}$ |
| | Rubber Tire | 220 day / 24 night | 30 mph | $L_{dn}$ |
| | Monorail | 220 day / 24 night | 30 mph | $L_{dn}$ |
| Yards and Shops | | 20 train movements | N/A | $L_{eq(1hr)}$ |
| Parking Facilities | | 1000 cars | N/A | $L_{eq(1hr)}$ |
| Access Roads to Parking | | 1000 cars | 35 mph | $L_{eq(1hr)}$ |
| Ancillary Facilities: Ventilation Shafts | | Rapid Transit in Subway | 50 mph | $L_{dn}$ |
| Ancillary Facilities: Power Substations | | Sealed shed, air conditioned | N / A | $L_{dn}$ |
| ***Bus Systems*** | | | | |
| Busway | | 30 buses, 120 automobiles | 50 mph | $L_{eq(1hr)}$ |
| BRT on exclusive roadway | | 30 buses | 35 mph | $L_{eq(1hr)}$ |
| Bus Facilities | Access Roads | 1000 cars | 35 mph | $L_{eq(1hr)}$ |
| | Transit Mall | 20 buses | N/A | $L_{eq(1hr)}$ |
| | Transit Center | 20 buses | N/A | $L_{eq(1hr)}$ |
| | Storage & Maintenance | 30 buses | N/A | $L_{eq(1hr)}$ |
| | Park & Ride Lots w/Buses | 1000 cars, 12 buses | N/A | $L_{eq(1hr)}$ |
| ***Ferry Boat Terminals*** | | 8 boats with horns used in normal docking cycle | N/A | $L_{eq(1hr)}$ |

*N/A = not applicable

**$L_{eq(1hr)}$ = the loudest hour of project related activity during hours of noise sensitivity.

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## 4.4 Evaluate Impact: General Noise Assessment

The General Noise Assessment should be completed after the Noise Screening Procedure (Section 4.3), through which noise-sensitive receivers have been identified. This can be completed either by using the General Noise Assessment Procedure described below or using the FTA General Noise Assessment Spreadsheet found on the following FTA website: http://www.fta.dot.gov/12347_2233.html.

Assumptions are used throughout the General Noise Assessment. If the listed assumptions are not appropriate for the project and good engineering judgement cannot be used by following the General Noise Assessment procedure, proceed to a Detailed Noise Analysis or consult with the FTA Regional office.

Major steps in the General Noise Assessment procedure and recommended workflow are shown in Figure 4-5 and listed below. Four examples of General Noise Assessments are given at the end of this section. Many of these concepts are explained in greater detail in the context of a Detailed Noise Analysis in Section 4.5.

**Step 1: Identify Noise-Sensitive Receivers –** Identify noise-sensitive receivers (Section 4.3) and their proximity to the project and major noise sources.

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Cont.

**Step 2: Determine Project Noise Source Reference Levels –** Determine the project noise sources and reference levels. Then, estimate the project noise exposure at the reference distance of 50 ft considering operational characteristics with preliminary estimations of the effect of mitigation.

**Step 3: Estimate Project Noise Exposure by Distance –** Estimate project noise exposure at distances beyond 50 ft considering propagation characteristics using a simplified procedure.

**Step 4: Combine Noise Exposure from All Sources –** Combine all sources associated with the project to predict the total project noise at the receivers.

**Step 5: Measure Existing Noise Exposure –** Measure the existing noise or estimate the existing noise exposure using a simplified procedure.

**Step 6: Inventory Impacts**

**Option A:** Tabulate the change in noise (existing vs. estimated project noise) at each noise-sensitive receiver or cluster, identifying all moderate and severe impacts.

**Option B:** Take inventory of noise-sensitive receivers that fall within the moderate and severe noise contours.

**Step 7: Determine Noise Mitigation Needs –** Evaluate the need for mitigation and repeat the General Noise Assessment with proposed mitigation.

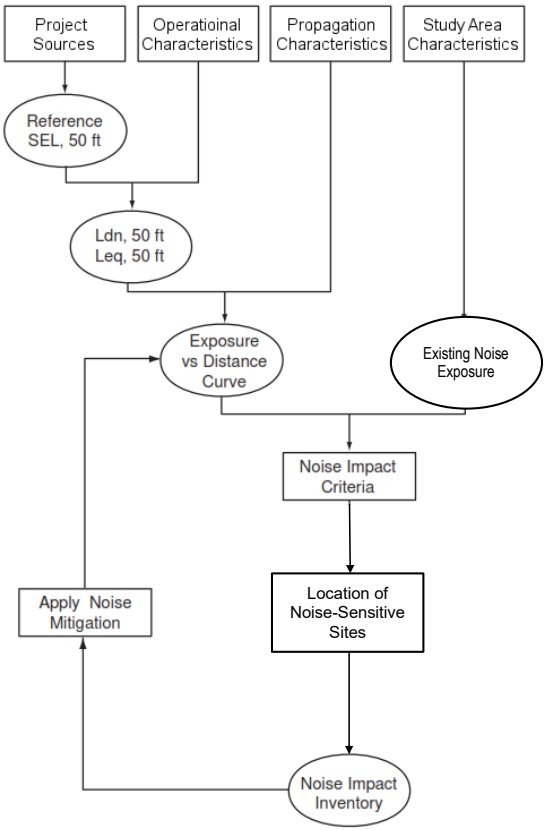


**Figure 4-5 Procedure for General Noise Assessment**

## Step 1: Identify Noise-Sensitive Receivers

*Determine the proximity of noise-sensitive land uses identified in Section 4.3 to the project and to the nearest major roadways and railroad lines.*

**1a.** When necessary, use windshield surveys or detailed land use maps to confirm the location of noise-sensitive land uses.

**1b.** For land uses more than 1,000 ft from major roadways or railroad mainlines, obtain an estimate of the population density in the immediate area, expressed in people per square mile. Distances to roadways or railroads, or population density, will be used later to estimate the existing

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noise level. Coordinate with the Metropolitan Planning Organization (MPO) for population densities at an appropriate level of detail.

## Step 2: Determine Project Noise Source Reference Levels

*Determine the general source reference level for each project noise source.*

Classify all project noise sources as fixed-guideway transit, highway/transit, or stationary facility and determine the source reference levels. Note that a major fixed-guideway system will have stationary facilities associated with it and that a stationary facility may have highway/transit elements associated with it.

**Option A: Fixed-guideway Transit Sources –** For this manual, fixed-guideway transit sources include commuter rail, RRT, LRT, streetcar, AGT, monorail, and magnetically levitated vehicles (maglev). For commuter railroads and LRT systems, the crossing of streets and highways at-grade is likely, and in that case, warning devices should be included in the assessment. At an early project stage, the information available for a General Noise Assessment includes:

- Candidate transit mode
- Guideway options
- Time of operation
- Operational headways
- Design speed
- Alternative alignments

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This information is not sufficient to predict noise levels at all locations along the ROW. Therefore, use conservative estimates (e.g., maximum (expected) design speeds and operations at design capacities) to estimate worst-case noise levels.

First choose the appropriate fixed-guideway transit source reference level and then predict the noise exposure at 50 ft in terms of $L_{eq(1hr)}$ and $L_{dn}$.

**A.i.** Choose the reference source noise levels 50 ft from the track for one vehicle in terms of Sound Exposure Level (SEL) using Table 4-9. See Appendix B for a detailed explanation of SEL. Note that the SEL reference speed is 50 mph, unless otherwise noted.

**Table 4-9 Reference SEL's 50 ft from Track and at 50 mph, One Vehicle**

| Source | Type | Reference Conditions | Reference SEL ($SEL_{ref}$), dBA |
|---|---|---|---|
| Commuter Rail, At-Grade | *Locomotives* | Diesel-electric, 3000 hp, throttle 5 | 92 |
| | | Electric | 90 |
| | *Diesel Multiple Unit (DMU)* | Diesel-powered, 1200 hp | 85 |
| | *Horns* | Within ¼ mile of grade crossing | 110 |
| | *Cars* | Ballast, welded rail | 82 |
| Rail Transit and Streetcars at 50 mph | | At-grade, ballast, welded rail | 82 |
| Rail Transit and Streetcars at 25 mph | | At-grade, ballast, welded rail | 76 |
| Transit whistles / warning devices | | Within 1/8 mile of grade crossing | 93 |
| AGT | *Steel Wheel* | Aerial, concrete, welded rail | 80 |
| | *Rubber Tire* | Aerial, concrete guideway | 78 |
| Monorail | | Aerial straddle beam | 82 |
| Maglev | | Aerial, open guideway | 72 |

**A.ii.** Collect the following data:

- Number of train passbys during the day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) for category 2 land uses
- Maximum number of train passbys during hours that category 1 or category 3 land uses are normally in use (typically the peak hour train volume)
- Number of vehicles per train for each time period for category 2 land uses (if this number varies during the day or night, take the average)
- Maximum number of vehicles per train during hours that category 1 or category 3 land uses are normally in use (typically the peak hour train volume)
- Train speed in mph (maximum expected)
- Guideway configuration
- Location of highway and street grade crossings, if any
- If this process is repeated to estimate the effect of proposed noise mitigation, include the noise barrier location

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**A.iii.** Calculate the noise exposure at 50 ft in terms of $L_{eq(1hr)}$:

- Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-10.
- Compute $L_{eq(1hr).Combo}$ using Eq. 4-6. It may be necessary to compute the combined totals with and without warning horns. Some neighborhoods along the corridor may be exposed to horn noise, but some may not.

**A.iv.** Calculate the noise exposure at 50 ft in terms of $L_{dn}$:

- If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-10.
- It may be necessary to calculate $L_{dn}$ with and without warning horns, as in the previous step.

Note that the equations in Table 4-10 include terms to account for a difference in speed from the 50 mph reference speed and a numerical adjustment to account for the one-hour time period for this metric. For

more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

Table 4-10 presents an estimate of the noise reduction potentially provided by wayside noise barriers that can be used when assessing mitigation options in a General Noise Assessment. If impact is determined during the General Noise Assessment, repeat the procedure and include proposed mitigation according to Section 4.4, Step 7. See Section 4.5, Step 7 for a complete description of the benefits resulting from various noise mitigation measures that can be evaluated with a Detailed Noise Analysis.

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Cont.

**Table 4-10 Computation of Noise Exposure at 50 ft for Fixed-Guideway General Noise Assessment**

| | | |
|---|---|---|
| **Locomotives*** $L_{eq(1hr)}$ at 50 ft | $L_{eq.Loco(1hr)} = SEL_{ref} + 10\,log(N_{Loco}) + Klog(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-1** |
| **Locomotive Warning Horns**** $L_{eq(1hr)}$ at 50 ft | $L_{eq.LHorns(1hr)} = SEL_{ref} + 10\,log(V) - 35.6$ | **Eq. 4-2** |
| **Rail Vehicles†** $L_{eq(1hr)}$ at 50 ft | $L_{eq.RCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-3** |
| **Streetcars (25 mph or slower)** $L_{eq(1hr)}$ at 50 ft | $L_{eq.SCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 2\log(\frac{S}{25}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-4** |
| **Transit Warning Horns** $L_{eq(1hr)}$ at 50 ft | $L_{eq.THorns(1hr)} = SEL_{ref} - 10\,log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-5** |
| **Combined Locomotive and transit††** $L_{eq(1hr)}$ at 50 ft | $L_{eq.Combo(1hr)} = 10\log(10^{(L_{eq.Loco(1hr)}/10)} + 10^{(L_{eq.RCars(1hr)}/10)} + 10^{(L_{eq.SCars(1hr)}/10)} + 10^{(L_{eq.LHorns(1hr)}/10)} + 10^{(L_{eq.THorns(1hr)}/10)})$ | **Eq. 4-6** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$, $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-7** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$, $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-8** |
| **Day/Night** $L_{dn}$ at 50 ft | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-9** |

$N_{Loco}$ = average number of locomotives per train

K = constant
- -10 for passenger diesel
- 0 for DMUs
- +10 for electric

S = train speed, mph

$V$ = average hourly volume of train traffic, trains per hour

$N_{Cars}$ = average number of cars per train

$Adj_{track}$ = constant
- +5 for jointed track or for a crossover within 300 ft
- +4 for aerial structure with slab track (except AGT and monorail)
- +3 for embedded track on grade
- -5 if a noise barrier blocks the line of sight

$V_d$ = average hourly daytime volume of train traffic, trains per hour

$= \frac{number\ of\ trains,\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of train traffic, trains per hour

$= \frac{number\ of\ trains,\ 10\ p.m.\ to\ 7a.m.}{9}$

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)

$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)

$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

* Assumes a diesel locomotive power rating at approximately 3000 hp.

** Based on FRA's horn noise model (http://www.fra.dot.gov/eLib/Details/L04091).

† Includes all commuter rail cars, transit cars, streetcars above 25 mph, AGT and monorail.

†† Only include appropriate terms.

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**Option B: Highway/Transit Sources –** The highway/transit type sources include most transit modes that do not require a fixed-guideway. Examples are high-occupancy vehicles, such as buses, commuter vanpools and carpools. Use the instructions below to estimate source noise levels for projects that involve these types of vehicles and are using FTA's environmental review procedures. At an early project stage, the information available for a General Noise Assessment includes:

- Vehicle type
- Transitway design options
- Time of operation
- Typical headways
- Design speed
- Alternative alignments

This information is not sufficient to predict noise levels at all locations along the ROW; therefore, use of conservative estimates (e.g., maximum (expected) design speeds and operations at design capacities) to estimate worst-case noise impact levels is recommended. The procedure is consistent with FHWA's highway noise prediction method. The reference SEL levels in Table 4-11 correspond to FHWA's source emission levels and speed coefficients for buses and automobiles.[22]

**B.i.** Using Table 4-11, choose the appropriate reference source noise levels 50 ft from the roadway in terms of SEL. Note that the SEL reference speed is 50 mph, unless otherwise noted.

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**Table 4-11 Source Reference Levels at 50 ft from Roadway, 50 mph**

| Source* | Reference SEL, dBA |
|---|---|
| Automobiles and Vans | 74 |
| Buses (diesel-powered) | 82 |
| Buses (electric) | 80 |
| Buses (hybrid) | 83** |

* Assumes normal roadway surface conditions.
** For hybrid buses, determine Reference SEL on a case-by-case basis because they vary, and data are scarce.

**B.ii.** Collect the following data:

- Number of vehicle passbys during the day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) for each vehicle type in Table 4-11, if a category 2 land use is present
- Number of vehicle passbys during hours that category 1 or category 3 land uses are normally in use, each vehicle type in Table 4-11
- Speed (maximum expected)
- Transitway configuration (with or without noise barrier)

**B.iii.** Calculate the noise exposure at 50 ft in terms of $L_{eq(1hr)}$. Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-12.

**B.iv.** Calculate the noise exposure at 50 ft in terms of $L_{dn}$. If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-12.

Note that the equations in Table 4-12 include terms to account for a speed other than the 50 mph reference speed and a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

Table 4-12 presents an estimate of noise reduction potentially provided by wayside noise barriers. This is considered illustrative given that barriers are the most common noise mitigation measure. See Section 4.5, Step 7 for a complete description of the benefits resulting from noise mitigation. If impact is determined during the General Noise Assessment without mitigation, repeat the procedure and include proposed mitigation.

**Table 4-12 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Highway/Transit General Noise Assessment**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(V) + C_S log(\frac{S}{50}) - 35.6$ | **Eq. 4-10** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{Aeq(1hr)}$ where V = $V_d$ | **Eq. 4-11** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{Aeq(1hr)}$ where V = $V_n$ | **Eq. 4-12** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-13** |
| **Barrier Adjustment** | = -5 for noise barriers | |
| $V$ | = hourly volume of vehicles, vehicles per hour | |
| $C_s$ | = Speed constant<br>15 for diesel buses<br>28 for electric buses<br>21 for hybrid buses[23]<br>30 for automobile and van pools | |
| S | = average vehicle speed, mph | |
| $V_d$ | = average hourly daytime volume of vehicles, vehicles per hour<br>$= \frac{total\ number\ of\ vehicles, 7\ a.m.\ to\ 10\ p.m.}{15}$ | |
| $V_n$ | = average hourly nighttime volume of vehicles, vehicles per hour<br>$= \frac{total\ number\ of\ vehicles, 10\ p.m.\ to\ 7\ a.m.}{9}$ | |

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**Option C: Stationary Sources** – Stationary sources include fixed transit system facilities. New transit facilities undergo a site review for best location that considers the noise sensitivity of surrounding land uses. Although many facilities such as bus maintenance garages are usually located in industrial and commercial areas, some facilities such as bus terminals, ferry terminals, train stations, and park-and-ride lots may be placed near residential neighborhoods where noise impact may occur. Access roads to some of these facilities may also

pass through noise-sensitive areas. Noise from access roads is treated according to the procedures described in the Highway/Transit Sources category. In a General Noise Assessment, only the prominent features of each fixed facility are considered in the noise analysis.

**C.i.** For small facilities, using Table 4-13, determine the reference source noise levels 50 ft from the center of the site in terms of SEL. The source reference levels given in the table are based on measurements for the peak hour of operation of a typical stationary source of the noted type and size.

A large facility, such as a rail yard, is spread out over considerable area with various noise sources with different noise levels depending on the layout of the facility. Specifying a single reference SEL for the facility at 50 ft from the center of the site could be misleading if all of these different noise sources are not represented. Therefore, the reference distance should be the equivalent distance of 50 ft, which is determined by estimating the noise levels from the center of the site at a distance far enough to capture all noise sources and projecting back to 50 ft from the center of the site. This approach allows for a conservative estimate of noise for all surrounding areas and the equivalent noise can be considered as concentrated at the center of the site. If the location of noise sources is known, then the distance should be taken from the point of the noisiest activity on the site (e.g., the dock in the case of ferry boat operations) instead of the center of the site.

**Table 4-13 Source Reference Levels at 50 ft from Center of Site, Stationary Sources**

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| Source | Reference SEL, dBA | Reference Conditions |
|---|---|---|
| ***Rail System*** | | |
| Yards and shops | 118 | 20 train movements in peak activity hour |
| Layover tracks (commuter rail) | 109 | 1 train with diesel locomotive idling for 1 hour |
| Crossing signals | 109 | 3600 second duration |
| ***Bus System*** | | |
| Storage yard | 111 | 100 buses accessing facility in peak activity hour |
| Operating facility | 114 | 100 buses accessing facility, 30 buses serviced and cleaned in peak activity hour |
| Transit center | 101 | 20 buses in peak activity hour |
| ***Ferry Terminal*** | | |
| Ferry boat (no fog horn sounded) | 97 | 4 ferry boat landings in 1 hour |
| Ferry boat (fog horn sounded) | 100 | |
| ***Parking Garage*** | 92 | 1000-car capacity in peak activity hour |
| ***Park & Ride Lot*** | 101 | 12 buses, 1000 cars in peak activity hour |

**C.ii.** Collect the following data:

- Number of layover tracks and hours of use
- Number of buses, if different from assumed reference conditions (if this number varies during the day or night, take the average)
- Number of ferry boat landings, if different from assumed reference conditions (if this number varies during the day or night, take the average)
- Actual capacity of parking garage or lot

**C.iii.** Calculate $L_{eq(1hr)}$ at 50 ft. Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-14.

**C.iv.** Calculate $L_{dn}$ at 50 ft. If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-14.

The equations in Table 4-14 include a numerical adjustment to account for the one-hour time period for this metric. See Appendix B.1.4.4 for more information on the numerical adjustment.

Table 4-14 presents an estimate of noise reduction potentially provided by noise barriers at the property line. Only approximate locations and lengths for barrier or other noise mitigation measures are developed during a General Noise Assessment to provide a preliminary indication of the costs and benefits of mitigation. A Detailed Noise Analysis of the preferred alternative is usually warranted following the General Noise Assessment (if it predicts any impacts) to verify impacts and design the mitigation.

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Cont.

**Table 4-14 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Stationary Source General Noise Assessment***

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + C_N - 35.6$ | **Eq. 4-14** |
| **Daytime** $L_d$ at 50 ft | $L_d = 10\log((\frac{1}{15}) \sum_{7am-10pm} 10^{(L_{Aeq(1hr)}/10)})$ | **Eq. 4-15** |
| **Nighttime** $L_n$ at 50 ft | $L_n = 10\log((\frac{1}{9}) \sum_{10pm-7am} 10^{(L_{Aeq(1hr)}/10)})$ | **Eq. 4-16** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-17** |
| **Barrier Adjustment** | = -5 for noise barrier at property line | |
| **Volume Adjustment** | $= C_N$ | |
| | $= 10\log(\frac{N_T}{20})$ Rail yards and shops | |
| | $= 10\log(N_T)$ Layover tracks | |
| | $= 10\log(\frac{N_B}{100})$ Bus storage yard | |
| | $= 10\log(\frac{N_B}{200} + \frac{N_S}{60})$ Bus operating facility | |
| | $= 10\log(\frac{N_B}{20})$ Bus transit center | |
| | $= 10\log(\frac{N_F}{4})$ Ferry terminal | |
| | $= 10\log(\frac{N_A}{1000})$ Parking garage | |
| | $= 10\log(\frac{N_A}{2000} + \frac{N_B}{24})$ Park & ride lot | |
| | $= 10\log(\frac{E}{3600})$ Crossing signals | |
| | $N_T$ = average number of trains per hour during the day (7AM to 10PM) or night (10PM to 7AM)<br>$N_B$ = average number of buses per hour during the day or night<br>$N_F$ = average number of ferry boat landings per hour during the day or night<br>$N_S$ = average number of buses serviced and cleaned per hour during the day or night<br>$N_A$ = average number of automobiles per hour during the day or night<br>E = average hourly duration of events, sec during the day or night | |

* If any of these numbers is zero, omit that term.

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## Step 3: Estimate Project Noise Exposure by Distance

*Estimate the project noise exposure for locations beyond the reference distance, such as for noise-sensitive land uses.*

In the previous step, noise exposure at the reference distance of 50 ft was calculated for the various noise sources. This step describes how to estimate the project noise exposure beyond (or, if needed, closer than) the reference distance, such as at noise-sensitive land uses locations. This procedure estimates the source's noise exposure as a function of distance. Adjustments are provided to account for shielding attenuation from rows of buildings.

**3a.** Select the appropriate distance correction curve (Fixed-Guideway & Highway or Stationary) from Figure 4-6. The Fixed-Guideway & Highway curve refers to line sources while the Stationary curve is refers to point sources. The distance correction factor ($C_{distance}$) is 0 dB at 50 ft.

**3b.** Choose a distance other than 50 ft, such as the distance to a receiver. Determine the correction factor using Figure 4-6 or calculate using the equations in Table 4-15.[iii] For distances beyond 1,000 ft, the equations in Table 4-15 can be used; however, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. More detailed calculation methods may be required to account for those effects beyond 1,000 ft.

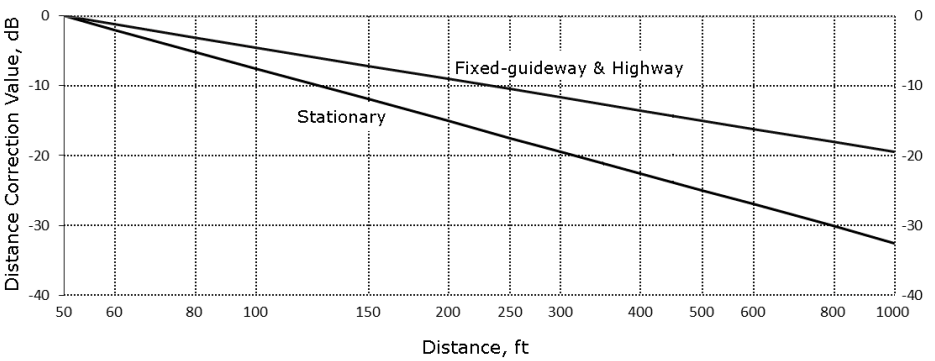


**Figure 4-6 Curves for Estimating Exposure vs. Distance in General Noise Assessment**

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[iii] Note that the curves and equations assume acoustically soft ground beyond a distance of 50 ft. See Table 4-27 for more detailed calculation of ground attenuation.

**Table 4-15 Distance Correction Factor Equations for General Noise Assessment**

| Source | Equation | |
|---|---|---|
| Stationary Sources | $C_{distance} = -25\log(\frac{D}{50})$ | **Eq. 4-18** |
| Fixed-guideway and Highway | $C_{distance} = -15\log(\frac{D}{50})$ | **Eq. 4-19** |
| $D$ = distance, ft | | |

**3c.** Apply the distance correction ($C_{distance}$) to the project noise exposure at 50 ft (Section 4.4, Step 2) using the following equation:

$$L_{distance} = L_{50} + C_{distance} \quad \textbf{Eq. 4-20}$$

where:

$L_{distance}$ = $L_{dn}$ or $L_{eq(1hr)}$ at the new distance in feet
$L_{50}$ = $L_{dn}$ or $L_{eq(1hr)}$ at 50 ft

**3d.** Repeat Step 3c for each source-receiver distance from the project. A noise exposure vs. distance curve can be created, if desired, by calculating the noise exposure for all distances of interest and plotting a curve. This curve can be used to assist in determining the noise impact contour for the first row of unobstructed buildings. This plot can be used to display noise from both unmitigated and mitigated conditions to assess the potential benefits from mitigation measures.

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For second row receivers and beyond, it is necessary to account for shielding attenuation from rows of intervening buildings. Without accounting for shielding, impacts may be substantially overestimated. Use the following general rules to account for the effect of shielding from intervening rows of buildings:

- Assign 4.5 dB of shielding attenuation for the first row of intervening buildings only.
- Assign 1.5 dB of shielding attenuation for each subsequent row, up to a maximum total attenuation of 10 dB.

## Step 4: Combine Noise Exposure from All Sources

*Combine all sources to predict the total project noise at the receivers using the equations in Table 4-16, once propagation adjustments have been made for the noise exposure from each source separately (fixed-guideway, highway/transit, and stationary).*

**Table 4-16 Computing Total Noise Exposure**

| | | |
|---|---|---|
| Total $L_{eq(t)}$ from all sources for the hour of interest: | $L_{eq.total(1hr)} = 10\log(\sum_{all\ sources} 10^{L_{eq}/10})$ | **Eq. 4-21** |
| Total $L_{dn}$ from all sources | $L_{dn.total} = 10\log(\sum_{all\ sources} 10^{L_{dn}/10})$ | **Eq. 4-22** |

## Step 5: Estimate Existing Noise Exposure

*Measure the existing noise or estimate the existing noise exposure using a simplified procedure.*

Existing noise in the project vicinity must be quantified and compared to the project noise to determine the potential noise impact. It is generally recommended to measure existing noise, especially at locations known to be noise-sensitive, but if measurement results are not available then they must be estimated. In the Detailed Noise Analysis, the existing noise exposure is usually based on noise measurements at representative locations in the community.

It is not necessary or recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for "clusters" of sites based on measurements or estimates at representative locations in the community. Because of the sensitivity of the noise criteria to the existing noise exposure, careful characterization of pre-project ambient noise is important. Guidelines for selecting representative receiver locations and determining ambient noise are provided in Appendix D and Appendix E, respectively.

**Changes to Existing Transit**
For projects that propose changes to an existing transit system, such as a rehabilitation project, the project noise can include changes to the existing noise because of the project, and so it is not possible to define project noise separately. For these projects, refer to Section 4.1, Step 3 – Option B, on using the cumulative noise criteria.

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This section describes how to estimate the existing noise in the project study area from general data available early in project planning. The procedure uses Table 4-17, where a neighborhood's existing noise exposure is based on proximity to nearby major roadways or railroads, or on population density. For areas near major airports, published aircraft noise contours can also be used to estimate the existing noise exposure. The process is as follows:

**5a.** Obtain scaled mapping and aerial photographs showing the project location and alternatives. A scale of 1 inch = 200 or 400 ft is convenient for the accuracy needed in the noise assessment. The size of the base map should be sufficient to show distances of at least 1000 ft from the center of the alignment or property center, depending on whether the project is a line source (fixed guideway/ roadway) or a stationary facility. These data are commonly available from local transit agencies and a number of publicly available online tools.

**5b.** Estimate the existing noise exposure by estimating the noise from major roads and railroad lines or by population density. First, evaluate the site's proximity to major roads and railroad lines including those that are included in the project. If these noise sources are far enough away that ambient noise is dominated by local streets and community activities, estimate the existing noise based on population density. To choose the appropriate existing noise exposure, compare noise levels from each of the three categories—Roadways, Railroads, and Population Density—and select the lowest level. In case of a

lightly used railroad (one train per day or less) select the Population Density category. Existing noise levels are presented in Table 4-17. Refer to Section 4.1, Step 3 – Option B, on using the cumulative noise criteria for projects that propose changes to an existing transit system, such as a rehabilitation project.

**Option A: Roadways –** Major roadways are separated into two categories for a general noise assessment. Roadways that cannot be described by these two categories are not considered major roadways and would use the Population Density method described below. The roadway categories are as follows:

- Interstate highway—roadways with 4 or more lanes that allow trucks
- Other roadway—parkways without trucks and city streets with the equivalent of 75 or more heavy trucks per hour or 300 or more medium trucks per hour

The estimated roadway noise levels in Table 4-17 are based on data for light to moderate traffic on typical highways and parkways using FHWA highway noise prediction procedures. Where a range of distances is given, the noise exposure estimates are given at the larger distance (note that the traffic noise at the smaller distance is underestimated). For highway noise, distances are measured from the centerline of the near lane for roadways with two lanes, while for roadways with more than two lanes the distance is measured from the geometric mean of the roadway. This distance is computed as follows:

$$D_{GM} = \sqrt{(D_N)(D_F)} \qquad \textbf{Eq. 4-23}$$

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where:

$D_{GM}$ = distance to the geometric mean in feet
$D_N$ = distance to the nearest lane centerline in feet
$D_F$ = distance to the farthest lane centerline in feet

**Option B: Railroad Lines –** For railroads, the estimated noise levels are based on an average train traffic volume of 5–10 trains per day at 30–40 mph for main line railroad corridors and the noise levels are provided in terms of $L_{dn}$ only. Distances are referenced to the track centerline, or in the case of multiple tracks, to the centerline of the rail corridor. Because of the intermittent nature of train operations, train noise will affect the $L_{eq(1hr)}$ only during certain hours of the day, and these hours may vary from day to day. Therefore, to avoid underestimating noise impact when using $L_{eq(1hr)}$ , it is recommended that sites near rail lines are estimated based on nearby roadways or population density unless very specific train information is available.

**Option C: Population Density –** In areas away from major roadways, noise from local streets or in neighborhoods is estimated using a relationship determined during a research program by EPA.[24] EPA determined that ambient noise can be related to population density in locations away from transportation corridors, such as airports, major roads and railroad tracks, according to the following relation:

$$L_{dn} = 22 + 10\log(p) \qquad \textbf{Eq. 4-24}$$

where:

$L_{dn}$ = in dBA
$p$ = population density in people per square mile

In areas near major airports, published noise contours can be used to estimate the existing noise exposure. The $L_{dn}$ from such contours should be applied if greater than the estimates of existing noise from other sources at a given location.

**Table 4-17 Estimating Existing Noise Exposure for General Noise Assessment**

| Dominant Existing Noise Source | Distance from Major Noise Source, ft* | Population Density, people per sq. mi. | *Noise Exposure Estimates* | | | |
|---|---|---|---|---|---|---|
| | | | $L_{eq}$ Day | $L_{eq}$ Evening | $L_{eq}$ Night | $L_{dn}$ |
| Interstate Highway** | 10–50 | | 75 | 70 | 65 | 75 |
| | 50–100 | | 70 | 65 | 60 | 70 |
| | 100–200 | | 65 | 60 | 55 | 65 |
| | 200–400 | | 60 | 55 | 50 | 60 |
| | 400–800 | | 55 | 50 | 45 | 55 |
| | 800 and up | | 50 | 45 | 40 | 50 |
| Other Roadway† | 10–50 | | 70 | 65 | 60 | 70 |
| | 50–100 | | 65 | 60 | 55 | 65 |
| | 100–200 | | 60 | 55 | 50 | 60 |
| | 200–400 | | 55 | 50 | 45 | 55 |
| | 400 and up | | 50 | 45 | 40 | 50 |
| Railway†† | 10–30 | | -- | -- | -- | 75 |
| | 30–60 | | -- | -- | -- | 70 |
| | 60–120 | | -- | -- | -- | 65 |
| | 120–240 | | -- | -- | -- | 60 |
| | 240–500 | | -- | -- | -- | 55 |
| | 500–800 | | -- | -- | -- | 50 |
| | 800 and up | | -- | -- | -- | 45 |
| Population | | 1–100 | 35 | 30 | 25 | 35 |
| | | 100–300 | 40 | 35 | 30 | 40 |
| | | 300–1000 | 45 | 40 | 35 | 45 |
| | | 1000–3000 | 50 | 45 | 40 | 50 |
| | | 3000–10000 | 55 | 50 | 45 | 55 |
| | | 10000–30000 | 60 | 55 | 50 | 60 |
| | | 30000 and up | 65 | 60 | 55 | 65 |

* Distances do not include shielding from intervening rows of buildings. Generally, for estimating shielding attenuation in populated areas, assume 1 row of buildings every 100 ft, 4.5 dB for the first row, and 1.5 dB for every subsequent row up to a maximum of 10 dB attenuation.
** Roadways with 4 or more lanes that permit trucks, with traffic at 60 mph.
† Parkways with traffic at 55 mph, but without trucks, and city streets with the equivalent of 75 or more heavy trucks per hour and 300 or more medium trucks per hour at 30 mph.
†† Main line railroad corridors typically carrying 5-10 trains per day at speeds of 30-40 mph.

## Step 6: Inventory Noise Impacts

*Inventory the potential noise impacts either by comparing the project and existing noise at each noise-sensitive land use or by developing noise impact contours.*

Use land use information and assumptions for shielding attenuation from rows of buildings. In some cases, it may be necessary to supplement the land use information or determine the number of dwelling units within a multi-family building with a visual survey. If the objective is to compare major alignment options, it may not be necessary to identify every different type of noise-

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sensitive land use. The inventory may include a subset of land uses, including residential and public institutional uses.

Option A is the preferred method as it quantifies the noise impact at each noise-sensitive land use indicating the severity of the impact. Option B may be useful for comparing and narrowing down major alignment options with numerous noise-sensitive land uses.

**Option A: Compare existing noise to project noise at each noise-sensitive land use.**

**A1.** Tabulate each individual noise-sensitive land use building and site within the identified screening distance (Section 4.3).

**A2.** Determine for each noise-sensitive land use the existing noise (Section 4.4, Step 5), the project noise (Section 4.4, Step 3) and the resulting change in noise.

**A3.** Designate each noise-sensitive land use with either a no, moderate, or severe noise impact based on the criteria in Section 4.1.

**A4.** Identify all moderate and severe impacts on a project map.

**Option B: Develop noise impact contours.**

**B1.** Determine the noise level thresholds at which the project noise would cause moderate and severe impacts using the estimated existing noise exposure from Section 4.4, Step 5 and the noise impact criteria in Figure 4-2.

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**B2.** Determine the distances from the project boundary to the two impact levels using the noise exposure vs. distance curves or equations in Section 4.4, Step 3.

**B3.** Plot points on a project land use map that correspond to the distances determined in Section 4.4, Step 3. Continue this process for all areas surrounding the project. Connect the plotted points to represent the noise impact contours.

**B4.** Tabulate all noise-sensitive land use buildings and sites that lie between the impact contours and the project boundary. For residential buildings, an estimate of the number of dwelling units is satisfactory.

**B5.** Prepare summary tables showing the number of buildings (and estimated dwelling units, if available) within both impact categories.

Specific decibel level noise contours, for example, 65 dBA, can also be plotted if desired. The distances can be determined using the procedure in Section 4.4, Step 3 by substituting the desired decibel level for the impact threshold.

Locations of points will change with respect to the project boundary as the existing ambient exposure changes, the project source levels change, and as shielding effects change. It is recommended to plot points close together to

draw a smooth curve. For a General Noise Assessment, the contours may be drawn through buildings and terrain features as if they were not present. This practice is acceptable considering the level of detail associated with a project in its early stages of development. Example 4-1 and Example 4-4 describe the development of noise contours with illustrations.

### Step 7: Determine Noise Mitigation Needs

*Apply estimates of the noise reduction from proposed mitigation measures (Section 4.4, Step 2), where the assessment shows either severe or moderate impact, and repeat the tabulation of noise impacts.*

Note that noise barriers are the only form of mitigation available in a General Noise Assessment. The other mitigation measures are available for a Detailed Noise Analysis. The approximate noise barrier lengths and locations developed in a General Noise Assessment provide a preliminary basis for evaluating the costs and benefits of impact mitigation. This evaluation will provide a conservative estimate of the effect of the mitigation on the identified impacts.

In general, it is recommended to complete a Detailed Noise Analysis for final mitigation measures. However, if impact is identified through a General Noise Assessment and can be mitigated to a level of no impact using the noise reduction estimates included in the General Noise Assessment, a Detailed Noise Analysis may not be needed. Mitigation assumed in the assessment used for the NEPA evaluation must be included in the project as a commitment. Consult with the FTA Regional office to determine if a Detailed Noise Analysis is required for final mitigation measures.

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The following examples illustrate how to complete general noise assessments for varying project types including commuter rail, highway/transit, BRT system, and a transit center.

## Example 4-1 General Noise Assessment – Commuter Rail

**General Noise Assessment for a Commuter Rail System in an Existing Abandoned Railroad Right-of-Way**

The following example illustrates the General Noise Assessment procedure for a new fixed-guideway project. The hypothetical project is a commuter rail system to be built within the abandoned ROW of a railroad. The example covers a segment of the corridor that passes through a densely developed area with population density of 25,000 people per square mile in mixed single- and multi-family residential land uses as shown in Figure 4-7. The example is presented in two parts: first, a segment where the rail line is grade-separated and a horn is not sounded; and second, an at-grade street-rail crossing where the horn is sounded.

**Assumptions**

- **Project Corridor**
  Existing population density is 25,000 people per square mile.
- **Commuter Rail System**
  Commuter train with one locomotive and a three-car consist on a double-track at-grade system with welded rail. Trains operate with 20-minute headways during peak hours and 1-hour headways during off-peak. Speeds are approximately 40 mph along the corridor.

**Operating Schedule**

| | Period | Headway (minutes) | | Trains per hour | | | Period Total |
|---|---|---|---|---|---|---|---|
| | | Inbound | Outbound | Inbound | Outbound | Total | |
| Daytime | 7 a.m. – 8 a.m. | 20 | 20 | 3 | 3 | 6 | 6 |
| | 8 a.m. – 4 p.m. | 60 | 60 | 1 | 1 | 2 | 16 |
| | 4 p.m. – 6 p.m. | 20 | 20 | 3 | 3 | 6 | 12 |
| | 6 p.m. – 10 p.m. | 60 | 60 | 1 | 1 | 2 | 8 |
| Nighttime | 10 p.m. – 11 p.m. | 60 | 60 | 1 | 1 | 2 | 2 |
| | 11 p.m. – 5 a.m. | -- | -- | -- | -- | -- | -- |
| | 5 a.m. – 6 a.m. | 60 | 60 | 1 | 1 | 2 | 2 |
| | 6 a.m. – 7 a.m. | 20 | 20 | 1 | 1 | 2 | 2 |

***Part 1: Grade-Separated Street Crossing***

**Determine Project Source Reference Levels at 50 ft**

Classify the noise source: Fixed-Guideway Transit
Determine noise source reference level from Table 4-9:
Locomotive: 92 dBA
Cars: 82 dBA

**Estimate Project Noise Exposure at 50 ft**

Determine average hourly daytime and nighttime volumes of train traffic.

Daytime (7 a.m. – 10 p.m.)

$$V_d = \frac{42\ trains}{15\ hours} = 2.8\ trains/hour$$

Nighttime (10 p.m. – 7 a.m.)

$$V_n = \frac{6\ trains}{9\ hours} = 0.7\ trains/hour$$

Use Eq. 4-1 and Eq. 4-3 to calculate the daytime $L_{eq(1hr)}$ at 50 ft for the locomotives and rail cars.

$$\begin{aligned} L_{d.Locos} &= SEL_{ref} + 10log(N_{Locos}) + Klog(\frac{S}{50}) + 10log(V_d) - 35.6 \\ &= 92 + 10log(1) - 10log(\frac{40}{50}) + 10log(2.8) - 35.6 \\ &= 61.8\ dBA \text{ at 50 ft} \end{aligned}$$

$$\begin{aligned} L_{d.RCars} &= SEL_{ref} + 10log(N_{Cars}) + 20log(\frac{S}{50}) + 10log(V_d) - 35.6 \\ &= 82 + 10log(3) + 20log(\frac{40}{50}) + 10log(2.8) - 35.6 \\ &= 53.7\ dBA \text{ at 50 ft} \end{aligned}$$

Calculate the total daytime $L_d$ for the locomotive and rail cars using Eq. 4-7.

$$\begin{aligned} L_{d.Combo} &= 10log(10^{L_{d.Loco}/10} + 10^{L_{d.RCars}/10}) \\ &= 10log(10^{61.8/10} + 10^{53.7/10}) \\ &= 62.4\ dBA \text{ at 50 ft} \end{aligned}$$

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Calculate the nighttime $L_{eq(1hr)}$ at 50 ft for the locomotives and rail cars.

$$L_{n.Locos} = SEL_{ref} + 10\log(N_{Locos}) + K\log(\frac{S}{50}) + 10\log(V_n) - 35.6$$
$$= 92 + 10\log(1) - 10\log(\frac{40}{50}) + 10\log(0.7) - 35.6$$
$$= 55.8\ dBA \text{ at 50 ft}$$

$$L_{n.RCars} = SEL_{ref} + 10\log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\log(V_n) - 35.6$$
$$= 82 + 10\log(3) + 20\log(\frac{40}{50}) + 10\log(0.7) - 35.6$$
$$= 47.7\ dBA \text{ at 50 ft}$$

Calculate the total nighttime $L_n$ for the locomotive and rail cars using Eq. 4-8.

$$L_{n.Combo} = 10log(10^{L_{n.Locos}/10} + 10^{L_{n.RCars}/10})$$
$$= 10log(10^{55.8/10} + 10^{47.7/10})$$
$$= 56.4\ dBA \text{ at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-9.

$$L_{dn.Combo} = 10log\ (15 \times 10^{(L_{d.Combo}/10)} + 9 \times 10^{((L_{n.Combo}+10)/10)}) - 13.8$$

**Estimate Existing Noise Exposure**

Estimate existing noise at noise-sensitive sites. Since the existing alignment is on an abandoned railroad, the dominant existing noise source can be described by a generalized noise level to characterize a large area. Use Table 4-17 and population density of 25,000 people per square mile to determine the existing noise level. Unobstructed residences range from 100 to 200 ft from the rail line.

According to Table 4-17: $L_{dn}$ = 60 dBA

**Determine Noise Level and Distance for the Onset Of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 60 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{dn}$.

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 60 dBA | 58 dBA | 64 Dba |

Determine the distance from the project noise sources to the noise impact contours using the fixed-guideway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise level at 50 ft is approximately 64 dBA.

Moderate impact (58 dBA)

$$58 - 64 = -6\ dB$$

According to Figure 4-6, the distance correction is approximately -6 dB at 120 ft.

Severe Impact (64 dBA)

$$64 - 64 = 0\ dB$$

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According to Figure 4-6, the distance correction is less than 0 dB at approximately 51 ft.

| Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 64 dBA | 120 ft | 51 ft |

**Develop Noise Impact Contours**

Draw contours for each affected land use, based on the above table and its distance from the rail line (Figure 4-7). Note that the impact distances listed are in terms of distance to the centerline of the Commuter Rail corridor.

**Inventory of Noise Impact**

There are six residential buildings within the contours defining moderate impact (shaded in Figure 4-7).

**Noise Mitigation**

The procedure is repeated assuming a noise barrier to be placed at the railroad ROW line. The barrier serves to reduce project noise from the commuter rail by at least 5 dB. Note that the barrier does not affect the project criteria to be used in determining impact, and the same existing noise levels (as the case without a barrier) are used to determine these thresholds.

In this example, the noise barrier decreases the distance to moderate impact from 120 to 60 ft and eliminates all residential noise impact for this segment of the project area.

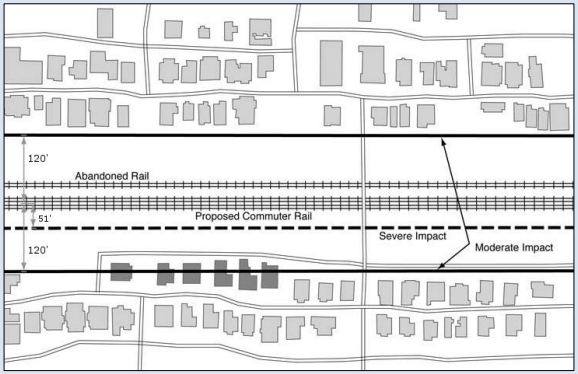


**Figure 4-7 Noise Impacts of Hypothetical Commuter Rail**

***Part 2: At-Grade Crossing with Horn Blowing***

Now consider the case of an active street crossing of the commuter railroad tracks. The General Noise Assessment method includes source reference levels for horns on moving trains and warning bells (crossing signals) at the street crossing. According to Table 4-9, the horn noise applies to track segments within ¼ mile of the grade crossing.

**Estimate Project Noise Exposure at 50 ft**

Using the train volumes from Part 1 and the information in Table 4-9 and Table 4-10, determine the day and nighttime $L_{eq(1hr)}$ from sounding the horns at 50 ft.

$$\begin{aligned} L_{d.LHorns} &= SEL_{ref} + 10\log(V_d) - 35.6 \\ &= 110 + 10\log(2.8) - 35.6 \\ &= 78.9\ dBA \end{aligned}$$

01-31 Cont.

$$L_{n.LHorns} = SEL_{ref} + 10\log(V_n) - 35.6$$
$$= 110 + 10\log(0.7) - 35.6$$
$$= 72.9\ dBA$$

Calculate the $L_{dn}$ at 50 ft from train horns using Eq. 4-9 :

$$L_{dn.LHorns} = 10\log(15 \times 10^{(L_{d.LHorns}/10)} + 9 \times 10^{((L_{n.LHorns}+10)/10)}) - 13.8$$
$$= 81\ dBA$$

At-grade street crossings will have warning bells, typically sounding for 20 seconds for every train passby. The total daytime and nighttime durations are as follows:

$E_d$ = average daytime hourly duration
=20 seconds X 2.8 trains/hour = 56 seconds/hour

$E_n$ = average nighttime hourly duration
=20 seconds X 0.7 trains/hour = 14 seconds/hour

From Table 4-14:

$$L_{d.WBell} = SEL_{ref} + 10\log(\frac{E_d}{3600}) - 35.6$$
$$= 109 + 10\log(\frac{56}{3600}) - 35.6$$
$$= 55.3\ dBA$$

$$L_{n.WBell} = SEL_{ref} + 10\log(\frac{E_n}{3600}) - 35.6$$
$$= 109 + 10\log(\frac{14}{3600}) - 35.6$$
$$= 49.3\ dBA$$

Calculate $L_{dn}$ at 50 ft. from the warning bells using Eq. 4-17:

$$L_{dn.WBell} = 10\log(15 \times 10^{(L_{d.WBell}/10)} + 9 \times 10^{((L_{n.WBell}+10)/10)}) - 13.8$$
$$= 57.3\ dBA$$

Compared to horn blowing, the crossing signal warning bell noise is negligible, but still must be included in the evaluation.

**Estimate Existing Noise Exposure**

From Part 1, the existing noise level is 60 dBA.

**Determine Noise Level and Distance for the Onset Of Impact**

As in Part 1, the existing noise level (60 dBA) is used to determine the onset of moderate and severe impacts:

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 60 dBA | 58 dBA | 64 dBA |

01-31 Cont.

Determine the distance from the project noise sources to the impact contours using the fixed-guideway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise at 50 ft is approximately 81 dBA. However, there are at least two intervening rows of buildings, which will provide 6 dB (4.5 dB for the first row and 1.5 dB for the second row) of shielding.

Moderate impact (58 dBA)

$$58 - (81 - 6) = -17\ dB$$

According to Figure 4-6, the distance correction is approximately -17 dB at 715 ft.

Severe Impact (64 dBA)

$$64 - (81 - 6) = -11\ dB$$

According to Figure 4-6, the distance correction is approximately -11 dB at 265 ft.

| Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 81 dBA | 715 ft | 265 ft |

**Draw Noise Impact Contours**

Contours can be drawn as in Part 1 for ¼ mile on either side of the grade crossing.

## Example 4-2 General Noise Assessment – Highway/Transit

**General Noise Assessment Example of Highway/Transit Corridor Projects**

This example illustrates a highway/transit project where the highway noise dominates and the FHWA assessment methods should be used to inform the FTA process according to the impact criteria in Section 4.1.

**Case 1: Highway Dominates**

A new LRT system is planned for the median of a major highway that carries heavy traffic both day and night. The noise levels at the first row of houses along the highway were measured during peak hour, mid-day and nighttime with hourly $L_{eq(1hr)}$ readings of 65 dBA, 63 dBA, and 60 dBA, respectively. The LRT tracks will be 125 ft from the first row of houses. The LRT operations during peak hour will be 4-car trains at 45 mph, with 5-minute headways in both directions. Nighttime service decreases to 2-car trains and 20 minute headways.

FTA is providing a share of the funding for the LRT project, but the State DOT and the FHWA are co-lead agencies because the median requires considerable preparation for the tracks, including replacing bridge piers of street crossings and moving some highway lanes.

**Assumptions**

$SEL_{ref}$ = 82 dBA
$Nd$ = 4 cars per train
$Nn$ = 2 cars per train
$S$ = 45 mph
$V_d$ = 24 trains per hour
$V_n$ = 6 trains per hour

**Estimate Project Noise Exposure at 50 ft**

Use Table 4-9 and Table 4-10 to determine the peak hour $L_{eq(1hr)}$ for the rail vehicles.

Use Eq. 4-3 to calculate the LRT peak-hour noise level.

$$L_{d.RCars}(h) = SEL_{ref} + 10\,log(N_{cars}) + 20\log(\tfrac{S}{50}) + 10\,log(V) - 35.6$$
$$= 82 + 10\,log(4) + 20\log(\tfrac{45}{50}) + 10\,log(24) - 35.6$$
$$= 65 \text{ dBA at 50 ft}$$

01-31 Cont.

Use Eq. 4-3 to calculate the LRT late evening hourly noise level.

$$L_{n.RCars}(h) = SEL_{ref} + 10\,log(N_{cars}) + 20\log(\tfrac{S}{50}) + 10\,log(V) - 35.6$$
$$= 82 + 10\,log(2) + 20\log(\tfrac{45}{50}) + 10\,log(6) - 35.6$$
$$= 56 \text{ dBA at 50 ft}$$

**Estimate Project Noise Exposure at 125 ft**

Since the LRT tracks will be 125 ft from the first row of houses, use Figure 4-6 to determine the level at 125 ft.

At 125 ft, the distance correction is 5 dB.
Peak hour:

$$65 - 5 = 60\ dBA\ at\ 125\ ft$$

Night hourly:

$$56 - 5 = 51\ dBA\ at\ 125\ ft$$

In this case, the highway dominates the noise environment in the area both day and night, by 5 dB during peak hour and 9 dB at night. According to Section 4.1 and Table 4-2, use the FHWA assessment methods.

## Example 4-3 General Noise Assessment – BRT System

**General Noise Assessment for a BRT System in an Existing Railroad Right-of-Way**

This example for a simple BRT project illustrates using the FTA procedures for a new BRT corridor planned in an existing abandoned railroad ROW.

**Assumptions**

| | |
|---|---|
| $SEL_{ref}$ | = 82 for buses |
| $S$ | = 25 mph |
| $V_d$ | = (344 buses) / (15 hours) = 22.9 buses per hour |
| $V_n$ | = (116 buses) / (9 hours) = 12.9 buses per hour |

**Estimate Project Noise Exposure**

Use the information and equations in Table 4-12 to calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$C_S$ = 15 for buses

$$L_{d.Bus} = SEL_{ref} + 10\,log(V_d) + C_S\log(\tfrac{S}{50}) - 35.6$$
$$= 82 + 10\,log(22.9) + 15log(\tfrac{25}{50}) - 35.6$$
$$= 55 \text{ dBA at 50 ft}$$

$$L_{n.Bus} = SEL_{ref} + 10\,log(V_n) + C_S\log(\tfrac{S}{50}) - 35.6$$
$$= 82 + 10\,log(12.9) + 15log(\tfrac{25}{50}) - 35.6$$
$$= 53 \text{ dBA at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-13.

$$L_{dn.Bus} = 10\log(15 \times 10^{(L_{d.Bus}/10)} + 9 \times 10^{((L_{n.Bus}+10)/10)}) - 13.8$$
$$= 60 \text{ dBA at 50 ft}$$

01-31 Cont.

**Estimate Existing Noise Exposure**

The surrounding area is residential with 2,500 people per square mile starting approximately 100 ft away from the proposed alignment. Determine the existing noise using Table 4-17.

$L_{dn}$ = 50 dBA

**Determine Noise Level and dIstance for the Onset of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 50 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{dn}$.

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 50 dBA | 54 dBA | 59 dBA |

Determine the distance to the noise impact contours using the fixed-guideway & highway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise level at 50 ft is approximately 60 dBA.

Moderate impact (54 dBA)

$54 - 60 = -6\ dB$

According to Figure 4-6, the distance correction is approximately -6 dB at 125 ft.

Severe Impact (59 dBA)

$59 - 60 = -1\ dB$

According to Figure 4-6, the distance correction is less than -1 dB at approximately 60 ft.

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| Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 60 dBA | 125 ft | 60 ft |

**Inventory of Noise Impact**

Since there are residential land uses approximately 100 ft away from the proposed alignment and the onset of moderate impact is at 125 ft, there are possible moderate impacts to the residences.

**Noise Mitigation**

A barrier is proposed for mitigation between the BRT system and the residences. The analysis is repeated and results in a predicted new project level of 55 dBA and the following impact distances:

| Mitigated Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 55 dBA | 60 ft | N/A |

With a noise barrier in place between the BRT system and the residences, it is predicted that the onset of moderate impact would occur approximately 60 ft away from the BRT system. Since the residential area begins approximately 100 ft away from the BRT system, which is beyond the distance of moderate impact (60 ft), a noise barrier would provide the appropriate noise mitigation for the predicted moderate impact. The onset of severe impact is listed as N/A because with a noise barrier, the severe impact criterion is not exceeded by the project.

## Example 4-4 General Noise Assessment – Transit Center

**General Noise Assessment for a Transit Center**

The following example illustrates the procedure for performing a General Noise Assessment for a stationary source. The example represents a typical FTA-assisted project in an urban area, the siting of a busy transit center in a mixed commercial and residential area, as shown in Figure 4-8.

Assume that the Noise Screening Procedure has already been done for this project and the nearest residence has been identified approximately 140 ft from the center of the proposed transit center. Recall that if any residential or other noise-sensitive land use is identified within 150 ft of a transit center during the Noise Screening Procedure, additional analysis is required.

**Assumptions**

- **Main Street Traffic**
  Peak hour traffic of 1200 autos, 20 heavy trucks, 300 medium trucks.

- **Population Density**
  12 houses per block, single family homes, 3 people per family.
  - Block area 78,750 square ft.
  - Population density = 9,750 people/square mile.

- **Bus Traffic**

| Period | Hours | Buses per Hour |
|---|---|---|
| Peak, Morning | 7 a.m.–9 a.m. | 30 |
| Peak, Afternoon | 4 p.m.–6 p.m. | 30 |
| Mid-day | 9 a.m.–4 p.m. | 15 |
| Evening | 6 p.m.–10 p.m. | 12 |
| Early Morning (Night) | 6 a.m.–7 a.m. | 15 |
| Late Night | 10 p.m.–1 a.m. | 4 |

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**Estimate Project Noise Exposure at 50 ft**

Determine the hourly volume of buses during day and night.

Daytime (7 a.m. – 10 p.m.)

$$V_d = \frac{273\ buses}{15\ hours} = 18.2\ buses/hour$$

Nighttime (10 p.m. – 7 a.m.)

$$V_n = \frac{27\ buses}{9\ hours} = 3\ buses/hour$$

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft for the bus transit center using the reference levels in Table 4-13 and the equations in Table 4-14.

$$\begin{aligned} L_{d.BTCenter} &= SEL_{ref} + C_N - 35.6 \\ &= 101 + 10\log(\frac{18.2}{20}) - 35.6 \\ &= 65\ dBA \text{ at 50 ft} \end{aligned}$$

$$L_{n.BTCenter} = SEL_{ref} + C_N - 35.6$$

$$= 101 + 10\log(\frac{3}{20}) - 35.6$$
$$= 57\ dB\text{A at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-17.

$$L_{dn.BTCenter} = 10\log(15 \times 10^{(L_{d.BTCenter}/10)} + 9 \times 10^{((L_{n.BTCenter}+10)/10)})\text{-13.8}$$
$$= 66\ dBA \text{ at 50 ft}$$

**Estimate Existing Noise Exposure**

Estimate existing noise at noise-sensitive sites from the dominant noise source, and either major roadways or local streets (population density).

**Roadway Noise Estimate –** The traffic on Main Street qualifies this street for the Other Roadway category in Table 4-17. According to the map, the nearest residence is 275 ft from the edge of Main Street. The table shows existing $L_{dn}$ = 55 dBA at this distance for representative busy city street traffic.
**Population Density Noise Estimate –** Noise from local streets is estimated from the population density of 9,750 people/square mile. Table 4-17 confirms that the $L_{dn}$ is approximately 55 dBA.

In this example, the existing noise level by both the roadway and population density estimates are the same, but that is not always the case. If the levels are different, use the lower noise level. The existing noise level associated with the residential neighborhood in this example is $L_{dn}$ = 55 dBA.

**Determine Noise Level and Distance for the Onset of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 55 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{dn}$.

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 55 dBA | 56 dBA | 62 dBA |

Determine the distances from the center of the property to the noise impact contours using the stationary curve in Figure 4-6. The project noise level at 50 ft is 66 dBA.

Moderate impact (56 dBA)

$$56 - 66 = -10\ dB$$

According to Figure 4-6, the distance correction is approximately -10 dB at 125 ft.

Severe impact (62 dBA)

$$62 - 66 = -4\ dB$$

According to Figure 4-6, the distance correction is -4 dB at approximately 70 ft.

| Project Noise $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 66 dBA | 125 ft | 70 ft |

**Draw Noise Impact Contours**

Draw lines at 70 ft and 125 ft from the center of the property of the proposed transit center. These lines represent the noise impact contours. (Note that in Figure 4-8 the severe impact contour is not drawn for clarity. The contour is just within the dashed line representing the moderate impact contour after mitigation).

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**Inventory of Noise Impact**

Within, or touching, the contour defining moderate impact are three residential buildings (shaded in Figure 4-8). No residences are within the severe impact contour.

**Noise Mitigation**

The process is repeated with a hypothetical noise barrier at the property line on the residential side of the transit center. This would consist of a wall approximately 15 ft high partially enclosing the transit center, sufficient to screen the residences but not the commercial block facing Main Street. According to Table 4-14, the approximate noise barrier effect is -5 dB. Repeating the procedure above, the noise barrier will reduce the moderate impact contour to 80 ft and the severe impact contour to 45 ft (note that at 50 ft the distance correction is 0), which in this example eliminates all potential impacts on the residences.

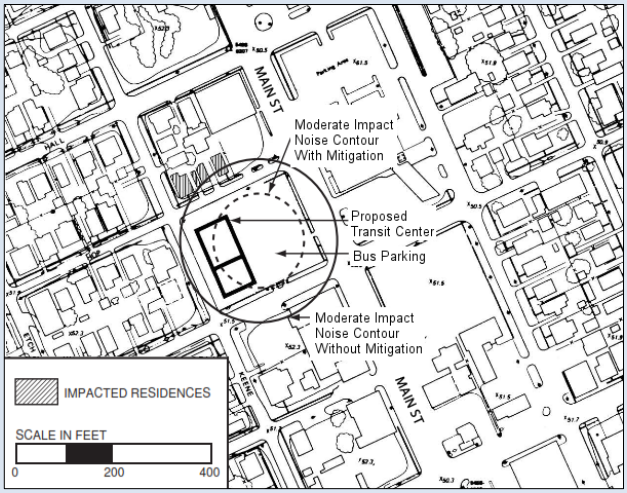


**Figure 4-8 Example of Project for General Noise Assessment: Siting of Transit Center in Mixed Commercial/Residential Area**

## 4.5 Evaluate Impact: Detailed Noise Analysis

**Evaluate for impact using the Detailed Noise Analysis procedure in this section, if appropriate.** For guidelines on when the Detailed Noise Analysis is appropriate, review Section 4.2.

The steps in the Detailed Noise Analysis (Figure 4-9) parallel the steps in the General Noise Assessment, though the Detailed Noise Analysis employs equations for computations rather than graphs or tables. Each step in the Detailed Noise Analysis is more refined in the prediction of project noise and subsequent evaluation of mitigation measures. Noise projections from the project must be determined for each receiver.

- **Step 1: Identify Noise-Sensitive Receivers**
  Identify the noise-sensitive receivers of interest in the impact analysis study, including clustering noise-sensitive areas. This identification is usually based

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Cont.

on the Screening Procedure and General Noise Assessment previously conducted.

- **Step 2: Determine Project Noise Source Reference Levels**
  Determine the project noise sources and reference levels. Then, estimate the project noise exposure at the reference distance of 50 ft, considering operational characteristics. When appropriate, measurements may be used to determine noise source reference levels.

- **Step 3: Determine Propagation Characteristics**
  Estimate project noise exposure as a function of distance, accounting for shielding and propagation along the path.

- **Step 4: Combine Noise Exposure from All Sources**
  Combine all sources to predict the total project noise at receivers.

- **Step 5: Determine Existing Noise Exposure**
  Determine the existing noise exposure. Measurements are used to determine the existing noise exposure. When measurements are unavailable, a simplified procedure to estimate existing noise exposure may be used with a clear justification to and approval by the FTA Regional office.

- **Step 6: Assess Noise Impact**
  Assess the noise impact at each receiver of interest using separate procedures for transit only and multimodal transportation projects.

- **Step 7: Determine Noise Mitigation Measures**
  Evaluate the need for mitigation and repeat the Detailed Noise Analysis with proposed mitigation.

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When situations arise that are not explicitly covered in the Detailed Noise Analysis, professional judgment, in consultation with the FTA Regional office, may be used to extend these methods to cover these unique cases, when appropriate. Appendix G provides information on developing and using non-standard modeling procedures.

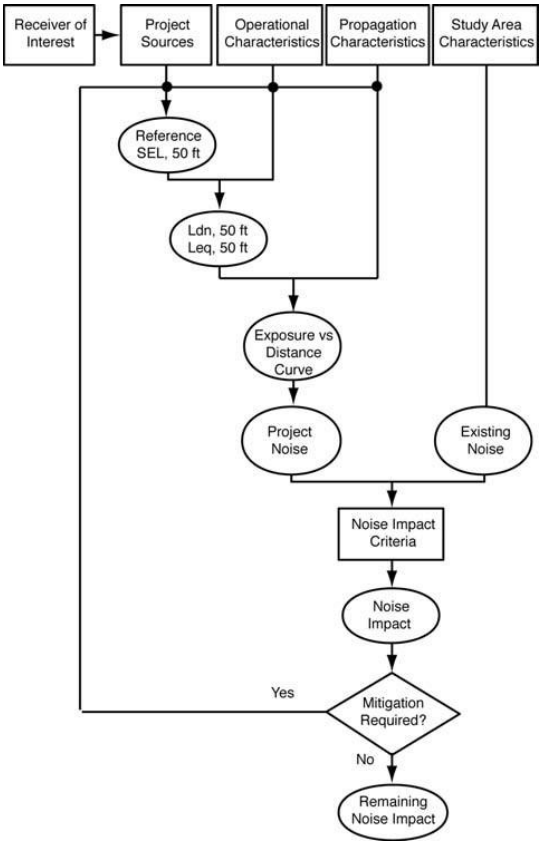


**Figure 4-9 Procedure for Detailed Noise Analysis**

## Step 1: Identify Noise-Sensitive Receivers

*Select the noise-sensitive receivers of interest, the number of which will depend upon the land use in the vicinity of the proposed project and the extent of the study area defined by the Noise Screening Procedure in Section 4.3 and the results of the General Noise Assessment in Section 4.4.*

The steps in identifying the noise-sensitive receivers of interest, both the number of receivers needed and their locations, shown in Figure 4-10, include:

**1a.** Identify all noise-sensitive land uses.
**1b.** Select individual receivers of interest.
**1c.** Cluster residential neighborhoods and other large noise-sensitive areas.

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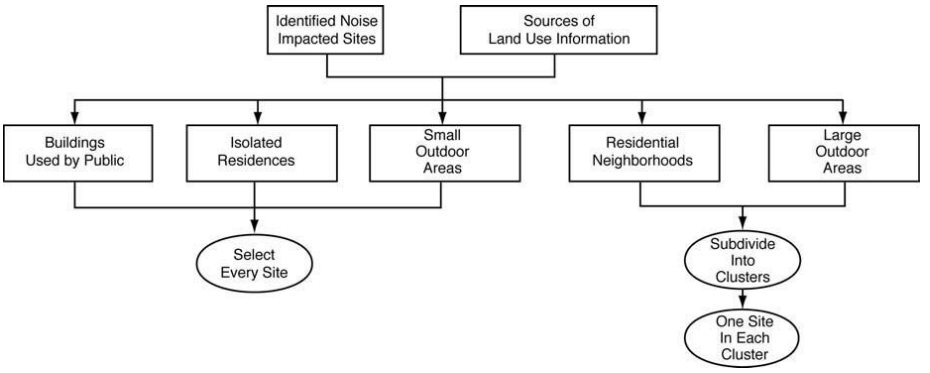


**Figure 4-10 Guide to Selecting Noise-Sensitive Receivers of Interest**

**1a.** Identify all noise-sensitive land uses where impact is identified by the General Noise Assessment in Section 4.4. If a General Noise Assessment has not been done, include all noise-sensitive sites according to the Noise Screening Procedure in Section 4.3. In areas where ambient noise is low, include land uses that are farther from the proposed project than for areas with higher ambient levels.

Recommended materials and methods that can assist in locating noise-sensitive land uses near the proposed project include:

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- **Land use maps** prepared by regional or local planning agencies or by the project staff. Area-wide maps often do not have sufficient detail to be of much use. But they can provide broad guidance and may suggest residential pockets hidden within otherwise commercial zones. Of more use are project-specific maps that provide building-by-building detail on the land near the proposed project.

- **Road and town maps** can supplement other maps, are generally more up-to-date, and may be of larger scale.

- **Aerial photographs,** when current, especially those of 400-ft scale or better, are valuable in locating all potential noise-sensitive land uses close to the proposed project. In addition, they can be useful in determining the distances between receivers and the project.

- **Windshield survey,** in which the corridor is driven and land uses are annotated on base maps, may be used for definitive identification of noise-sensitive sites. The windshield survey, supplemented by footwork where needed, is especially useful in identifying newly-constructed sites and in confirming land uses very close to the proposed project. In addition, maps and aerial photos typically reveal only horizontal distances, not vertical distances. Houses on a hill overlooking the project may need a barrier of unacceptable height for its attenuation to be effective, and the greater vertical distance between source and receiver may eliminate the impact entirely. The windshield survey would reveal where vertical contour maps

or other means may be needed so that vertical distances can be determined.

- **Geographic Information Systems (GIS)** provides electronic mapping needed for identifying noise-sensitive land uses. GIS data may include land parcels, building structures, aerial photography, and project-specific information. These data may be obtained during the project study or from local or regional agencies that store and maintain GIS data. Using electronic GIS data has advantages over paper mapping with respect to automating the process of identifying noise-sensitive land uses and accurately being able to determine their distances to the project alignment

Table 4-18 contains three types of *land uses of interest* and provides guidelines as to when receivers should be analyzed individually and when they can be clustered.

**Table 4-18 Land Uses of Interest**

| Land Uses | Specific Use | Selecting Receivers |
|---|---|---|
| Residences | Isolated single family residences<br><br>Neighborhoods (single and multi-family residences, apartment buildings, duplexes, etc.) | Select each isolated residence as a receiver of interest. For residential areas, cluster by proximity to project sources, proximity to ambient-noise sources, and location along project line. Choose one receiver of interest (closest to the project noise source and at an intermediate distance from the predominant sources of existing noise) in each cluster (i.e., Balance the distance between the receiver and the new noise source and the receiver and the existing noise source). Multiple clusters in one location may be needed to fully characterize the area. |
| Indoor noise-sensitive sites | Places of worship<br>Schools Hospitals/nursing homes Libraries<br>Public meeting halls<br>Concert halls/auditoriums/theaters<br>Recording/broadcast studios<br>Museums and certain historic buildings<br>Hotels and motels<br>Other public buildings with noise- sensitive indoor use | Select noise-sensitive buildings as separate receivers of interest. |
| Outdoor noise-sensitive areas | Certain parks<br>Historic sites used for interpretation<br>Amphitheaters<br>Passive recreation areas<br>Cemeteries<br>Other outdoor noise-sensitive areas | For relatively small noise-sensitive areas, select noise-sensitive sites as separate receivers of interest.<br>For relatively large areas (e.g. a cemetery, etc.), cluster by proximity to project noise sources, proximity to ambient-noise sources, and location along project line. Choose one receiver of interest (closest to the project noise source and at an intermediate distance from the predominant sources of existing noise) in each cluster. |

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**1b.** Select the following types of noise-sensitive receivers within the noise study area, per Table 4-18, to be evaluated as individual receivers:

- Every major noise-sensitive public building
- Every isolated residence
- Every relatively small outdoor noise-sensitive area

Use judgment to avoid analyzing noise where such analysis is obviously not needed. Areas that are considered particularly noise-sensitive by the community, but do not meet the criteria in Table 4-3, should be considered on a case-by-case basis as discussed in Section 4.1.

**1c.** Residential neighborhoods and relatively large outdoor noise-sensitive areas can often be clustered, simplifying the analysis that is required without compromising the accuracy of the analysis. Subdivide all such neighborhoods/areas into clusters of approximately uniform noise, each containing a collection of noise-sensitive sites. Strive to obtain uniformity of both project noise and ambient noise using the following guidelines:

- In general, project noise reduces (drops off) with distance from the project. For this reason, project noise uniformity requires nearly equal distances between the project noise source and all sites within the cluster. Clusters are typically shaped as long narrow strips parallel to the transit corridor and/or circling project point sources such as maintenance facilities. It is suggested to cluster sites where the project noise varies over a range of 5 dB or less.

- Note that noise drops off approximately 3 dB per doubling of distance for line sources and approximately 6 dB per doubling of distance for point sources over open terrain. This reduction in noise will occur over a shorter distance in areas containing obstacles blocking the path of sound propagation, such as rows of buildings.

- Ambient noise usually drops off from non-project sources in the same manner as noise from project sources. For this reason, clustering for uniform ambient noise will usually result in long narrow strips parallel to major roadways or circling major point sources of ambient noise, such as manufacturing facilities. It is suggested to cluster sites where the ambient noise varies over a range of 5 dB or less. Ambient noise levels may be difficult to judge without measurements. In areas without predominant sources of noise, like highways, ambient noise can be considered to vary with population density, which is often uniform along the corridor. In situations where ambient noise tends to be uniform, the clusters can encompass relatively large areas.

After defining clusters, select one representative receiver in each cluster. It is recommended to choose the receiver closest to the project noise source and at an intermediate distance from the predominant sources of existing noise. See Appendix D for additional guidance and examples on clustering receivers, as well as an example.

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Cont.

Assess each identified cluster representative and individual noise-sensitive receiver of interest using the Detailed Noise Analysis as presented in the following steps.

## Step 2: Determine Project Noise Source Reference Levels

*Identify the major project noise sources near the noise-sensitive receivers of interest, group them by source type, and determine reference levels to compute project noise at 50 ft, as shown in Figure 4-11.*

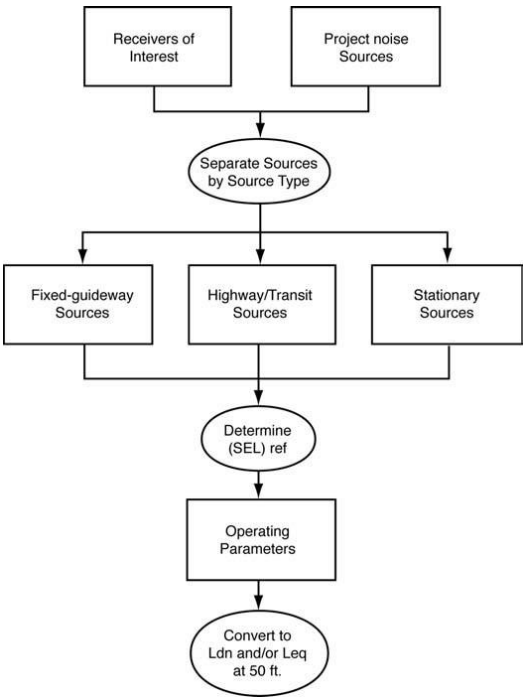


**Figure 4-11 Flow Diagram for Determining Project Noise at 50 ft**

**2a.** Identify the major project noise sources near receivers of interest according to Table 4-19. The right-hand column of the table indicates if each source is considered as a major contributor to the overall noise impact. Note that some noise sources can create high noise levels but are not indicated as major contributors. Although such sources are loud, they rarely stay in a neighborhood for more than a day or two; therefore, the overall noise exposure is relatively minor. Computations are required for all major noise sources in this table.

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**Table 4-19 Sources of Transit Noise**

| Project Type | Source Type | Actual Source | Major? |
|---|---|---|---|
| Commuter Rail<br>Light Rail Streetcars<br>RRT | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Horns and whistles | Yes |
| | | Crossing signals | Yes |
| | | Crossovers/switches | Yes |
| | | Squeal on tight curves | Yes |
| | | Track-maintenance equipment | No |
| | Stationary | Substations | Yes |
| | | Chiller plants | No |
| Busways<br>Bus Transit Malls | Highway/Transit | Bus passbys | Yes |
| | | Buses parking | No |
| | Stationary | Buses idling | Yes |
| AGT | Fixed-Guideway | Vehicle passbys | Yes |
| Monorail | Miscellaneous | Line equipment | No |
| Terminals<br>Stations<br>Transit Centers | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Crossovers/switches | Yes |
| | | Squeal on tight curves | Yes |
| | Highway/Transit | Bus passbys | Yes |
| | | Buses parking | No |
| | | Automobile passbys | No |
| | Stationary | Locomotives idling | Yes |
| | | Buses idling | Yes |
| | | Ferry boats landing, idling, and departing at dock | Yes |
| | | HVAC equipment | No |
| | | Cooling towers | No |
| | | P/A systems | No |
| Park-and-Ride Lots | Highway/Transit | Bus passbys | Yes |
| | | Buses idling | Yes |
| | | Automobile passbys | No |
| | Stationary | P/A systems | No |
| Traffic Diversion Projects | Highway/Transit | Highway vehicle passbys | Yes |
| Storage Facilities<br>Maintenance Facilities | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Locomotives idling | Yes |
| | | Squeal on tight curves | Yes |
| | | Horns, warning signals, coupling/ uncoupling, auxiliary equipment, crossovers/ switches, brake squeal, and air release | Yes |
| | Highway/Transit | Bus passbys | Yes |
| | Stationary | Buses idling | Yes |
| | | Yard/shop activities | No |
| | | Car washes | No |
| | | HVAC Equipment | No |
| | | P/A Systems | No |

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**2b.** Separate the major noise sources by source type: fixed-guideway transit, highway/transit or stationary facility. Note that a major fixed-guideway system will usually have stationary facilities associated with it, and that a stationary facility may have highway/transit elements associated with it. Then use the instructions in the following source type options below to:

**2c.** Determine the source reference levels for the all project noise sources. Each source reference level pertains to reference operating conditions for stationary sources or one vehicle passby under reference operating conditions.

These reference levels should incorporate source-noise mitigation only if such mitigation will be considered for incorporation into the system specifications. The source levels used in this manual are typical of systems designed according to current engineering practice, but they do not include special noise control features that could be incorporated in the specifications at extra cost. If special features that result in noise reductions are included in any of the predictions, the Federal environmental documents must include a commitment by the project sponsor to adopt such treatments before the project is approved for construction. For example, if the specifications include vehicle noise limits that may not be exceeded, these limits should be used to determine the reference level, and this level should be used in the analysis rather than the standard, tabulated reference level.

**2d.** Convert the source reference level to noise exposure in terms of $L_{eq(1hr)}$ or $L_{dn}$ under project operating conditions using the appropriate equations depending upon the type of source. The noise exposure is determined at the reference distance of 50 ft.

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**Option A. Fixed-guideway Sources –** Compute project noise at 50 ft for fixed-guideway sources as identified in the second column of Table 4-19.

**A.i. Reference SEL Levels**
Determine the reference SEL at 50 ft for each major fixed-guideway noise source, either by measurement according to Appendix F or by referencing Table 4-20. The table provides guidance on which method is preferred for each source type. The "NO" designation implies that the source levels given in the table are appropriate to use in the analysis, and the "YES" designation implies that measurements are preferred over the data given in the table. In general, measurements are preferred for source types that vary considerably from project to project, including any emerging technology sources. The data in the table are adequate for source types that do not vary considerably from project to project.

For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of these measurements to the reference conditions of Table 4-20. For projects where source-noise specifications have been defined (e.g., noise limits are usually included in the specifications for purchase of new transit vehicles), these specifications may be used instead of measurements after conversion to reference conditions using the equations in Appendix F. This is only appropriate when there is a firm commitment to adopt the noise specifications in the vehicle

procurement documents during the engineering phase and to adhere to the specifications throughout the procurement, delivery, and testing of the vehicles.

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

**Table 4-20 Source Reference SELs at 50 ft: Fixed-Guideway Sources at 50 mph**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements? * |
|---|---|---|---|
| Rail cars | 82 | 80 | No |
| Streetcars** | 76 | 74 | No |
| Locomotives – diesel | 92 | 88 | No |
| Locomotives – electric | 90 | 86 | No |
| Diesel multiple unit (DMU) | 85 | 81 | Yes |
| Agt – steel wheel | 80 | 78 | Yes |
| Agt – rubber tire | 78 | 75 | Yes |
| Monorail | 82 | 80 | Yes |
| Maglev | 72 | 70 | Yes |
| Transit car horns (emergency) | 93 | 90 | No |
| Transit car whistles | 81 | 78 | No |
| Locomotive horns | | | |
| At-grade crossing | 113 | 110 | No |
| From crossing to 1/8 mile | † | 110 | |
| From 1/8 mile to 1/4 mile | 110 | 110 | |

* "No" implies that the source levels given in the table are appropriate to use in the analysis and "Yes" implies that measurements are preferred over the data given in the table.
** The reference speed for streetcars is 25 mph. For streetcar speeds above 25 mph, use the "Rail Cars" reference level and 50 mph for the reference speed.
† Use the following equation for locomotive horns from crossing to 1/8 mile:

$$SEL_{Ref} = 113 - 3 \times (\frac{D_P}{660})$$

where:
$D_P$= distance from grade crossing parallel to tracks

01-31 Cont.

**A.ii. Estimate Noise Exposure at 50 ft** – Use the reference SELs in Table 4-20, operating conditions, and the equations in Table 4-21 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Trains with different numbers of cars or operating conditions produce different noise exposure levels and should be converted from SEL to $L_{dn}$ separately. Use the following guidelines to determine if sources should be converted separately. These differences in operating conditions will produce an approximate 2-decibel change in noise exposure:
   - 40 percent change in number of locomotives or cars per train.
   - 40 percent change in number of trains per hour.
   - 40 percent change in number of trains per day, or per night (for computation of $L_{dn}$).
   - 15 percent change in train speed.
   - Change of one notch in diesel locomotive throttle setting (e.g., from notch 5 to notch 6).

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project-related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for locomotives, rail cars, and warning horns.
   - Number of rail cars in the train (if this number varies during the day, take the average for the daytime and nighttime periods separately for category 2 land uses, and use the maximum number during the period of interest for category 1 or 3 land uses).
   - Number of locomotives in the train, if any.
   - Train speed, in miles per hour (maximum expected).
   - Average throttle setting of the train's locomotive(s) for diesel-powered locomotives and DMU's only.[iv] If this input is not available, assume a throttle setting of 8 for locations where the vehicle would accelerate and 5 for all other locations.[25]
   - For residential receivers of interest:
     - Average hourly train volume during daytime hours (the total number of train passbys between 7 a.m. and 10 p.m., divided by 15 hours);
     - Average hourly train volume during nighttime hours (the total number of train passbys between 10 p.m. and 7 a.m., divided by 9 hours);
   - For non-residential receivers of interest, number of events that occur during each hour of interest in trains per hour; and
   - Track type (continuously welded or jointed) and profile (at-grade or elevated).

4. **Calculate $L_{eq(1hr)}$ at 50 ft**
   - Calculate $L_{eq(1hr)}$ using the appropriate equations in Table 4-21 for each hour of interest.
   - Compute the combined $L_{eq(1hr)}$. It may be necessary to compute the combined totals with and without the warning horns; some neighborhoods along the corridor may be exposed to the horn noise and some may not.

5. **Calculate $L_{dn}$ at 50 ft**
   - If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined day $L_{eq(1hr)}$ and the combined night $L_{eq(1hr)}$.
   - It may be necessary to calculate $L_{dn}$ with and without the warning horns, as above.

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[iv] Omit this term if not applicable from the equation in Table 4-21 for other vehicle types.

Note that the equations in Table 4-21 include terms to account for a difference in speed from the reference speed of 50 mph and a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

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Cont.

**Table 4-21 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Fixed-Guideway Sources**

| | | |
|---|---|---|
| **Locomotives*** $L_{eq(1hr)}$ at 50 ft | $L_{eq.Loco(1hr)} = SEL_{ref} + 10\,log(N_{Loco}) + C_T + Klog(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-25** |
| **Locomotive Warning Horns**** $L_{eq(1hr)}$ at 50 ft | $L_{eq.LHorns(1hr)} = SEL_{ref} + 10\,log(V) - 35.6$ | **Eq. 4-26** |
| **Rail Vehicles†** $L_{eq(1hr)}$ at 50 ft | $L_{eq.RCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-27** |
| **Streetcar (25 mph or slower)** $L_{eq(1hr)}$ at 50 ft | $L_{eq.SCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 2\log(\frac{S}{25}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-28** |
| **Transit Warning Horns**** $L_{eq(1hr)}$ at 50 ft | $L_{eq.THorns(1hr)} = SEL_{ref} - 10\,log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-29** |
| **Combined Locomotive and transit††** $L_{eq(1hr)}$ at 50 ft | $L_{eq.Combo(1hr)} = 10\log(10^{(L_{eq.Loco(1hr)}/10)} + 10^{(L_{eq.RCars(1hr)}/10)} + 10^{(L_{eq.SCars(1hr)}/10)} + 10^{(L_{eq.LHorns(1hr)}/10)} + 10^{(L_{eq.THorns(1hr)}/10)})$ | **Eq. 4-30** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$, $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-31** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$, and $N_{Loco} = N_d$ (loco events), and $N_{Cars} = N_d$ (car events) | **Eq. 4-32** |
| **Day/Night** $L_{dn}$ at 50 ft | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-33** |

$N_{Loco}$ = average number of locomotives per train

$C_T$ = $0\ for\ T < 6$
$2(T-5)\ for\ T \geq 6$
where
T = average throttle setting for diesel-powered locomotives and DMUs only

K = -10 for passenger diesel
0 for DMUs[Ŧ]
+10 for electric

$N_{Cars}$ = average number of cars per train

$V$ = average hourly volume of train traffic, trains per hour

S = train speed, mph

$Adj_{track}$ = constant
+5 for jointed track or for a crossover within 300 ft
+4 for aerial structure with slab track (except AGT and monorail)
+3 for embedded track on grade

$V_d$ = average hourly daytime volume of train traffic, trains per hour
$= \frac{number\ of\ trains, 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)
$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of train traffic, trains per hour
$= \frac{number\ of\ trains, 10\ p.m.\ to\ 7a.m.}{9}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)
$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

* Assumes a diesel locomotive power rating at approximately 3000 hp ** Based on FRA's horn noise model (www.fra.dot.gov/Elib/Document/2681)
† Includes all commuter rail cars, transit cars, streetcars above 25 mph, AGT and monorail. †† Only include appropriate terms.
[Ŧ] Because of the wide range of vehicle types that qualify as a DMU, measurements are preferred for the reference level and speed coefficient. If no measurements are conducted, use the reference level in Table 4-20 and a speed coefficient of 0.

01-31 Cont.

## Example 4-5 Detailed Noise Analysis – Fixed Guideway Noise Sources

**Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Fixed-Guideway Source**

A commuter train with 1 diesel locomotive and 6 cars will pass close to a residential area at a grade crossing. The track is jointed.

**Assumptions**

$SEL_{ref}$ = 92 for diesel locomotives
= 82 for rail cars
= 113 for locomotive warning horns at-grade crossing
$N_{Cars}$ = 6
$N_{Loco}$ = 1
$S$ = 43 mph
$T$ = 8
$V_d$ = $40\ trains/15\ hours = 2.667\ trains\ per\ hour$
$V_n$ = $2\ trains/9\ hours = 0.222\ trains\ per\ hour$

Use the equations in Table 4-21 to determine the daytime $L_{eq(1hr)}$ for each source and the combined daytime $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Locos(1hr)} = SEL_{ref} + 10\,log(N_{Loco}) + C_T + Klog(\frac{S}{50}) + 10\,log(V_d) - 35.6$$
$$= 92 + 10\,log(1) + 6 + (-10)log(\frac{43}{50}) + 10\,log(2.667) - 35.6$$
$$= 67.3\ dBA \text{ at 50 ft}$$

$$L_{d.RCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 20log\left(\frac{S}{50}\right) + 10\,log(V_d) - 35.6 + Adj_{track}$$
$$= 82 + 10\,log(6) + 20log\left(\frac{43}{50}\right) + 10\,log(2.667) - 35.6 + 5$$
$$= 62.1\ dBA \text{ at 50 ft}$$

$$L_{d.LHorn(1hr)} = SEL_{ref} + 10\,log(V_d) - 35.6$$
$$= 113 + 10\,log(2.667) - 35.6$$
$$= 81.7\ dBA \text{ at 50 ft}$$

$L_{d.Combo(1hr)}$ With horn:
$$= 10log\left[10^{(L_{d.Locos(1hr)}/10)} + 10^{(L_{d.RCars(1hr)}/10)} + 10^{(L_{d.LHorn(1hr)}/10)}\right]$$
$$= 81.9\ dBA \text{ in neighborhoods where the horn is sounded}$$

Without horn:
$$= 10log\left[10^{(L_{d.Locos(1hr)}/10)} + 10^{(L_{d.RCars(1hr)}/10)}\right]$$
$$= 68.4\ dBA \text{ in neighborhoods where the horn is not sounded}$$

Use the same equations as above to determine the nighttime $L_{eq(1hr)}$ at 50 ft. Use $V_n$ instead of $V_d$.

$L_{n.Locos(1hr)}$ = 56.5 for locomotives
$L_{n.RCars(1hr)}$ = 51.3 for cars
$L_{n.LHorn(1hr)}$ = 70.9 for horns
$L_{n.Combo(1hr)}$ = 71.1 in neighborhoods where the horn is sounded
= 57.6 in neighborhoods where the horn is not sounded

Calculate the $L_{dn}$ with and without horns.

$$L_{dn.Combo} = 10log\left[15 \times 10^{(L_{d.Combo}/10)} + 9 \times 10^{((L_{n.Combo}+10)/10)}\right] - 13.8$$

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With horn: = 81.6 at 50 ft in neighborhoods where horns are sounded
Without horn: = 68.1 at 50 ft in neighborhoods where horns are not sounded

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

**Option B. Highway/Transit Sources** – Compute project noise at 50 ft for highway/transit noise sources as identified in the second column of Table 4-19. Use the instructions below to estimate source noise levels for projects following FTA's procedures that involve highway vehicles.

This method is based on the original FHWA highway noise prediction model, with updated noise emission levels.[26] The vehicle equations are applicable to speeds typical of freely-flowing traffic on city streets and access roads.

**B.i. Reference SEL Levels** – Determine the reference SEL at 50 ft for each major highway/transit source, either by measurement according to Appendix F or by using Table 4-22.[v] The table provides guidance on which method is preferred for each source type. "NO" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table. For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of measurement data to the reference conditions in Table 4-20.

01-31 Cont.

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

**Table 4-22 Source Reference SELs at 50 ft: Highway/Transit Sources at 50 mph**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements?* |
|---|---|---|---|
| Automobiles | 74 | 70 | No |
| Buses (diesel) | 82 | 79 | No |
| Buses (electric trolleybus) | 80 | 77 | No |
| Buses (hybrid)** | 83 | 80 | Yes |

* "No" implies that the source levels given in the table are appropriate to use in the analysis and "Yes" implies that measurements are preferred over the data given in the table.
** Hybrid bus with full-time diesel engine and electric drive motors.

[v] Idling buses are considered stationary sources.

**B.ii. Noise Exposure at 50 ft** – Use the reference SELs in Table 4-22, operating conditions, and the equations in Table 4-23 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Noise emission from most transit buses is not dependent upon whether the buses are accelerating or cruising. However, accelerating suburban buses are substantially louder than cruising suburban buses. For this reason, suburban buses require separate calculation along roadway stretches where they are accelerating. Separate calculation is also needed for all highway/transit vehicles at different speeds, since speed affects noise emissions. Use the following guidelines to determine if sources should be calculated separately. These differences in operating conditions will produce an approximate 2-decibel change in noise exposure:
   - 40 percent change in number of vehicles per hour;
   - 40 percent change in number of vehicles per day, or per night (for computation of $L_{dn}$); or
   - 15 percent change in vehicle speed.

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for the vehicle types of concern
   - Average running speed in miles per hour
   - For residential receivers of interest:
     - Average hourly vehicle volume during daytime hours (total number of vehicle passbys between 7 a.m. and 10 p.m., divided by 15).
     - Average hourly vehicle volume during nighttime hours (total number of vehicle passbys between 10 p.m. and 7 a.m., divided by 9).
   - For non-residential receivers of interest, number of events that occur during each hour of interest, in vehicles per hour

4. **Calculate $L_{eq(1hr)}$ at 50 ft – Calculate $L_{eq(1hr)}$ using the appropriate** equations in Table 4-23 for each hour of interest.

5. **Calculate $L_{dn}$ at 50 ft –** If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the day $L_{eq(1hr)}$ and night $L_{eq(1hr)}$.

Note that the equations in Table 4-23 include terms to account for a difference in speed from the reference speed of 50 mph and a numerical adjustment to

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account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

**Table 4-23 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Highway/Transit Sources**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(V) + C_{emissions} - 10\log(\frac{S}{50}) - 35.6$ | **Eq. 4-34** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$ | **Eq. 4-35** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$ | **Eq. 4-36** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-37** |
| **Adjustments** | = -3 for automobiles, open-graded asphalt<br>= +3 for automobiles, grooved pavement | |

$V$ = average hourly volume of vehicles, vehicles per hour

$C_{emissions}$ = $25\log(\frac{S}{50})$ for buses
$31\log(\frac{S}{50})$ for hybrid buses [23]
1.6 for accelerating 3-axle commuter buses
$40\log(\frac{S}{50})$ for automobiles

S = average vehicle speed, mph (distance divided by time, excluding stop time at red lights)

$V_d$ = average hourly daytime volume of vehicles of this type, vehicles per hour
$= \frac{total\ vehicle\ volume, 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of vehicles, vehicles per hour
$= \frac{total\ vehicle\ volume, 10\ p.m.\ to\ 7\ a.m.}{9}$

## Example 4-6 Detailed Noise Analysis – Highway Transit Noise Sources

**Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Highway/Transit Source**

A bus route with city buses will pass close to a school that is in session from 8 a.m. to 4 p.m. on weekdays. Within this time period, the hour of greatest activity for this bus route is 8 a.m. to 9 a.m.

**Assumptions**

$SEL_{ref}$ = 82 dBA
$S$ = 40 mph
$V$ = 30 buses per hour

Use the equations in Table 4-23 to determine the hourly $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Bus} = SEL_{ref} + 10\,log(V) + C_{emissions} - 10\log(\frac{S}{50}) - 35.6$$
$$= 82 + 10\,log(30) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 59.7\ dBA \text{ at 50 ft}$$

01-31 Cont.

This same bus also passes close to a residential area with the following operating conditions:

$V_d$ = 200 $buses/15\ hours = 13.33\ buses\ per\ hour$
$V_n$ = 20 $buses/9\ hours = 2.22\ buses\ per\ hour$

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Bus} = 82 + 10\,log(13.33) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 56.2\ dBA \text{ at } 50 \text{ ft}$$

$$L_{n.Bus} = 82 + 10\,log(2.22) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 48.4\ dBA \text{ at } 50 \text{ ft}$$

Calculate $L_{dn}$ at 50 ft.

$$L_{dn.Bus} = 10log(15 \times 10^{(L_{d.Bus}/10)} + 9 \times 10^{((L_{n.Bus}+10)/10)}) - 13.8$$
$$= 57.2\ dBA \text{ at } 50 \text{ ft}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

**Option C. Stationary Sources** – Compute project noise at 50 ft for stationary sources as identified in the second column of Table 4-19.

**C.i. Determine Reference SEL Levels** – Determine the reference SEL at 50 ft for each major stationary source, either by measurement according to Appendix F or by using Table 4-24. The table provides guidance on which method is preferred for each source type. "NO" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table. In general, measurements are preferred for source types that vary considerably from project to project. For example, curve squeal is highly variable depending on weather conditions, curve radius, and train speed. The data in the table are adequate for source types that do not vary considerably from project to project (crossing signals, for example). For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of these measurements to the reference conditions of Table 4-24.

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Layover facilities and transit centers can be the sources of low-frequency noise from idling diesel engines. Sounds with considerable low-frequency components can cause greater annoyance than would be expected based on their A-weighted levels. Low-frequency sounds often cause windows and walls to vibrate resulting in secondary effects in buildings such as rattling of dishes in cupboards and wall-mounted pictures. The reference levels in Table 4-24 are adjusted to take increased annoyance into account. For a Detailed Noise Analysis at locations where such idling takes place for an extended period, use the method described in ANSI Standard S12.9-Part 4, Annex D.(27)

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

**Table 4-24 Source Reference SELs at 50 ft: Stationary Sources**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements?* |
|---|---|---|---|
| Auxiliary Equipment | 101 | 65 | Yes |
| Locomotive Idling | 109 | 73 | No |
| Rail Transit Idling | 106 | 70 | No |
| Buses Idling | 111 | 75 | No |
| Ferry Boat Landing**, Idling, and Departing | 91 | 78 | No |
| Ferry Boat Fog Horn | 90 | 84 | No |
| Track Curve Squeal | 136 | 100 | Yes |
| Car Washes | 111 | 75 | Yes |
| Crossing Signals | 109 | 73 | No |
| Substations | 99 | 63 | No |

* "No" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table.

**Ferry boat landings are included in the stationary source category because the noise from the landing remains in one area even though the boats move in and out.

**C.ii. Estimate Noise Exposure at 50 ft** – Use the reference SELs in Table 4-24, operating conditions, and the equations in Table 4-25 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Identify actual source durations and numbers of events. Sources with different operating conditions should be converted from SEL to $L_{dn}$ separately. Use the following guidelines to determine if sources should be converted separately. These differences in operating conditions will produce an approximate 2-dB change in noise exposure:
   - 40 percent change in event duration (e.g., from 30 to 42 minutes), or
   - 40 percent change in number of events per hour (e.g., from 10 to 14 events per hour).

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for each relevant source
   - Average duration of one event, in seconds
   - For residential receivers of interest:
     - Average number of events per hour that occur during the daytime (the total number of events between 7 a.m. and 10 p.m., divided by 15).

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- Average number of events per hour that occur during the nighttime (the total number of events between 10 p.m. and 7 a.m., divided by 9).
- For non-residential receivers of interest, number of events that occur during each hour of interest in events per hour

4. **Calculate $L_{eq(1hr)}$ at 50 ft** – Calculate $L_{eq(1hr)}$ using the appropriate equations in Table 4-25 for each hour of interest.

5. **Calculate $L_{dn}$ at 50 ft** – If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the day $L_{eq(1hr)}$ and night $L_{eq(1hr)}$.

Note that the equations in Table 4-25 include a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

**Table 4-25 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Stationary Sources**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(N) + 10\log(\frac{E}{3600}) - 35.6$ | **Eq. 4-38** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where N = $N_d$ | **Eq. 4-39** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where N = $N_n$ | **Eq. 4-40** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-41** |

$N$ = number of events of this type that occur during one-hour

E* = duration of one event, sec

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)

$$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)

$$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$$

*Omit the term containing E for ferry boat, and fog horn noise sources.

01-31 Cont.

## Example 4-7 Detailed Noise Analysis – Stationary Noise Sources

**Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Stationary Sources**

A signal crossing lies close to a school that is in session from 8 a.m. to 4 p.m. on weekdays. Within this time period, the hour of greatest activity for the signal crossing is 8 a.m. to 9 a.m.

**Assumptions**

$SEL_{ref}$ = 109 dBA
$E$ = 25 seconds (counting both cycles of the signal)
$N$ = 22

Use the equations in Table 4-25 to determine the hourly $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Cross} = SEL_{ref} + 10log(N) + 10log\left(\frac{E}{3600}\right) - 35.6$$
$$= 109 + 10log(22) + 10log(\frac{25}{3600}) - 35.6$$
$$= 65.2\ dBA \text{ at 50 ft}$$

This same signal crossing lies close to a residential area with the following operating conditions:

$N_d$ = 200 /15 $hours = 13.3\ events\ per\ hour$
$N_n$ =12 /9 $hours = 1.33\ events\ per\ hour$

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Cross} = 109 + 10log(13.3) + 10log(\frac{25}{3600}) - 35.6$$
$$= 63.1\ dBA \text{ at 50 ft}$$
$$L_{n.Cross} = 109 + 10log(1.33) + 10log(\frac{25}{3600}) - 35.6$$
$$= 53.1\ dBA \text{ at 50 ft}$$

Calculate $L_{dn}$ at 50 ft.

$$L_{dn} = 10log(15 \times 10^{(L_{d.Cross}/10)} + 9 \times 10^{((L_{n.Cross}+10)/10)}) - 13.8$$
$$= 63.1\ dBA \text{ at 50 ft}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

### Step 3: Determine Propagation Characteristics

*Determine the combined propagation characteristics between each source and receiver of interest.*

**3a.** Calculate project noise exposure as a function of distance. *Calculate the project noise exposure at distances other than 50 ft, such as at receiver locations, as a function of distance accounting for shielding and ground effects along the path*. See Example 4-8 below.

01-31 Cont.

1. Determine the topography of the ground within the transit corridor using the figures in Table 4-26 as a guide. It is not necessary to represent the transit corridor with an extreme number of changes in topography. Often, several typical sections will suffice throughout the transit corridor.

2. Use the equations in Table 4-26 to determine ground factor (G) based on the effective path height (Heff) for each identified terrain feature. Standard source heights are included at the bottom of the table. Assume receiver heights of 5 ft for both outdoor receivers and first-floor receivers. Note that larger ground factors correspond to larger amounts of ground attenuation with increasing distance from the source. For acoustically "hard" (e.g., non-absorptive) ground conditions, G should be taken to be zero.

3. Determine the distance correction factor using the ground factor and another distance, such as the distance to a receiver, and the equations in Table 4-27.

4. Apply the distance correction ($C_{distance}$) to the project noise exposure at 50 ft (Section 4.5, Step 2) using the following equation:

$$L_{distance} = L_{50ft} + C_{distance} \quad \textbf{Eq. 4-42}$$

where:

$L_{distance}$ = $L_{dn}$ or $L_{Aeq(1hr)}$ at the new distance, ft
$L_{50ft}$ = $L_{dn}$ or $L_{Aeq(1hr)}$ at 50 ft

5. Plot noise exposure as a function of distance if desired.

01-31 Cont.

**Table 4-26 Ground Factor G, for Ground Attenuation**

**Ground Factor**

**Soft Ground:**

$$G = \begin{cases} 0.66, & H_{eff} \le 5 \\ 0.75(1 - \frac{H_{eff}}{42}), & 5 < H_{eff} < 42 \\ 0, & H_{eff} \ge 42 \end{cases}$$ **Eq. 4-43**

$H_{eff}$ = sum of average path heights on either side of the barrier, see below.

**Hard Ground:** $G = 0$




**Figure 4-12 Flat Ground**

$$H_{eff} = \frac{H_s + 2H_b + H_r}{2}$$ **Eq. 4-44**

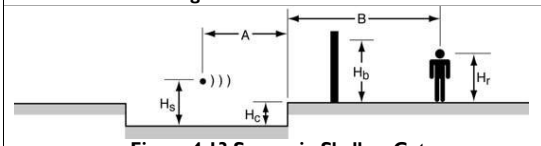


**Figure 4-13 Source in Shallow Cut**

$$H_{eff} = \frac{H_s + 2H_b + H_c + H_r}{2} \quad for\ B \le \frac{A}{2}$$

Use **Eq. 4-44** $\quad for\ B > \frac{A}{2}$

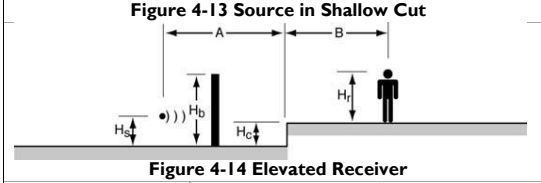


**Figure 4-14 Elevated Receiver**

$$H_{eff} = \frac{H_s + H_c + H_r}{2} \quad for\ H_b \le H_c$$

$$H_{eff} = \frac{H_s + 2H_b - H_c + H_r}{2} \quad for\ H_b > H_c$$

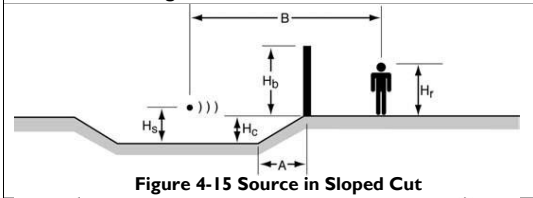


**Figure 4-15 Source in Sloped Cut**

Use **Eq. 4-44** $\quad for\ A \le \frac{B}{2}$

$$H_{eff} = \frac{H_s + 2H_b + H_c + H_r}{2} \quad for\ A > \frac{B}{2}$$

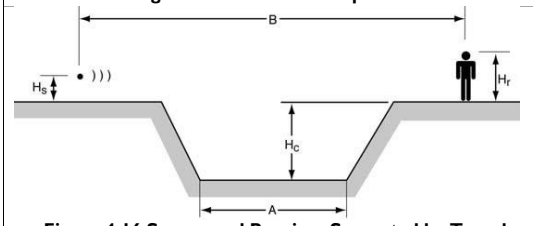


**Figure 4-16 Source and Receiver Separated by Trench**

$$H_{eff} = \frac{H_s + H_r}{2} \quad for\ A \le \frac{B}{2}$$

$$H_{eff} = \frac{H_s + 2H_c + H_r}{2} \quad for\ A > \frac{B}{2}$$

$H_s$ = 8 ft for trains with diesel-electric locomotives
= 2 ft for trains without diesel-electric locomotives
= 0 ft for automobiles
= 3 ft for 2-axle city buses
= 8 ft for 3-axle commuter buses

Note: Equations for $H_{eff}$ remain valid when $H_b = 0$

01-31 Cont.

**Table 4-27 Distance Correction Factor Equations for Detailed Noise Analysis**

| Source | Equation* | |
|---|---|---|
| Stationary Sources | $C_{distance} = -20\log(\frac{D}{50}) - 10Glog(\frac{D}{50})$ | **Eq. 4-45** |
| Fixed-guideway rail car passbys | $C_{distance} = -10\log(\frac{D}{50}) - 10Glog(\frac{D}{42})$ | **Eq. 4-46** |
| Fixed-guideway locomotive and rubber-tired vehicle passbys, highway vehicle passbys and horns | $C_{distance} = -10\log(\frac{D}{50}) - 10Glog(\frac{D}{29})$ | **Eq. 4-47** |
| $D$ = distance, ft<br>$G$ = ground factor, see Table 4-26 | | |

*These equations assume the distance between the source and receiver is approximately 300 ft or less. At longer distances, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. Therefore, more detailed calculation methods may be required to account for those effects.

## Example 4-8: Detailed Noise Analysis – Exposure vs. Distance Curve

**Exposure vs. Distance Curve for Fixed-Guideway Source**

Plot an exposure vs. distance curve for a diesel-electric commuter train that does not sound the horn in this area.

**Assumptions**

The terrain is flat grassland without a noise barrier.

$L_{eq.Loco}\ (8-9am)$ = 72 dBA at 50 ft
$L_{dn.Loco}$ = 68 dBA at 50 ft
$H_r$ = 5 ft
$H_b$ = 0 ft (for a "no noise barrier" case)
$H_s$ = 8 ft (for a diesel-electric commuter train)

Calculate $H_{eff}$ using the equations in Table 4-26.

$$H_{eff} = \frac{H_s + 2H_b + H_r}{2}$$
$$= \frac{8 + 0 + 5}{2}$$
$$= 6.5 \text{ ft}$$

Determine the ground factor using Eq. 4-43.

$$G = 0.75(1 - \frac{H_{eff}}{42})$$
$$= 0.63$$

Use Eq. 4-45 to determine noise vs. exposure equations for $L_{d.loco}$ and $L_{dn.loco}$.

$$L_{eq.Loco} = 72 - 10\log(\frac{D}{50}) - 6.3\log(\frac{D}{42})$$

$$L_{dn.Loco} = 68 - 10\log(\frac{D}{50}) - 6.3\log(\frac{D}{42})$$

Plot the two equations (see example in Figure 4-17). From these curves, the noise levels due to this train operation can be determined for a receiver of interest at any distance without shielding.

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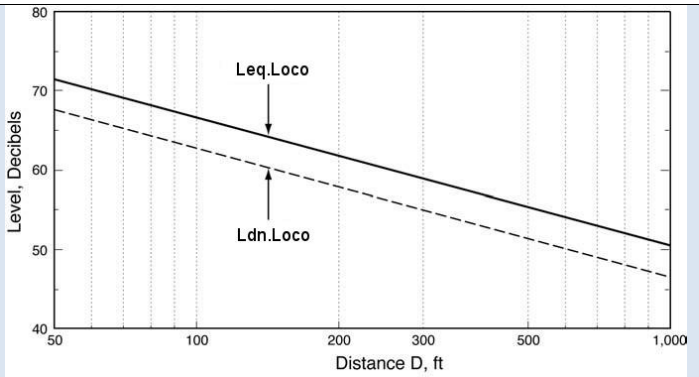


**Figure 4-17 Example Exposure vs. Distance Curves**

**3b.** Calculate the attenuation due to shielding for each distance of interest from Step 3a, using the following equation and Tables 4-26 through 4-30 and as illustrated in Example 4-9. If the conditions described in the tables are not met, the attenuation due to shielding is considered zero. Shielding can be due to intervening noise barriers, terrain features, rows of buildings, and dense tree zones.

$$A_{shielding} = \max\{IL_{barrier} \; or \; A_{buildings} \; or \; A_{trees}\} \qquad \textbf{Eq. 4-48}$$

where:

$IL_{barrier}$ = barrier insertion loss, see Table 4-28

$A_{buildings}$ = attenuation due to buildings, see Table 4-29

$A_{trees}$ = attenuation due to trees, see Table 4-30

**Table 4-28 Barrier Insertion Loss**

| **Barrier Insertion Loss** | $IL_{barrier} = \max\{0 \text{ or } (A_{barrier} - 10(G_{NB} - G_B)\log(\frac{D}{50}))\}$ **Eq. 4-49** | |
|---|---|---|
| $A_{barrier}$ | $= \min\{12 \; or \; [5.3\log(P) + 6.7]\}$ | For non-absorptive transit barriers within 5 ft of the rail |
| | $= \min\{15 \; or \; (5.3\log(P) + 9.7)\}$ | For absorptive transit barriers within 5 ft of the rail |
| | $= \min\{15 \text{or}(20\log(\frac{2.51\sqrt{P}}{\tanh(4.46\sqrt{P})}) + 5)\}$ | For all other barriers, and for protrusion of terrain above the line of sight |

P = path length difference, ft (see figure 4-18)*

$D$ = closest distance between the receiver and the source, ft

$G_{NB}$ = ground factor G computed without barrier (see Table 4-26)

$G_B$ = ground factor G computed with barrier (see Table 4-26)

* If the source height (exhaust outlet) for diesel-electric locomotives is not available, assume 15 ft.

01-31 Cont.

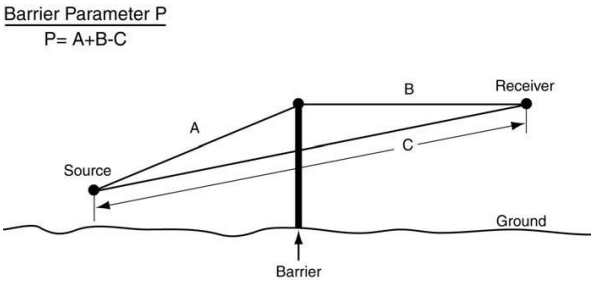


**Figure 4-18 Noise Barrier Parameter "P"**

**Table 4-29 Attenuation due to Buildings**

| Condition | Equation | |
|---|---|---|
| Gaps in the row of buildings constitute less than 35% of the length of the row | $A_{buildings} = \min\{10\ or\ [1.5\ (R-1)+5]\}$ | **Eq. 4-50** |
| Gaps in the row of buildings constitute 35 to 65% of the length of the row | $A_{buildings} = \min\{10\ or\ [1.5\ (R-1)+3]\}$ | **Eq. 4-51** |
| Gaps in the row of buildings constitute more than 65% of the length of the row | $A_{buildings} = 0$ | |
| $R$ = number of rows of houses that intervene between the source and receiver | | |

**Table 4-30 Attenuation due to Trees**

| Condition | Equation | |
|---|---|---|
| At least 100 ft of trees intervene between the source and receiver with no clear line-of-sight between source and receiver, and the trees extend 15 ft or more above the line-of-sight | $A_{trees} = \min\left\{10\ or\ \frac{W}{20}\right\}\ where\ W \geq 100ft$ $= 0\ where\ W < 100ft$ | **Eq. 4-52** |
| W = width of tree zone along the line-of-site between the source and receiver in feet | | |

01-31 Cont.

## Example 4-9: Detailed Noise Analysis – Shielding

**Computation of Shielding**

The following features are between the rail corridor and a receiver of interest. Calculate the attenuation due to shielding.

1. A 15-foot high noise barrier is 40 ft from the closest track and 130 ft from the receiver
2. A dense tree zone 100 ft thick that extends 15 ft above the line-of-sight

**Assumptions**

$H_s$ = 8 ft
$H_r$ = 5 ft

Barrier dimensions

A = 40.61 ft
B = 130.38 ft
C = 170.03 ft

**Barrier**

Calculate $H_{eff}$ with and without the barrier using the equations in Table 4-26.

$$H_{eff.NoBarrier} = \frac{H_s + 2H_b + H_r}{2}$$

$$= \frac{8 + 0 + 5}{2}$$
$$= 6.5 \text{ ft}$$

$$H_{eff.Barrier} = \frac{H_s + 2H_b + H_r}{2}$$
$$= \frac{8 + 15 + 5}{2}$$
$$= 21.5 \text{ ft}$$

Determine the ground factor with and without the barrier using Eq. 4-43.

$$G_{NoBarrier} = 0.75\left(1 - \frac{H_{eff}}{42}\right)$$
$$= 0.63$$

$$G_{Barrier} = 0.75\left(1 - \frac{H_{eff}}{42}\right)$$
$$= 0.37$$

Calculate the barrier insertion loss using Table 4-28 and Figure 4-18.

$$P = A + B - C$$
$$= 0.96 \text{ ft}$$

$$A_{barrier} = \min\left\{15 \text{or} \left(20 \log\left(\frac{2.51\sqrt{P}}{\tanh\left(4.46\sqrt{P}\right)}\right) + 5\right)\right\}$$
$$= 12.8 \text{ dB}$$
$$= \min\{15 \; or \; 12.8\}$$
$$= 12.8 \text{ dB}$$

$$IL_{barrier} = \max\{0 \text{ or } (A_{barrier} - 10(G_{NoBarrier} - G_{Barrier}) \log(\frac{D}{50}))\}$$
$$= 12.8 - 10(0.63 - 0.37) \log(\frac{170}{50})$$
$$= 11.4 \text{ dB}$$

**Trees**

Determine the attenuation due to trees using Table 4-30.

$$A_{trees} = \min\{10 \; or \; \frac{W}{20}\}$$
$$= 5 \text{ dB}$$

**Total Shielding**

The total shielding is the maximum of the barrier and tree zone shielding, 11.4 dB.

$$A_{shielding} = \max\{IL_{barrier} \; or \; A_{buildings} \; or \; A_{trees}\}$$
$$= \max\{11.4 \; or \; 0 \; or \; 5\}$$
$$= 11.4 \text{ dB}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

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**3c.** Combine the two propagation characteristics.
Combine the results from Steps 3a and 3b to determine the noise at the receiver considering the propagation characteristics of distance and shielding by applying the distance correction and attenuation due to shielding to the project noise exposure level at 50 ft.

The equations in Table 4-31 combine the equations in Steps 3a and 3b.

**Table 4-31 Calculate $L_{dn}$ or $L_{eq(1hr)}$**

| Source | Equation* | |
|---|---|---|
| Stationary Sources | $L_{DistShield} = L - 20\log(\frac{D}{50}) - 10Glog(\frac{D}{50}) - A_{shielding}$ | **Eq. 4-53** |
| Fixed-guideway rail car passbys | $L_{DistShield} = L - 10\log(\frac{D}{50}) - 10Glog(\frac{D}{42}) - A_{shielding}$ | **Eq. 4-54** |
| Fixed-guideway locomotive and rubber-tired vehicle passbys, highway vehicle passbys and horns | $L_{DistShield} = L - 10\log(\frac{D}{50}) - 10Glog(\frac{D}{29}) - A_{shielding}$ | **Eq. 4-55** |
| $L = L_{dn}$ *or* $L_{eq}$<br>$D$ = distance, ft<br>$G$ = ground factor, see Section 4.5, Step 3a<br>$A_{shielding}$ = attenuation due to shielding, see Section 4.5, Step 3b. | | |

*These equations assume the distance between the source and receiver is approximately 300 ft or less. At longer distances, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. Therefore, more detailed calculation methods may be required to account for those effects.[28, 29]

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## Step 4: Combine Noise Exposure from All Sources

*Combine all sources to predict the total project noise at the receivers using the equations in Table 4-32 after propagation adjustments have been made for the noise exposure from each source separately.*

**Table 4-32 Computing Total Noise Exposure**

| | | |
|---|---|---|
| Total $L_{eq(1hr)}$ from all sources for the hour of interest: | $L_{eq.total(1hr)} = 10\log(\sum_{all\ sources} 10^{L_{Aeq(1hr)}/10})$ | **Eq. 4-56** |
| Total $L_{dn}$ from all sources | $L_{dn.total} = 10\log(\sum_{all\ sources} 10^{L_{dn}/10})$ | **Eq. 4-57** |

## Example 4-10 Detailed Noise Analysis – Combine Sources

**Computation of Total Exposure from Combined Sources**

Combine the noise exposure from the commuter train and light rail system to estimate the total noise exposure at the receiver.

**Assumptions**
A commuter train operation produces the following levels at a receiver of interest:
$L_{eq.Commuter}$ = 72 dBA
$L_{dn.Commuter}$ = 68 dBA

A light rail system produces the following levels at the same receiver:
$L_{eq.LightRail}$ = 69 dBA

$L_{dn.LightRail}$ = 70 dBA

No other project sources affect this receiver.

Calculate the total noise exposure at the receiver using the equations in Table 4-32.

$$L_{eq.total} = 10\log(10^{(72/10)} + 10^{(69/10)})$$
$$= 73.8 \text{ dBA}$$
$$L_{dn.total} = 10\log(10^{(68/10)} + 10^{(70/10)})$$
$$= 72.1 \text{ dBA}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

## Step 5: Determine Existing Noise Exposure

*Choose the appropriate method for characterizing noise and then determine the existing noise at each identified noise-sensitive receiver.* The existing noise is needed to determine the noise impact according to the criteria described in Section 4.1, Step 2. Recall that impact is assessed based on a comparison of the existing ambient noise exposure and the additional noise exposure that will be caused by the project. The existing noise exposure must be estimated for all receivers of interest identified in Section 4.5, Step 1.

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For a Detailed Noise Analysis, it is recommended to measure existing noise at each receiver of interest identified in Section 4.5, Step 1, for the most precise assessment of existing noise and conclusions concerning noise impact. However, measurements are expensive, often thwarted by weather, and take considerable time in the field. If taking measurements at each identified receiver is not possible, other less precise methods are available. Different methods may be used at different receivers along the project. However, it is important to recognize the correlation between the precision of measurements and the confidence in the impact assessment. Especially in a Detailed Noise Analysis, avoid using less precise methods of measuring existing noise just for the sake of convenience or expediency. The use of less precise methods must be clearly justified.

**Option A. Noise Exposure Measurements** – Full one-hour measurements are the most appropriate way to determine ambient noise exposure for non-residential receivers with the level of precision expected in a Detailed Noise Analysis**.** For residential receivers, full 24-hour measurements are more appropriate. These full-duration measurements are preferred over other methods of characterizing existing noise where time and study funds allow.

Follow the procedures below for these full-duration ambient noise exposure measurements:

**Ai. Non-residential land uses** – Measure a full hour $L_{eq(1hr)}$ at the receiver of interest on at least two non-successive weekdays (generally between noon on Monday and noon on Friday). Select the hour of the day when the maximum project activity is expected to occur.

**A.ii. Residential land uses** – Measure a full 24-hour $L_{dn}$ at the receiver of interest for a single weekday (generally between noon on Monday and noon on Friday).

**A.iii. Microphone position** – The location of the microphone at the receiver depends upon the proposed location of the transit noise source, so use good technical judgment in positioning the measurement microphone. If, for example, a new rail line will be in front of the house, do not locate the microphone in the backyard behind the house where the line of sight between the noise source and receiver is obstructed. Figure 4-19 illustrates recommended measurement positions for various locations of the project, with respect to the house and the existing source of ambient noise.

**A.iv. Measurement guidelines** – Undertake all measurements in accordance with good engineering practice following guidelines given in ASTM and ANSI standards.[30][31]

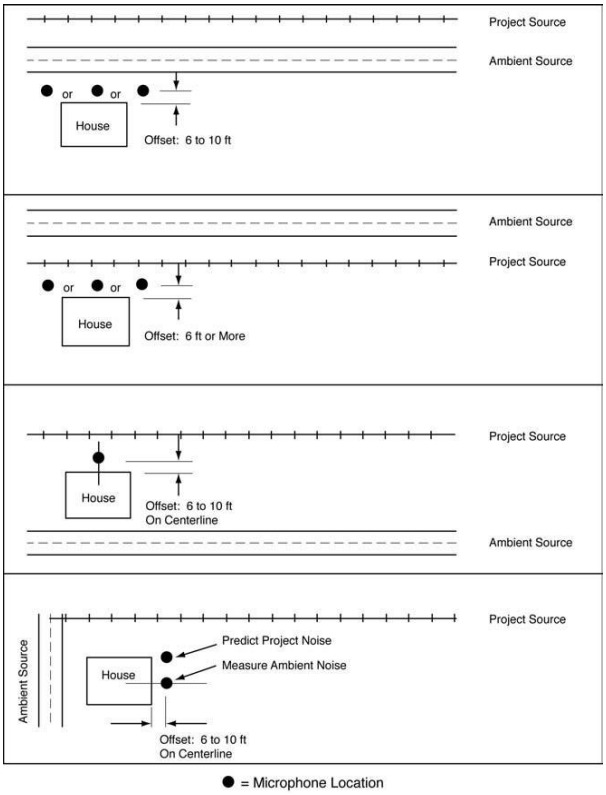


**Figure 4-19 Recommended Microphone Locations for Existing Noise Measurements**

01-31 Cont.

**Option B. Noise Exposure Computations from Partial Measurements** – Often, measurements can be made at some of the receivers of interest and used to estimate noise exposure at nearby receivers. In other situations, several $L_{eq(1hr)}$ measurements can be taken at a receiver and then the $L_{dn}$ computed from these. Both options require experience and knowledge of acoustics to select representative measurement sites. If using this method to compute an Ldn, a minimum time period of one hour should be used for each measurement period. It is unacceptable to extrapolate a one hour measurement from a shorter measurement period.

Measurements at one receiver can be used to represent the noise environment at other sites, but only when proximity to major noise sources is similar among the sites. Residential neighborhoods with otherwise similar homes may have greatly varying noise environments. For example, one area of the neighborhood may be located where the ambient noise is clearly due to highway traffic. A second area toward the interior of the neighborhood may have highway noise as a factor, but also include other noise sources from the community. A third area located deep into the residential area could have local street traffic and other community activities dominate the ambient noise. In this example, three or more measurement sites would be required to represent the varying ambient noise conditions in a single neighborhood.

Typical situations where representative measurement sites can be used to estimate noise levels at other sites occur when both share the following characteristics:

- Proximity to the same major transportation noise sources, such as highways, rail lines and aircraft flight patterns
- Proximity to the same major stationary noise sources, such as power plants, industrial facilities, rail yards and airports
- Similar type and density of housing, such as single-family homes on quarter-acre lots and multi-family housing in apartment complexes

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Acoustical professionals are often adept at such computations from partial data and are encouraged to use their experience and judgment in fully utilizing the measurements in their computations. This does necessitate a conservative estimate (underestimate) of existing noise to account for reduced precision from partial data as compared to full noise measurements.

Those without a background in acoustics are encouraged to use the procedures in Appendix E to compute existing noise from partial measurements. These methods include a factor to conservatively estimate (underestimate) existing noise to account for reduced precision from partial data as compared to full noise measurements.

**Option C. Estimating Existing Noise Exposure** – The least precise way to determine noise exposure is to estimate it from a table. This method is often used for the General Noise Assessment, but it is not recommended for a Detailed Noise Analysis. It can be used, however, in the absence of better data for locations where roadways or railroads are the predominant ambient noise source. Table 4-17 presents these existing levels. The levels in Table 4-17 are

conservative and underestimate existing noise to account for reduced precision compared to full noise measurements. If a simplified procedure to estimate existing noise exposure is chosen it must be clearly justified and receive approval by the FTA Regional office.

While measurements are considered the most precise method, there is one situation where it may be more accurate to estimate rather than measure the existing noise exposure, which is in areas near major airports where aircraft noise is dominant. Because airport noise is highly variable based on weather conditions and corresponding runway usage, it is preferable in such cases to base the existing noise exposure on published aircraft noise contours in terms of Annual Average $L_{dn}$.

### Step 6: Assess Noise Impact

Assess noise impact at each receiver of interest identified in Section 4.5, Step 1 using the noise impact criteria in Section 4.1 and the procedures in this step. Choose the appropriate noise impact assessment procedure for a transit project or multimodal project.

**Option A. Transit Projects** – For transit projects, noise impact is assessed at each receiver of interest using the criteria for transit projects described in Section 4.1. The noise impact assessment procedure is as follows:

**A.i.** Tabulate existing ambient noise exposure (rounded to the nearest whole decibel) at all receivers identified Section 4.5, Step 1. In cases where large residential buildings are exposed to noise on one side only, the receivers on that side are included in the analysis.

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**A.ii.** Tabulate project noise exposure at these receivers from Section 4.5, Step 4.

**A.iii.** Determine the level of noise impact (no impact, moderate impact, or severe impact) according to Section 4.1.

**A.iv.** Document the results in noise-assessment inventory tables. Include the following information:

- Receiver identification and location
- Land use description
- Number of noise-sensitive sites represented (number of dwelling units in residences or acres of outdoor noise-sensitive land)
- Closest distance to the project
- Existing noise exposure
- Project noise exposure
- Level of noise impact (no impact, moderate impact, or severe impact)
- A sum of the total number of receivers and numbers of dwelling units predicted to experience moderate impact or severe impact

**A.v.** Illustrate the areas of moderate impact and severe impact. Two methods of displaying impact are labeling and contouring.

- In a Detailed Noise Analysis, the most accurate indication of impact is to label each impacted building or cluster identified in the inventory table.
- A less precise illustration of impacted areas is a plot of project noise contours on the maps or aerial photographs, along with shaded impact areas. Use the procedures in Section 4.4, Step 6 and the levels from Section 4.5, Step 2 to develop these contours.

Note that it is difficult to position noise contours in urban areas due to shielding, terrain features, and other propagation anomalies. If noise contours are used, they should be considered illustrative rather than definitive. If desired to conform to the practices of another agency, the contouring may perhaps include several contour lines of constant project noise, such as $L_{dn}$ 65, $L_{dn}$ 70, and $L_{dn}$ 75 dBA.

**A.vi.** Including information on the magnitude of the impacts is an essential part of the assessment. The magnitude of noise impact is defined by the two threshold curves delineating onset of moderate impact and severe impact.

**Option B. Multimodal Projects** – For multimodal projects, project noise comprised of both highway and transit noise sources that are assessed according to the FTA noise impact criteria (see Table 4-2), use the procedure in Option A above. For multimodal projects that require FHWA's noise assessment methods to inform FTA's evaluation (see Section 4.1, Step 1 - Option B), follow the FHWA guidance.[32] In general, the appropriate calculation method is to use the current version of FHWA's Traffic Noise Model (TNM).[22] TNM is a state-of-the-art computer program used for predicting noise impacts near highways.

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TNM allows for a detailed assessment at each receiver of interest by separately calculating the noise contribution of each roadway segment. For each roadway segment, the noise from each vehicle type is computed from reference noise levels, adjusted for:

- Vehicle volume
- Vehicle speed
- Grade
- Roadway segment length
- Source-to-receiver distance

Further adjustments needed to accurately model the sound propagation from source to receiver include:

- Shielding provided by rows of buildings,
- Effects of different ground types,
- Source and receiver elevations, and
- Effect of any intervening noise barriers.

TNM sums the noise contributions of each vehicle type for a given roadway segment at the receiver. TNM then repeats this process for all roadway segments, summing their contributions to generate the predicted noise level at each receiver.

## Step 7: Determine Noise Mitigation Measures

Evaluate alternative mitigation measures where the Detailed Noise Analysis shows either severe or moderate impact, and it is not feasible to change the alignment or location of the project to avoid impact. Project noise that is found to cause no impact does not generally require any mitigation.

Mitigation of noise impact from transit projects may involve treatments at the three fundamental components of the noise problem: at the noise source, along the source-to-receiver propagation path, or at the receiver. Generally, the transit property has authority to treat the source and some elements of the propagation path, but may have little or no authority to modify anything at the receiver. After mitigation options have been determined, repeat the project noise computations including the adopted mitigation and reassess the remaining noise impact.

Approximate costs for noise control measures are documented in a report from the Transit Cooperative Research Program (TCRP)[33] and are also presented in this section. These costs reflect the noise mitigation costs available in 1997 (unless otherwise noted), which are the most recent data available as of this publication, and should only be used as representative estimates when considering noise mitigation options. Current noise mitigation costs should be researched before decisions on noise mitigation options are finalized, and then they should be documented according to Section 8.

**7a. Evaluate Source Treatments** – The most effective noise mitigation treatments are applied at the noise source. This is the preferred approach to mitigation when possible. Common source treatments and their estimated acoustical effectiveness are included in Table 4-33 and described below. It is important to note that the values below are estimates and should be applied with good engineering judgement. It also important to note that these mitigation measures should not be applied as a reduction in the reference SEL values for a vehicle that already incorporates that measure as a feature, such as vehicle skirts. Measurements to determine the reference SEL source level are required in those instances.

01-31 Cont.

**Table 4-33 Transit Noise Mitigation Measures – Source Treatments**

| Mitigation Measure | | Effectiveness |
|---|---|---|
| Stringent Vehicle & Equipment Noise Specifications | | Varied |
| Operational Restrictions† | | Varied |
| Resilient or Damped Wheels* | For rolling noise on tangent track: | 2 dB |
| | For wheel squeal on curved track: | 10-20 dB |
| Vehicle Skirts* | | 6-10 dB |
| Undercar Absorption* | | 5 dB |
| Quiet Fan Design and Fan Placement* | | Varied |
| Preventative Maintenance on Rail Systems* | | Varied |
| Resurfacing Roads** | | 10 dB |
| Guideway Support for Buses** | | 10 dB |
| Turn Radii Greater than 1000 ft* | | Avoids Squeal |
| Rail Lubrication on Sharp Curves* | | Reduces Squeal |
| Movable-Point Frogs (reduce rail gaps at crossovers)* | | Reduces Impact Noise |
| Engine Compartment Treatments | | 6-10 dB |
| Quiet Zones* | | Reduces occurrence of horn noise |

†FTA does not normally accept operational restrictions as a noise mitigation measure – see below.
* Applies to rail projects only.
** Applies to bus projects only.

- **Stringent Vehicle and Equipment Noise Specifications**
  - **Vehicles** – Among the most effective noise mitigation treatments is noise control during the specification and design of the transit vehicle. Such source treatments apply to all transit modes. By developing and enforcing stringent but achievable noise specifications, the transit property takes a major step in controlling noise everywhere on the system. It is important to ensure that the noise levels quoted in the specifications are achievable with the application of best available technology during the development of the vehicle and reasonable considering the noise reduction benefits and costs.

    Effective enforcement includes penalties for non-compliance with the specifications. The noise mitigation achieved by source treatment is dependent on the quality of installation and maintenance. Vehicles failing to meet the noise specification could result in complaints from the public and require additional noise mitigation measures applied along the path or at receivers.

  - **Stationary sources** – Stringent but achievable noise specifications for stationary sources are also an effective approach for mitigating noise impacts. Typical equipment includes fixed plant equipment such as transformers and mechanical equipment, as well as grade-crossing signals. For example, it may be possible to reduce noise impact from grade-crossing signals in some areas by specifying equipment that sets the level of the warning signal lower in locations where ambient noise is lower to minimize the signal noise in the direction of noise-sensitive receivers.

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- **Operational Restrictions** – Changes in operations that can mitigate noise include the lowering of speed, the reduction of nighttime (10 p.m. to 7 a.m.) operations, and reduction of warning horns and signals.

  - **Speed reduction** – Because noise from most transit vehicles is dependent on speed, a reduction of speed results in lower noise levels. The effect can be considerable. For example, the speed dependency of steel-wheel/steel-rail systems for $L_{eq(1hr)}$ and $L_{dn}$ (Table 4-21) results in a 6-dB reduction when reducing the speed to half of the original speed.

    Although there are tangible benefits from speed reductions during the most noise-sensitive time periods, FTA does not ordinarily accept speed reduction as a noise mitigation measure for two important reasons: speed reduction is unenforceable and negated if vehicle operators do not adhere to established policies, and it is contrary to the purpose of the transit investment by FTA, which is to move as many people as possible as efficiently and safely as possible.

  - **Reduction of nighttime operations** – Complete elimination of nighttime operations has a strong effect on reducing the $L_{dn}$, because nighttime noise is increased by 10 dB when calculating $L_{dn}$. But restrictions on operations are usually not feasible because of service demands. FTA generally does not pursue restrictions on operations as a

noise reduction measure. However, if early morning idling can be curtailed to the minimum necessary, however, this can have a measurable effect on $L_{dn}$.

While there are tangible benefits from limits on operations during the most noise-sensitive time periods, FTA does not recommend limits on operations as a way to reduce noise impacts because it is contrary to the purpose of the transit investment by FTA which is to move as many people as possible as efficiently and safely as possible.

- **Reduction of warning horns and signals** – Minimizing or eliminating horns and other warning signals at gate crossings can reduce noise impact for light rail and commuter rail systems. Although these mitigation options are limited by safety considerations, they can be effective in the right circumstances. For examples, see quiet zones below and wayside horns in Step 7b.

- **Wheel Treatments (Rail)** – A major source of noise from steel-wheel and steel-rail systems is the wheel/rail interaction that can produce three distinctive sounds: roar, impact, and squeal (as discussed in Section 3.2). Roar is the rolling noise caused by small-scale roughness on the wheel tread and rail running surface. Impacts are caused by discontinuities in the running surface of the rail or by a flat spot on the wheels. Squeal occurs when a steel-wheel tread or its flange rubs across the rail, resulting in resonant vibrations in the wheel that creates a screeching sound. Various wheel designs and other mitigation measures exist to reduce the noise from each of these three mechanisms.

  - **Resilient wheels** – Resilient wheels are effective in eliminating wheel squeal on tight turns with reductions of 10 to 20 dB in the high-frequency range where squeal noise occurs. Rolling noise is also slightly reduced with resilient wheels and typically achieves a 2-dB reduction on tangent track. The costs for resilient wheels are approximately $2000 to $3000 per wheel, as compared to about $400 to $700 for standard steel wheels.[vi]

  - **Damped wheels** – Damped wheels, like resilient wheels, are effective in eliminating wheel squeal on tight turns with reductions of 5 to 15 dB in the high-frequency range where squeal occurs. Rolling noise is also slightly reduced by approximately 2 dB on tangent track. This treatment involves attaching vibration absorbers to standard steel wheels. The costs for damped wheels add approximately $500 to $1000 to the normal $700 for each steel wheel.

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[vi] Assumes 8 wheels per vehicle.

- **Vehicle Treatments** – Vehicle noise mitigation measures are applied to the various mechanical systems associated with propulsion, ventilation, and passenger comfort. Propulsion systems of transit vehicles include diesel engines, electric motors, and diesel-electric combinations. Noise from the propulsion system depends on the type of unit and how much noise mitigation is built into the design. Mufflers on diesel engines are generally required to meet noise specifications; however, mufflers are generally practical only on buses, not on locomotives. Control of noise from engine casings may require shielding the engine by body panels without louvers, dictating other means of cooling, and ventilation.

  Ventilation requirements for vehicle systems are related to the noise generated by a vehicle. Fan noise often remains a major noise source after other mitigation measures have been instituted because of the need to have direct access to cooling air. This applies to heat exchangers for electric traction motors, diesel engines, and air-conditioning systems. The mitigation options for these systems include:

  - **Quiet fan design and placement** – Fan noise can be reduced by installation of quiet, efficient fans. Forced-air cooling on electric traction motors can be quieter than self-cooled motors at operating speeds. Placement of fans on the vehicle can make a considerable difference in the noise radiated to the wayside or to patrons on the station platforms.

  - **Vehicle skirts and undercar absorption** – The vehicle body design can provide shielding and absorption of the noise generated by the vehicle components. Acoustical absorption under the car has been demonstrated to provide up to 5 dB of mitigation for wheel/rail noise and propulsion-system noise on rapid transit trains. Similarly, vehicle skirts over the wheels can provide more than 5 dB of mitigation. By carrying their own noise barriers, vehicles with these features can provide cost-effective noise reduction. The cost for vehicle skirts will add approximately $5000 to $10000 per vehicle. Undercar absorption will add approximately $3500 per vehicle, assuming that 50% of the underside of the floor is treated.

- **Preventative Maintenance (Rail)** – Preventative maintenance is the best strategy to minimize rail and wheel deterioration. While these are not mitigation measures in the traditional sense and should not be included as mitigation in an environmental document, they can help to keep both noise and vibration levels at a "like-new" level or reduce both noise and vibration in systems with deferred maintenance. This can be accompanied by considerable life cost benefits for the transit system.

  - **Spin-slide control systems** – Similar to anti-locking brake systems (ABS) on automobiles, spin-slide control systems reduce the incidence of wheel flats, a major contributor of impact noise. Trains with smooth wheel treads can be up to 20 dB quieter than those with wheel flats. To be effective, the anti-locking feature should be in operation during all braking phases, including emergency braking. Wheel flats are more likely

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to occur during emergency braking than during dynamic braking. The cost of slip-slide control may be incorporated in the new vehicle costs, but may be between $5,000 and $10,000 per vehicle with a maintenance cost of $200 per year.

- **Wheel truing** – Maintenance of wheels by truing eliminates wheel flats from the treads and restores the wheel profile. As discussed above, wheel flats are a major source of impact noise. As a guideline, it is recommended that wheel sets match within approximately ±0.01 inch and all wheels on the same truck should match within ±0.02 inches to minimize damage and wear to wheels and rails.(34) A wheel truing machine costs approximately $1 million, including associated maintenance materials and labor costs. The TCRP report estimates a system with 700 vehicles would incur a yearly cost of $300,000 to $400,000 for a wheel truing program.

  It is recommended to install wheel-flat detector systems to identify vehicles that are most in need of wheel truing. These systems are becoming more common on railroads and intercity passenger systems, but are relatively rare on transit systems.

- **Rail grinding** – The smoothness of the running surface is critical in the mitigation of noise from a moving vehicle. Mill scale grinding before commencement of pre-revenue service train operations is critical. Experience shows that grinding new rails after approximately 3 months of train operations and scheduling routine grinding at approximate intervals of 2 years in the problem areas would minimize noise problems related to corrugation in most cases. Grinding with small machines when the corrugation depth is still small is a reasonable approach. As a guideline, it is recommended to spot-grind at locations where corrugation occurs before corrugation grows to 0.02 inches (32).

  Periodic rail grinding can result in a net savings per year on wheel and rail wear. Most transit systems contract out rail grinding, although some of the larger systems make the investment of approximately $1 million for the equipment and do their own grinding. Contractors typically charge a fixed amount per day for the equipment on site, plus an amount per pass-mile (one pass of the grinding machine for one mile). Typical rail grinding cost would be approximately $7,000 to $10,000 per pass-mile.

- **Wheel and rail profile matching** – It is important to consider the wheel and rail profile compatibility when truing wheels and grinding rails. If the profiles do not match, the benefits of this kind of preventative maintenance will not be achieved.

  It is equally important to consider initial wheel and rail profile compatibility. Work with track designers and vehicle suppliers early in the design process to ensure wheel and rail profile compatibility. Profiles should be defined during the design phase and should be in

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place when system opens.[32] The cost of wheel and rail profile matching may be incorporated in the new vehicle and new rail costs.

Profile grinding of the rail head in combination with a wheel truing program may be the most practical approach to controlling and reducing noise and vibration where such practices are not normally conducted.

- **Maintenance program** – Clearly defined maintenance specifications should be developed during design phase of the project. The specifications should define rail and wheel profiles, include detailed guidance for pre-revenue mill scale grinding, address issues related to healthy rail-wheel interface, and include a mechanism for periodic monitoring of wheel and rail condition and verification for compliance.[32] A diligent maintenance program can often resolve or reduce rail noise issues before they occur. Vehicle reconditioning programs should also be developed particularly for components such as suspension system, brakes, wheels, and slip-slide detectors.

- **Guideway Support (Bus)** – The smoothness of the running surface is critical in the mitigation of noise from a moving vehicle.
  - **Resurfacing roads** – Roughness on the guideway can be eliminated by resurfacing roads, thereby reducing noise levels by up to 10 dB.

  - **Bridge expansion joint angles and design** – Bridge expansion joints are also a source of noise for rubber-tire vehicles. This source of noise can be reduced by placing expansion joints on an angle or by specifying the serrated type rather than joints with right-angle edges.

- **Turn Radii and Rail Lubrication** – For steel-wheel/steel-rail systems with non-steerable trucks and sharp turns, squeal can typically be eliminated by designing all turn radii to be greater than 1000 ft, or 100 times the truck wheelbase, whichever is less. If this is not possible, squeal can be mitigated by installation of lubricators (though the potential environmental impacts of lubricant application should be factored into this decision).Rail lubricators cost approximately $10,000 - $40,000 per curve.

- **Movable-point and Spring-rail Frogs** – Frogs with spring-loaded mechanisms and frogs with movable points can reduce impact noise near crossovers. According to the TCRP report, a spring frog costs approximately $12,000, twice the cost of a standard frog. A movable point frog involves elaborate signal and control circuitry resulting in higher costs of approximately $200,000.

- **Use of Locomotive Horns at-grade Crossings and Quiet Zones** – In cases where commuter rail operations share tracks or ROW with freight or intercity passenger trains that are part of the general railroad system, the safety rules of the FRA, including the Train Horn Rule, apply.[35] The Train Horn Rule requires that locomotive horns be sounded at public highway grade crossings, although some exceptions are allowed in carefully defined circumstances. Locomotive horns are often a major contributor in

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projections of adverse noise impact, in the community from proposed commuter rail projects. Since noise barriers are not feasible at highway-rail grade crossings, the establishment of quiet zones could be considered.

Quiet zones can be established in which supplemental safety measures (SSMs) are used in place of the locomotive horn to provide an equivalent level of safety at-grade crossings.[vii] By adopting an approved SSM at each public grade crossing, a quiet zone of at least a half-mile long can be established. These measures are in addition to the standard safety devices required at most public grade crossings (e.g., stop signs, reflectorized crossbucks, flashing lights with gates that do not completely block travel over the tracks). Below are four SSMs that have been predetermined by the FRA to fully compensate for the lack of a locomotive horn:

- **Temporary closure of a public highway-rail grade crossing** – This measure requires closure of the grade crossing for one period each 24 hours, and the closure must occur at the same time each day.
- **Four-quadrant gate system** – This measure involves the installation of at least one gate for each direction of traffic to fully block vehicles from entering the crossing.
- **Gates with medians or channelization devices** – This measure keeps traffic in the proper travel lanes as it approaches the crossing. This denies the driver the option of circumventing the gates by traveling in the opposing lane.
- **One-way street with gates** – This measure consists of one-way streets with gates installed, so that all approaching travel lanes are completely blocked.

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In addition to the pre-approved SSMs, the FRA rule also identifies a range of other measures that may be used in establishing a quiet zone. These could include modified SSMs or non-engineering types of measures, such as increased monitoring by law enforcement for grade crossing violations or instituting public education and awareness programs that emphasize the risks associated with grade crossings and applicable requirements. These alternative safety measures (ASMs) require approval by FRA based on a demonstration that public safety would not be compromised by eliminating horn usage.

The lead agency for designating a quiet zone is the local public authority responsible for traffic control and law enforcement on the roads crossing the tracks. To satisfy the FRA regulatory requirements, the public transit agency must work closely with this agency while also coordinating with any freight or passenger railroad operator sharing the ROW. The final environmental document should discuss the main considerations in adopting the quiet zone including: the engineering feasibility, receptiveness of the local public authority, consultation with the railroad, preliminary cost estimates, and evidence of the planning and interagency coordination that has occurred to date. If a quiet zone will be relied on as a mitigation measure, the final environmental document should provide reasonable

[vii] For more information on quiet zones, visit: https://www.fra.dot.gov/Page/P0889.

assurance that any remaining issues can and will be resolved. For more information on documentation requirements see Section 8.

The cost of establishing a quiet zone varies considerably, depending on the number of intersections that must be treated and the specific SSMs, ASMs, or combination of measures that are used. The FRA gives a cost estimate of $15,000 per crossing for installing two 100-foot-long, non-traversable medians that prevent motorists from driving around closed gates. A typical installation of a four-quadrant gate system is in the range of $175,000–$300,000 per crossing.[36] Who pays for the installation of modifications can become a major consideration in a decision to pursue a quiet zone designation, especially in cases where noise from preexisting railroad operations is controversial in the community. In many cases where a quiet zone would mitigate a severe impact caused by the proposed transit project, the costs are covered by the project sponsor and FTA in the same proportion as the overall cost-sharing for the project.

**7b. Evaluate Path Treatments** – When noise mitigation treatments cannot be applied at the noise source or additional mitigation is required after treating the source, the next preferred placement of noise mitigation is along the noise propagation path between the source and receiver. Common path treatments and their estimated acoustical effectiveness are included in Table 4-34 and described below.

**Table 4-34 Transit Noise Mitigation Measures – Path Treatments**

| Mitigation Measure | Effectiveness |
|---|---|
| Noise barriers close to vehicles | 6-15 dB |
| Noise barriers at row line | 3-15 dB[37] |
| Alteration of horizontal & vertical alignments | Varied |
| Wayside horns | Varied |
| Acquisition of buffer zones | Varied |
| Ballast on at-grade guideway* | 3 dB |
| Ballast on aerial guideway* | 5 dB |
| Resilient track support on aerial guideway | Varied |
| Vegetation and trees | Varied, see Table 4-30 |

* Applies to rail projects only.

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- **Noise Barriers** – Noise barriers are effective in mitigating noise when they break the line-of-sight between source and receiver. The mechanism of sound shielding is described in Section 3.3. The necessary height of a barrier depends on the source height and the distance from the source to the barrier, see Table 4-28 and Figure 4-18.
  - **Noise barriers close to vehicles** – Barriers located very close to a rapid transit train, for example, may only need to be approximately 3 to 4 ft above the top of rail to be effective. Standard barriers close to vehicles can provide noise reductions of 6 to 10 dB.
  - **Noise barriers at ROW line –** Barriers on the ROW line or for trains on the far track, the height must be increased to provide equivalent effectiveness to barriers located close to the vehicles. Otherwise, the effectiveness can drop to 3 dB or less, even if the barrier breaks the line-of-sight.

All barrier effectiveness can be increased by as much as 5 dB by applying sound-absorbing material to the inner surface of the barrier. The length of the barrier wall is also important to its effectiveness. The barrier must be long enough to block noise from a moving train along most of its visible path. This is necessary so that train noise from beyond the ends of the barrier will not severely compromise noise-barrier performance at noise-sensitive locations. The barrier length can be refined in the engineering phase, closely examining the predicted sound level exceedances at specific receivers, site geometries, and the contribution of barrier flanking noise, then adjusting the length as appropriate.

Noise barriers can be made of any outdoor weather-resistant solid material that meets the minimum sound transmission loss required by the project. Materials that are commonly used for noise barriers include 16-gauge steel, 1-inch thick plywood, and any reasonable thickness of concrete. Typically, a surface density of 4 pounds per square foot is required. Areas with strong winds may require more stringent structural requirements. It is critical to seal any gaps between barrier panels and between the barrier and the ground or elevated guideway deck for maximum performance.

Costs for noise barriers (based on highway installations) range from $20 to $25 per square foot of installed noise barrier at-grade with additional cost for design and inspection.[38] Installation on aerial structures could be twice the amount of installation at-grade, especially if the structure has to be strengthened to accommodate the added weight and wind load.

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As described in Section 3.3, noise barriers, if not designed and sited carefully, can reduce visibility of trains for pedestrians and motorists, which causes safety concerns. It is important to consult with safety experts in choosing and siting a noise barrier.

- **Alteration of Horizontal and Vertical Alignments** – Transit alignment in a cut as part of grade separation can accomplish the same result as installation of a noise barrier at-grade or on aerial structure. The walls of the cut serve the same function as barrier walls in breaking the line-of-sight between source and receiver.

- **Wayside Horns** – The sounding of a locomotive horn as the train approaches an at-grade intersection produces a very wide noise footprint in the community. Using wayside horns at these intersections instead of the locomotive horn can substantially reduce the noise footprint without compromising safety at the grade crossing.

  A wayside horn does not need to be as loud as a locomotive horn, and the warning sound is focused only on the area where it is needed. These are pole-mounted horns used in conjunction with flashing lights and gates at the intersection, with a separate horn oriented toward each direction of oncoming vehicle traffic. Noise levels in nearby residential and business areas can be reduced substantially with wayside horns, depending on the location with respect to the grade crossing.

A plan to use wayside horns in place of the locomotive horn at public grade crossings must be coordinated with several public and private entities, notably the local agency having responsibility for traffic control and law enforcement on the road crossings, the state agency responsible for railroad safety, any railroads that share the ROW, and FRA. Public notification must also be given. Preliminary cost information from testing programs indicates a wayside horn system at a railroad/highway grade crossing costs approximately $50,000.

- **Buffer Zones** – Because noise levels attenuate with distance, one noise mitigation option is to increase the distance between noise sources and the closest noise-sensitive receivers. This can be accomplished by locating alignments away from noise-sensitive sites. Acquisition of land or purchasing easements for noise buffer zones is an option that may be considered if appropriate for the project.

- **Ground Absorption – Ballast on Guideways** – Propagation of noise over ground is affected by whether the ground surface is absorptive or reflective. Noise from vehicles on the surface is strongly affected by the character of the ground in the immediate vicinity of the vehicle. Roads and streets for buses are hard and reflective, but the ground at the side of a road has a substantial effect on the propagation of noise to greater distance. Guideways for rail systems can be either reflective or absorptive, depending on whether they are concrete or ballast. Ballast on a guideway can reduce train noise 3 dB at-grade and up to 5 dB on an aerial structure.

- **Vegetation and Trees** – In almost all cases, vegetation and trees are ineffective at providing noise mitigation. Vegetation and Trees can provide some mitigation if at least 100 ft of trees intervene between the source and receiver, if no clear line-of-sight exists between the source and receiver, and if the trees extend 15 ft or more above the line-of-sight as described in Section 4.5, Step 3b. This is generally not a recommended form of mitigation to pursue.

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**7c. Evaluate Receiver Treatments –** Consider treatments to the receivers when noise mitigation treatments cannot be applied at the source or along the propagation path, or if combinations of treatments are required. Common receiver treatments and their estimated acoustical effectiveness are included in Table 4-35 and are described in this section.

**Table 4-35 Transit Noise Mitigation Measures – Receiver Treatments**

| Mitigation Measure | Effectiveness |
|---|---|
| Acquisition of Property Rights for Construction of Noise Barriers | 5-10 dB |
| Building Noise Insulation | 5-20 dB |

- **Noise Barriers** – In certain cases, it may be possible to acquire limited property rights for the construction of noise barriers at the receiver. As discussed above, barriers need to break the line-of-sight between the noise source and the receiver to be effective and are most effective when they are

closest to either the source or the receiver. See Section 3.3 for more information on noise barriers.

- **Building Insulation** – In cases where noise barriers are not feasible—such as multi-story buildings, buildings very close to the ROW, or grade crossings—the only practical noise mitigation measure may be to provide sound insulation for the buildings. In these cases, the need for mitigation at locations where impact has been identified will depend on the use (outdoor vs. indoor), any existing outdoor to indoor reduction in noise levels, and the feasibility of constructing effective noise barriers for second stories and above.

  Depending on the quality of the original building façade, especially windows and doors, sound insulation treatments can improve the noise reductions from transit noise by 5 to 20 dB. To be considered cost-effective, a treatment should provide a minimum reduction of 5 dB in the interior of the building and meet the $L_{dn}$ 45 dBA interior criterion. For more information, see Section 4.1.

  In many cases, especially in locations with high ambient noise levels, the existing sound insulation of a building may already meet the 45 dBA $L_{dn}$ interior noise criterion. It is recommended that sound insulation testing be conducted to determine if the existing sound insulation is sufficient or what additional measures would be required to meet the interior criterion. Effective treatments include:
  - Caulking and sealing gaps in the building façade; and
  - Installation of new doors and windows that are specially designed to meet acoustical transmission-loss requirements:
    - Exterior doors facing the noise source should be replaced with well-gasketed, solid-core wood doors and well-gasketed storm doors.
    - Acoustical windows are typically made of multiple layers of glass with air spaces between to provide noise reduction. Acoustical performance ratings are published in terms of Sound Transmission Class (STC) for these windows. It is recommended to use a minimum STC rating of 39 on any window exposed to the noise source.

  These treatments are beneficial for heat insulation as well as for sound insulation, but acoustical windows are typically non-operable and central ventilation or air conditioning is needed. Residents' preferences should be considered.

  If needed, additional building sound insulation can be provided by sealing vents and ventilation openings and relocating them to a side of the building away from the noise source. In cases where the noise sources is low-frequency noise from diesel locomotives, it may be necessary to increase the mass of the building façade for wood-frame houses by adding a layer of sheathing to the exterior walls.

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Examples of residential sound insulation for rail or highway projects are limited. However, much practical experience with sound insulation of buildings has been gained through grants for noise mitigation to local airport authorities by FAA.

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SECTION 5

# Transit Vibration

This section presents the basic concepts of transit ground-borne vibration, also referred throughout this manual as simple "vibration," and low-frequency groundborne-noise that sometimes results from vibration. The steps for the screening and assessing of potential vibration impacts of transit projects for FTA NEPA approval are described in the following sections.

The Source-Path-Receiver framework for ground-borne vibration for a rail system illustrated in Figure 5-1 is central to all environmental vibration studies. The train wheels rolling on the rails create vibration energy that is transmitted through the track support system into the transit structure. The vibration of the transit structure excites the adjacent ground, creating vibration waves that propagate through the ground and into nearby buildings creating ground-borne vibration effects that potentially interfere with activities. The vibrating building components may radiate sound, which this manual refers to as ground-borne noise. Airborne noise from transit sources is covered in Sections 2.3–4.5 of this manual. Ground-borne noise refers to the noise generated by ground-borne vibration.

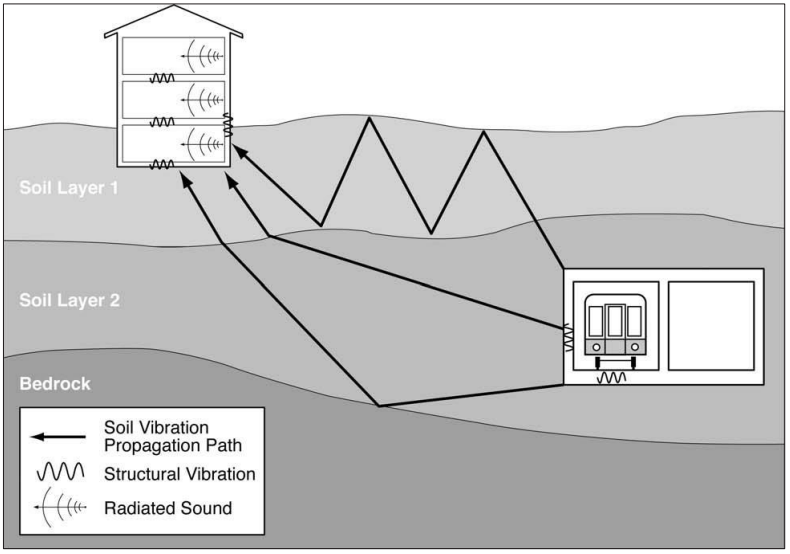


**Figure 5-1 Propagation of Ground-Borne Vibration into Buildings**

This section contains the following:

- Section 5.1 The ground-borne vibration and noise metrics used in this manual
- Section 5.2 An overview of transit vibration sources

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- Section 5.3 An overview of transit vibration paths
- Section 5.4 An overview of receiver factors of transit vibration and a discussion of the technical background for ground-borne noise criteria

## 5.1 Ground-Borne Vibration and Noise Metrics

Vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration. Because the motion is oscillatory, there is no net movement of the vibration element and the average of any of the motion metrics is zero. Displacement is the most intuitive metric. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement and acceleration is the rate of change of the speed.

Although displacement is easier to understand than velocity or acceleration, it is rarely used for describing ground-borne vibration. Most transducers used for measuring ground-borne vibration use either velocity or acceleration. Furthermore, the response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.

This manual uses the metrics outlined in Table 5-1 for transit ground-borne vibration and noise measurements, computations, and assessment. These metrics are consistent with common usage in the United States.

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**Table 5-1 Ground-borne Vibration and Noise Metrics**

| Metric | Abbreviation | Definition |
|---|---|---|
| Vibration Decibels | VdB | The vibration velocity level in decibel scale. |
| Peak Particle Velocity | PPV | The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States. |
| Root Mean Square | rms | The square root of the arithmetic average of the squared amplitude of the signal. |
| A-weighted Sound Level | dBA | A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This unit is used to characterize ground-borne noise. |

The metrics in the table above are illustrated in Figure 5-2. The components in the figure include:

- **Raw signal** – This curve shows the instantaneous vibration velocity, which fluctuates positively and negatively about the zero point.
- **Peak particle velocity (PPV)** – PPV is the maximum instantaneous positive or negative peak of the vibration signal. PPV is often used in monitoring of construction vibration (such as blasting) since it is related to the stresses that are experienced by buildings and is not used to evaluate human response.
- **Root mean square (rms) velocity** – Because the net average of a vibration signal is zero, the rms amplitude is used to describe smoothed vibration amplitude. The rms of a signal is the square root of the

average of the squared amplitude of the signal. The average is typically calculated over a one-second period. The rms amplitude is always less than the PPV[viii] and is always positive. The rms amplitude is used to convey the magnitude of the vibration signal felt by the human body, in inches/second.

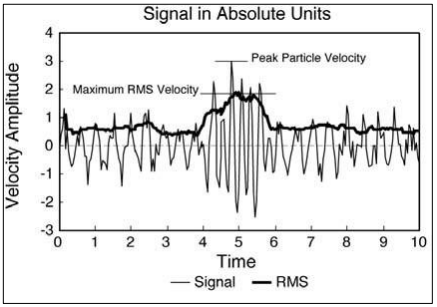


**Figure 5-2 Vibration Signal in Absolute Units**

The PPV and rms velocity are described in inches per second in the United States and meters per second internationally (with several different reference values). Although it is not universally accepted, vibration is commonly expressed in decibel notation. The decibel scale compresses the range of numbers required to describe vibration.

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The graph in Figure 5-3 shows the rms curve from Figure 5-2 expressed in decibels.

Vibration velocity level in decibels is defined as:

$$L_v = 20 \log\left(\frac{v}{v_{ref}}\right) \qquad \textbf{Eq. 5-1}$$

where:

$L_v$ = velocity level, VdB
$v$ = rms velocity amplitude
$v_{ref}$ = 1 x $10^{-6}$in/sec in the USA
= 1 x $10^{-8}$m/sec internationally*

*Because of the variations in the reference quantities, it is important to be clear about what reference quantity is being used when specifying velocity levels. All vibration levels in this manual are referenced to 1x$10^{-6}$ inches/second.

[viii] The ratio of PPV to maximum rms amplitude is defined as the crest factor for the signal. The crest factor is typically greater than 1.41, although a crest factor of 8 or more is not unusual for impulsive signals. For ground-borne vibration from trains, the crest factor is usually 4 to 5.

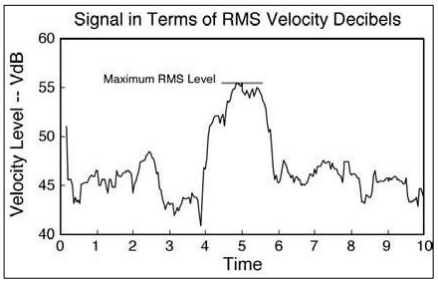


**Figure 5-3 Vibration Signal in RMS Velocity Decibels**

Ground-borne noise occurs when vibration radiates through a building interior and creates a low-frequency sound, often described as a rumble, as a train passes by. The annoyance potential of ground-borne noise is typically characterized with the A-weighted sound level. Although the A-weighted sound level is typically used to characterize community noise, characterizing low-frequency noise using A-weighting can be challenging because the non-linearity of human hearing causes sounds dominated by low-frequency components to seem louder than broadband sounds (sounds consisting of many frequency components, with no dominant frequencies) that have the same A-weighted level. The result is that ground-borne noise with a level of 40 dBA sounds louder than 40 dBA broadband noise. Because ground-borne noise sounds louder than broadband noise at the same noise level, the limits for ground-borne noise are lower (i.e., stricter) than would be the case for broadband noise.

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## 5.2 Sources of Transit Ground-borne Vibration and Noise

Ground-borne vibration can be a concern for nearby neighbors of a transit system route or maintenance facility. However, in contrast to airborne noise, ground-borne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. This section discusses common sources of ground-borne vibration and noise.

Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of vibration waves that propagate through the ground and create perceptible ground-borne vibration in nearby buildings include construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is fairly smooth, the vibration from rubber-tired traffic is rarely perceptible. Building damage due to vibration is also rare for typical transportation projects; but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings.

Figure 5-4 illustrates common vibration sources and the human and structural response to ground-borne vibration ranging from approximately 50 VdB (below

perceptibility) to 100 VdB (the threshold of potential damage). The background vibration velocity level in residential areas is usually 50 VdB or lower,[ix] and the threshold of perception for humans is approximately 65 VdB. A vibration level of 85 VdB in a residence can result in strong annoyance.

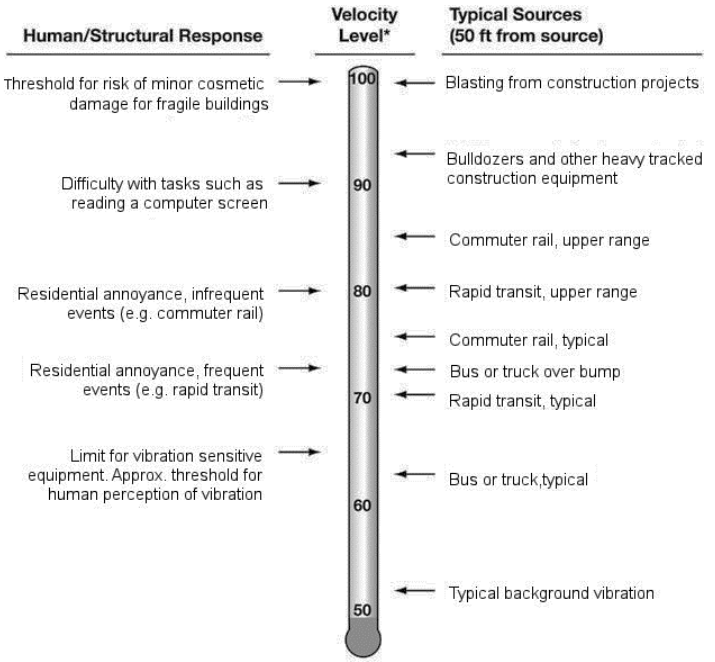


**Figure 5-4 Typical Levels of Ground-Borne Vibration**

Rapid transit or light rail systems typically generate vibration levels of 70 VdB or more near their tracks, while buses and trucks rarely create vibration that exceeds 70 VdB unless there are bumps due to frequent potholes in the road. Heavy locomotives on diesel commuter rail systems create vibration levels approximately 5 to 10 dB higher than rail transit vehicles.

Vibration from trains is strongly dependent on factors such as how smooth the wheels and rails are, as well as the resonance frequencies of the vehicle suspension system and the track support system. These systems, like all mechanical systems, have resonances that result in increased vibration response at certain frequencies, called natural frequencies. Unusually rough road or track, steel-wheel flats, geologic conditions that promote efficient propagation of vibration, or vehicles with very stiff suspension systems could increase typical

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[ix] Background vibration is typically well below the threshold of human perception and is of concern only when the vibration affects very sensitive manufacturing or research equipment. Electron microscopes and high-resolution lithography equipment are examples of equipment that is highly sensitive to vibration.

vibration levels by approximately 10 VdB. Common factors that contribute to ground-borne vibration and noise at the source are presented in Table 5-2. These factors are discussed in more detail throughout this Section.

**Table 5-2 Factors that Influence Levels of Ground-Borne Vibration and Noise at the Source**

| Category | Factors | Influence |
|---|---|---|
| Operations and Vehicles | Speed | Higher speeds result in higher vibration levels. Doubling speed results in a vibration level increase of approximately 4 to 6 dB. |
| | Vehicle Suspension | Stiff suspension in the vertical direction can increase the effective vibration forces. On transit cars, the primary suspension has the largest effect on vibration levels. |
| | Wheel Condition and Type | Wheel flats and general wheel roughness are major sources of vibration from steel wheel/steel rail systems. Resilient wheels on rail transit systems can provide some vibration reduction over solid steel wheels, but are usually too stiff to provide substantial reduction. For more information, see Section 6.4, Step 2. |
| Guideway | Track/Roadway Surface | Rough track or rough roads are often sources of excessive vibration. Maintaining a smooth surface will reduce vibration levels. |
| | Track Support System | On rail systems, the track support system is one of the major components in determining the levels of vibration. The highest vibration levels are created by track that is rigidly attached to a concrete trackbed (e.g., track on wood half-ties embedded in the concrete). The vibration levels are much lower when special vibration control track systems such as resilient fasteners, ballast mats, and floating slabs are used. |
| | Transit Structure | Heavier transit structures typically result in the lower vibration levels. The vibration levels from a lightweight bored tunnel will usually be higher than from a poured concrete box subway. |
| | Transit System Elevation | A rail system guideway will be either underground (subway), at-grade, or elevated, with substantial differences in the vibration characteristics at each elevation.<br>▪ Underground: vibration is typically the most important environmental factor of interest.<br>▪ At-grade: airborne noise is typically the dominant factor, although vibration and noise can be a problem, particularly at interior locations well isolated from exterior noise.<br>▪ Elevated: it is rare for vibration to be an issue with elevated railways except when guideway supports are located within 50 ft of buildings. |

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Brief discussions of ground-borne vibration and noise sources for different modes of transit are provided below.

**At-Grade Heavy Rail and Light Rail**

Ground-borne vibration and noise from urban heavy rail and LRT is common when there is less than 50 ft between the track and building foundations. Local geology and structural details of the building determine if the source of complaints is due to perceptible vibration or audible ground-borne noise. Complaints about ground-borne vibration from surface track are more common than ground-borne noise complaints. A substantial percentage of complaints about both ground-borne vibration and noise correlate with proximity of special track work, rough or corrugated track, or wheel flats. Light rail systems tend to generate fewer complaints than heavy rail due to lower operating speeds.

**Commuter and Intercity Passenger Trains**

There is the potential for vibration-related issues when new commuter or intercity rail passenger service (including electric multiple units (EMUs) and diesel multiple units (DMUs)) powered by either diesel or electric locomotives is introduced in an urban or suburban area. Commuter and intercity passenger trains have similar characteristics, but commuter trains typically operate on a more frequent schedule. These passenger trains often share track with freight trains, which have different vibration characteristics as discussed below.

**Freight Trains**

Local and long-distance freight trains are similar in that they both are diesel-powered and have the same types of cars. They differ in their overall length, number and size of locomotives, and number of heavily loaded cars. However, because locomotive suspensions are similar, the maximum vibration levels of local and long-distance freights are similar. Locomotives and rail cars with wheel flats are the sources of the highest vibration levels.

If the transit project does not in any way change the freight service, tracks, etc., then vibration from the freight line would be part of the existing conditions and need to be considered in terms of cumulative impacts (see Section 6.2, Step 3 on how to consider cumulative impacts). If the project results in changes to the freight path, operations, frequency, etc. (e.g., relocating freight tracks within the ROW to make room for the transit tracks) then those potential impacts and mitigation should be evaluated as part of the proposed project. However, note that vibration mitigation is very difficult to implement on tracks where freight trains with heavy axle loads operate.

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**High-Speed Passenger Trains**

Passenger trains travelling at high speeds, 90 to 250 miles per hour, have the potential for creating high levels of ground-borne vibration. Ground-borne vibration should be anticipated as one of the major environmental impacts of any trains travelling at high speeds located in an urban or suburban area.[x] For projects that are specifically high-speed transportation refer to the FRA "High-Speed Ground Transportation Noise and Vibration Impact Assessment" guidance manual.[39]

**AGT Systems**

AGT systems include a wide range of transportation vehicles that provide local circulation in downtown areas, airports, and theme parks. Because AGT systems normally operate at low speeds, have lightweight vehicles, run on elevated structures, and rarely operate in vibration-sensitive areas, ground-borne vibration problems are very rare.

**Subway and At-grade Track**

While ground-borne vibration produced from trains operating subway and at-grade track have very different characteristics, they have comparable overall vibration velocity levels. Complaints about ground-borne vibration are often more common near subways than near at-grade track. This is not because

× Amtrak trains (branded Acela at the time of publication) on the Northeast Corridor between Boston and Washington, DC, which attain moderate to high speeds in some sections with improved track, fit into this category.

subways create higher vibration levels than at-grade systems, rather because subways are usually located in more densely developed areas in closer proximity to building foundations, and the airborne noise is usually a more serious problem for at-grade systems than the ground-borne vibration. Another difference between subway and at-grade track is that the ground-borne vibration from subways tends to be higher frequency than the vibration from at-grade track, which makes the ground-borne noise more noticeable.

**Streetcars**
Complaints about ground-borne vibration from street cars are uncommon given that streetcars typically operate at very low speeds (less than 25 mph).

**Buses**
Because the rubber tires and suspension systems of buses provide vibration isolation, it is unusual for buses to cause ground-borne vibration or noise problems. For most issues with bus-related vibration, such as rattling of windows, the cause is almost always airborne noise and directly related to running surface conditions such as potholes, bumps, expansion joints, or other discontinuities in the road surface (usually resolved by smoothing the discontinuities).

Buses operating inside buildings will likely cause vibration concerns for other building inhabitants. An example of this situation is a bus transfer station in the same building as commercial office space. Sudden loading of a building slab by a heavy moving vehicle or by vehicles running over lane divider bumps can cause intrusive building vibration.

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## 5.3 Paths of Transit Ground-Borne Vibration and Noise

Vibration travels from the source through the transit structure and excites the adjacent ground, creating vibration waves that propagate through soil layers and rock strata to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the building structure. The vibration of the building structure and room surfaces can radiate a low-frequency rumble called ground-borne noise (Figure 5-1).

Soil and subsurface conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils. Shallow rock may concentrate the vibration energy close to the surface, resulting in ground-borne vibration problems at large distances from the track. Factors such as soil layers and depth to water table can have substantial effects on the propagation of ground-borne vibration. These factors are summarized in Table 5-3.

**Table 5-3 Factors that Influence Levels of Ground-borne Vibration and Noise along Path**

| Geology Factors | Influence |
|---|---|
| Soil type | Vibration levels are generally higher in stiff clay-type soil than in loose sandy soil. |
| Rock layers | Vibration levels are usually high near at-grade track when the depth to bedrock is 30 ft or less. Subways founded in rock will result in lower vibration amplitudes close to the subway. Vibration levels do not attenuate as rapidly in rock as in soil. |
| Soil layering | Soil layering can have a substantial effect on the vibration levels since each stratum can have considerably different dynamic characteristics. |
| Depth to water table | The presence of the water table may have a substantial effect on vibration, but a definite relationship has not been established. |

## 5.4 Receiver Factors that Influence Ground-Borne Vibration and Noise

Ground-borne vibration is a concern almost exclusively inside buildings. Train vibration may be perceptible to people who are outdoors, but it is very rare for outdoor vibration to cause complaints.

The vibration levels inside a building are dependent on the vibration energy that reaches the building foundation, coupling of the building foundation to the soil, and propagation of the vibration through the building. In general, the heavier a building is, the lower the response will be to the incident vibration energy. Common factors that contribute to ground-borne vibration and noise at the receiver are presented in Table 5-4.

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**Table 5-4 Factors that Influence Levels of Ground-Borne Vibration and Noise at the Receiver**

| Receiver Building Factors | Influence |
|---|---|
| Foundation type | The heavier the building foundation, the greater the coupling loss as the vibration propagates from the ground into the building. |
| Building construction | Each building has different characteristics relative to structure-borne vibration, but, in general, the heavier the building, the lower the levels of vibration. The maximum vibration amplitudes of the floors and walls of a building will often occur at the resonance frequencies of the components of the building. |
| Acoustical absorption | The more acoustically absorptive materials in the receiver room, the lower the ground-borne noise level. Note that because ground-borne noise usually is a low-frequency phenomenon, it is affected by low-frequency absorption (e.g., below 250 Hz). |

## 5.5 Human Response to Transit Ground-borne Vibration and Noise

This section contains an overview of human receiver response to ground-borne vibration and noise. It serves as background information for the vibration impact criteria in Section 6.2.

The effects of ground-borne vibration can include perceptible movement of floors in buildings, rattling of windows, shaking of items on shelves or hanging on walls, and low-frequency noise (ground-borne noise). Building damage is not a

factor for typical transportation projects, but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings. Although the perceptibility threshold is approximately 65 VdB, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB (Figure 5-4). A vibration level that causes annoyance is well below the damage risk threshold for typical buildings (100 VdB).

Ground-borne vibration is almost never a problem outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of a building, the motion does not provoke the same adverse human reaction. Ground-borne noise that accompanies the building vibration is usually perceptible only inside buildings and typically is only an issue at locations with subway or tunnel operations where there is no airborne noise path or for buildings with substantial sound insulation such as a recording studio.

One of the challenges in developing suitable criteria for ground-borne vibration is that there has been relatively little research into human response to vibration and, specifically, human annoyance with building vibration. The American National Standards Institute (ANSI) developed criteria for evaluation of human exposure to vibration in buildings in 1983,[40] and the International Organization for Standardization (ISO) adopted similar criteria in 1989[41] and revised them in 2003.[42] The 2003 version of ISO 2631-2 acknowledges that "human response to vibration in buildings is very complex." It further indicates that the degree of annoyance cannot always be explained by the magnitude of the vibration alone. In some cases, complaints are associated with measured vibration that is lower than the perception threshold. Other phenomena such as ground-borne noise, rattling, visual effects such as movement of hanging objects, and time of day (e.g., late at night) all play some role in the response of individuals. To understand and evaluate human response, which is often measured by complaints, all of these related effects need to be considered.

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Figure 5-5 illustrates the relationship between the vibration velocity level measured in 22 homes and the general response of the occupants to the vibration from measurements performed for several transit systems along with subjective ratings by researchers and residents. These data are published in the "State-of-the-Art Review of Ground-borne Noise and Vibration."[43] The figure also includes a curve representing the percent of people annoyed by vibration from high-speed trains from a Japanese study for comparison.[44]

Both the occupants and the people who performed the measurements agreed that floor vibration in the Distinctly Perceptible range is unacceptable for a residence. The data indicates that residential vibration exceeding 75 VdB is unacceptable for a repetitive vibration source such as rapid transit trains that pass every 5 to 15 minutes. The results from the Japanese study confirm the conclusion that at a vibration velocity level of 75 to 80 VdB, many people will find the vibration annoying. A Transportation Research Board (TRB) study of human response to vibration from 2009 also supports this finding and indicates that incidence of complaints fall rapidly with a level decreasing below 72 VdB.[42][45]

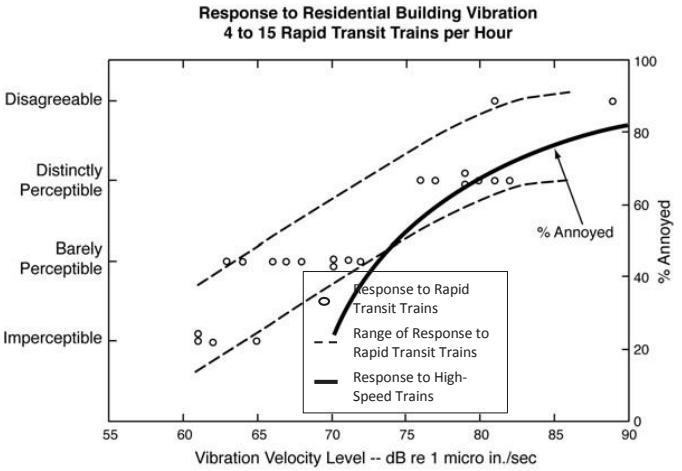


**Figure 5-5 Response to Transit-Induced Residential Vibration**

Table 5-5 presents the human response to different levels of ground-borne vibration and noise on which the criteria presented in Section 6.2 are based. The vibration level (VdB) is presented with the corresponding frequency assuming that the vibration spectrum peaks at 30 Hz or 60 Hz.[xi] The ground-borne noise levels (dBA) are estimated for the specified vibration velocity with a peak vibration spectrum of 30 Hz (Low Freq) and 60 Hz (Mid Freq). Note that the human response differs for vibration velocity level based on frequency. For example, the noise caused by vibrating structural components may cause annoyance even though the vibration cannot be felt. Alternatively, a low-frequency vibration can cause annoyance while the ground-borne noise level it generates does not.

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[xi] The A-weighted level of ground-borne noise can be estimated by applying A-weighting to the vibration velocity spectrum and by subtracting an additional 5 dB for a room with average acoustical absorption. Since the A-weighting at 31.5 Hz is -39.4 dB, if the vibration spectrum peaks at 30 Hz, the A-weighted sound level will be approximately 40 dB lower than the velocity level. If the vibration spectrum peaks at 60 Hz, the A-weighted sound level will be approximately 25 dB lower than the velocity level.

**Table 5-5 Human Response to Different Levels of Ground-Borne Vibration and Noise**

| Vibration Velocity Level | Noise Level | | Human Response |
|---|---|---|---|
| | Low Freq* | Mid Freq** | |
| 65 VdB | 25 dBA | 40 dBA | Approximate threshold of perception for many humans. Low-frequency sound: usually inaudible. Mid-frequency sound: excessive for quiet sleeping areas. |
| 75 VdB | 35 dBA | 50 dBA | Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise: tolerable for sleeping areas. Mid-frequency noise: excessive in most quiet occupied areas. |
| 85 VdB | 45 dBA | 60 dBA | Vibration tolerable only if there are an infrequent number of events per day. Low-frequency noise: excessive for sleeping areas. Mid-frequency noise: excessive even for infrequent events for some activities. |

*Approximate noise level when vibration spectrum peak is near 30 Hz.
**Approximate noise level when vibration spectrum peak is near 60 Hz.

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Cont.

SECTION 6

# Vibration Impact Analysis

The FTA vibration impact analysis process is a multi-step process used to evaluate a project for potential vibration impacts. If impact is determined, measures necessary to mitigate adverse impacts are to be considered for incorporation into the project.(3)

The FTA vibration impact analysis steps are summarized as follows and are described in the following sections:

**6.1** Determine vibration analysis level.

**6.2** Determine vibration impact criteria.
- **Option A:** General Vibration Assessment Criteria
- **Option B:** Vibration Impact Criteria for a Detailed Vibration Analysis

**6.3** Evaluate Impact: Vibration Screening Procedure
- **Step 1:** Classify project vehicles.
- **Step 2:** Determine project type.
- **Step 3:** Determine screening distance.
- **Step 4:** Identify vibration-sensitive land uses.

**6.4** Evaluate Impact: General Vibration Assessment.
- **Step 1:** Select base curve for ground surface vibration level.
- **Step 2:** Apply adjustments.
- **Step 3:** Inventory vibration impact.

**6.5** Evaluate Impact: Detailed Vibration Analysis
- **Step 1:** Characterize Existing Vibration
- **Step 2:** Estimate Vibration Impact
- **Step 3:** Assess Vibration Impacts
- **Step 4:** Determine Vibration Mitigation Measures

A similar process for the noise impact analysis is presented in Section 4. After the noise and vibration analyses have been completed, assess construction noise and vibration according to Section 7 and document findings according to Section 8.

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## 6.1 Determine Vibration Analysis Level

There are three levels of analysis to assess the potential ground-borne vibration and noise impacts resulting from a public transportation project. The appropriate level of analysis varies by project based on the type and scale of the project, the stage of project development, and its environmental setting. These three levels are: the Vibration Screening Procedure, the General Vibration Assessment, and the Detailed Vibration Analysis. These levels of vibration analysis mirror the levels of noise analysis discussed in Section 4.2.

The Vibration Screening Procedure, performed first, defines the study area of any subsequent vibration impact assessment. Where there is potential for

impact, the General Vibration Assessment and Detailed Vibration Analysis procedures are used to determine the extent and severity of impact. In some cases, a General Vibration Assessment may be all that is needed. However, if the proposed project is near noise-sensitive land uses and it appears at the outset that the impact would be substantial, it is prudent to conduct a Detailed Vibration Analysis.

The methods for analyzing transit vibration are consistent with those described in recognized handbooks and international standards.[46][47]

*Conduct the vibration screening procedure and then determine the appropriate vibration analysis option:*

**Vibration Screening Procedure** – The Vibration Screening Procedure is a simplified method of identifying the potential for vibration impact from transit projects. The Vibration Screening Procedure is applicable to all types of transit projects and does not require any specific knowledge about the vibration characteristics of the system or the geology of the area. This procedure uses simplified assumptions and considers the type of project and the presence or absence of vibration-sensitive land uses within a screening distance that has been developed to identify most potential vibration impacts. If no vibration-sensitive land uses are present within the defined screening distance, then no further vibration assessment is necessary.

The Vibration Screening Procedure steps are provided in Section 6.3, Step 1.

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**General Vibration Assessment** – The General Vibration Assessment is used to examine potential impacts to vibration-sensitive land use areas identified in the screening step more closely. It uses generalized information likely to be available at an early stage in the project development process and during the development of most environmental documents.

Vibration levels at receivers are determined by estimating the overall vibration velocity level and A-weighted ground-borne noise levels as a function of distance from the track and applying adjustments to account for factors such as track support systems, vehicle speed, type of building, and track and wheel conditions.

A General Vibration Assessment is sufficient for the environmental review of many projects, including projects that compare transit modal alternatives or relocate a crossover or turnout. The General Vibration Assessment may also be sufficient if it results in a commitment to mitigation that eliminates the vibration impacts, such as a change in transit mode or alignment. However, if impact is identified through the General Vibration Assessment procedures and not mitigated, a Detailed Vibration Analysis of the selected alternative must be completed. Most vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done.

The General Vibration Assessment procedure is provided in Section 6.3, Step 2.

**Detailed Vibration Analysis** – The Detailed Vibration Analysis procedure is a comprehensive assessment method that produces the most accurate estimates

of vibration impact for a proposed project and is often accomplished during the engineering phase of a project when there are sufficient data identifying potential adverse vibration impacts from the project. However, a Detailed Vibration Analysis may be warranted earlier in the environmental review process if there are potentially severe impacts due to the proximity of vibration-sensitive land uses. This type of assessment requires professionals with experience in performing and interpreting vibration propagation tests.

A Detailed Vibration Analysis may not be necessary for all segments of a project. Generalized prediction curves from the General Vibration Assessment procedures may be sufficient for most of the alignment, and the Detailed Vibration Analysis procedure may only need to be applied to particularly sensitive receivers (Section 6.3). Note that a Detailed Vibration Analysis is typically required when designing special track-support systems such as floating slabs or ballast mats. These and other costly vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done in the engineering phase of the project.

The Detailed Vibration Analysis procedure is presented in Section 6.3, Step 3.

## 6.2 Determine Vibration Impact Criteria

Use the FTA criteria presented in this section when conducting a General Vibration Assessment or a Detailed Vibration Assessment. Like noise, the sensitivity to vibration varies by land use type, and the criteria represent these sensitivities. These criteria are based on national and international standards,[38][39][48] as well as experience on human response to building vibration. See Section 5.5 for additional background information on the development of FTA vibration criteria. The criteria for environmental impact from ground-borne vibration and noise are based on the maximum root-mean-square (rms) vibration velocity levels for repeated events of the same source.

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Determine the appropriate criteria based on the level of analysis (Section 6.1). The impact criteria for the General Vibration Assessment are presented in Option A, and the impact criteria for the Detailed Vibration Analysis are presented in Option B.

### Option A: General Vibration Assessment Criteria

Determine the land use according to Step 1 and the frequency of events according to Step 2. The impact criteria for the General Vibration Analysis are presented in Step 3.

#### Step 1: Land Use Categories

*Determine the appropriate land use category for the receiver of vibration impacts of the project or project segment.* Sensitive land use categories for vibration assessment are presented in Table 6-1 in order of sensitivity. Consider indoor use of the buildings when determining land use categories for ground-borne vibration and noise, since impact is experienced indoors.

**Table 6-1 Land Use Categories for General Vibration Assessment Impact Criteria**

| Land Use Category | Land Use Type | Description of Land Use Category |
|---|---|---|
| - | Special Buildings | This category includes special-use facilities that are very sensitive to vibration and noise that are not included in the categories below and require special consideration. However, if the building will rarely be occupied when the source of the vibration (e.g., the train) is operating, there is no need to evaluate for impact. Examples of these facilities include concert halls, TV and recording studios, and theaters. |
| 1 | High Sensitivity | This category includes buildings where vibration levels, including those below the threshold of human annoyance, would interfere with operations within the building. Examples include buildings where vibration-sensitive research and manufacturing* is conducted, hospitals with vibration-sensitive equipment, and universities conducting physical research operations. The building's degree of sensitivity to vibration is dependent on the specific equipment that will be affected by the vibration. Equipment moderately sensitive to vibration, such as high resolution lithographic equipment, optical microscopes, and electron microscopes with vibration isolation systems are included in this category.** For equipment that is more sensitive, a Detailed Vibration Analysis must be conducted. |
| 2 | Residential | This category includes all residential land use and buildings where people normally sleep, such as hotels and hospitals. Transit-generated ground-borne vibration and noise from subways or surface running trains are considered to have a similar effect on receivers.*** |
| 3 | Institutional | This category includes institutions and offices that have vibration-sensitive equipment and have the potential for activity interference such as schools, churches, doctors' offices. Commercial or industrial locations including office buildings are not included in this category unless there is vibration-sensitive activity or equipment within the building. As with noise, the use of the building determines the vibration sensitivity. |

* Manufacturing of computer chips is an example of a vibration-sensitive process.
** Standard optical microscopes can be impacted at vibration levels below the threshold of human annoyance.
*** Even in noisy urban areas, the bedrooms will often be in quiet buildings with effective noise insulation. However, ground-borne vibration and noise are experienced indoors, and building occupants have practically no means to reduce their exposure. Therefore, occupants in noisy urban areas are just as likely to be exposed to ground-borne vibration and noise as those in quiet suburban areas.

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- **Ground-borne Vibration** – Locations with equipment that is highly-sensitive to vibration should be included in category 1 or assessed using the Detailed Vibration Analysis procedures (Section 6.3, Step 3) and criteria (Section 6.2, Option B) or specific criteria of the equipment manufacturer.

  Most computer installations or telephone switching equipment is not considered sensitive to vibration. Although the owners of this type of equipment often are concerned with the potential for ground-borne vibration interrupting smooth operation of their equipment, it is rare for computer or other electronic equipment to be particularly sensitive to vibration. This type of equipment is typically designed to operate in common building environments where the equipment may experience occasional disturbances and continuous background vibration caused by other equipment.

- **Ground-borne Noise** – Ground-borne noise is typically only assessed at locations with subway or tunnel operations where there is no airborne noise path, or for buildings with substantial sound insulation such as a recording studio. For typical buildings with at-grade or elevated transit operations, the interior airborne noise levels are often higher than the

ground-borne noise levels. For interior rooms or other special cases, ground-borne noise may need to be assessed.

## Step 2: Identify Event Frequency

*Determine the appropriate frequency of events for the project or project segment.*

Community response to vibration correlates with the frequency of events and, intuitively, more frequent events of low vibration levels may evoke the same response as fewer high vibration level events. This effect is accounted for in the ground-borne vibration and noise impact criteria by characterizing projects by frequency of events. Event frequency definitions are presented in Table 6-2.

**Table 6-2 Event Frequency Definitions**

| Category | Definition | Typical Project Types |
|---|---|---|
| Frequent Events | More than 70 events per day | Most rapid transit |
| Occasional Events | 30–70 events per day | Most commuter trunk lines |
| Infrequent Events | Fewer than 30 events per day | Most commuter rail branch lines |

## Step 3: Apply Impact Criteria by Land Use and Event Frequency

Select the appropriate impact criteria for ground-borne vibration and noise based on the previously identified land use categories and frequency of events. It is also important to consider the time of vibration sensitivity. If the building is not typically occupied when the vibration source (e.g., train) is operating, it is not necessary to consider impact.

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The criteria in this section are appropriate for assessing human annoyance or interference with vibration-sensitive equipment for common projects. While not typical, existing conditions, freight train operations, and building damage may require consideration.

- **Existing Conditions** – The criteria in this section do not consider existing conditions. In most cases, the existing environment does not include a substantial number of perceptible ground-borne vibration or noise events. However, existing conditions must be evaluated in some cases, such as for projects located in an existing rail corridor. For criteria considering existing conditions, see Step 3b.

- **Freight Train Operations** – The criteria are primarily based on experience with passenger train operations. Passenger train operations (rapid transit, commuter rail, and intercity passenger railroad) create vibration events that last approximately 10 seconds or less while a typical line-haul freight train event lasts approximately two minutes. This manual is oriented to transit projects. However, situations will occur when freight train operations must be evaluated, such as when freight train tracks are relocated for a transit project within a railroad ROW. Guidelines on applying these criteria to freight train operations are presented in Step 3c.

- **Building Damage** – It is extremely rare for vibration from train operations to cause substantial or even minor cosmetic building damage. However, damage to fragile historic buildings located near the ROW may be of concern. Even in these cases, damage is unlikely except when the track is located very close to the structure. Damage thresholds that apply to these structures are discussed in Section 7.2, Step 4 on Construction Vibration Impacts.

**3a. Choose the impact criteria by land use category and event frequency.** The criteria for ground-borne vibration and noise land use categories 1-3 are presented in Table 6-3. The criteria are presented in terms of acceptable indoor ground-borne vibration and noise levels. Impact will occur if these levels are exceeded. Criteria for ground-borne vibration are expressed in terms of rms velocity levels in VdB, and criteria for ground-borne noise are expressed in terms of A-weighted sound pressure levels in dBA.

**Table 6-3 Indoor Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for General Vibration Assessment**

| Land Use Category | GBV Impact Levels (VdB re 1 micro-inch /sec) | | | GBN Impact Levels (dBA re 20 micro Pascals) | | |
|---|---|---|---|---|---|---|
| | Frequent Events | Occasional Events | Infrequent Events | Frequent Events | Occasional Events | Infrequent Events |
| **Category 1**: Buildings where vibration would interfere with interior operations. | 65 VdB* | 65 VdB* | 65 VdB* | N/A** | N/A** | N/A** |
| **Category 2**: Residences and buildings where people normally sleep. | 72 VdB | 75 VdB | 80 VdB | 35 dBA | 38 dBA | 43 dBA |
| **Category 3**: Institutional land uses with primarily daytime use. | 75 VdB | 78 VdB | 83 VdB | 40 dBA | 43 dBA | 48 dBA |

* This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed.
** Vibration-sensitive equipment is generally not sensitive to ground-borne noise; however, the manufacturer's specifications should be reviewed for acoustic and vibration sensitivity.

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The criteria for ground-borne vibration and noise for special land uses are presented in Table 6-4. The criteria are presented in terms of acceptable indoor ground-borne vibration and noise levels. Impact will occur if these levels are exceeded. As for the other land uses, the criteria for ground-borne vibration are expressed in terms of rms velocity levels in VdB, and criteria for ground-borne noise are expressed in terms of sound pressure levels in dBA.

**Table 6-4 Indoor Ground-Borne Vibration and Noise Impact Criteria for Special Buildings**

| Type of Building or Room | Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch/sec) | | Ground-Borne Noise Impact Levels (dBA re 20 micro-Pascals) | |
|---|---|---|---|---|
| | Frequent Events | Occasional or Infrequent Events | Frequent Events | Occasional or Infrequent Events |
| Concert halls | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| TV studios | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| Recording studios | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| Auditoriums | 72 VdB | 80 VdB | 30 dBA | 38 dBA |
| Theaters | 72 VdB | 80 VdB | 35 dBA | 43 dBA |

**3b. Consider the presence of existing vibration conditions.**
When the project will cause vibration more than 5 dB above the existing vibration, the existing source can be ignored, and the standard vibration criteria in Step 3a are appropriate. When the project will cause vibration less than 5 dB above the existing vibration level, use the instructions presented in this section to determine the appropriate impact criteria for the project. For information on characterizing existing vibration conditions, see Section 6.2, Step 3.

Use Table 6-5 and Figure 6-1 to determine the appropriate impact criteria. Sources of existing vibration are typically longer in duration than the events introduced into the environment due to the project. The frequency of use in the rail corridor is also a factor in characterizing the existing conditions. Both factors are considered in the process of determining appropriate impact criteria in Table 6-5 and Figure 6-1.
Examples of projects considering the existing vibration conditions in Table 6-5 and Figure 6-1 include:

- An automated people mover system planned for a corridor with an existing rapid transit service with 220 trains per day that did not have a significant increase in events from the existing 220 trains per day and that is not 3 dB above the existing vibration level would cause no additional impact.
- Where a new commuter rail line shares a heavily-used corridor with a rapid transit system, the project vibration exceeds the existing vibration level, there is not a significant increase in the number of events, and the project vibration exceeds the existing vibration level by 3 dB or more, the projected vibration levels must be evaluated using the standard impact criteria to determine impact.
- If a new transit project will use an existing railroad ROW and the location of existing railroad tracks are shifted, existing vibration can be substantial. The track relocation and reconstruction can result in lower vibration levels that would benefit the receivers and not introduce any adverse impact. However, if the track relocation causes higher vibration levels at vibration-sensitive receivers, then the projected vibration levels must be evaluated using the standard impact criteria to determine impact.

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**Table 6-5 Impact Criteria Considering Existing Conditions**

| Category | Number of Operations (At present – without project) | Criteria |
|---|---|---|
| Heavily Used | More than 12 trains per day | Use the standard vibration criteria in Section 6.2, Step 3a for the following scenarios:<br>▪ The existing vibration does not exceed the standard vibration criteria.<br>▪ The existing vibration exceeds the standard vibration criteria and there is a significant increase in events.*<br>▪ The existing vibration exceeds the standard vibration criteria, and the project vibration is 3 dB or more above the existing vibration.<br>The project has no impact if the existing vibration exceeds the standard vibration criteria, the number of events does not increase significantly, and the project vibration does not exceed the existing vibration by 3 dB or more. |
| Moderately Used | 5 – 12 trains per day | Use the standard vibration criteria in Section 6.2 Step 3a for the following scenarios:<br>▪ The existing vibration does not exceed the standard vibration criteria.<br>▪ The existing vibration exceeds the standard vibration criteria, and the project vibration is not 5 dB or more below the existing vibration.<br>The project has no impact if the existing vibration exceeds the standard vibration criteria and the project vibration is at least 5 dB below the existing vibration. |
| Infrequently Used | Fewer than 5 trains per day | The standard vibration criteria in Section 6.2, Step 3a apply. |

* Approximately doubling the number of events is required for a significant increase.

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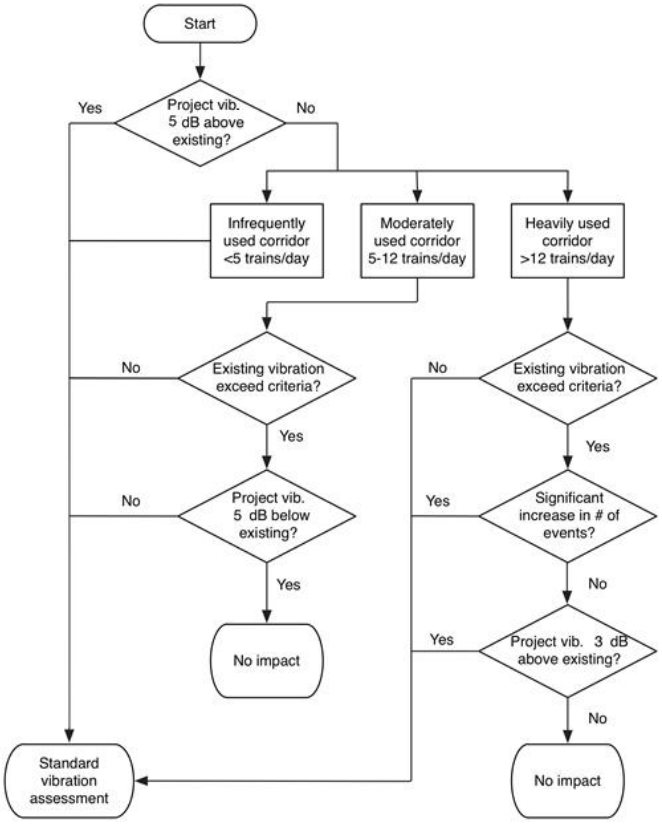


**Figure 6-1 Existing Vibration[xii] Criteria Flow Chart**

**3c. Apply criteria to freight trains if part of the project.**
Use the criteria presented in Step 3a to assess the vibration from freight trains in shared ROW scenarios because no specific impact criteria exist for freight railroads. It is important to consider that freight operations occur over substantially greater distances than passenger train operations and have different weight and axle loads.

When assessing vibration from freight train operations, consider the locomotive and rail car vibration separately. Since locomotive vibration lasts for a very short time, it can be characterized by the infrequent events category in Table 6-2. Rail car vibration from a typical line-haul freight train usually lasts for several minutes and can be characterized by the frequent events category in Table 6-2. Note

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[xii] Vibration is abbreviated as "vib." in this flowchart.

that locomotives often create vibration levels that are 3 to 8 dB higher than those created by rail cars.

Use good engineering judgment to confirm the approach is reasonable for each project. For example, some spur rail lines carry very little rail traffic (sometimes only one train per week) or have short trains, in which case it may not be necessary to evaluate for impact. If there is uncertainty in how to determine the appropriate criteria, contact the FTA Regional office.

Decisions to relocate freight tracks closer to vibration-sensitive sites should be made with the understanding that increased vibration due to freight rail may not be possible to mitigate. Freight rail vibration may not always be successfully mitigated by the same methods as rail transit systems.

### Option B: Vibration Impact Criteria for a Detailed Vibration Analysis

Determine the appropriate impact criteria for ground-borne vibration and ground-borne noise for a Detailed Vibration Analysis.

### Step 1: Ground-Borne Vibration

*Choose the appropriate criteria based on Figure 6-2 and Table 6-6.*

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Ground-borne vibration criteria presented in this section are more detailed than in the General Vibration Assessment. The criteria are based on international standards for the effects of vibration on people related to annoyance and interference with activities in buildings[39] as well as industry standards for vibration-sensitive equipment.[46] The criteria in this section are used to assess the potential for interference or annoyance from building response and to determine performance of vibration reduction methods. Note that for highly-sensitive equipment, specific vibration criteria provided by the manufacturer supersede the criteria in this section.

The criteria are presented by category in Figure 6-2 and are defined by international and industry standards.[39][46] These criteria define limits for acceptable maximum rms vibration velocity level with a one-second averaging time at the floor of the receiving building in terms of a one-third octave band frequency spectrum. Band levels that exceed a particular criterion curve indicate impact; and therefore, mitigation options should be evaluated considering the specific frequency range in which the treatment is most effective. Interpretations of the criteria are presented in Table 6-6.

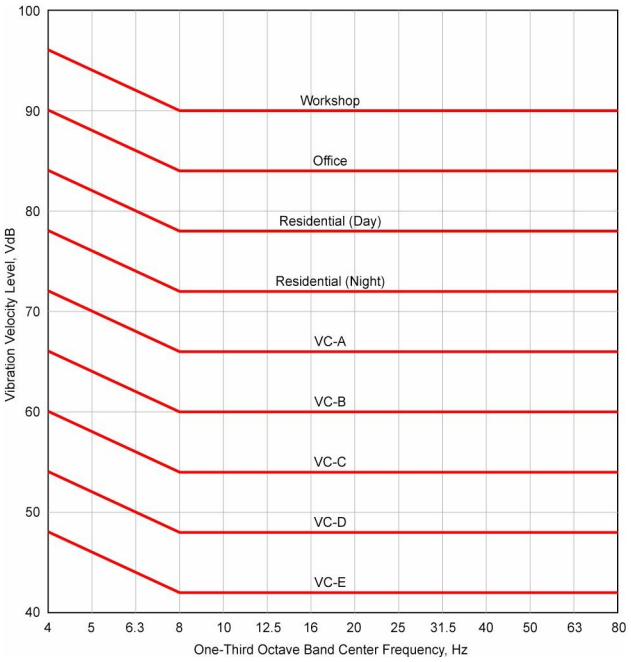


**Figure 6-2 Criteria for Detailed Vibration Analysis**

**Table 6-6 Interpretation of Vibration Criteria for Detailed Vibration Analysis**

| Criterion Curve | Max Lv,* VdB | Description of Use |
|---|---|---|
| Workshop (ISO) | 90 | Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration. |
| Office (ISO) | 84 | Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration. |
| Residential Day (ISO) | 78 | Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20X). |
| Residential Night, Operating Rooms (ISO) | 72 | Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power optical microscopes (100X) and other equipment of low sensitivity. |
| VC-A | 66 | Adequate for medium- to high-power optical microscopes (400X), microbalances, optical balances, and similar specialized equipment. |
| VC-B | 60 | Adequate for high-power optical microscopes (1000X) and inspection and lithography equipment to 3-micron line widths. |
| VC-C | 54 | Appropriate for most lithography and inspection equipment to 1-micron detail size. |
| VC-D | 48 | Suitable in most instances for the most demanding equipment, including electron microscopes operating to the limits of their capabilities. |
| VC-E | 42 | The most demanding criterion for extremely vibration-sensitive equipment. |

* As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hz.

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In addition to the uses described in Table 6-6, the detailed vibration criteria can be applied to the three land use categories presented in Table 6-3.

- For residential land uses (category 2), use the residential night criterion curve in Table 6-6.
- For institutional uses (category 3), use the residential day criterion curve in Table 6-6.
- For category 1, the specific use of the building should be matched to the appropriate criterion curve in Table 6-6.
- For special buildings, such as those found in Table 6-4, either the criteria in Table 6-4 or specific criteria presented by the building operator should be used.

These criteria use a frequency spectrum because vibration-related problems generally occur due to resonances of the structural components of a building or vibration-sensitive equipment. Resonant response is frequency-dependent. A Detailed Vibration Analysis can provide an assessment that identifies potential problems resulting from resonances.

The detailed vibration criteria are based on generic cases when people are standing or equipment is mounted on the floor in a conventional manner. Consequently, the criteria are less stringent at very low frequencies below 8 Hz. Where special vibration isolation has been provided in the form of pneumatic isolators, the resonant frequency of the isolation system is very low. Consequently, in this special case, the curves may be extended flat at lower frequencies.

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### Step 2: Ground-borne Noise

Ground-borne noise impacts are assessed based on criteria for human annoyance and activity interference. The Detailed Vibration Analysis procedure provides vibration spectra inside a building. To evaluate ground-borne noise, convert these vibration spectra to sound pressure level spectra in the occupied spaces using the method described in Section 6.5 and compare to the criteria as follows:

- For residential buildings, use the criteria presented in Table 6-3.
- For special buildings listed in Table 6-4, A-weighted noise may not be sufficient to assess activity interference for a Detailed Vibration Analysis. Each special building may have a unique specification for acceptable noise levels and criteria must be determined on a case-by-case basis. For example, a recording studio may have stringent requirements for allowable noise in each frequency band.

## 6.3 Evaluate Impact: Vibration Screening Procedure

*Determine the potential for impact using the Vibration Screening Procedure by identifying any vibration-sensitive land uses (Table 6-1) within the appropriate screening distance.*

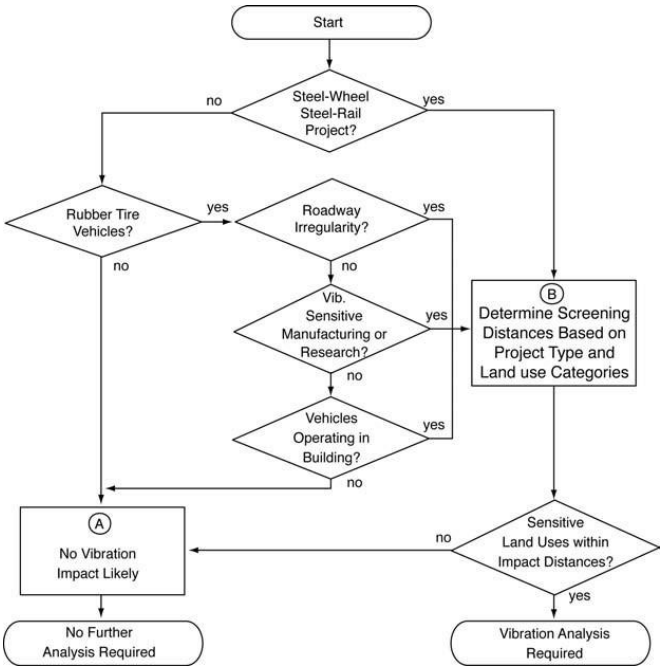


**Figure 6-3 Flow Chart of Vibration Screening Process**

## Step 1: Classify Project Vehicles

*Determine the project type and the next step based on the guidelines below.*

**Option A: No Vehicles** – Transit projects that do not involve vehicles do not have potential for vibration impact and do not require further analysis (Box A in Figure 6-3).

Many smaller FTA-funded projects, such as bus terminals, park-and-ride lots, and station rehabilitation are in this category, and do not require further analysis of ground-borne vibration impact. However, if track systems are modified (e.g., tracks moved or switches modified), *proceed to Step 2***.**

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**Option B: Steel-wheeled/Steel-rail Vehicles** – Transit projects with steel-wheeled/steel-rail vehicles have potential for vibration impact (Box B in Figure 6-3); *proceed to Step 2*. These rail systems include urban rapid transit, LRT, commuter rail, and steel-wheel intermediate capacity transit (ICT) systems.

**Option C: Rubber-tire Vehicles** – For projects that involve rubber-tire vehicles and do not meet the following conditions, vibration impact is unlikely, and no further analysis is needed. *Proceed to Step 2* for projects that involve rubber-tire vehicles and meet the following conditions (Box A in Figure 6.3):

- **Roadway irregularity** – Expansion joints, speed bumps, or other design features that result in unevenness in the road surface can result in perceptible ground-borne vibration at distances up to 75 ft away.
- **Operation close to vibration-sensitive buildings** – Buses, trucks, or other heavy vehicles operating close to a vibration-sensitive building (within approximately 100 ft from the property line) may impact vibration-sensitive activities, such as research that uses electron microscopes or manufacturing of computer chips.
- **Vehicles operating within buildings** – Special considerations are often required for shared use facilities where vehicles operate inside or directly underneath buildings such bus stations located inside an office building complex.

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Cont.

## Step 2: Determine Project Type

*Determine the project type according to Table 6-7.*

**Table 6-7 Project Types for Vibration Screening Procedure**

| Project Type Number | Project Type | Description |
|---|---|---|
| 1 | Conventional Commuter Railroad | Both locomotives and passenger vehicles create vibration. For commuter trains, the highest vibration levels are typically created by the locomotives. Electric commuter rail vehicles create levels of ground-borne vibration that are comparable to electric rapid transit vehicles. |
| 2 | RRT | Ground-borne vibration impact from rapid transit trains is one of the major environmental issues for new systems. Ground-borne vibration is usually a major concern for subway operations. It is less common for at-grade and elevated rapid transit lines to create intrusive ground-borne vibration and noise since air-borne noise typically dominates. |
| 3 | LRT and Streetcars | The ground-borne vibration characteristics of light rail systems are very similar to those of rapid transit systems. Because the speeds of light rail systems are usually lower, typical vibration levels are usually lower. Steel-wheel/steel-rail AGT is included in either this category or the ICT category depending on the level of service and train speeds. |
| 4 | Intermediate Capacity Transit | Because of the low operating speeds of most ICT systems, vibration problems are not common. However, steel-wheel ICT systems that operate close to* vibration-sensitive buildings have the potential of causing intrusive vibration. With a stiff suspension system, an ICT system could create intrusive vibration. |
| 5 | Bus and Rubber-Tire Transit Projects | This category encompasses most projects that do not include steel-wheel trains of some type. Examples include diesel buses, electric trolley buses, and rubber-tired people movers. Most projects that do not include steel-wheel trains do not cause vibration impacts.** |

*See the screening distances for category 1 land uses in Table 6-8.

** Most complaints about vibration caused by buses and trucks are related to rattling of windows or items hung on the walls. These vibrations are usually the result of airborne noise and not ground-borne vibration. In the case where ground-borne vibration is the source of the complaint, the vibration can usually be attributed to irregularities in the road.

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## Step 3: Determine Screening Distance

*Determine the appropriate screening distances based on land use and project type according to Table 6-8.*

The distances are based on the criteria presented in Section 6.3, the procedures in Section 6.4 assuming normal vibration propagation, and include a 5-dB factor of safety. Even so, areas with very efficient vibration propagation can have substantially higher vibration levels.

Because of the 5-decibel safety factor, the screening distances will identify most of the potentially impacted areas, even for areas with efficient propagation. However, when there is evidence of efficient propagation, such as previous complaints about existing transit facilities or a history of problems with construction vibration, increase the distances in Table 6-8 by a factor of 1.5.

**Table 6-8 Screening Distances for Vibration Assessments**

| Type of Project | Critical Distance for Land Use Categories* Distance from ROW or Property Line, ft | | |
|---|---|---|---|
| | Land Use Cat. 1 | Land Use Cat. 2 | Land Use Cat. 3 |
| Conventional Commuter Railroad | 600 | 200 | 120 |
| RRT | 600 | 200 | 120 |
| LRT and Streetcars | 450 | 150 | 100 |
| ICT | 200 | 100 | 50 |
| Bus Projects (if not previously screened out) | 100 | 50 | -- |

*For the Vibration Screening Procedure, evaluate special buildings as follows: Category 1 - concert halls and TV studios, Category 2 - theaters and auditoriums

### Step 4: Identify Vibration-Sensitive Land Uses

Identify all vibration-sensitive land uses (Table 6-1) within the chosen screening distance. If no vibration-sensitive land uses are identified, no further vibration analysis is needed. If one or more of the vibration-sensitive land uses are in the screening distance, complete a General Vibration Assessment (Section 6.4) or a Detailed Vibration Analysis (Section 6.5).

## 6.4 Evaluate Impact: General Vibration Assessment

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*Evaluate for impact using the General Vibration Assessment procedure if the Vibration Screening Procedure (Section 6.3) identified vibration-sensitive receivers within the screening distance of the transit vibration source.*

For guidelines on when the General Vibration Assessment is appropriate, review Section 6.1.

The basic approach for the General Vibration Assessment is to define a curve or set of curves that predicts the overall ground-borne vibration as a function of distance from the source, then apply adjustments to these curves to account for factors such as vehicle speed, geologic conditions, building type, and receiver location within the building. When the vehicle type is not covered by the curves included in this section, it will be necessary to define an appropriate curve either by extrapolating from existing information or performing measurements at an existing facility.

### Step 1: Select Base Curve for Ground Surface Vibration Level

*Select a standard vibration curve to represent general vibration characteristics for the source.*

The curves presented in Figure 6-4 are based on measurements of ground-borne vibration at representative North American transit systems and can be used to represent vibration characteristics for standard transportation systems in the General Vibration Assessment.

These curves assume typical ground-borne vibration levels, equipment in good condition, and speeds of 50 mph for the rail systems and 30 mph for buses. Adjustments to account for differences in speed and geologic conditions are included in Step 2.

Select a base curve from Figure 6-4 according to the guidelines in Table 6-9. Equations for the curves in Figure 6-4 are included in Table 6-10. Additional considerations for selecting a base curve for systems not included in Table 6-9 are presented below by transit mode.

**Table 6-9 Ground Surface Vibration Level Base Curve Descriptions**

| Curve | Description |
|---|---|
| Locomotive-Powered Passenger or Freight Curve | Appropriate for vehicles powered by diesel or electric locomotives including intercity passenger trains and commuter rail trains. |
| Rapid Transit or Light Rail Vehicles Curve | Appropriate for both heavy and light-rail vehicles on at-grade and subway track. |
| Rubber-Tired Vehicles Curve | Appropriate for rubber-tire vehicles. These types of vehicles rarely create ground-borne vibration problems unless there is a discontinuity or bump in the road that causes the vibration. This curve represents the vibration level for a typical bus operating on smooth roadway. |

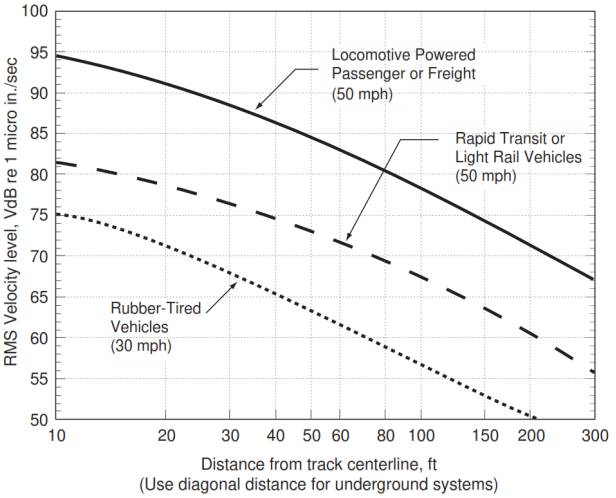


**Figure 6-4 Generalized Ground Surface Vibration Curves**

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**Table 6-10 Generalized Ground Surface Vibration Equations**

| Curve | Equation | |
|---|---|---|
| Locomotive Powered Passenger or Freight Curve | $L_v = 92.28 + 14.81\log(D) - 14.17\log(D)^2 + 1.65\log(D)^3$ | **Eq. 6-1** |
| Rapid Transit or Light Rail Vehicles Curve | $L_v = 85.88 - 1.06\log(D) - 2.32\log(D)^2 - 0.87\log(D)^3$ | **Eq. 6-2** |
| Rubber-Tired Vehicles Curve | $L_v = 66.08 + 34.28\log(D) - 30.25\log(D)^2 + 5.40\log(D)^3$ | **Eq. 6-3** |
| $L_v$ = velocity level, VdB<br>$D$ = distance, ft | | |

Considerations for selecting a base curve for different transit modes include:

- **Intercity passenger trains** – Although intercity passenger trains can be an important source of environmental vibration, it is rare that they are considered for FTA-funded projects unless a new transit mode uses an existing rail alignment. When a new transit line uses an existing rail alignment, changes in the intercity passenger traffic can result in either positive or negative impacts. Use the locomotive-powered passenger or freight curve for intercity passenger trains unless there are specific data available on the ground-borne vibration created by the new train operations.

- **Locomotive-powered commuter rail** – Use the locomotive-powered passenger or freight curve for all commuter rail system powered by either diesel or electric locomotives.

- **Electric multiple unit (EMU)** – Use the rapid transit or light rail vehicles curve for self-powered electric commuter rail trains.

- **Diesel multiple unit (DMU)** – Self-powered DMUs create vibration levels somewhere between rapid transit vehicles and locomotive-powered passenger trains. A vibration curve for DMUs can be estimated by lowering the locomotive-powered passenger or freight curve by 5 dB.

- **Subway heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for subway heavy rail and subway light rail. Although vibrations from subway and at-grade tracks have very different characteristics, the overall vibration velocity levels are comparable. When applied to subways, the rapid transit or light rail vehicles curve assumes a relatively lightweight bored concrete tunnel in soil. The vibration levels will be lower for heavier subway structures such as cut-and-cover box structures and stations.

- **At-grade heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for at-grade heavy rail or light rail. Heavy rail and LRT vehicles have similar suspension systems and axle loads and create similar levels of ground-borne vibration.

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- **Elevated guideways or aerial structures** – Vibration from operations on an elevated structure is typically not an issue unless the guideway is supported by a building or located very close to buildings. Apply the appropriate adjustment for the aerial structures (Section 6.4, Step 2).

- **Streetcars** – Use the rapid transit or light rail vehicles curve for street cars.

- **ICT** – Use the rapid transit or light rail vehicles curve for ICT systems with steel wheels and the rubber-tired vehicles curve for ICT systems with rubber tires.

- **Other vehicle types** – For less common modes such as magnetically-levitated vehicles (maglev), monorail, or AGT, use good engineering judgment to choose a standard curve to best fit the mode or if a new curve needs to be developed, as a function of distance from the track. Examples include:
  - Vibration from a rubber-tire monorail operating on aerial guideway can be approximated using the rubber-tired vehicles curve with the appropriate adjustment for the aerial structure (Section 6.4, Step 2).
  - Most of the data available on the noise and vibration characteristics of maglev vehicles comes from high-speed systems intended for inter-city service. Even though there is no direct contact between the vehicle and the guideway, the dynamic loads on the guideway can generate ground-borne vibration. Measurements on a German high-speed maglev resulted in ground-borne vibrations at 75 mph which is comparable to the base curve for rubber-tired vehicles at 30 mph.[49]

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## Step 2: Apply Adjustments

*Apply project-specific adjustments to the standard vibration curve.*

Once the base curve has been selected, use the adjustments in the following instructions to develop project-specific vibration projections at each receiver. All adjustments are given as single numbers to add to, or subtract from, the base level.

Adjustments are separated by source, path, and receiver and include speed, wheel and rail type and condition, type of track support system, type of building foundation, and number of floors above the basement level. Calculate the appropriate adjustments to the base level. An example of the General Vibration Assessment is provided at the end of this Section.

It should be recognized that many of these adjustments are strongly dependent on the frequency spectrum of the vibration source and the frequency dependence of the vibration propagation. The adjustments in this section are suitable for generalized evaluation of the vibration impact and vibration

mitigation measures because they are based on typical vibration spectra. However, these adjustments are not adequate for detailed evaluations of impact of vibration-sensitive buildings or for detailed specification of mitigation measures.

**2a.** Apply source adjustments to the base curve using Table 6-11 and the descriptions below to account for the project-specific source characteristics.

**Table 6-11 Source Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Source Factor | Adjustment to Propagation Curve | | | Comment |
|---|---|---|---|---|
| Speed | | Reference Speed | | Vibration level is approximately proportional to 20log(speed/speed$_{ref}$), see Eq. 6-4. |
| | Vehicle Speed | 50 mph | 30 mph | |
| | 60 mph | +1.6 dB | +6.0 dB | |
| | 50 mph | 0.0 dB | +4.4 dB | |
| | 40 mph | -1.9 dB | +2.5 dB | |
| | 30 mph | -4.4 dB | 0.0 dB | |
| | 20 mph | -8.0 dB | -3.5 dB | |
| **Vehicle Parameters (not additive, apply greatest value only)** | | | | |
| Vehicle with stiff primary suspension | +8 dB | | | Transit vehicles with stiff primary suspensions have been shown to create high vibration levels. Include this adjustment when the primary suspension has a vertical resonance frequency greater than 15 Hz. |
| Resilient Wheels | 0 dB | | | Resilient wheels do not generally affect ground-borne vibration except at frequencies greater than about 80 Hz. |
| Worn Wheels or Wheels with Flats | +10 dB | | | Wheel flats or wheels that are unevenly worn can cause high vibration levels. |
| **Track Conditions (not additive, apply greatest value only)** | | | | |
| Worn or Corrugated Track | +10 dB | | | Corrugated track is a common problem. Mill scale* on new rail can cause higher vibration levels until the rail has been in use for some time. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment. |
| Special Trackwork within 200 ft | +10 dB (within 100 ft)<br>+5 dB (between 100 and 200 ft) | | | Wheel impacts at special trackwork will greatly increase vibration levels. The increase will be less at greater distances from the track. Do not include an adjustment for special trackwork more than 200 ft away. |
| Jointed Track | +5 dB | | | Jointed track can cause higher vibration levels than welded track. |
| Uneven Road Surfaces | +5 dB | | | Rough roads or expansion joints are sources of increased vibration for rubber-tire transit. |
| **Track Treatments (not additive, apply greatest value only)** | | | | |
| Floating Slab Trackbed | -15 dB | | | The reduction achieved with a floating slab trackbed is strongly dependent on the frequency characteristics of the vibration. |
| Ballast Mats | -10 dB | | | Actual reduction is strongly dependent on frequency of vibration. |
| High-Resilience Fasteners | -5 dB | | | Slab track with track fasteners that are very compliant in the vertical direction can reduce vibration at frequencies greater than 40 Hz. |

*Mill scale on a new rail is a slightly corrugated condition caused by certain steel mill techniques.

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In addition to the comments in Table 6-11, use the following guidelines to select the appropriate adjustment factors. Some adjustments in the same category are not cumulative (additive) and only the greatest applicable adjustment should be applied. The adjustments that are not additive are noted in Table 6-11 and in the descriptions below. Note that some adjustments are not additive across multiple categories and are noted in the comments of Table 6-11. For example, the adjustment for a vehicle with stiff primary suspension is 8 dB, and the adjustment for wheel flats is 10 dB. If the vehicle has a stiff primary suspension and has wheel flats, the projected vibration levels should be increased by 10 dB, not 18 dB.

In addition, some vibration control measures are targeted for specific frequency ranges. The shape of the actual vibration spectra should be considered so that an appropriate vibration control measure may be selected.

- **Speed** – The levels of ground-borne vibration and noise vary, approximately, as 20 times the logarithm of speed. This means that doubling train speed will increase the vibration levels approximately 6 dB, and halving train speed will reduce the levels by 6 dB. The adjustments in Table 6-11 have been tabulated for reference vehicle speeds of 30 mph for rubber-tired vehicles and 50 mph for steel-wheel vehicles. Use the following relationship to calculate the adjustments for other speeds.

  $$Adj_{speed}\ (dB) = 20\log(\frac{speed}{speed_{ref}}) \qquad \textbf{Eq. 6-4}$$

  Variation with speed has been observed to be as low as $15\log(\frac{speed}{speed_{ref}})$, but unless specific speed data for vibration for a vehicle has been obtained, use Eq. 6-4.

- **Vehicle Parameters** – The most important factors for the vehicles are the suspension system, wheel condition, and wheel type. Most new heavy rail and light rail vehicles have relatively soft primary suspensions. However, a stiff primary suspension (vertical resonance frequency greater than 15 Hz) can result in higher levels of ground-borne vibration than soft primary suspensions. Vehicles, for which the primary suspension consists of rubber or neoprene around the axle bearing, usually have a very stiff primary suspension with a vertical resonance frequency greater than 40 Hz or more.

  Deteriorated wheel condition is another factor that increases vibration levels. It can be assumed that a new system has vehicles with wheels in good condition. When older vehicles are used on new track, it is important to consider the condition of the wheels, and it may be appropriate to include an adjustment for the wheel condition.

  Resilient wheels will reduce vibration levels at frequencies greater than the effective resonance frequency of the wheel. When this resonance

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frequency is relatively high, greater than 80 Hz, resilient wheels may only have a marginal effect on ground-borne vibration.

The adjustments in this category are not additive; apply the greatest applicable value only.

- **Track Conditions** – This category includes the type of rail (welded, jointed, or special trackwork), the track support system, and the condition of the rail. The base curves assume welded rail in good condition. Jointed rail causes higher vibration levels than welded rail and the increase depends on the condition of the joints.

  Wheel impacts at special trackwork, such as frogs at crossovers, create much higher vibration forces than typical track conditions. Because of the higher vibration levels at special trackwork, crossovers are the principal areas of vibration impact on new systems. Methods of mitigating the vibration impact include modifying the track support system, installing low-impact frogs, or relocating the crossover. Special track support systems such as ballast mats, high-resilience track fasteners, resiliently supported ties, and floating slabs have all been shown to be effective in reducing vibration levels.

  The condition of the running surface of the rails can strongly affect vibration levels. Factors such as corrugations, general wear, or mill scale on new track can cause vibration levels 5 to 15 dB higher than normal. Mill scale will typically wear away after some time in service, but the track must be ground to remove corrugations or to reduce the roughness from wear.

  Roadway surfaces in the rubber-tired vehicle base curve are assumed to be smooth. Rough washboard surfaces, bumps, or uneven expansion joints are the types of running surface defects that cause increased vibration levels over the smooth road condition.

  The adjustments in this category are not additive; apply the greatest applicable value only. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment.

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Cont.

**2b.** Apply path adjustments to the base curve using Table 6-12 and the descriptions below to account for the project-specific path characteristics.

**Table 6-12 Path Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Path Factor | Adjustment to Propagation Curve | | | Comment |
|---|---|---|---|---|
| Resiliently Supported Ties (Low-Vibration Track, LVT) | -10 dB | | | Resiliently supported tie systems have been found to provide very effective control of low-frequency vibration. |
| **Track Structure (not additive, apply greatest value only)** | | | | |
| Type of Transit Structure | Relative to at-grade tie & ballast: | | | In general, the heavier the structure, the lower the vibration levels. Putting the track in cut may reduce the vibration levels slightly. Rock-based subways generate higher-frequency vibration. |
| | Elevated structure | | -10 dB | |
| | Open cut | | 0 dB | |
| | Relative to bored subway tunnel in soil: | | | |
| | Station | | -5 dB | |
| | Cut and cover | | -3 dB | |
| | Rock-based | | -15 dB | |
| **Ground-borne Propagation Effects** | | | | |
| Geologic conditions that promote efficient vibration propagation | Efficient propagation in soil | | +10 dB | Refer to the text for guidance on identifying areas where efficient propagation is possible. |
| | Propagation in rock layer | Dist. | Adjust. | The positive adjustment accounts for the lower attenuation of vibration in rock compared to soil. It is generally more difficult to excite vibrations in rock than in soil at the source. |
| | | 50 ft | +2 dB | |
| | | 100 ft | +4 dB | |
| | | 150 ft | +6 dB | |
| | | 200 ft | +9 dB | |
| Coupling to building foundation | Wood-Frame Houses | | -5 dB | In general, the heavier the building construction, the greater the coupling loss. |
| | 1-2 Story Masonry | | -7 dB | |
| | 3-4 Story Masonry | | -10 dB | |
| | Large Masonry on Piles | | -10 dB | |
| | Large Masonry on Spread Footings | | -13 dB | |
| | Foundation in Rock | | 0 dB | |

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In addition to the comments in Table 6-12, use the following guidelines to select the appropriate adjustment factors.

- **Track Structure** – The weight and size of a transit structure affects the vibration radiated by that structure. In general, vibration levels are lower for heavier transit structures. Therefore, the vibration levels from a cut-and-cover concrete double-box subway can be assumed to be lower than the vibration from a lightweight concrete-lined bored tunnel.

  The vibration from elevated structures is lower than from at-grade track because of the mass and damping of the structure and the extra distance that the vibration must travel before it reaches the receiver. Elevated structures in AGT applications are sometimes designed to bear on building elements. This is a special case and may require detailed design considerations.

  The adjustments in this category are not additive; apply the greatest applicable value only.

- **Ground-Borne Propagation Effects – Geologic Conditions** – Although it is known that geologic conditions have a considerable effect on the vibration levels, it is rarely possible to develop more than a general understanding of the vibration propagation characteristics for a General Vibration Assessment. One of the challenges with identifying the cause of efficient propagation is the difficulty in determining whether higher than normal vibration levels are due to geologic conditions or due to special source conditions (e.g., rail corrugations or wheel flats).

  Some geologic conditions are repeatedly associated with efficient propagation. Shallow bedrock, less than 30 ft below the surface, is likely to have efficient propagation. Soil type and stiffness are also important factors in determining propagation characteristics. In particular, stiff, clayey soils, consolidated sand, gravel, and glacial till can be associated with efficient vibration propagation. Investigation of soil boring records can be used to estimate depth to bedrock and the presence of problem soil conditions.

  A conservative approach would be to use the 10-dB adjustment for efficient propagation for areas where efficient propagation is likely. However, this adjustment can greatly overstate the potential for vibration impact where efficient propagation is not present and should be applied using good judgment. Review available geological data and any complaint history from existing transit lines and major construction sites near the transit corridor to identify areas where efficient propagation is possible. If there is reason to suspect efficient propagation conditions, conduct a Detailed Vibration Analysis during the engineering phase and include vibration propagation tests at the areas with potential for efficient propagation.

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Cont.

- **Track Structure and Geologic Conditions – Examples**
  - **Subway**
    For a subway, determine if the subway will be founded in bedrock. Bedrock is considered to be hard rock. It is usually appropriate to consider soft siltstone and sandstone to be more like soil than hard rock. Whether a subway is founded in soil or rock can make a 15-dB difference in the vibration levels.

    When a subway structure is founded in rock, include the following Track Structure and Ground-borne Propagation Effects adjustments from Table 6-12:
    - Type of Transit Structure adjustment: Rock-based – 15 dB
    - Geologic Conditions adjustment: Propagation in rock layer for the appropriate distance.

    This adjustment increases with distance because vibration attenuates more slowly in rock than in the soil used as a basis for the reference curve.

- **At-grade** – When considering at-grade vibration sources, determine if the vibration propagation characteristics are typical or efficient. Efficient

vibration propagation results in vibration levels approximately 10 dB higher than typical levels. This more than doubles the potential impact zone for ground-borne vibration.

- **Ground-Borne Propagation Effects – Coupling to Building Foundation** – Since annoyance from ground-borne vibration and noise is an indoor phenomenon, the effects of the building structure on the vibration must be considered. Wood-frame buildings, such as typical residential structures, are more easily excited by ground vibration than heavier buildings. In contrast, large masonry buildings with spread footings have a low response to ground vibration.

  When a building foundation is directly on the rock layer, there is no coupling loss due to the weight and stiffness of the building. Use the standard coupling factors based on building type if there is at least a 10-foot layer of soil between the building foundation and the rock layer.

**2c.** Apply receiver adjustments to the base curve using Table 6-13 and the descriptions below to account for the project-specific receiver characteristics. The data in Table 6-13 is applicable when the building structural features are known.

For more generic cases that do not have detailed information on individual buildings, use a conservative approach and apply the following adjustments to predict indoor vibration based on the outdoor vibration, instead of using the adjustments in Table 6-13:[43][50]

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- Light-weight, wood-frame construction 1st floor: +3 dB
- Light-weight, wood-frame construction 2nd and 3rd floors: +6 dB
- Large buildings: 0 dB
- Small masonry buildings: +3 dB

**Table 6-13 Receiver Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Receiver Factor | Adjustment to Propagation Curve | | Comment |
|---|---|---|---|
| Floor-to-floor attenuation | 1 to 5 floors above grade | -2 dB/floor | This factor accounts for dispersion and attenuation of the vibration energy as it propagates through a building starting with the first suspended floor.* |
| | 5 to 10 floors above grade | -1 dB/floor | |
| Amplification due to resonances of floors, walls, and ceilings | +6 dB | | The actual amplification will vary greatly depending on the type of construction. The amplification is lower near the wall/floor and wall/ceiling intersections. |

* Floor-to-floor attenuation adjustments for the first floor assume a basement.

In addition to the comments in Table 6-13, use the following guidelines to select the appropriate adjustment factors. Note that receiver adjustments are additive.

- Vibration generally reduces in level as it propagates through a building. As indicated in Table 6-13, a 1- to 2-decibel attenuation per floor is typically appropriate.
- Resonances of the building structure, particularly the floors, will cause some amplification of the vibration. Consequently, for a wood-frame structure, the building-related adjustments nearly cancel out. Example: All adjustments for the first floor assuming a basement are: -5 dB for the coupling loss; -2 dB for the propagation from the basement to the first floor; and +6 dB for the floor amplification. The total adjustment in this case is -1 dB.

**2d.** Apply adjustments to the final adjusted curve using Table 6-14 and the descriptions below to convert ground-borne vibration levels to ground-borne noise levels.

**Table 6-14 Conversion to Ground-borne Noise**

| Conversion to Ground-borne Noise | | | |
|---|---|---|---|
| Noise Level in dBA | Peak frequency of ground vibration: | | Use these adjustments to estimate the A-weighted sound level given the average vibration velocity level of the room surfaces. See text for guidelines for selecting low-, mid-, or high-frequency characteristics. Use the high-frequency adjustment for subway tunnels in rock or if the dominant frequencies of the vibration spectrum are known to be 60 Hz or greater. |
| | Low frequency (<30 Hz) | -50 dB | |
| | Mid Frequency (peak 30 to 60 Hz) | -35 dB | |
| | High frequency (>60 Hz) | -20 dB | |

Estimate the levels of radiated noise using the average vibration amplitude of the room surfaces (floors, walls, and ceiling), and the total acoustical absorption in the room.

The un-weighted sound pressure level is approximately 5 dB[37][43] less than the vibration velocity level when the velocity level is referenced to $1 \times 10^{-6}$ inches/sec; but for a better estimate, it is necessary to consider general frequency ranges. Since ground-borne noise is A-weighted, the adjustments vary by frequency range, as described below. See Appendix B.1.4.1 for more information on A-weighting.

To select the appropriate adjustment, classify the frequency characteristics according to the guidelines below.

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- **Low Frequency (<30 Hz)** – Low-frequency vibration characteristics can be assumed for the following conditions:
  - Subways surrounded by cohesionless sandy soil
  - Vibration isolation track support systems
  - Most surface track

- **Mid Frequency (peak 30 to 60 Hz)** – The mid-frequency vibration characteristic can be assumed for the following conditions:
  - Subways, unless other information indicates that one of the other assumptions is appropriate,
  - Surface track when the soil is very stiff with high clay content

- **High Frequency (>60 Hz)** – High-frequency characteristics can be assumed for the following conditions:
  - Subways with the transit structure founded in rock
  - Subways, when there is very stiff, clayey soil

## Step 3: Inventory of Vibration Impact

*Take inventory of vibration-sensitive land uses with impact and determine if a Detailed Vibration Analysis is required.*

Compare the projected vibration levels, including all appropriate adjustments in Section 6.4, Step 2, to the criteria to determine if impact from ground-borne vibration or noise is likely. Note that for any transit mode, variation in vibration levels under apparently similar conditions is not uncommon. In the General Vibration Assessment, it is preferable to make a conservative assessment of the impact and include buildings that may ultimately not be subject to impact.

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The standard curves in Section 6.4, Step 1, represent the upper range of vibration levels from well-maintained systems. Although actual levels fluctuate widely, it is rare that ground-borne vibration will exceed these curves by more than 1 or 2 dB unless there are extenuating circumstances such as wheel- or running-surface defects. However, because actual levels of ground-borne vibration will sometimes differ substantially from the projections, use the following guidelines to interpret vibration impact:

- **Projected vibration is below the impact threshold** – Vibration impact is unlikely, and the environmental document should state this.

- **Projected ground-borne vibration is 0 to 5 dB greater than the impact threshold** – There is a strong chance that actual ground-borne vibration levels will be below the impact threshold. The environmental document should report impact at these locations as exceeding the applicable threshold, present possible mitigation measures and costs, and commit to conducting more detailed studies to refine the vibration impact analysis during the engineering phase. During the Detailed Vibration Analysis, determine appropriate mitigation, if necessary. A site-specific Detailed Vibration Analysis may show that vibration impacts will not occur and control measures are not needed.

- **Projected ground-borne vibration is 5 dB or greater than the impact threshold** – Vibration impact is probable and Detailed Vibration Analysis must be conducted during the engineering phase to determine appropriate vibration control measures. The environmental document should report impact at these locations as exceeding the applicable threshold, present possible mitigation measures and costs, and commit to conducting more detailed studies to refine the vibration impact analysis during the engineering phase. During the Detailed Vibration Analysis, determine appropriate mitigation, if necessary. A site-specific, Detailed Vibration Analysis may show that very costly vibration mitigation must be incorporated into the project to eliminate the impacts.

FTA recommends the reporting of a vibration level as a single value and not as a range, as ranges tend to confuse the interpretation of impact.

Express the results of the General Vibration Assessment in terms of an inventory with the following components:

- Include all vibration-sensitive land uses as identified in the Vibration Screening Procedure.
- Organize the inventory according to the categories described in Table 6-8.
- Include information on potentially feasible mitigation measures to reduce vibration to acceptable levels based on the generalized reduction estimates provided in this section. To be considered feasible, the measure or combination of measures must provide at least a 5-dB reduction of the vibration levels and be reasonable in terms of cost.

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These potential mitigation measures are considered preliminary. Final vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done; see Section 6.5 for more information. Vibration control is frequency-dependent; therefore, specific recommendations of vibration control measures can only be made after evaluating the frequency characteristics of the vibration.

## Example 6-1 General Vibration Assessment – LRT

**General Vibration Assessment for an LRT project**

The hypothetical project is a LRT system that operates at 40 mph on at-grade, ballast and tie track with welded rail. The first floor of houses is at 125 ft from the LRT tracks and there is efficient propagation through the soil. The houses are constructed with wood frames. The houses will be exposed to 260 train passbys per day. Calculate the ground-borne vibration and assess for impact.

**Select Base Curve for Ground Surface Vibration**

Determine the appropriate base curve and the RMS velocity level ($L_v$).

According to Table 6-9, the Rapid Transit or Light Rail Vehicles curve is appropriate.

$L_v = 65\ VdB$ at 125 ft for this curve at 50 mph

**Apply Adjustments**

Apply the appropriate source adjustments using Table 6-11.

$$Source\ Speed\ Adjustment = 20\log\left(\frac{40}{50}\right) = -1.9\ dB$$
$$L_v = 65 - 1.9 = 63.1\ VdB$$

Apply the appropriate path adjustments using Table 6-12.

$$Efficient\ propagation = +10\ dB$$
$$Coupling\ to\ building\ foundation\ (wood\ frame) = -5\ dB$$
$$L_v = 63.1 + 10 - 5 = 68.1\ VdB$$

Apply the appropriate receiver adjustments using Table 6-13.

$$Amplification\ due\ to\ resonance\ of\ floor = +6\ dB$$
$$First\ floor\ attenuation = -2\ dB$$
$$L_v = 68.1 + 6 - 2 = 72.1\ VdB$$

**Assess for Impact**
Because there are more than 70 events per day, this project is in the Frequent Events category (Table 6-2). For category 2 land uses (residences) with frequent events, the impact criteria is 72 VdB (Table 6-3). Therefore, according to the General Vibration Assessment, there is potential for impact and a Detailed Vibration Analysis should be completed.

## 6.5 Evaluate Impact: Detailed Vibration Analysis

*Evaluate for impact using the Detailed Vibration Analysis procedure, if appropriate (Section 6.1).*

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The goal of the Detailed Vibration Analysis is to use all available tools to develop accurate projections of potential ground-borne vibration impact and when necessary, to design mitigation measures. A Detailed Vibration Analysis requires developing estimates of the frequency components of the vibration signal, usually in terms of 1/3-octave-band spectra. The analytical techniques for solving vibration problems are complex, and the technology continually advances. Therefore, the approach presented in this section focuses on the key steps for these analyses. The key elements of the Detailed Vibration Analysis procedure and recommended steps are described below.

The methods in this section generally assume a steel-wheel/rail system. The procedures could be adapted to bus systems. However, this is rarely necessary because vibration impact is very infrequent with rubber-tired transit.

In general, when situations arise that are not explicitly covered in the Detailed Vibration Analysis, professional judgment may be used to extend these methods to cover these unique cases, when appropriate. Appendix G provides information on developing and using non-standard modeling procedures.

### Step 1: Characterize Existing Vibration Conditions

*Conduct measurements to survey and document the existing vibration conditions.*

In contrast to noise impact analysis, the existing ambient vibration is not required to assess vibration impact in most cases; but, it is important to

document general background vibration in the project corridor. Because the existing environmental vibration is usually below human perception, a limited vibration survey is sufficient even for a Detailed Vibration Analysis.

It is particularly valuable to survey vibration conditions at sensitive locations for the following reasons:

- To obtain valuable information on the true sensitivity of the activity to external vibration and obtain a reference condition under which vibration is not problematic.
- To document that existing vibration levels are above or below the normal threshold of human perception for the existing condition.
- To document levels of vibration created by existing rail lines. If vibration from an existing rail line is higher than the proposed train, there may not be impact even if the standard impact criteria are exceeded.
- To use existing vibration sources to characterize propagation. Existing vibration sources such as freight trains, industrial processes, quarrying operations, or normal traffic can be used to characterize vibration propagation. Carefully designed and performed measurements may eliminate the need for more complex propagation tests. See Appendix G for information on using non-standard modeling procedures.
- To identify the potential for efficient vibration propagation. If a measurement site has existing vibration approaching the range of human perception (e.g., the maximum vibration velocity levels are greater than about 65 VdB), then this site should be carefully evaluated for the possibility of efficient vibration propagation.

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Cont.

Conduct measurements to characterize existing vibration conditions. The goal of most ambient vibration measurements is to characterize the rms vertical vibration velocity level at the ground surface. In almost all cases, it is sufficient to measure only vertical vibration and ignore the transverse components of the vibration. Although transverse components[51] can transmit vibration energy into a building, the vertical component typically dominates.

**1a. Choose Measurement Locations** – Conduct outdoor and/or indoor measurements to characterize existing vibration conditions, as appropriate, for the project. Although ground-borne vibration is almost exclusively a problem inside buildings, it is generally recommended to perform measurements outdoors because equipment inside the building may cause more vibration than exterior sources. Additionally, the building structure and the resonances of the building can have strong effects on the vibration that are difficult to predict. It can also be important to measure and document those indoor sources of vibration. These indoor sources may cause vibration greater than that due to external sources like street traffic or aircraft overflights. When measuring (indoor) floor vibration, take measurements near the center of a floor span where the vibration amplitudes are the highest.

**1b. Measurement Considerations**

- **Site selection** – Selecting sites for an ambient vibration survey requires good judgment. Sites selected to characterize a transit corridor should be distributed along the entire project where potential for impacts have been identified and should be representative of the types of vibration environments found in the corridor. This would commonly include:
  - Measurements in quiet, residential areas removed from major traffic arterials to characterize low-ambient vibration areas;
  - Measurements along major traffic arterials and highways or freeways to characterize high-ambient vibration areas;
  - Measurements in any area with vibration-sensitive activities; and
  - Measurements at any major existing source of vibration such as railroad lines.

- **Transducer placement** – Place the transducers near the building setback line. For ambient measurements along railroad lines, it is recommended to include:
  - Multiple sites at several distances from the rail line at each site, and
  - 4 to 10 train passbys for each test.

  Because of the irregular schedule for freight trains and the low number of operations each day, it is often impractical to perform tests at more than two or three sites along the rail line or to measure more than two or three passbys at each site.

  Rail type and condition strongly affect the vibration levels. Consequently, it is important to inspect the track to locate any switches, bad rail joints, corrugations, or other factors that could be responsible for higher than normal vibration levels. Locations with these kinds of irregularities should be represented in addition to locations with rail in better condition.

- **Transducer mounting methods** – The way a transducer is mounted can affect the measured levels of ground-borne vibration.
  - Straightforward methods of mounting transducers on the ground surface or on pavement are adequate for vertical vibration measurements for the frequencies of concern for ground-borne vibration (less than about 200 Hz).
  - Quick-drying epoxy, clay, or beeswax can be used to mount transducers to smooth paved surfaces or metal stakes driven into the ground.
  - Rough concrete or rock surfaces require special mountings. One approach is to use a liberal base of epoxy to attach small aluminum blocks to the surface, and then mount the transducers on the aluminum blocks.
  - When in doubt, review the specific transducer documentation and discuss additional mounting guidance with the transducer manufacturer.

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**1c. Existing Vibration Characterization** – The appropriate methods of characterizing ambient vibration are dependent on the type of information required for the analysis. Consider the following when characterizing the existing vibration:

- **Ambient vibration** – Ambient vibration is usually characterized with a continuous 10- to 30-minute measurement of vibration. The rms velocity level of the vibration velocity level over the measurement period provides an indication of the average vibration energy. The rms velocity level over the measurement period is typically equivalent to a long averaging time rms level.

- **Specific events** – Characterize specific events such as train passbys by the rms level over the time that the train passes by. If the locomotives produce vibration levels more than 5 dB higher than the passenger or freight cars, obtain a separate rms level for the locomotives. The locomotives can usually be characterized by the $L_{max}$ during the train passby. The rms averaging time or time constant should be 1 second when determining $L_{max}$. In some cases, it may be adequate to characterize the train passby using $L_{max}$, which is simpler to obtain than the rms averaged over the entire train passby.

- **Spectral analysis** – Perform a spectral analysis of vibration propagation data. For example, if vibration transmission of the ground is suspected of having particular frequency characteristics, use 1/3-octave band charts to describe vibration behavior. Narrowband spectra also can be valuable, particularly for identifying discrete frequency components and designing specific mitigation measures.

  Note that it is preferred to characterize existing vibration in terms of the rms velocity level instead of the peak PPV, which is commonly used to monitor construction vibration. As discussed in Section 5.1, rms velocity is considered more appropriate than PPV for describing human response to building vibration.

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## Step 2: Estimate Vibration Impact

*Estimate ground-borne vibration and noise at sites where significant impact is probable and assess for impact.*

Predicting ground-borne vibration associated with a transportation project continues to be a developing field. Because ground-borne vibration is a complex phenomenon that is difficult to model and predict accurately, most projection procedures that have been used for transit projects rely on empirical data.

The procedure described in this section is based on site-specific tests of vibration propagation. This procedure was developed under a FTA-funded research contract[52] and is recommended for detailed evaluations of ground-borne vibration. Other approaches to a prediction procedure, such as finite element methods, can be used. See Appendix G for information on using non-standard modeling procedures.

**Overview of Prediction Procedure** – This procedure was developed to allow the use of data collected in one location to accurately predict vibration levels in another site where the geologic conditions may be completely different. The procedure is based on transfer mobility. Transfer mobility is the complex velocity response produced by a point force as a function of frequency. It represents the relationship between a vibration source that excites the ground and the resulting vibration of the ground surface. It is a function of both frequency and distance from the source. The analyses in this manual focus on transfer mobility magnitude, which is the magnitude for the velocity relative to the force without reference to phase. The transfer mobility level is the level in decibels relative to 1E-6 in/lb-s.

The transfer mobility measured at an existing transit system is used to normalize ground-borne vibration data and remove the effects of geology. The normalized vibration is referred to as the force density. Force density is the force per root distance along the track in $lb/ft^{1/2}$. The force density can be combined with transfer mobility measurements at vibration-sensitive sites along a new project to develop projections of future ground-borne vibration.

The transfer mobility between two points completely defines the composite vibration propagation characteristics between the two points. In most practical cases, receivers are close enough to the train tracks that the vibration cannot be considered as originating from a single point. Therefore, the vibration source must be modeled as a line-source. Consequently, the point transfer mobility must be modified to account for a line-source. The subsequent line-source transfer mobility is given in units of decibels relative to 1e-6 in/s/lb/sqrt(ft).

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Cont.

The prediction procedure considers ground-borne vibration to be divided into several basic components described below and shown in Figure 6-5.

- **Excitation Force (Force Density)** – The vibration energy is created by oscillatory and impulsive forces. Steel wheels rolling on smooth steel rails create random oscillatory forces. When a wheel encounters a discontinuity such as a rail joint, an impulsive force is created. The force excites the transit structure, such as the subway tunnel or the ballast for at-grade track.

  In the prediction method, the combination of the actual force generated at the wheel/rail interface and the vibration of the transit structure are usually combined into an equivalent force density level. The force density level is the level in decibels of the force density relative to 1 $lb/ft^{1/2}$ and describes the force that excites the soil/rock surrounding the transit structure.

- **Vibration Propagation (Transfer Mobility)** – The vibration of the transit structure causes vibration waves in the soil that propagate away from the transit structure. The vibration energy can propagate through the soil or rock in a variety of wave forms. All ground vibration includes shear and compression waves. Rayleigh waves [49] are also created and propagate along the ground surface. These Rayleigh waves can be a

major carrier of vibration energy. The mathematical modeling of vibration is complicated when there are soil strata with different elastic properties, which is common. As indicated in Figure 6-5, the propagation through the soil/rock is modeled using the transfer mobility, which is usually determined experimentally.

The combination of the force density level and the transfer mobility is used to predict the ground- surface vibration. This is the major difference from the General Vibration Assessment, which generalizes estimates of the ground-borne vibration.

- **Building Vibration** – When the ground vibration excites a building foundation, it sets the building into vibratory motion and vibration waves propagate throughout the building structure. The interaction between the ground and the foundation causes some reduction in vibration levels. The amount of reduction is dependent on the mass and stiffness of the foundation. The more massive the foundation, the lower the response to ground vibration. As the vibration waves propagate through the building, they can create vibration that can be felt and cause windows and household items to rattle.

- **Audible Noise** – In addition to vibration that can be felt, the vibration of room surfaces radiates low-frequency sound that may be audible. The sound level is affected by the amount of acoustical absorption in the receiver room.

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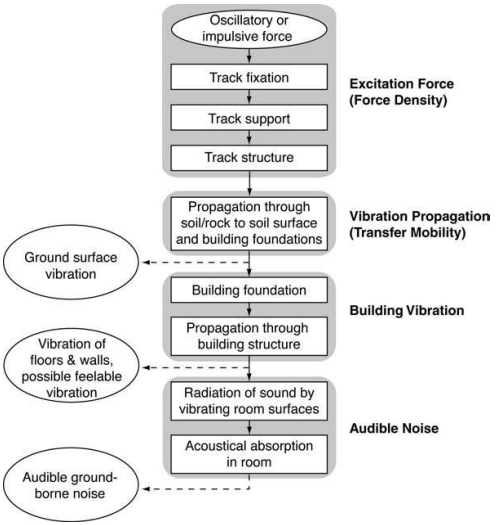


**Figure 6-5 Ground-Borne Vibration and Noise Model**

A fundamental assumption of the prediction approach outlined in this section is that the force density, transfer mobility, and the building coupling to the ground are all independent factors. The following equations are the basis for the

prediction procedure, where all of the quantities are one-third octave band spectral levels in decibels with consistent reference values:

$$L_v = FDL + LSTM + C_{build} \quad \textbf{Eq. 6-5}$$

$$L_A = L_v + K_{rad} + K_{A-wt} \quad \textbf{Eq. 6-6}$$

where:

$L_v$ = rms vibration velocity level in VdB
$FDL$ = force density level in dB for a line vibration source such as a train
$LSTM$ = line-source transfer mobility level in dB from the tracks to the sensitive site
$C_{build}$ = adjustments to account for ground-building foundation interaction and attenuation of vibration amplitudes as vibration propagates through buildings
$L_A$ = A-weighted sound level
$K_{rad}$ = adjustment to account for conversion from vibration to sound pressure level including accounting for the amount of acoustical absorption inside the room. A value of -5 dB can be used for $K_{rad}$ for typical residential rooms when the decibel reference value for $L_v$ is 1 micro in/sec [37][50]
$K_{A-wt}$ = A-weighting adjustment at the 1/3-octave band center frequency

All of the quantities given above are functions of frequency, and the standard approach is to develop projections on a 1/3-octave band basis using the average values for each 1/3-octave band. The end results of the analysis are the 1/3-octave band spectra of the ground-borne vibration and the ground-borne noise.

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The spectra are then compared to the vibration criteria for the Detailed Vibration Analysis. The A-weighted ground-borne noise level can be calculated from the vibration spectrum and compared to the criteria. This more detailed approach differs from the General Vibration Assessment, where the overall vibration velocity level and A-weighted sound level are predicted without any consideration of the particular frequency characteristics of the propagation path.

The key steps in obtaining quantities for Eq. 6-5 and Eq. 6-6 are presented in the following steps and include:

**Step 2a.** Estimate force density
**Step 2b.** Measure the point-source transfer mobility
**Step 2c.** Estimate line-source transfer mobility
**Step 2d.** Project ground-borne vibration and ground-borne noise

**2a. Estimate Force Density** – The estimate of force density can be based on previous measurements or a special test program can be designed to measure the force density at an existing facility.

If no suitable measurements are available, conduct testing at a transit facility with equipment similar to the planned vehicles. Adjustments for factors such as train speed, track support system, and vehicle suspension may be needed to match the force density to the conditions at a specific site. Review the report

"State-of- the-Art Review: Prediction and Control of Ground-Borne Noise and Vibration from Rail Transit Trains" [41] for examples of appropriate adjustments.

Force density is not a quantity that can be measured directly; it must be inferred from measurements of transfer mobility and train vibration at the same site. To derive force density, the best results are achieved by deriving line-source transfer mobility from a line of impacts. The standard approach is to average the force density from measurements at three or more positions at one site. If feasible, it is recommended to take measurements at more than one site and at multiple speeds.

If no suitable measurements are available, see Steps 2b and 2c for guidelines on obtaining line-source transfer mobility.

The force density for each 1/3-octave band is as follows:

$$FDL = L_v - LSTM \quad \textbf{Eq. 6-7}$$

where:

$FDL$ = force density level in dB
$L_v$ = measured train ground-borne vibration level in VdB
$LSTM$ = line-source transfer mobility level in dB

Figure 6-6 shows example trackbed force densities in decibels relative to 1 lb/(ft)$^{1/2}$. These force densities were developed from measurements of vibration from heavy and LRT vehicles and represent an incoherent line of vibration force equal to the length of transit trains. This figure provides a comparison of the vibration forces from heavy commuter trains and LRT vehicles with different types of primary suspensions, illustrating the range of vibration forces commonly experienced in a transit system. A force density of a vehicle includes the characteristics of its track support system at the measurement site. Adjustments must be applied to the force density to account for differences between the facility where the force density was measured and the new system being analyzed.

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Figure 6-7 shows typical force densities for rail transit vehicles at 40 mph on ballast and tie tracks, which are approximately within the tolerances shown in Figure 6-6. The force densities should be applied very carefully for other track types and speeds. The embedded tracks, although considerably stiffer than ballast and tie tracks, are expected to show similar force density levels.[53] The curves in Figure 6-7 should also be applied with caution for newer generations of light rail vehicles as well as vehicles that utilize direct fixation tracks. The preferred approach for vibration predictions would be to perform force density measurements at a system with vehicles and operations that are similar to those of the future project.

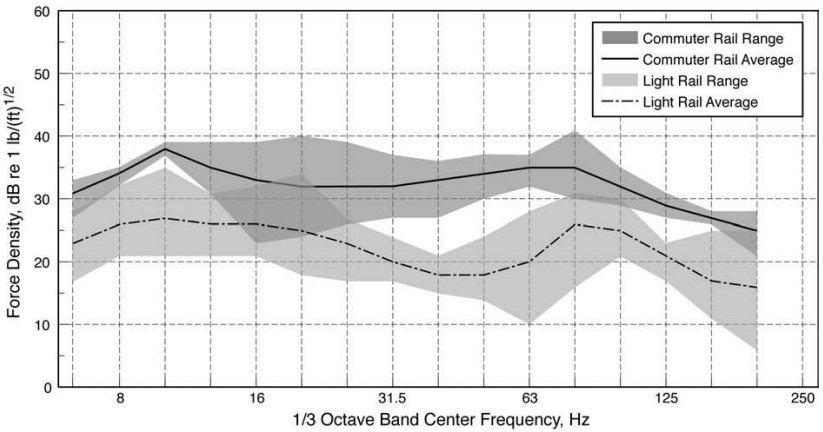


**Figure 6-6 Typical Force Densities for Rail Transit Vehicles, 40 mph**

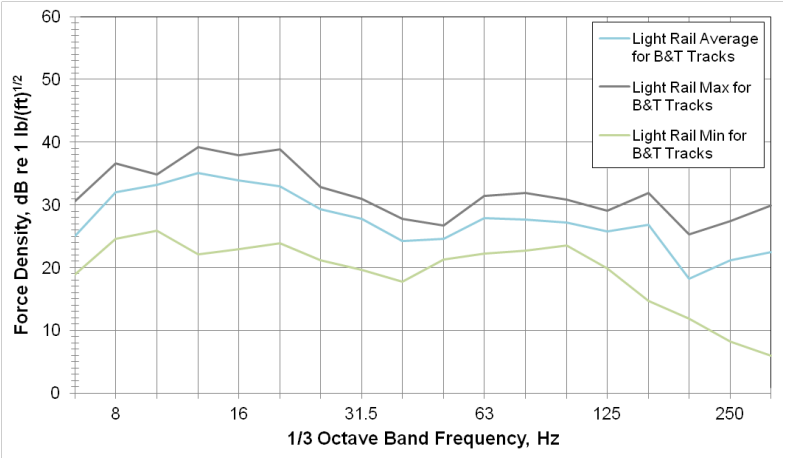


**Figure 6-7 Typical Force Densities for LRT Vehicles, 40 mph**

**2b. Measure Point-Source Transfer Mobility** – Using the appropriate instrumentation, measure point-source transfer mobility for sources with short lengths, such as buses or single car vehicles or columns supporting elevated structures. For longer vehicles, see Section 2c for a discussion of measuring line-source transfer mobilities.

The test procedure to measure point-source transfer mobility consists of impacting the ground by dropping a heavy weight and measuring the force into the ground and the response at several distances from the impact. Other excitation sources may include swept sine, sine-dwell, random vibration, and maximum length sequence. The goal of the test is to create vibration pulses that

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travel from the source to the receiver using the same path that will be taken by the transit system vibration.

Figure 6-8 illustrates the field procedure for measuring both at-grade and subway testing of transfer mobility. A weight is dropped from a height of 3 to 4 ft onto a force transducer. The responses of the force and vibration transducers are recorded on a multichannel recorder for later analysis in the laboratory. An alternative approach is to set up the analysis equipment in the field and capture the signals directly. This complicates the field testing, but eliminates the laboratory analysis of recorded data.

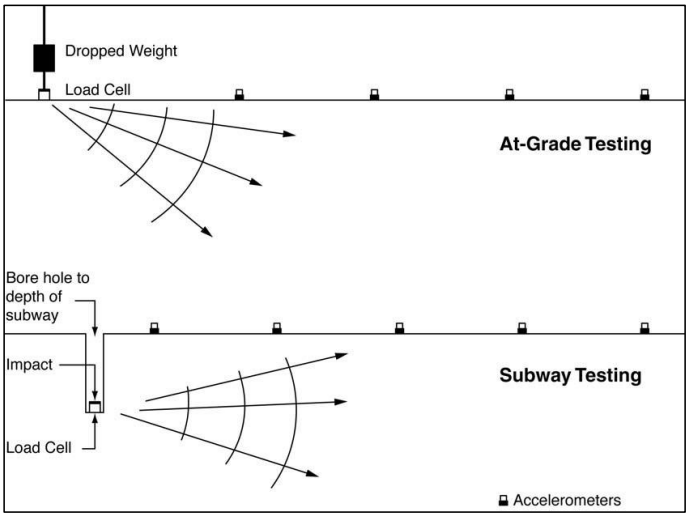


**Figure 6-8 Test Configuration for Measuring Transfer Mobility**

When the procedure is applied to subways, the force must be located at the approximate depth of the subway. This is done by drilling a bore hole and locating the force transducer at the bottom of the hole. The tests are usually performed while the bore holes are drilled to allow for the use of the soil-sampling equipment on the drill rig for the transfer mobility testing. The force transducer is attached to the bottom of the drill string and lowered to the bottom of the hole. A standard soil sampling hammer is used to excite the ground; typically, a 140-pound weight is dropped 18 inches onto a collar that is attached to the drill string. The force transducer must be capable of operating under water if the water table is near the surface or a slurry drilling process is used.

Standard signal-processing techniques are used to determine the transfer function (frequency response function) between the exciting force and the resultant ground-borne vibration. Numerical regression methods are used to combine a number of two-point transfer functions into a smooth point-source transfer mobility level that represents the average vibration propagation characteristics of a site as a function of both distance from the source and

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frequency. The transfer mobility level is usually expressed in terms of a group of 1/3-octave band transfer mobility levels. Figure 6-9 is an example of point-source transfer mobility levels from a series of tests at the Transportation Technology Center in Pueblo, Colorado.[50][54][55][56][57]

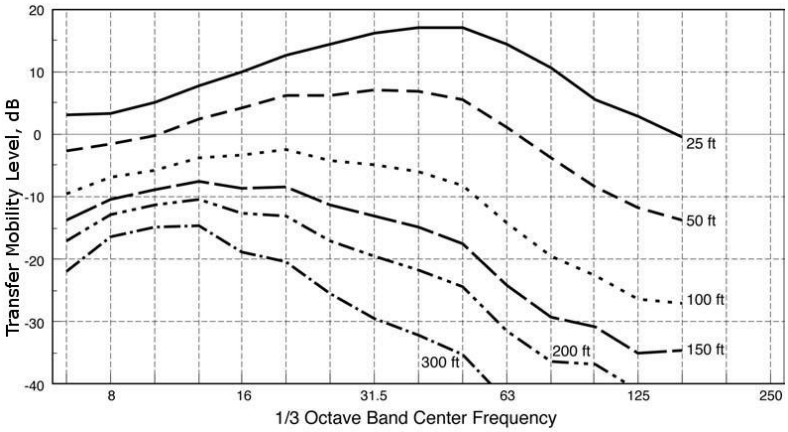


**Figure 6-9 Example of Point-Source Transfer Mobility**

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**Instrumentation**

Performing a transfer mobility test requires specialized equipment, which is generally available from commercial sources. Typical instrumentation for field-testing and laboratory analysis of transfer mobility is shown in Figure 6-10.

A load cell can be used as the force transducer. The force transducer should be capable of impact loads of 5,000 to 50,000 pounds depending on the hammer used for the impact. For borehole testing, the load cell must be hermetically sealed and capable of being used at the bottom of a 30- to 100-foot-deep hole partially filled with water.

Either accelerometers or geophones can be used as the vibration transducers. Geophones should be carefully mounted so that they are vertical. The requirement is that the transducers with the associated amplifiers be capable of accurately measuring levels of 0.0001 in/sec at 40 Hz and have a flat frequency response from 6 Hz to 400 Hz. Data should be acquired with a digital acquisition system with a flat frequency response over the range of 6 to 400 Hz.

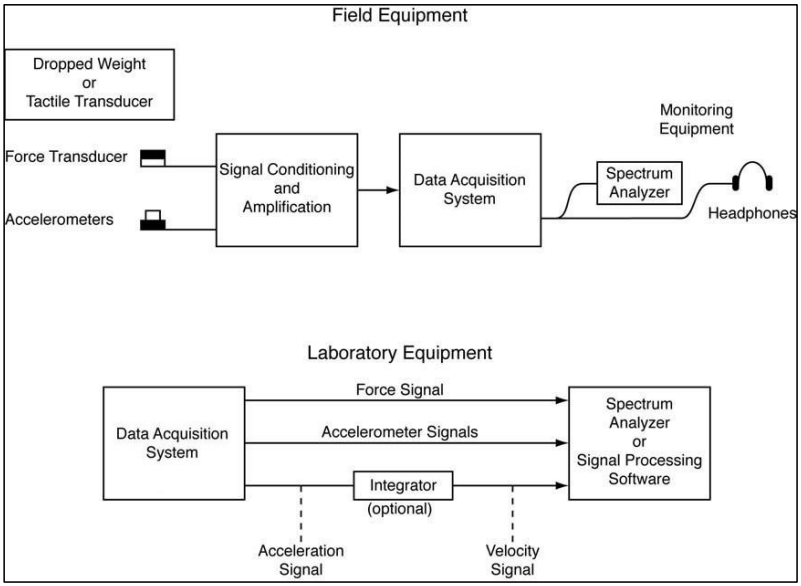


**Figure 6-10 Equipment Required for Field Testing and Laboratory Analysis**

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Cont.

A narrowband spectrum analyzer or signal-processing software can be used to calculate the transfer function and coherence between the force and vibration data. The analyzer must be capable of capturing impulses from at least two channels to calculate the frequency spectrum of the transfer function between the force and vibration channels. All transfer functions should include the average of at least 20 impulses. Time averaging of the impulses will provide substantial signal enhancement, which is usually required to accurately characterize the transfer function. Signal enhancement is particularly important when the vibration transducer is more than 100 ft from the impact.

Alternative methods of determining transfer mobility may be used, provided that these techniques have been demonstrated to provide the same results as the conventional weight-drop method over the frequency range of 6 Hz to 400 Hz. See Appendix G for information on developing and using non-standard procedures. These methods may include using other impulse-response measurement systems involving the use of shakers or electro-mechanical actuators, stimuli such as sweeps or maximum length sequences (MLS), and various signal processing techniques. A forthcoming ANSI Standard will describe in detail the procedures, methodologies, and reporting requirements for performing ground-borne vibration propagation measurements.

The transfer function can be calculated with either a spectrum analyzer or signal-processing software. Note that transfer functions should include the average of at least 20 impulses. Specialized multi-channel spectrum analyzers have built-in capabilities for computing transfer functions and are computationally efficient. However, signal-processing software can offer more

flexibility in analyzing data signals and allows the use of different digital signal processing methods. Typical measurement programs involve acquisition of data in the field and later processing of the information in a laboratory. However, recent advances in instrumentation and signal-processing software allow data to be collected and analyzed while in the field.

**2c. Estimate Line-Source Transfer Mobility** – Estimate line-source transfer mobility for long sources such as multi-car trains. Line-source transfer mobilities are used to normalize measured vibration velocity levels from train passbys and to obtain force density. Two different approaches can be used to develop estimates of line-source transfer mobility. The first consists of using lines of transducers and the second consists of a line of impact positions.

**Option A: Lines of Transducers** – Develop line-source transfer mobility curves from tests using one or more lines of transducers as shown in Figure 6-11 and described below.

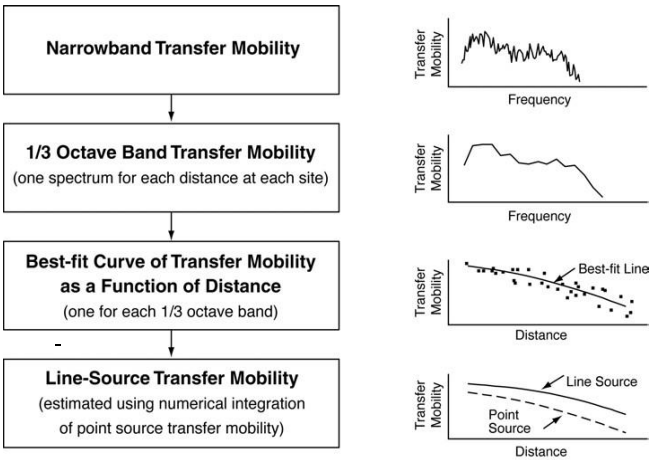


**Figure 6-11 Analysis of Transfer Mobility**

**Ai.** Obtain the narrowband transfer function between source and receiver at each measurement position. There should be a minimum of four distances in any test line. Because of the possibility of local variations in propagation characteristics, two or more lines should be used to characterize a site if possible. A total of 10 to 20 transducer positions are often used to characterize a site.

**Aii.** Calculate the equivalent 1/3-octave band transfer functions, generally between 6 and 400 Hz. This reduces each spectrum to 15 numbers. As shown in Figure 6-11, the 1/3-octave band spectrum is much smoother than the narrowband spectrum.

**Aiii.** Calculate a best-fit curve of transfer mobility as a function of distance for each 1/3-octave band. When analyzing a specific site, the best-fit curve will be

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based on 10 to 20 points. Up to several hundred points could be used to determine average best-fit curves for a number of sites.

**Aiv.** Apply the best-fit curve to the vibration sources. The 1/3-octave band best-fit curves can be directly applied to point vibration sources. Buses can usually be considered point-sources, as can columns supporting elevated structures. However, for a line vibration source such as a train, numerical integration must be used to calculate the equivalent line-source transfer mobility. The numerical integration procedures are detailed in the TRB publication: "A Prediction Procedure for Rail Transportation Ground-Borne Noise and Vibration."[50]

**Option B: Line of Impulses** – This second procedure for estimating line-source transfer mobility is best for detailed assessment of specific vibration paths or specific buildings and is a more direct approach.

**Bi.** Measure multiple point-source transfer mobilities according to the procedures in Step 2b above. The vibration transducers are placed at specific points of interest and a line of impacts is used. For example, a 150-foot train might be represented by a line of 11 impact positions along the track centerline at 15-foot intervals (Figure 6-12).

**Bii.** Sum the point-source results using Simpson's rule[xiii] for numerical integration to calculate the line-source transfer mobility.

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Figure 6-13 shows an example of line-source transfer mobilities that were derived from the point-source transfer mobilities shown in Figure 6-9.

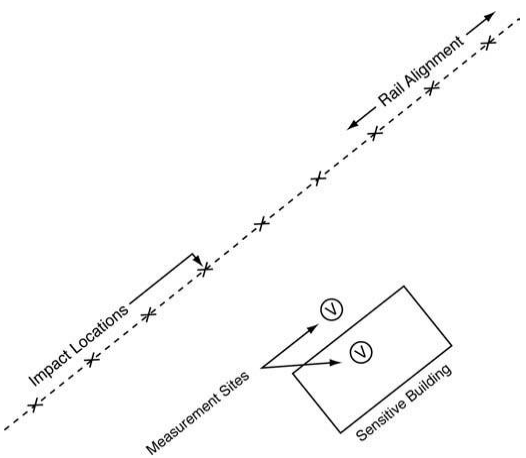


**Figure 6-12 Schematic of Transfer Mobility Measurements Using a Line of Impacts**

[xiii] Simpson's rule is a method for approximating integrals.

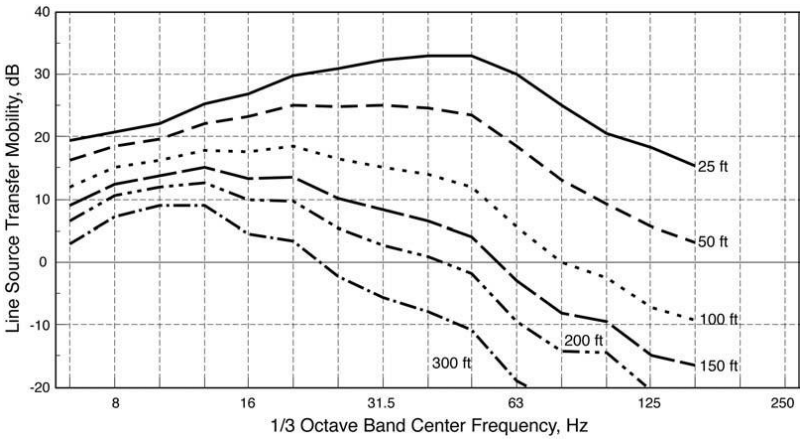


**Figure 6-13 Example of Line-source Transfer Mobility**

**2d. Project Ground-Borne Vibration and Noise** – Combine force density and line-source transfer mobility to project ground-borne vibration. Then, apply adjustment factors to estimate the building response to the ground-borne vibration and to estimate the A-weighted sound level inside buildings.

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The propagation of vibration from the building foundation to the receiver room is very complex and dependent on the specific design of the building. Detailed evaluation of the vibration propagation would require extensive use of numerical procedures such as the finite element method. Such a detailed evaluation is generally not practical for individual buildings considered in this manual. If the detailed features of the individual buildings are available, the recommended procedure is to estimate the propagation of vibration through a building and the radiation of sound by vibrating building surfaces using simple empirical or theoretical models. The recommended procedures are outlined in the Handbook of Urban Rail Noise and Vibration Control.[44] The approach consists of adding the following adjustments to the 1/3-octave band spectrum of the projected ground-borne vibration:

- **Building response or coupling loss** – This adjustment represents the change in the incident ground-borne vibration due to the presence of the building foundation. The adjustments described in the handbook [44] are shown in Figure 6-14. Note that the correction is zero when estimating basement floor vibration or vibration of at-grade slabs. Measured values may be used in place of these generic adjustments.

- **Transmission through the building** – The vibration amplitude typically decreases as the vibration energy propagates from the foundation through the remainder of the building. The general assumption is that vibration attenuates by 1 to 2 dB for each floor.

- **Floor resonances** – Vibration amplitudes will be amplified because of resonances of the floor/ceiling systems. For a typical wood-frame

residential structure, the fundamental resonance is usually in the 15 to 20 Hz range. Reinforced-concrete slab floors in modern buildings will have fundamental resonance frequencies in the 20 to 30 Hz range. An amplification resulting in a gain of approximately 6 dB should be used in the frequency range of the fundamental resonance.

- **Floor vibration and ground-borne noise** – The projected floor vibration is used to estimate the levels of ground-borne noise. The primary factors affecting noise level are the average vibration level of the room surfaces and the amount of acoustical absorption within the room. The radiation adjustment is -5 dB for typical rooms, [37] [50] which gives:

$$L_A \approx L_V + K_{A-wt} - 5 \qquad \textbf{Eq. 6-8}$$

where:

$L_A$ = A-weighted sound level in a 1/3-octave band
$L_v$ = rms vibration velocity level in that band
$K_{A-wt}$ = A-weighting adjustment at the 1/3-octave band center frequency

The A-weighted levels in the 1/3-octave bands are combined to produce the overall A-weighted sound level.

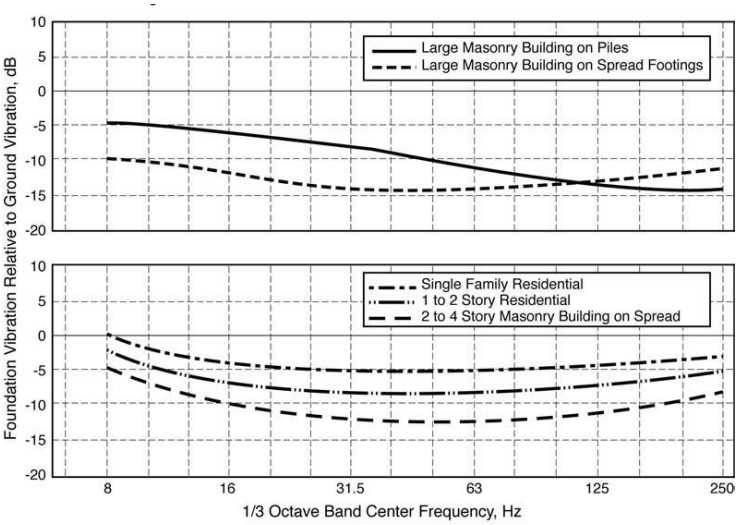


**Figure 6-14 Foundation Response for Various Types of Buildings**

Where detailed information on the structural features of individual buildings are unavailable and there are no site-specific data on outdoor to indoor propagation characteristics, the preferred approach is to apply a combined factor for the foundation response and the gain from floor resonances. Empirical data based on the TCRP D-12 Project from 34 measurement sites across 5 cities in North

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America and other studies suggest that the average change in vibration from outdoor to indoor was 0 dB across all 1/3-octave bands with a standard deviation of approximately 5 to 6 dB in the 31.5 to 63 Hz frequency.[43][48] Therefore, the recommended approach for predicting indoor vibration based on outdoor data is to use an adjustment of +3 to +6 dB for light-weight, wood-frame construction and use an adjustment of 0 dB for heavier buildings.

However, for buildings with high-vibration sensitivity or where there is concern regarding interference with vibration-sensitive equipment, it is advisable to measure the outdoor-indoor response of the building, using the process described in Section 2b or 2c, to determine the actual response of the foundation and building to vibration.

### Step 3: Assess Vibration Impact

*Take inventory of vibration-sensitive land uses with impact.*

Assess vibration impact at each receiver of interest using the impact criteria in Section 6.3. Note that ground-borne vibration and noise levels that exceeded criteria in the General Vibration Assessment may not cause impact according to the more detailed procedures of the Detailed Vibration Analysis; in which case, mitigation is not required. But if projected levels still exceed the criteria, evaluate vibration mitigation measures using the spectra provided by the Detailed Vibration Analysis.

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### Step 4: Determine Vibration Mitigation Measures

*Select practical vibration control measures that will be effective at the dominant vibration frequencies and compatible with the given transit structure and track support system.*

The purpose of vibration mitigation is to minimize the adverse effects that the project ground-borne vibration and ground-borne noise will have on sensitive land uses. Because ground-borne vibration is not as common a problem as environmental noise, the mitigation approaches have not been as well defined. In some cases it may be necessary to develop innovative approaches to control the impact. See Appendix G for information on using non-standard methods.

Standard vibration control measures for rail transit systems are discussed in this step. Note that vibration control measures for rail transit systems are not always effective for freight trains.[xiv] Bus systems rarely cause vibration impact, but if impact occurs, roadway roughness or unevenness caused by bumps, pot holes, expansion joints, or driveway transitions are usually the causes. Smoothing the roadway surface is typically the recommended course of action.[xv]

[xiv] The heavy axle loads associated with freight rail are outside the range of applicable design parameters for vibration reduction on lighter rail transit systems. Plans to relocate existing railroad tracks closer to vibration-sensitive sites in order to accommodate a new rail transit line in the ROW must be carefully considered because it may not be possible to mitigate the increased vibration impact from freight trains.

[xv] In cases where a rubber-tired system runs inside a building, such as an airport people mover, vibration control may involve additional measures. Loading and unloading of guideway support beams may generate dynamic forces that transmit into the building structure. Special guideway support systems may be required, similar to the discussion below regarding floating slabs.

Vibration reduction measures incur additional costs to a system. Some of the same treatments for noise mitigation can be considered for vibration mitigation. Costs for noise control measures are documented in a report from the Transit Cooperative Research Program (TCRP).[31] Where applicable to vibration reduction, costs for noise abatement methods from that report are given in the following sections. These costs reflect the noise mitigation costs as of 1997 (unless otherwise noted), and should only be used as representative estimates when considering noise mitigation options. Current noise mitigation costs should be researched before decisions on noise mitigation options are finalized, and then they should be documented according to Section 8.

Mitigation of vibration impacts may involve treatments at the source, along the source-to-receiver propagation path, or at the receiver.

**1a. Evaluate Source Treatments** – The most effective vibration mitigation treatments are applied at the vibration source. This is the preferred approach to mitigation when possible. Possible source treatments include:

- **Preventative Maintenance** – Effective maintenance programs are essential for controlling ground-borne vibration. Key vibration points are discussed below; see Section 4.5, Step 7 for more detailed information on the benefits of effective maintenance programs on controlling transit noise and vibration. While these are not mitigation measures in the traditional sense, and should not be included as mitigation in an environmental document, they can help to keep both noise and vibration levels at a "like-new" level or reduce both in systems with deferred maintenance.

  - **Rail grinding** is a particularly important practice for vibration mitigation for rail that develops corrugations. The TCRP report notes that periodic rail grinding results in a net savings per year on wheel and rail wear. Most transit systems contract out rail grinding, although some of the larger systems make the investment and do their own grinding. As mentioned in Section 4.5, Step 7, the typical rail grinding cost would be $1000 to $7000 per grinding pass mile, with an additional investment of approximately $1 million for the equipment for a larger transit system to do its own grinding.

  - **Dramatic vibration reduction** results can be achieved by removing wheel flats through **wheel truing**. As mentioned in Section 4.5, Step 7, a wheel truing machine costs approximately $1 million, including associated maintenance, materials, and labor costs. The TCRP report figures a system with 700 vehicles would incur a yearly cost of $300,000 to $400,000 for a wheel truing program.

  - **Profile grinding of the rail head** in combination with a wheel truing program may be the most practical approach to controlling and reducing vibration and noise where such practices are not normally conducted. Profiles should be defined during the design phase and should be in place when system opens.[32] The cost of

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wheel and rail profile matching may be incorporated in the new vehicle and new rail costs.

Rough wheels or rails can increase vibration levels by as much as 20 dB in extreme cases, negating the effects of even the most effective vibration control measures. Yet, it is rare that vibration control measures (such as those discussed below) will provide more than 15 to 20 dB attenuation. When there are ground-borne vibration impacts with existing transit equipment, the best vibration control measure often is to implement new or improved maintenance procedures. Grinding rough or corrugated rail and wheel truing to eliminate wheel flats and restore the wheel contour may provide considerable vibration reduction. Regular maintenance may replace the need to modify the existing track system, such as through adding floating slabs.

- **Planning and Design of Special Trackwork** – A large percentage of the vibration impact from a new transit facility is often caused by wheel impacts at special trackwork for turnouts and crossovers. When feasible, the most effective vibration control measure is to relocate the special trackwork to a less vibration-sensitive area. This may require adjusting the location by several hundred feet provided it will not have an adverse impact on the operation plan for the system. Careful review of crossover and turnout locations during the project development phase is an important step to minimizing potential for vibration impact.

  Another approach is to use special devices (frogs) at turnouts and crossovers that incorporate mechanisms to close the gaps between running rails. Frogs with spring-loaded mechanisms and frogs with movable points can substantially reduce vibration levels near crossovers. According to the TCRP report, a spring frog costs about $12,000, twice the cost of a standard frog. A movable point frog involves elaborate signal and control circuitry resulting in higher costs at approximately $200,000.

- **Vehicle Specifications** – The ideal rail vehicle with respect to minimizing ground-borne vibration should have the following characteristics:
  - Low, unsprung weight
  - Soft primary suspension
  - A minimum of metal-to-metal contact between moving parts of the truck
  - Smooth wheels that are perfectly round

  A limit for the vertical resonance frequency of the primary suspension should be included in the specifications for any new vehicle. A vertical resonance frequency of 12 Hz or less is sufficient to control the levels of ground-borne vibration, although some have recommended the vertical resonance frequency be less than 8 Hz.

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- **Special Track Support Systems** – When the vibration assessment indicates that vibration levels will be excessive, the track support system is typically modified to reduce the vibration levels.

  Floating slabs, resiliently supported ties, high-resilience fasteners, and ballast mats can be used to reduce the levels of ground-borne vibration. To be effective, all of these measures must be optimized for the frequency spectrum of the vibration. Most of these relatively standard procedures have been successfully used on several subway projects.

  Applications on at-grade and elevated track are less common. This is because vibration impact is less common for at-grade and elevated track. Note that the cost of these types of vibration control measures is a higher percentage of the overall construction costs for at-grade and elevated track, and exposure to the elements can require substantial design modifications.

  Each major vibration control measure for track support is discussed below. Costs for these treatments are not covered by the TCRP report, but are given as estimates based on transit agency experience.

  - **Resilient fasteners** – Resilient fasteners are used to fasten the rail to concrete track slabs. Standard resilient fasteners are very stiff in the vertical direction, usually in the range of 200,000 lb/in, and do provide some vibration reduction compared to the rigid fastening systems used on older systems (e.g., wood half-ties embedded in concrete).

    Special fasteners with vertical stiffness in the range of 30,000 lb/in may reduce vibration by as much as 5 to 10 dB at frequencies above 30 to 40 Hz. These premium fasteners vary in cost and can be priced competitively when purchased in large quantities.

  - **Ballast mats** – A ballast mat consists of a rubber or other type of elastomer pad that is placed under the ballast. In general, the mat must be placed on a concrete pad to be effective. They will not be as effective if placed directly on the soil or the sub-ballast. Consequently, most ballast mat applications are in subway or elevated structures.

    Ballast mats can provide 8 to 12 dB attenuation at frequencies above 25 to 30 Hz.[58] Ballast mats are often a good retrofit measure for existing tie-and-ballast track where there is vibration impact. Installed ballast mats cost approximately $180 per track-foot.

  - **Undertie pads** – Undertie pads (resiliently supported concrete ties) consist of a rubber pad mounted on the bottom of a concrete tie directly on the ballast. The pads provide vibration isolation at frequencies above 25 Hz and are easy to

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install or retrofit. Installed undertie pads cost approximately $260 per track-foot.

- **Resiliently supported ties** – The resiliently supported tie system consists of concrete ties supported by rubber pads resting on top of a slab track or subway invert. The rails are fastened directly to the concrete ties using standard rail clips. Resiliently supported ties provide vibration reduction in between 15 to 40 Hz, which is particularly appropriate for transit systems with vibration impact in the 20 to 30 Hz range. A resiliently supported tie system costs approximately $400 per track-foot.

- **Floating slabs** – Floating slabs can be very effective at controlling ground-borne vibration and noise and consist of a concrete slab supported on resilient elements such as rubber or a similar elastomer. Floating slabs are effective at frequencies greater than their single-degree-of-freedom vertical resonance frequency.

  Floating slabs are among the most expensive vibration control treatments. A typical double-tie floating slab system costs approximately 4 times the cost of ballast and tie per track foot. Examples of floating slabs include:
  - Floating slabs used in Washington, DC; Atlanta, GA; and Boston, MA, were all designed to have a vertical resonance in the 14 to 17 Hz range.
  - A special system referred to as the double-tie system was first used in Toronto. It consists of 5-foot-long slabs with four or more rubber pads under each slab. This system was designed with a resonance frequency in the 12 to 16 Hz rang3.
  - Another special floating slab was used in San Francisco's Bay Area Rapid Transit (BART) system. It uses a discontinuous precast concrete double-tie system with a resonance frequency in the 5 to 10 Hz frequency range.

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- **Tire-derived aggregate (TDA)** – TDA (shredded tires) consists of a layer of tire shreds wrapped in geotech fabric placed underneath the ballast on hard packed ground. This is a new, low-cost option that can provide reduction in vibration levels at frequencies above 25 Hz. This mitigation measure has proven to be effective for the Denver Regional Transportation District (RTD) light rail system as well as the Santa Clara Valley Transportation Authority (VTA) light rail system,[59] but the effective life of TDA has not been determined. Installed TDA costs approximately $260 per track-foot.

- **Other treatments** – Changing any feature of the track support system can change the levels of ground-borne vibration. Approaches

such as using heavier rail, thicker ballast, or heavier ties can be expected to reduce the vibration levels. There also is some indication that vibration levels are lower with wood ties compared to concrete ties. But there is little confirmation that any of these approaches will make a substantial change in the vibration levels.

- **Operational Changes** – The most effective operational change is to reduce the vehicle speed. Reducing the train speed by a factor of two will reduce vibration levels approximately 6 dB. Other operational changes include:
  - Use of equipment that generates the lowest vibration levels during the nighttime hours when people are most sensitive to vibration and noise.
  - Adjusting nighttime schedules to minimize movements in the most sensitive hours.

While there are tangible mitigation benefits from speed reductions and limits on operations during the most sensitive time periods, FTA does not generally accept speed reduction as a vibration mitigation measure for two important reasons: (1) speed reduction is unenforceable and negated if vehicle operators do not adhere to established policies, and (2) it is contrary to the purpose of the transit investment by FTA, which is to move as many people as possible as efficiently and safely as possible. FTA does not recommend limits on operations as a way to reduce vibration impacts.

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**1b. Evaluate Path Treatments** – When vibration mitigation treatments cannot be applied at the vibration source or additional mitigation is required after treating the source, the next preferred placement of vibration mitigation is along the vibration propagation path between the source and receiver. Possible path treatments include:

- **Trenches** – Use of trenches to control ground-borne vibration is analogous to controlling airborne noise with noise barriers. This approach has not received much attention in the United States, but trenches could be a practical method for controlling transit vibration from at-grade track. A rule-of-thumb given by Richert and Hall[60] is that if the trench is located close to the source, the trench bottom must be at least 0.6 times the Rayleigh wavelength below the vibration source. For most soils, Rayleigh waves travel at around 600 ft/sec, which means that the wavelength at 30 Hz is 20 ft, requiring that a trench be approximately 15 ft deep to be effective at 30 Hz.

  A trench can be effective as a vibration barrier if it is either open or solid. The Toronto Transit Commission tested a trench filled with Styrofoam to keep it open and reported successful performance over a period of at least one year. Solid barriers can be constructed with sheet piling or concrete poured into a trench.

- **Buffer Zones** – Expanding the rail ROW can be the most economical method of reducing the vibration impact by simply increasing the distance between the source and receiver. A similar approach is to

negotiate a vibration easement from the affected property owners (e.g., a row of single-family homes adjacent to a proposed commuter rail line). There may be legal limitations, however, on the ability of funding agencies to acquire land strictly for the purpose of mitigating vibration (or noise) impact.

**1c. Evaluate Receiver Treatments** – When vibration mitigation treatments cannot be applied at the source or along the propagation path, or if combinations of treatments are required, treatments to the receivers can be considered as described below.

- **Building Modifications** – In some circumstances, it is practical to modify the affected building to reduce the vibration level. Vibration isolation of buildings consists of supporting the building foundation on elastomer pads, similar to bridge bearing pads. Vibration isolation of buildings is seldom an option for existing buildings and is typically only possible for new construction. Vibration impacts on sensitive laboratory instruments, such as electron microscopes, may be controlled with vibration isolation tables.

  This approach is particularly important for shared-use facilities such as an office space above a transit station or terminal. When vibration-sensitive equipment such as electron microscopes will be affected by transit vibration, specific modifications to the building structure may be the most cost-effective method of controlling the impact aside from modification of equipment mounting systems. For example, the floor upon which the vibration-sensitive equipment is located could be stiffened and isolated from the remainder of the building to reduce the vibration. Alternatively, the equipment mounting systems could be modified or the equipment could be relocated to a different building at far less cost.

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SECTION 7

# Noise and Vibration during Construction

Construction noise and vibration often generates complaints from the community, even when construction is for a limited timeframe. Public concerns about construction noise and vibration increase considerably with lengthy periods of heavy construction on major projects as well as prevalence of nighttime construction (often scheduled to avoid disrupting workday road and rail traffic). Noise and vibration complaints typically arise from interference with people's activities, especially when the adjacent community has no clear understanding of the extent or duration of the construction. Misunderstandings can arise when the community thinks a contractor is being insensitive, and the contractor believes it is performing the work in compliance with local ordinances. This situation underscores the need for early identification and assessment of potential problem areas.

This section outlines the procedures for assessing noise and vibration impacts during construction. The type of assessment (qualitative or quantitative) and the level of analysis are determined based on the scale of the project and surrounding land uses. In cases where a full quantitative assessment is not warranted, a qualitative assessment of the construction noise and vibration environment can lead to greater understanding and tolerance in the community. For major projects with extended periods of construction at specific locations, a quantitative assessment can aid contractors in making bids by allowing changes in construction approach and including mitigation costs before the construction plans are finalized.

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Generally, local noise ordinances are not very useful for evaluating construction noise impact. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land uses. While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.

Procedures for assessing construction noise are presented in Section 7.1. Procedures for assessing construction vibration are presented in Section 7.2.

## 7.1 Construction Noise Assessment

Noise impacts from construction may vary greatly depending on the duration and complexity of the project. The key elements of the Construction Noise Assessment procedure and recommended workflow are as follows.

**Step 1:** Determine Level of Construction Noise Assessment

**Step 2:** Use a Qualitative Construction Noise Assessment to Estimate Construction Noise

**Step 3:** Use a Quantitative Construction Noise Assessment to Estimate Construction Noise

**Step 4:** Assess Construction Noise Impact

**Step 5:** Determine Construction Noise Mitigation Measures

If there is uncertainty in how to determine the appropriate level of assessment, contact the FTA Regional office.

## Step 1: Determine Level of Construction Noise Assessment

*Determine the appropriate level of assessment based on the scale and type of the project and depending on the stage of environmental review.*

Consider the following factors:

- Scale of the project
- Proximity of noise-sensitive sites to the construction zones
- Number of noise-sensitive receivers in the project area
- Duration of construction activities near noise-sensitive receivers
- Schedule, including the construction days, hours, and time periods
- Method (e.g., cut-and-cover vs. bored tunneling)
- Concern about construction noise expressed in comments by the general public (e.g., through scoping or public meetings)

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**1a. Determine if an assessment is required** – Construction Noise Assessments are not required for many small projects including:

- Installation of safety features like grade-crossing signals;
- Track improvements within the ROW; or
- Erecting small buildings and facilities which are similar in scale to the surrounding development.

For small projects like these, include descriptions in the environmental document of the length of construction, the loudest equipment to be used, the expected truck access routes, the avoidance of nighttime activity, and any other relevant planned construction method.

**1b. Determine whether a qualitative or quantitative assessment is required**

- **Qualitative Construction Noise Assessment** – Qualitative Construction Noise Assessments may be required for projects with less than a month of construction time in a noise-sensitive area. See Step 2 for more information on Qualitative Construction Noise Assessments.

- **Quantitative Construction Noise Assessments** – Quantitative Construction Noise Assessments may be required for projects with a month or more of construction in noise-sensitive areas or if particularly noisy equipment will be involved. See Step 3 for more information on Quantitative Construction Noise Assessments.

## Step 2: Use a Qualitative Construction Noise Assessment to Estimate Construction Noise

*Use a qualitative construction noise assessment to estimate construction noise for appropriate projects per Section 7.1, Step 1b.*

Provide qualitative descriptions in the environmental document of the following elements:

- Duration of construction (both overall and at specific locations)
- Equipment expected to be used (e.g., noisiest equipment)
- Schedule with limits on times of operation (e.g., daytime use only)
- Monitoring of noise
- Forum for communicating with the public
- Commitments to limit noise levels to certain levels, including any local ordinances that apply
- Consideration of application of noise control treatments used successfully in other projects

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Cont.

Effective community outreach and relations are important for these projects. Disseminate information to the public early regarding the kinds of construction equipment, expected noise levels, and durations to forewarn potentially affected neighbors about the temporary inconvenience. Including a general description of the variation of noise levels during a typical construction day may also be helpful.

Note that the construction criteria in Step 4 do not apply to qualitative assessments.

## Step 3: Use a Quantitative Construction Noise Assessment to Estimate Construction Noise

*Use a quantitative construction noise assessment to estimate construction noise for appropriate projects per Section 7.1, Step 1b.*

For Quantitative Construction Noise Assessments, follow the recommended procedure in this step and include a description of the planned construction methods and any basic measures that have been identified to reduce the potential impact, such as prohibiting the noisiest construction activities during the nighttime, in the environmental document. It may be prudent, however, to defer final decisions on noise control measures until the project and construction plans are defined in greater detail during the engineering phase.

- **Noise Source Levels from Typical Construction Equipment and Operations** – The noise levels generated by construction

equipment vary greatly on factors such as the type of equipment, the equipment model, the operation being performed, and the condition of the equipment. Typically, the dominant source of noise from most construction equipment is the engine, often a diesel engine, which usually does not have sufficient muffling. In other cases, such as impact pile-driving or pavement-breaking, noise generated by the process dominates. Construction equipment can be considered to operate in the following two modes for Construction Noise Assessments:

- **Stationary** – Stationary equipment operates in one location for one or more days at a time, with either a fixed power operation (pumps, generators, compressors) or a variable noise operation (pile drivers, pavement breakers).
- **Mobile** – Mobile equipment moves around the construction site with power applied in cyclic fashion (bulldozers, loaders), or to and from the site (trucks). Movement around the site is considered in the construction noise prediction procedure.

Variation in power imposes additional complexity in characterizing the noise source level from mobile equipment. Describe the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the $L_{eq(t)}$ of the operation.

Typical noise levels from representative equipment are included in Table 7-1. The levels are based on an EPA Report,[61] measured data from railroad construction equipment taken during the 1976 Northeast Corridor Improvement Project, the FHWA Roadway Construction Noise Model, and other measured data.

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For equipment that is not represented in Table 7-1, measure the noise levels according to the standard procedures for measuring the exterior noise levels for the certification of mobile and stationary construction equipment by the Society of Automotive Engineers.[62][63]

**Table 7-1 Construction Equipment Noise Emission Levels**

| Equipment | Typical Noise Level 50 ft from Source, dBA |
|---|---|
| Air Compressor | 80 |
| Backhoe | 80 |
| Ballast Equalizer | 82 |
| Ballast Tamper | 83 |
| Compactor | 82 |
| Concrete Mixer | 85 |
| Concrete Pump | 82 |
| Concrete Vibrator | 76 |
| Crane, Derrick | 88 |
| Crane, Mobile | 83 |
| Dozer | 85 |
| Generator | 82 |
| Grader | 85 |
| Impact Wrench | 85 |
| Jack Hammer | 88 |
| Loader | 80 |
| Paver | 85 |
| Pile-driver (Impact) | 101 |
| Pile-driver (Sonic) | 95 |
| Pneumatic Tool | 85 |
| Pump | 77 |
| Rail Saw | 90 |
| Rock Drill | 95 |
| Roller | 85 |
| Saw | 76 |
| Scarifier | 83 |
| Scraper | 85 |
| Shovel | 82 |
| Spike Driver | 77 |
| Tie Cutter | 84 |
| Tie Handler | 80 |
| Tie Inserter | 85 |
| Truck | 84 |

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**3a.** Use the metric $L_{eq(t)}$ to assess construction noise. This unit is appropriate because $L_{eq(t)}$ can be used to describe:

- Noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period
- Noise level during an entire phase
- Average noise over all phases of the construction

**3b.** Use Eq. 7-1 to predict construction noise impact for major transit projects, considering the noise generated by the equipment and noise propagation due to distance. Calculate $L_{eq.equip}$ for all equipment individually, then use decibel addition to sum the $L_{Aeq.equip}$ for all equipment operating during the same time period. See Appendix B.1.1 for information on decibel addition.

$$L_{eq.equip} = L_{emission} + 10\log(Adj_{Usage}) - 20\log(\frac{D}{50}) - 10G\log(\frac{D}{50}) \quad \textbf{Eq. 7-1}$$

where:

$L_{eq,equip}$ = $L_{eq(t)}$at a receiver from the operation of a single piece of equipment over a specified time period, dBA
$L_{emission}$ = noise emission level of the particular piece of equipment at the reference distance of 50 ft, dBA
$Adj_{Usage}$ = usage factor to account for the fraction of time that the equipment is in use over the specified time period
$D$ = distance from the receiver to the piece of equipment, ft
$G$ = a constant that accounts for topography and ground effects

Determine the quantities for Eq. 7-1 based on the level of assessment as described below.

- A general assessment of construction noise is warranted for projects in an early assessment stage when the equipment roster and schedule are undefined and only a rough estimate of construction noise levels is practical.
- A detailed analysis of construction noise is warranted when many noise-sensitive sites are adjacent to a construction project or where contractors are faced with stringent local ordinances or heightened public concerns expressed in early outreach efforts.

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Complete the appropriate assessment for each phase of construction. Major construction projects are accomplished in several different phases. Each phase has a specific equipment mix, depending on the work to be accomplished during that phase. As a result of the equipment mix, each phase has its own noise characteristics; some phases have higher continuous noise levels than others, and some have higher impact noise levels than others.

**Option A: General Assessment** – Determine the quantities for Eq. 7-1 based on the following assumptions for a General Assessment of each phase of construction.

- **Noise emission level ($L_{emission}$)** – Determine the emission level at 50 ft according to noise from typical construction equipment described above and Table 7-1.

- **Usage factor ($Adj_{Usage}$)** – Assume a usage factor of 1. This assumes a time period of one-hour with full power operation. Most construction equipment operates continuously for periods of one-hour or more during the construction period.

  Therefore, 10log($Adj_{usage}$) = 0 and can be omitted from the equation.

- **Distance (D)** – Assume that all equipment operates at the center of the project, or centerline for guideway or highway construction project.

- **Ground effect (G)** – G = 0 assuming free-field conditions and ignoring ground effects. If ground effects are of specific importance to the assessment, consider using the Detailed Analysis procedure.

Only determine the $L_{eq.equip}$ for the two noisiest pieces of equipment expected to be used in each phase of construction. Then, sum the levels for each phase of construction using decibel addition.

**Option B: Detailed Analysis –** Determine the quantities for Eq. 7-1 based on the following assumptions for a Detailed Analysis of each phase of construction. Alternatively, for detailed, long-term, and complex construction projects or projects near a particularly sensitive site, the FHWA's Windows-based screening tool, "Roadway Construction Noise Model (RCNM)," can be used for the prediction of construction noise.(64)

- **Noise emission level ($L_{emission}$)** – Measure or certify the noise emission level for each piece of equipment.

- **Usage factor ($Adj_{Usage}$)** – Long-term construction project noise impact is based on a 30-day average $L_{dn}$, the times of day of construction activity (nighttime noise is penalized by 10 dB in residential areas), and the percentage of time the equipment is used during a period of time that will affect $Adj_{Usage}$.

  For example, an 8-hour $L_{eq(t)}$ is determined by making $Adj_{Usage}$ the percentage of time each individual piece of equipment operates under full power in that period. Similarly, the 30-day average $L_{dn}$ is determined from the $Adj_{Usage}$ expressed by the percentage of time the equipment is used during the daytime hours (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.), separately, over a 30-day period. To account for increased sensitivity to nighttime noise, the nighttime noise levels are adjusted by 10 dB in the $L_{dn}$ computation (see Appendix B.1.4.5).

- **Distance (D)** – Determine the location of each piece of equipment during operation and the distance to each receiver.

- **Ground effect (G)** – Use Table 4-26 in Section 4.5, Step 3 to calculate G to account for the site topography, natural and man-made barriers, and ground effects.

  Compute the 8-hour $L_{eq(t)}$ ( $L_{eq.equip(8hr)}$) and the 30-day average $L_{dn}$ ($L_{dn.equip(30day)}$) for all equipment expected to be used in each phase of construction separately. Then, sum the levels for each phase of construction using Eq. 4-56 and Eq. 4-57 in Table 4-32.

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## Step 4: Assess Construction Noise Impact

*Compare the predicted noise levels from the Quantitative Construction Noise Assessment with impact criteria to assess impact from construction noise for each phase of construction.*

No standardized criteria have been developed for assessing construction noise impact. Consequently, criteria must be developed on a project-specific basis unless local ordinances apply. As stated earlier in this section, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.

The construction impact guidelines are presented based on the level of quantitative assessment.

**Option A: General Assessment** – Compare the combined $L_{eq.equip(1hr)}$ for the two noisiest pieces of equipment for each phase of construction determined in Section 7.1, Step 3 to the criteria below. Then, identify locations where the level exceeds the criteria.

**Table 7-2 General Assessment Construction Noise Criteria**

| Land Use | $L_{eq.equip(1hr)}$, dBA | |
|---|---|---|
| | Day | Night |
| Residential | 90 | 80 |
| Commercial | 100 | 100 |
| Industrial | 100 | 100 |

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**Option B: Detailed Analysis** – Compare the combined $L_{eq.equip(1hr)}$ and the combined $L_{dn.equip(30day)}$ for all equipment for each phase of construction determined in Section 7.1, Step 3 to the criteria below. Then, identify locations where the level exceeds the criteria.

**Table 7-3 Detailed Analysis Construction Noise Criteria**

| Land Use | $L_{eq.equip(8hr)}$, dBA | | $L_{dn.equip(30day)}$, dBA |
|---|---|---|---|
| | Day | Night | 30-day Average |
| Residential | 80 | 70 | 75 |
| Commercial | 85 | 85 | 80* |
| Industrial | 90 | 90 | 85* |

*Use a 24-hour $L_{eq(24hr)}$ instead of $L_{dn.equip(30day)}$.

## Step 5: Determine Construction Noise Mitigation Measures

*Evaluate the need for mitigation and select appropriate mitigation measures.*

Where potential impacts have been identified according to Section 7.1, Step 4, evaluate appropriate control measures. Include descriptions of how each affected location will be treated with one or more mitigation measures in the environmental document.

**5a.** Determine the appropriate approach for construction noise control. Categories of approaches include:

- **Design considerations and project layout**
  - Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.
  - Re-route truck traffic away from residential streets. Select streets with the fewest homes if no alternatives are available.
  - Site equipment on the construction lot as far away from noise-sensitive sites as possible.
  - Construct walled enclosures around especially noisy activities or clusters of noisy equipment. For example, shields can be used around pavement breakers, and loaded vinyl curtains can be draped under elevated structures.

- **Sequence of operations**
  - Combine noisy operations to occur in the same time period. The total noise level produced will not be substantially greater than the level produced if the operations were performed separately.
  - Avoid nighttime activities. Sensitivity to noise increases during the nighttime hours in residential neighborhoods.

- **Alternative construction methods**
  - Avoid impact pile-driving where possible in noise-sensitive areas. Drilled piles or the use of a sonic/vibratory pile driver or push pile driver are quieter alternatives where the geological conditions permit their use.
  - Use specially-quieted equipment, such as quieted and enclosed air compressors and properly-working mufflers on all engines.
  - Select quieter demolition methods. For example, sawing bridge decks into sections that can be loaded onto trucks results in lower cumulative noise levels than impact demolition by pavement breakers.

  Include descriptions of how each impacted location will be treated with one or more mitigation measures in the environmental impact assessment when possible.

**5b.** Describe and commit to a mitigation plan that will be developed later when the information is available to make final decisions (not often available during the project development phase) on all specific mitigation measures. This may be the case for large, complex projects. The objective of the plan should be to minimize construction noise using all reasonable (e.g., cost vs. benefit) and feasible (e.g., possible to construct) means available.

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Components of a mitigation plan may include some or all of the following provisions, which should also be specified in construction contracts:

- **Equipment noise emission limits** – Equipment noise limits are absolute noise limits applied to generic classes of equipment at a reference distance (typically 50 ft). The limits should be set no higher than what is reasonably achievable for well-maintained equipment with effective mufflers. Lower limits that require source noise control may be appropriate for certain equipment when needed to minimize community noise impact, if reasonable and feasible. Provisions could also be included to require equipment noise certification testing prior to use on-site.

- **Lot-line construction noise limits** – Lot-line construction noise limits are noise limits that apply at the lot-line of specific noise-sensitive properties. The limits are typically specified in terms of both noise exposure (usually $L_{eq(t)}$ over a 20-30-minute period) and maximum noise level. They should be based on local noise ordinances if applicable, as well as pre-construction baseline noise levels (usually 3 to 5 dB above the baseline).

- **Operational and/or equipment restrictions** – It may be necessary to prohibit or restrict certain construction equipment and activities near residential areas during nighttime hours. This is particularly true for activities that generate tonal, impulsive, or repetitive sounds, such as back-up alarms, hoe ram demolition, and pile-driving.

- **Noise abatement requirements** – In some cases, specifications may be provided for particular noise control treatments based on the results of the design analysis and/or prior commitments made to the public by civic authorities. An example would be the requirement for a temporary noise barrier to shield a particular community area from noisy construction activities.

- **Noise monitoring plan requirements** – Plans can be developed for pre-project noise monitoring to establish baseline noise levels at sensitive locations, as well as for periodic equipment and lot-line noise monitoring during the construction period. The plan should outline the measurement and reporting methods that will be used to demonstrate compliance with the project noise limits.

- **Noise control plan requirements** – For major construction projects, preparation and submission of noise control plans on a periodic basis (e.g., every six months) are generally required. These plans should predict the construction noise at noise-sensitive receiver locations based on the proposed construction equipment and methods. If the analysis predicts that the specified noise limits will be exceeded, the plan should specify the mitigation measures that will be applied and should demonstrate the expected noise reductions these measures will achieve. The objective of this proactive approach is to minimize the

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likelihood of community noise complaints by ensuring that any necessary mitigation measures are included in the construction plans.

- **Compliance enforcement program** – If construction noise is an issue in the community, it is important that a program be implemented to monitor contractor compliance with the noise control specifications and mitigation plan. It is recommended that this function be performed by a construction management team on behalf of the public agency.

- **Public information and complaint response procedures** – To maintain positive community relations, it is recommended to keep the public informed about the construction plans and efforts to minimize noise, and procedures should be established for prompt response and corrective action to noise complaints during construction.

Most of these provisions are appropriate for large-scale projects, where construction activity will continue for many months, if not years. The linked references contain more information on construction noise for major transportation projects.[60][65]

## 7.2 Construction Vibration Assessment

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings founded on the soil near the construction site respond to these vibrations with varying results, ranging from no perceptible effects at the lowest levels, low rumbling sounds and perceptible vibrations at moderate levels, and slight damage at the highest levels.

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While ground vibrations from construction activities do not often reach the levels that can damage structures, fragile buildings must receive special consideration. The construction vibration criteria include consideration of the building condition.

The key elements of the Construction Vibration Assessment procedures and recommended workflow are as follows:

**Step 1:** Determine level of construction vibration assessment

**Step 2:** Use a qualitative construction vibration assessment

**Step 3:** Use a quantitative construction vibration assessment

**Step 4:** Assess construction vibration impact

**Step 5:** Determine construction vibration mitigation measures

## Step 1: Determine Level of Construction Vibration Assessment

*Determine the appropriate level of assessment based on the scale and type of the project and the stage of environmental review.*

**1a. Determine if an assessment is required.**
Construction Vibration Assessments are not required for many small projects including:

- Installation of safety features like grade-crossing signals
- Track improvements within the ROW
- Erecting small buildings and facilities, which are similar in scale to the surrounding development

**1b. Determine whether a qualitative or quantitative assessment is required.**

- **Qualitative Construction Vibration Assessment** – A qualitative construction vibration assessment is appropriate for projects where prolonged annoyance or damage from construction vibration is not expected. For example, equipment that generates little or no ground vibration—such as air compressors, light trucks, and hydraulic loaders—only require qualitative descriptions. See Section 7.2, Step 2 for more information on qualitative construction vibration assessments.

- **Quantitative Construction Vibration Assessment** – A quantitative construction vibration analysis is appropriate for projects where construction vibration may result in building damage or prolonged annoyance. For example, activities such as blasting, pile-driving, vibratory compaction, demolition, and drilling or excavation near sensitive structures require a quantitative analysis. See Section 7.2, Step 3 for more information on quantitative construction vibration assessments.

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Cont.

If there is uncertainty in how to determine the appropriate level of assessment, contact the FTA Regional office.

## Step 2: Use a Qualitative Construction Vibration Assessment

*Use a qualitative construction vibration assessment to estimate vibration for appropriate projects per Section 7.2, Step 1b.*

Provide qualitative descriptions in the environmental document of the following elements:

- Duration of construction (both overall and at specific locations)
- Equipment expected to be used
- Description of how ground-borne vibration will be maintained at an acceptable level

Note that the criteria in Section 7.2, Step 4 do not apply to qualitative assessments.

## Step 3: Use a Quantitative Construction Vibration Assessment

*Use a quantitative construction vibration assessment to estimate vibration for appropriate projects per Section 7.2, Step 1b.*

For quantitative construction vibration assessments, follow the recommended procedure in this step. Vibration source levels from typical construction equipment and operations are provided below, and procedures on how to estimate construction vibration for damage and annoyance are provided in Steps 3a and 3b, respectively.

- **Vibration Source Levels from Construction Equipment** – Table 7-4 presents average source levels in terms of velocity for various types of construction equipment measured under a wide variety of construction activities. The approximate rms vibration velocity levels were calculated from the PPV limits using a crest factor of 4, representing a PPV-rms difference of 12 dB. Note that although the table gives one level for each piece of equipment, there is considerable variation in reported ground vibration levels from construction activities. The data in Table 7-4 provide a reasonable estimate for a wide range of soil conditions.[66][67][68][69]

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**Table 7-4 Vibration Source Levels for Construction Equipment**

| Equipment | | PPV at 25 ft, in/sec | Approximate Lv* at 25 ft |
|---|---|---|---|
| Pile Driver (impact) | upper range | 1.518 | 112 |
| | typical | 0.644 | 104 |
| Pile Driver (sonic) | upper range | 0.734 | 105 |
| | typical | 0.17 | 93 |
| Clam shovel drop (slurry wall) | | 0.202 | 94 |
| Hydromill (slurry wall) | in soil | 0.008 | 66 |
| | in rock | 0.017 | 75 |
| Vibratory Roller | | 0.21 | 94 |
| Hoe Ram | | 0.089 | 87 |
| Large bulldozer | | 0.089 | 87 |
| Caisson drilling | | 0.089 | 87 |
| Loaded trucks | | 0.076 | 86 |
| Jackhammer | | 0.035 | 79 |
| Small bulldozer | | 0.003 | 58 |

* RMS velocity in decibels, VdB re 1 micro-in/sec

### 3a. Damage Assessment

Assess for building damage for each piece of equipment individually. Construction vibration is generally assessed in terms of peak particle velocity (PPV), as described in Section 5.1.

- Determine the vibration source level ($PPV_{ref}$) for each piece of equipment at a reference distance of 25 ft as described above and in Table 7-4.
- Use Eq. 7-2 to apply the propagation adjustment to the source reference level to account for the distance from the equipment to the receiver. Note that the equation is based on point sources with normal propagation conditions.

$$PPV_{equip} = PPV_{ref} \times (\frac{25}{D})^{1.5} \quad \textbf{Eq. 7-2}$$

where:

$PPV_{equip}$ = the peak particle velocity of the equipment adjusted for distance, in/sec
$PPV_{ref}$ = the source reference vibration level at 25 ft, in/sec
$D$ = distance from the equipment to the receiver, ft

**3b. Annoyance Assessment**

Assess for annoyance for each piece of equipment individually. Ground-borne vibration related to human annoyance is related to rms velocity levels, expressed in VdB as described in Section 5.1.

Estimate the vibration level ($L_v$) using Eq. 7-3.

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$$L_{v.distance} = L_{vref} - 30log(\frac{D}{25}) \quad \textbf{Eq. 7-3}$$

where:

$L_{v.distance}$ = the rms velocity level adjusted for distance, VdB
$L_{vref}$ = the source reference vibration level at 25 ft, VdB
$D$ = distance from the equipment to the receiver, ft

## Step 4: Assess Construction Vibration Impact

*Compare the predicted vibration levels from the Quantitative Construction Vibration Assessment with impact criteria to assess impact from construction vibration.*

Assess potential damage effects from construction vibration for each piece of equipment individually. Note that equipment operating at the same time could increase vibration levels substantially, but predicting any increase could be difficult. The criteria presented in this section should be used during the environmental impact assessment phase to identify problem locations that must be addressed during the engineering phase.

Compare the PPV and approximate $L_v$ for each piece of equipment determined in Section 7.2, Step 3 to the vibration damage criteria in Table 7-5, which is presented by building/structural category, to assess impact.[70][71] The approximate rms vibration velocity levels were calculated from the PPV limits using a crest factor of 4.

**Table 7-5 Construction Vibration Damage Criteria**

| Building/ Structural Category | PPV, in/sec | Approximate $L_v$* |
|---|---|---|
| I. Reinforced-concrete, steel or timber (no plaster) | 0.5 | 102 |
| II. Engineered concrete and masonry (no plaster) | 0.3 | 98 |
| III. Non-engineered timber and masonry buildings | 0.2 | 94 |
| IV. Buildings extremely susceptible to vibration damage | 0.12 | 90 |

*RMS velocity in decibels, VdB re 1 micro-in/sec

Compare the $L_v$ determined in Section 7.2, Step 3 to the criteria for the General Vibration Assessment in Section 6.2 to assess annoyance or interference with vibration-sensitive activities due to construction vibration.

## Step 5: Determine Construction Vibration Mitigation Measures

*Evaluate the need for mitigation and select appropriate mitigation measures where potential human impacts or building damage from construction vibration have been identified according to Section 7.2, Step 4.*

**5a.** Determine the appropriate approach for construction vibration mitigation considering equipment location and processes.

- **Design considerations and project layout**
  - Route heavily-loaded trucks away from residential streets. Select streets with the fewest homes if no alternatives are available.
  - Operate earth-moving equipment on the construction lot as far away from vibration-sensitive sites as possible.

- **Sequence of operations**
  - Phase demolition, earth-moving, and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration level produced could be substantially less when each vibration source operates separately.
  - Avoid nighttime activities. Sensitivity to vibration increases during the nighttime hours in residential neighborhoods.

- **Alternative construction methods**
  - Carefully consider the use of impact pile-driving versus drilled piles or the use of a sonic/vibratory pile driver or push pile driver where those processes might create lower vibration levels if geological conditions permit their use.
    - Pile-driving is one of the greatest sources of vibration associated with equipment used during construction of a project. The source levels in Table 7-4 indicate that sonic pile drivers may provide substantial reduction of vibration levels compared to impact pile drivers. But, there are some additional vibration effects of sonic pile drivers that may limit their use in sensitive locations.
    - A sonic pile driver operates by continuously shaking the pile at a fixed frequency, literally vibrating it into the ground. Continuous operation at a fixed frequency may, however, be more

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noticeable to nearby residents, even at lower vibration levels. Furthermore, the steady-state excitation of the ground may induce a growth in the resonant response of building components. Resonant response may be unacceptable in cases of fragile buildings or vibration-sensitive manufacturing processes. Impact pile drivers, however, produce a high vibration level for a short time (0.2 seconds) with sufficient time between impacts to allow any resonant response to decay.

- Select demolition methods involving little to no impact, where possible. For example, sawing bridge decks into sections that can be loaded onto trucks results in lower vibration levels than impact demolition by pavement breakers. Milling generates lower vibration levels than excavation using clam shell or chisel drops.
- Avoid vibratory rollers and packers near sensitive areas.

**5b.** Describe and commit to a mitigation plan that will be developed and implemented during the engineering and construction phase when the information available during the project development phase will not be sufficient to define specific construction vibration mitigation measures. The objective of the plan should be to minimize construction vibration damage using all reasonable and feasible means available. The plan should include the following components:

- A procedure for establishing threshold and limiting vibration values for potentially affected structures, based on an assessment of each structure's ability to withstand the loads and displacements due to construction vibrations
- A commitment to develop a vibration monitoring plan during the engineering phase and to implement a compliance monitoring program during construction

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SECTION 8

# Documentation of Noise and Vibration Assessment

The level of required documentation is determined according to the project class of action. Section 2.1 covers the appropriate class of action (EIS, EA, or CE) for different projects. If there is uncertainty in the appropriate level of documentation, contact the FTA Regional office.

The noise and vibration analysis must be articulated to the public in a clear, comprehensive manner for all levels of documentation. The technical data and information necessary to withstand scrutiny in the environmental review process must be documented in a way that remains intelligible to the public. Justification for all assumptions used in the analysis, such as selection of representative measurement sites and all baseline conditions, must be presented for review.

A separate technical report or memorandum is often prepared as a supplement to the environmental document. A technical report is appropriate in cases when including the data from the assessment would create an unreasonably long environmental document. The details of the analysis are important for establishing the basis for the assessment. Therefore, all details in the technical report should be contained in a well-organized format for easy access to the information.

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For large-scale projects, the environmental document should contain a summary of the essential analysis information to provide subject matter context and the analysis findings. For these projects, separate technical reports are usually prepared as supplements to the EIS or EA and referred to in the environmental document. For smaller projects, or projects with minimal noise or vibration impact, all of the technical information may be presented in the environmental document itself or in a technical memorandum. Other projects might have no potential for noise or vibration impacts. For those projects, that environmental documentation should explain that no noise or vibration impacts are expected.

This section provides guidance on presenting the necessary noise and vibration information in the environmental document (Section 8.1) and the associated technical report (Section 8.2).

## 8.1 Environmental Document

In the environmental document, provide a summary of the comprehensive noise and vibration information from the technical report and emphasize the salient points of the analysis in a format and style that the public can understand. Smaller projects may have all of the technical information contained within the environmental document, so take special care in summarizing the technical details to convey the information adequately.

## Step 1: Choose the Information to Include

*Choose the appropriate noise and vibration analysis information to include based on the level of environmental review and the associated documentation.*

**1a. Provide full disclosure of noise and vibration impacts** in the environmental document, including identification of locations where impacts cannot be mitigated below the severe impact level. In general, an EIS describes significant impacts and plans to mitigate the impacts. For EAs, completion of the environmental review with a finding of no significant impact (FONSI) may depend on mitigation being considered for incorporation in the proposed project. The way mitigation is presented in the environmental document depends on the type of impact (noise or vibration) and the stage of project development and environmental review. Projects that meet the criteria of a CE may also require the completion of a noise and/or vibration analysis, and the results of such an analysis should be documented in a noise memo or the CE documentation.

**1b. Document noise impacts** – Typically, airborne noise impacts can be accurately predicted during the environmental review. For projects that focus on a single alternative, noise impacts can be accurately identified in the draft environmental document. If mitigation is anticipated, then mitigation options should be explored in the EA or draft EIS; firm decisions on mitigation can be deferred to the final document. But for all projects, decisions on noise mitigation should be made before the final document is approved.

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**1c. Document vibration impacts** – Predicting vibration impacts accurately is more complex because ground-borne vibration may be strongly influenced by subsurface conditions. The geotechnical studies that reveal these conditions are normally undertaken during the engineering phase, after the environmental review process is complete. Therefore, the final environmental document will usually not be able to state with certainty whether mitigation is needed for ground-borne vibration and noise.

If the engineering phase is conducted at the same time as the final environmental document, report the results of the Detailed Vibration Analysis in the final environmental document. If the engineering phase is conducted after the final environmental document, report the results of the General Vibration Assessment in the final environmental document. If impact is determined, include a commitment in the final document to conduct a Detailed Vibration Analysis during the engineering phase to complete the impact assessment. Also, include a discussion on various control measures that could be used and the likelihood that the criteria could be met through the use of one or more of the measures. It may be possible to state a commitment in the final environmental document to adhere to the impact criteria for the Detailed Vibration Analysis, while deferring the selection of specific vibration control measures until the completion of detailed studies in the engineering phase. When work is conducted after FTA signs its final decision document (i.e., ROD, combined FEIS/ROD, or FONSI), additional documentation, such as a reevaluation of the previous decision, may be necessary. FTA recommends contacting the FTA Regional office directly in these situations.

**1d. Describe mitigation measures in the decision document** – After the decision document is approved, incorporate the mitigation measures by reference in the actual grant agreements signed by FTA and the project sponsor. The mitigation measures then become contractual conditions that must be adhered to by the project sponsor.

It is typically appropriate to include the following noise and vibration information in the environmental document, as described in Section 8.1:

- The existing conditions (affected environment)
- The direct impacts from operation (environmental consequences)
- The construction impacts (environmental consequences)

## Step 2: Organize information in the Environmental Document

*Include information in the following sections of the environmental document separating out the noise and vibration information.*

**2a. Existing Conditions (Affected Environment)** – Describe the existing conditions (conditions without the project) in terms of the existing noise and vibration conditions in this section of the document. The primary function of this section is to establish the focus and baseline conditions for the discussion of environmental impacts. Include the following basic information and separate the noise and vibration sections.

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- **Description of noise/vibration metrics, effects and typical levels** – Include a targeted summary of relevant information from Section 3 of this manual. This will serve as background for the discussions of noise/vibration levels and characteristics that will follow in later sections. Provide illustrative material to convey typical levels to the public.

- **Inventory of noise/vibration-sensitive sites** – Describe the approach for identifying noise- and vibration-sensitive sites as well as the identified sites and site descriptions. Use sufficient detail to demonstrate completeness. Document these results on a map.

- **Noise/vibration measurements** – Document the basis for selecting measurement sites, including tables of sites coordinated with maps showing locations of sites. Summarize the measurement approach and include the justification for the measurement procedures used.

  Present measurement data in well-organized tables and figures with a summary and interpretation of measured data. Measurements are often included in the table of measurement sites described in the previous paragraph. In some cases, measurements may be supplemented or replaced by collected data relevant to the noise and vibration characteristics of the area. For example, soil information for estimating ground-borne vibration propagation characteristics may be available from other projects in the area.

A summary and interpretation of how the collected data define the project setting is fundamental to this section.

**2b. Direct Impacts** – Include the following in the discussion on direct impacts due to project operation:

- **Overview of approach** – Provide a targeted summary of relevant information on the assessment procedure for determining noise/vibration impacts as a framework for the following sections.

- **Estimated noise/vibration levels** – Provide a general description of prediction models used to estimate project noise/vibration levels. Describe any distinguishing features unique to the project, such as source levels associated with various technologies.

  Describe the results of the predictions in general terms first, followed by a detailed accounting of predicted noise levels. Supplement this information with tables and illustrate by contours, cross-sections, or shaded mapping. If contours are included in a technical report, it is not necessary to repeat them in this section.

- **Criteria for noise/vibration impact** – Describe the impact criteria for the project in detail and reference the appropriate section in this manual. Include tables listing the criteria levels or the figures included in this manual.

- **Noise/vibration impact assessment** – Present the impact assessment in its own section or combined with the section above.

  Describe the locations, as identified in the screening procedure, where noise/vibration impact is expected to occur without implementation of mitigation measures, based on the screening results, predicted future levels, existing levels, and application of the impact criteria.

  Include inventory tables of impacted noise- and vibration-sensitive sites to quantify the impacts for all noise/vibration-sensitive sites included in the Affected Environment (Existing Conditions) as described in the Existing Conditions section above.

- **Noise/vibration mitigation measures** – Perhaps the greatest difference between the technical report and the environmental document is with mitigation. The technical report discusses mitigation options and recommendations, while the environmental document provides the vehicle for reaching decisions on appropriate mitigation measures.

  Begin this section with a summary of the noise/vibration mitigation measures considered for the impacted locations. Describe the specific measures selected for implementation in detail. Also, include any

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applicable, specific noise or vibration policies the project sponsor may have in place.

In cases where it is not possible to commit to a specific mitigation measure in the final environmental document, it may be possible to commit to a certain noise/vibration level. For example, the environmental document could include a commitment to meet or exceed the impact criteria specified in Sections 4.1 and 6.2.

- **Unavoidable adverse environmental effects** – If it is projected that adverse noise/vibration impacts will result after all reasonable abatement measures have been incorporated, identify these impacts in this section.

**2c. Construction Impacts** – Discuss construction impacts in the environmental document's section on construction impacts, if present. If, because of the scale of the project, the environmental document does not have a separate construction impacts section, then the construction impacts should be discussed with the rest of the resource impacts.

When a special section on construction noise/vibration impacts is included in the document, it should be organized according to the comprehensive outline on long-term impacts described above. For projects with relatively minor effects, include a brief summary of impact.

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## 8.2 Technical Report on Noise and Vibration

The technical report is intended to present complete technical data and descriptions in a manner that can be understood by the general public, but is more technical than the information found in the environmental document. All necessary background information should be present in the technical report, including tables, maps, charts, drawings, and references that may be too detailed for the environmental document, but which are important in helping to draw conclusions about the project's noise and vibration impacts and mitigation options.

Include the following major subject headings and key information described below. If both noise and vibration have been assessed, include separate sections for noise and vibration with subsections for key information as described below. Additional details on documentation requirements for the technical report of non-standard procedures and methodologies are included in Appendix G.

- **Overview** – Include a brief description of the project and an overview of the noise/vibration concerns to highlight initial considerations in framing the scope of the study.

- **Inventory of Noise/Vibration-Sensitive Sites** – Describe the approach for identifying noise- and vibration-sensitive sites as well as the identified sites and site descriptions. Use sufficient detail to demonstrate completeness. Document results on a map.

- **Measurements of Existing Noise/Vibration Conditions**
  - Document the basis for selecting measurement sites, including tables of sites coordinated with maps showing locations of sites. Summarize the measurement approach with justification for the measurement procedures used.
  - If the measurement data are used to estimate existing conditions at other locations, include the rationale and the method of estimation. Describe measurement procedures in detail.
  - Include tables of measurement instruments documenting manufacturer, type, serial number, and date of most recent calibration by authorized testing laboratory. Document measurement periods, including the time of day and length of time at each site to demonstrate adequate representation of ambient conditions.
  - Present measurement data in well-organized tables and figures with a summary and interpretation of measured data.

- **Additional Measurements Related to the Project** – Include detailed description of measurements and results for projects that require specialized measurements at noise- and vibration-sensitive sites. Examples include:
  - Outdoor-to-indoor noise level reduction of homes
  - Transmission of vibration into concert halls and recording studios
  - Special source-level characterization

- **Predictions of Noise/Vibration from the Project**
  - Describe the prediction model used to estimate future project conditions and specific data used as input to the models. Reference the appropriate section in this manual. Document any change or extension to the models recommended in this manual, so that the validity of the adjustments can be confirmed. See Appendix G for more information.
  - Describe in detail the modeled scenarios and why the scenarios were chosen.
  - Tabulate computed levels and illustrate by contours, cross-sections, or shaded mapping. Illustrate noise/vibration impacts with base maps at a scale with enough detail to provide reference for the location.

- **Noise/Vibration Criteria**
  - Describe the impact criteria for the project in detail and reference the appropriate section in this manual. Include tables specifying the criteria levels or the figures included in this manual.
  - If construction noise and/or vibration assessments were conducted, include the construction criteria in a separate section with the construction assessment details. See below for more information.

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Cont.

- **Noise/Vibration Impact Assessment**
  - Describe the impact assessment according to the appropriate noise and/or vibration impact assessment sections in this manual.
  - If an alternatives analysis was conducted, present a resulting impact inventory for each alternative mode or alignment in a format that allows comparison among alternatives.
  - Tabulate the inventory according to the different types of affected noise- and vibration-sensitive sites. Present the results of the assessment both before and after mitigation.

- **Noise/Vibration Mitigation**
  - Begin this section with a summary of all treatments considered, including those not carried to final consideration.
  - Consider final candidate mitigation treatments separately and provide a description of the features of the treatment, including costs, expected benefit in reducing impacts, locations where the benefit would be realized, and a discussion of the practicality of alternative treatments.
  - Include enough noise and vibration impact information to allow the project sponsor and FTA to reach decisions on mitigation prior to issuance of an environmental decision document.

- **Construction Noise/Vibration Impacts**
  - Describe criteria adopted for construction noise or vibration if construction noise and/or vibration assessments were conducted.
  - Describe the method used for predicting construction noise or vibration and include inputs to the models such as equipment roster by construction phase, equipment source levels, assumed usage factors, and other assumed site characteristics.
  - Present predicted levels for noise- and vibration-sensitive sites and identify short-term impacts.
  - In cases where construction impacts are identified, discuss feasible abatement methods using enough detail to allow construction contract documents to include mitigation measures.

- **References** – Provide references for all criteria, approaches, and data used in the analyses, as well as other reports related to the project that may be relied on for information, e.g., geotechnical reports.

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Cont.

# Appendix A: Glossary of Terms

Terminology used through the manual is defined in this appendix.[49][72]

| | |
|---|---|
| A-weighting | A standardized filter used to alter the sensitivity of a sound level meter with respect to frequency so that the instrument is less sensitive at low and high frequencies where the human ear is less sensitive. Abbreviated as dBA. |
| Absolute Noise Impact | Noise that interferes with activities independent of existing noise levels and is expressed as a fixed level threshold. |
| Accelerometer | A transducer that converts vibratory motion to an electrical signal proportional to the acceleration of that motion. |
| Ambient | The pre-project background noise or vibration level, which is often used interchangeably with "existing noise" in this manual. |
| Amplitude | Difference between the extremes of an oscillating signal. |
| Alignment | The horizontal location of a railroad or transit system as described by curved and tangent track. |
| At-grade | Tracks on the ground surface. |
| Automated Guideway Transit (AGT) | Guided steel-wheel or rubber-tired transit passenger vehicles operating singly or in multi-car trains with a fully automated system on fixed-guideways along an exclusive ROW. AGT includes personal rapid transit, group rapid transit, and automated people mover systems. |
| Auxiliaries | The term applied to a number of separately driven machines, operated by power from the main engine or electric generation. They include the air compressor, radiator fan, traction motor blower, and air conditioning equipment. |
| Ballast mat | A 2- to 3-inch-thick elastomer mat placed under the normal track ballast on top of a rigid slab or packed sub-grade. |
| Ballast | Granular material placed on the trackbed for the purpose of holding the track in line and at surface. |
| Bus Rapid Transit (BRT) | A type of limited-stop bus operation that relies on technology to help speed up the service. Buses can operate on exclusive transitways, high-occupancy-vehicle lanes, expressways, or ordinary streets. |
| Catenary | On electric railroad and LRT systems, the term describing the overhead conductor that is contacted by the pantograph or trolley, and its support structure. |
| Commuter rail | Conventional passenger railroad serving areas surrounding an urban center. Most commuter railroads utilize locomotive-hauled coaches, often in push-pull configuration. |
| Consist | The total number and type of cars, locomotives, or transit vehicles in a trainset. |
| Continuous welded rail | A number of rails welded together to form unbroken lengths of track without gaps or joints. |
| Corrugated rail | A rough condition of alternating ridges and grooves which develops on the rail head in service. |
| Crest factor | The ratio of peak particle velocity to maximum RMS amplitude in an oscillating signal. |
| Criteria | Plural form of "criterion," the relationship between a measure of exposure (e.g., sound or vibration level) and its corresponding effect. |
| Cross tie | The transverse member of the track structure to which the rails are spiked or otherwise fastened to provide proper gage and to cushion, distribute, and transmit the stresses of traffic through the ballast to the trackbed. |
| Crossover | Two turnouts with the track between the frogs arranged to form a continuous passage between two nearby and generally parallel tracks. |
| Cumulative | The summation of individual sounds into a single total value related to the effect over time. |
| Cut | A terrain feature typically created to allow for a trackbed to be at a lower level than the surrounding ground. |

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| | |
|---|---|
| dB | See Decibel. |
| dBA | See A-weighting. |
| Decibel | The standard unit of measurement for sound pressure level and vibration level. Technically, a decibel is the unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm of this ratio. Abbreviated as dB. |
| DMU | Diesel-powered multiple unit. See Multiple Unit. |
| DNL | See $L_{dn}$. |
| Electrification | A term used to describe the installation of overhead wire or third rail power distribution facilities to enable operation of trains. |
| Embankment | A bank of earth, rock, or other material constructed above the natural ground surface. |
| Equivalent level | The level of a steady sound, which, in a stated time period and at a stated location, has the same sound energy as the time-varying sound. Also, written as $L_{eq}$. |
| Event | A passby of a vehicle (e.g., train, bus, or car) of any size consist. |
| Ferry boat | A transit mode comprised of vessels to carry passengers and/or vehicles over a body of water. |
| Fixed-guideway | A public transportation facility with a separate ROW for the exclusive use of public transportation and other high-occupancy vehicles. |
| Flange | The vertical projection along the inner rim of a wheel that serves, together with the corresponding projection of the mating wheel of a wheel set, to keep the wheel set on the track. |
| Floating slab | A special track support system for vibration isolation, consisting of concrete slabs supported on resilient elements, usually rubber or similar elastomer. |
| Force density | Force density is the force per root distance along the track in $lb/ft^{1/2}$. The force density level is the level in decibels of the force density relative to 1 $lb/ft^{1/2}$ and describes the vehicle force that excites the soil/rock surrounding the transit structure. |
| Frequency | The number of times that a periodically occurring quantity repeats itself in a specified period. With reference to noise and vibration signals, the number of cycles per second. |
| Frequency spectrum | Distribution of frequency components of a noise or vibration signal. |
| Frog | A track structure used at the intersection of two running rails to provide support for wheels and passageways for their flanges, thus permitting wheels on either rail to cross the other. |
| Gage (of track) | The distance between the rails on a track. |
| Grade crossing | The point where a rail line and a motor vehicle road intersect at the same vertical elevation. |
| Guideway | Supporting structure to form a track for rolling or magnetically-levitated vehicles. |
| Head-End Power (HEP) | A system of furnishing electric power for a complete railway train from a single generating plant in the locomotive. |
| Heavy rail | See Rail Rapid Transit. |
| Hertz (Hz) | The unit of acoustic or vibration frequency representing cycles per second. |
| Hourly average sound level | The time-averaged A-weighted sound level, over a 1-hour period, usually calculated between integral hours. Abbreviated as $L_{(1h)}$. |
| Hybrid Bus | A rubber-tired vehicle that features a hybrid diesel-electric propulsion system. A diesel engine runs an electric generator that powers the entire vehicle including electric drive motors that deliver power to the wheels. |
| Idle | The speed at which an engine runs when it is not under load. |
| Intermediate Capacity Transit (ICT) | A transit system with less capacity than rail rapid transit (RRT), but more capacity than typical bus operations. Examples of ICT include bus rapid transit (BRT), automated guideway transit (AGT), monorails, and trolleys. |
| Intermodal facility | Junction of two or more modes of transportation where transfers may occur. |
| Jointed rail | A system of joining rails with steel members designed to unite the abutting ends of contiguous rails. |

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| | |
|---|---|
| $L_{(1h)}$ | See Hourly Average Sound Level. |
| $L_{dn}$ | Day-Night Sound Level. The sound exposure level for a 24-hour day calculated by adding the sound exposure level obtained during the daytime (7 a.m. to 10 p.m.) to 10 times the sound exposure level obtained during the nighttime (10 p.m. to 7 a.m.). This unit is used throughout the United States for environmental impact assessment. Also, written as DNL. |
| $L_{eq(1hr)}$ | Equivalent Sound Level. The metric for cumulative noise exposure over a specific time interval is the equivalent sound level |
| Light Rail Transit (LRT) | A mode of public transit with tracked vehicles in multiple units operating in mixed traffic conditions on streets as well as sections of exclusive ROW. Vehicles are generally powered by electricity from overhead lines. |
| Locomotive | A self-propelled, non-revenue rail vehicle designed to convert electrical or mechanical energy into tractive effort to haul railway cars. See also Power Unit. |
| Main line | The principal line or lines of a railway. |
| Maglev | Magnetically-levitated vehicle; a vehicle or train of vehicles with guidance and propulsion provided by magnetic forces. Support can be provided by either an electrodynamic system wherein a moving vehicle is lifted by magnetic forces induced in the guideway or an electromagnetic system wherein the magnetic lifting forces are actively energized in the guideway. |
| Maximum sound level | The highest exponential-time-average sound level, in decibels, that occurs during a stated time period. Abbreviated as $L_{max}$. The standardized time periods are 1 second for $L_{max}$, slow, and 0.125 second for $L_{max}$, fast. |
| Metric | Measurement value or a quantitative descriptor used to identify a specific measure of sound level. |
| Monorail | Guided transit vehicles operating on or suspended from a single rail, beam, or tube. |
| Multimodal Project | In this manual, the term multimodal project is used to describe a project that includes changes to both transit and highway components in segments of the project. |
| Multiple Unit (MU) | A term referring to the practice of coupling two or more diesel-powered or electric-powered passenger cars together with provision for controlling the traction motors on all units from a single controller. |
| Noise | Any disagreeable or undesired sound or other audible disturbance. |
| Octave band | A standardized division of a frequency spectrum in which the interval between two divisions is a frequency ratio of 2. |
| One-third octave band | A standardized division of a frequency spectrum in which the octave bands are divided into thirds for more detailed information. The interval between center frequencies is a ratio of 1.25. |
| Pantograph | A device for collecting current from an overhead conductor (catenary), consisting of a jointed frame held up by springs or compressed air and having a current collector at the top. |
| Park-and-ride facility | A parking garage and/or lot used for parking passengers' automobiles while they use transit agency facilities and vehicles. |
| Peak factor | See Crest factor. |
| Plan-and-profile | Mapping used by transportation planners that shows two-dimensional plan views (x- and y- axes) on the same page as two-dimensional profiles (x- and z-axes) of a road or track. |
| Peak Particle Velocity (PPV) | The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States. |
| Peak-to-Peak (P-P) Value | Of an oscillating quantity, the algebraic difference between the extreme values of the quantity. |
| Power unit | A self-propelled vehicle, running on rails and having one or more electric motors that drive the wheels and thereby propel the locomotive and train. The motors obtain electrical energy either from a rail laid near, but insulated from, the track rails, or from a wire suspended above the track. Contact with the overhead wire is made by a pantograph mounted on top of the unit. |
| Project segment | Portions of a project with similar characteristics. |

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| | |
|---|---|
| Pure tone | Sound of a single frequency. |
| Radius of curvature | A measure of the severity of a curve in a track structure based on the length of the radius of a circle that would be formed if the curve were continued. |
| Rail | A rolled steel shape, commonly a T-section, designed to be laid end to end in two parallel lines on cross ties or other suitable supports to form a track for railway rolling stock. |
| Rail Rapid Transit (RRT) | Often called "Heavy Rail Transit." A mode of public transit with tracked vehicles in multiple units operating in exclusive rights-of-way. Trains are generally powered by electricity from a third rail alongside the track. |
| Receiver | A stationary far-field position at which noise or vibration levels are specified. |
| Relative Noise Impact | Noise increase above existing levels. |
| Resonance frequency | The phenomenon that occurs in a structure under conditions of forced vibration such that any change in frequency of excitation results in a decrease in response. |
| Right-of-Way | Abbreviated as ROW. Lands or rights used or held for railroad or transit operation. |
| Root Mean Square (rms) | The square root of the mean-square value of an oscillating waveform, where the mean-square value is obtained by squaring the value of amplitudes at each instant of time and then averaging these values over the sample time. |
| RMS Velocity Level (LV) | See Vibration Velocity Level. |
| SEL | See Sound Exposure Level. |
| Sound Exposure Level | The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second. Abbreviated as SEL. |
| Sound | A physical disturbance in a medium that is capable of being detected by the human ear. |
| Spectrum | See Frequency Spectrum. |
| Sub-ballast | Any material of a superior character, which is spread on the finished subgrade of the roadbed and below the top-ballast, to provide better drainage, prevent upheaval by frost, and better distribute the load over the roadbed. |
| Subgrade | The finished surface of the roadbed below the ballast and track. |
| Suburban bus | A bus similar to an intercity bus with high-backed seats but no luggage compartment, often used in express mode to city centers from suburban locations. |
| Switch | A track structure used to divert rolling stock from one track to another. |
| Tangent track | Track without curvature. |
| Track | An assembly of rail, ties, and fastenings over which cars, locomotives, and trains are moved. |
| Traction motor | A specially designed direct current series-wound motor mounted on the trucks of locomotives and self-propelled cars to drive the axles. |
| Trainset | A group of coupled cars including at least one power unit. |
| Transducer | Device designed to receive an input signal of a given kind (motion, pressure, heat, etc.) and to provide an output signal of a different kind (electrical voltage, amperage, etc.) in such a manner that desired characteristics of the input signal appear in the output signal for measurement purposes. |
| Transfer mobility | Transfer mobility is the complex velocity response produced by a point force as a function of frequency and represents the relationship between a vibration source that excites the ground and the resulting vibration of the ground surface. |
| Transit center | A fixed location where passengers interchange from one route or vehicle to another. |
| Trolley bus | A rubber-tired, electrically-powered bus operating on city streets drawing power from overhead lines. |
| Truck | The complete assembly of parts including wheels, axles, bearings, side frames, bolster, brake rigging, springs, and all associated connecting components, the function of which is to provide support, mobility, and guidance to a railroad car or locomotive. |
| Trunk line | See Mainline. The mainline of a commuter railroad where the branch line traffic is combined. |

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| | |
|---|---|
| Turnout | An arrangement of a switch and a frog with closure rails, by means of which rolling stock may be diverted from one track to another. |
| VdB | See Vibration Velocity Level. |
| Vibration Velocity Level (LV) | Ten times the common logarithm of the ratio of the square of the amplitude of the RMS vibration velocity to the square of the amplitude of the reference RMS vibration velocity. The reference velocity in the United States is one micro-inch per second. Abbreviated as VdB. |
| Vibration | An oscillation wherein the quantity is a parameter that defines the motion of a mechanical system. |
| Wheel flat | A localized flat area on a steel wheel of a rail vehicle, usually caused by skidding on steel rails, causing a discontinuity in the wheel radius. |
| Wheel squeal | The noise produced by wheel-rail interaction, particularly on curves where the radius of curvature is smaller than allowed by the separation of the axles in a wheel set. |

Additional, relevant acoustic terminology and formulas are defined in ANSI S1.1-1994 (49).

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Cont.

# Appendix B: Fundamentals of Noise

Noise is generally considered to be unwanted sound. Sound is what we hear when our ears are exposed to small pressure fluctuations in the air. There are many ways in which pressure fluctuations are generated, but typically they are caused by vibrating movement of a solid object. This manual uses the terms noise and sound interchangeably because there is no physical difference between them. Noise can be described in terms of three variables: amplitude (loud or soft); frequency (pitch); and time pattern (variability).

## B.1 Amplitude

The loudness of a sound is described by the sound wave's amplitude of pressure fluctuations above and below atmospheric pressure. Pressure is measured in Pascals. The mean value of the positive and negative pressure fluctuations is the static atmospheric pressure and is not a useful metric of sound. However, the effective magnitude of the sound pressure in a sound wave can be expressed by the rms of the oscillating pressure. See Figure B-1 for an illustration of the rms pressure.

The rms pressure is calculated according to Eq. B-1. The values of sound pressure are squared and time-averaged to smooth out variations. The rms pressure is the square root of this time-averaged value.

$$P_{rms} = \sqrt{\frac{1}{N}\sum_{i=1}^{N} P_i^2} \qquad \textbf{Eq. B-1}$$

where:

$P_{rms}$ = sound pressure
$P_i$ = individual sound pressure
$N$ = number of samples
$i = 1$ = index of summation

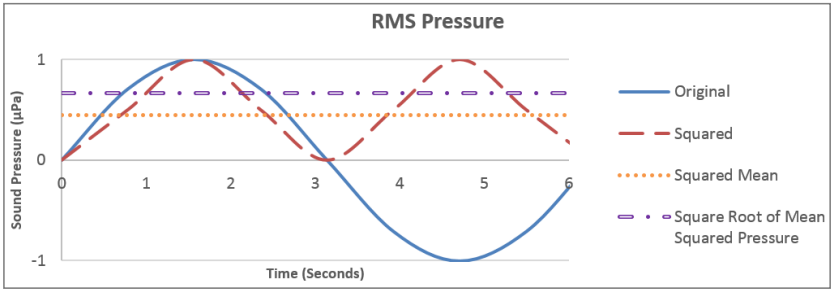


**Figure B-1 RMS Pressure Illustration**

Most humans with typical or average hearing can perceive sounds ranging from approximately 20 microPascals to 20 million microPascals or more. Because of the difficulty in dealing with such an extreme range of numbers, acousticians use a logarithmic scale to describe sound levels. Acousticians use a compressed scale based on logarithms of the ratios of the sound energy contained in the wave related to the square of sound pressures instead of the sound pressures themselves, resulting in the "sound pressure level" in decibels (dB). The 'B' in dB is always capitalized because the unit is named after Alexander Graham Bell, a leading 19th century innovator in communication.

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Sound pressure level ($L_p$) is defined as:

$$L_p = 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}); or$$

$$L_p = 20log_{10}(\frac{P_{rms}}{P_{ref}})\ dB \qquad \textbf{Eq. B-2}$$

where

$L_P$ = sound pressure level, dB
$P_{rms}$ = RMS sound pressure
$P_{ref}$ = 20 microPascals

Inserting the range of sound pressure values mentioned above into Eq. B-2 results in a typical quietest sound at 20 microPascals at 0 dB. A typical loudest sound of 20 million microPascals is 120 dB.

## B.1.1 Decibel Addition

The combination of two or more sound pressure levels at a single location requires decibel addition, which is the addition of logarithmic quantities of sound energy ($P^2_{rms}$).

To add sound energy from multiple, unique sources, add the sound energy as shown Eq. B-3.

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$$L_p = 10log_{10}(\frac{{P_1}^2 + {P_2}^2 + \cdots + {P_n}^2}{P_{ref}^2}) \qquad \textbf{Eq. B-3}$$

where

$L_P$ = sound pressure level, dB
$P_1, P_2, P_n$ = individual source RMS sound pressures to add
$P_{ref}$ = 20 microPascals

A doubling of identical sound sources results in a 3-dB increase, as shown mathematically below.

$$L_p = 10log_{10}(2\frac{p_{rms}^2}{p_{ref}^2})$$

$$= 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}) + 10log_{10}(2)$$

$$= 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}) + 3$$

To add decibel levels (instead of sound energy) use the following equation:

$$L_p = 10log_{10}(\sum_{i=1}^{N} 10^{(L_i/10)})$$

where

$L_p$ = sound pressure level, dB
$N$ = number of samples
$i$ = index of summation
$L_i$ = individual sound pressure levels, dB
$L_P$ = sound pressure level, dB
$L_1, L_{2,} L_n$ = individual source sound pressure levels to add

The equation above can be rewritten as follows:

$$L_p = 10log_{10}(10^{\frac{L_1}{10}} + 10^{\frac{L_2}{10}} + \cdots + 10^{\frac{L_n}{10}}) \quad \textbf{Eq. B-4}$$

where

$L_1, L_{2,} L_n$ = individual source sound pressure levels to add

Decibel addition can be quickly approximated using Figure B-2.

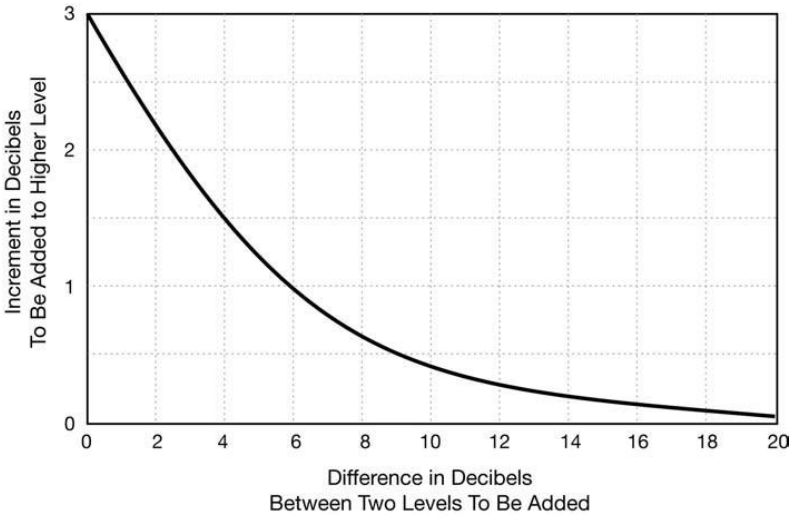


**Figure B-2 Graph for Approximate Decibel Addition**

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### Example B-1 Decibel Addition – Identical Buses

**Decibel Addition**

What is the combined sound pressure level of two identical buses if the noise from one bus resulted in a sound pressure level of 70 dB?

Since a doubling of identical sound sources results in a 3-dB increase:

$$L_p = 70 + 3$$
$$= 73\ dB$$

### Example B-2 Decibel Addition – Two Sources

**Decibel Addition**

What is the combined sound pressure level of 64 dB and 60 dB?

**Using Eq. B-4:**

$$L_p = 10log_{10}(10^{64/10} + 10^{60/10})$$
$$= 65.5\ dB$$

**Using Figure B-2:**
The x-axis values represent the difference between the two sound levels, 64 and 60 dB. The difference between the sound levels in this example is 4. The point on the curve corresponding to 4 on the x-axis is 1.5. The y-axis values represent the increment that is added to the higher level.

$$L_p = 64 + 1.5$$
$$= 65.5\ dB$$

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## B.1.2 Frequency

Sound is a fluctuation of air pressure. The number of times the fluctuation occurs in one second is called its frequency. In acoustics, frequency is quantified in cycles per second, or Hertz (Hz). The hearing for a typical human covers the frequency range from 20 Hz to 20,000 Hz.

Some sounds, like whistles, are associated with a single frequency; this type of sound is called a pure tone. However, most often, noise is made up of many frequencies, called a spectrum. Analyzing a noise spectrum allows for identification of dominant frequency ranges and can assist in identifying noise sources. Often a frequency spectrum is divided into standardized frequency bands for analysis. Most commonly, the frequency bands for transit analyses are octave bands (where the interval between two divisions is a frequency ratio of 2) and one-third octave bands (where the interval between center frequencies is a ratio of 1.25).[73]

If the spectrum associated with a transit noise source is dominated by many low-frequency components, the noise will have a characteristic like the rumble of thunder; this is often associated with noise from a subway. Mid-range frequencies are often associated with wheel/rail noise, and high frequencies may be associated with wheel squeal due to sharp curves on a track.

The spectrum in Figure B-3 illustrates the full range of acoustical frequencies that can occur near a transit system. In this example, the noise spectrum was measured near a train on an elevated steel structure with a sharp curve.

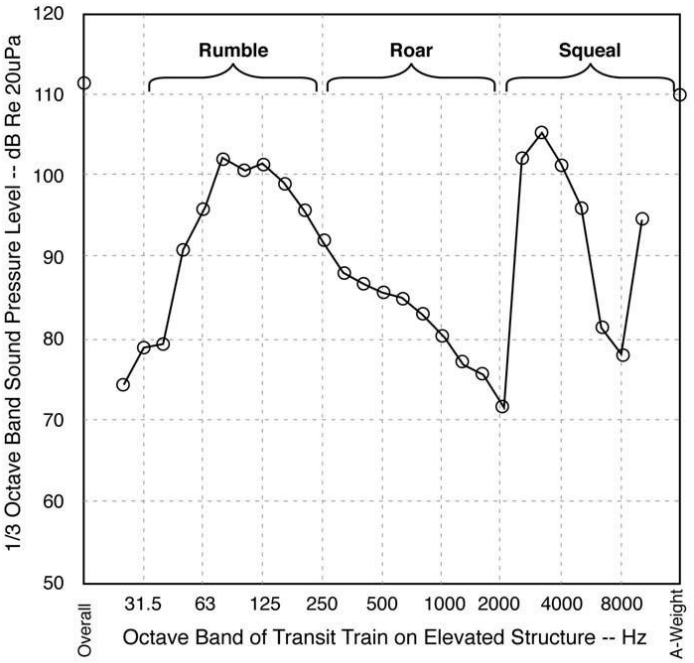


**Figure B-3 Noise Spectrum of Transit Train on Curve and Elevated Structure**

The human auditory system does not respond equally to all frequencies of sound. For sounds normally heard in our environment, low frequencies below 250 Hz and frequencies above 10,000 Hz are generally considered less audible than the frequencies in between. This is because our ears are less sensitive in those areas. To better represent human hearing, frequency response functions were developed to characterize the way people respond to different frequencies. These are referred to as A-, B-, and C-weighted curves and represent human auditory response to normal, very loud, and extremely loud sound levels, respectively. Environmental noise is generally considered to be in the normal sound level range; and, therefore, the A-weighted sound level is considered best to represent the human response.

The A-weighting curve is shown in Figure B-4. This curve illustrates that sounds at 50 Hz would have to be amplified by 30 dB to be perceived as loud as a sound at 1000 Hz at normal sound levels.

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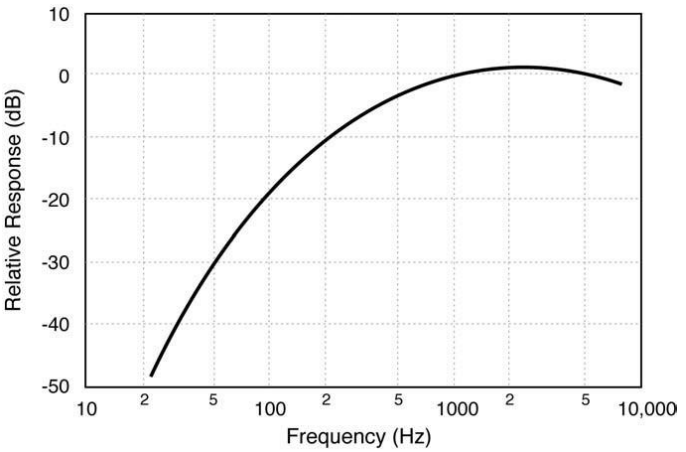


**Figure B-4 A-Weighting Curve**

Low frequencies have longer wavelengths of sound (cycles are less frequent) and, conversely, high frequencies have shorter wavelengths (cycles are more frequent). The size of the wavelength in feet is dependent on frequency and speed of sound as follows:

$$f\lambda = c \qquad \textbf{Eq. B-5}$$

01-31 Cont.

where

$f$ = frequency in cycles per second, Hz
$\lambda$ = wavelength, ft
$c$ = speed of sound, ft/sec

The speed of sound in air varies with temperature; but at standard conditions, it is approximately 1000 ft per second. Therefore, at standard conditions, a frequency of 1000 Hz has a wavelength of 1 foot and a frequency of 50 Hz has a wavelength of 20 ft. The scale of these waves explains, in part, the reason humans perceive sounds of 1000 Hz better than those of 50 Hz. A wavelength of 1 foot is similar to the size of a person's head; whereas, a wavelength of 20 ft is similar to dimensions associated with a house, which is why low-frequency sounds (such as those from an idling locomotive) are sometimes not attenuated by walls and windows of a home. These sounds transmit indoors with relatively little reduction in strength.

## B.1.3 Time Pattern

The third important characteristic of noise is its variation in time. Environmental noise is considered to be a combination of all outdoor noise sources. When combined, sources such as distant traffic, wind in trees, and distant industrial or farming activities often create a low-level background noise in which no particular individual source is identifiable. Background noise is often relatively constant from moment to moment, but varies slowly over time as natural forces change or as human activity follows its daily cycle. In addition to this low-level, slowly varying background noise, a succession of identifiable noisy events of relatively brief duration may be added. These events may include single-vehicle passbys, aircraft flyovers,

screeching of brakes, and other short-term events, which all cause the noise level to substantially fluctuate from moment to moment.

It is possible to describe these fluctuating noises in the environment using single-number metrics to allow for manageable measurements, computations, and impact assessment. The search for adequate single-number noise metrics has encompassed hundreds of attitudinal surveys and laboratory experiments in addition to decades of practical experience with many alternative metrics.

## B.1.4 Noise Metrics

The noise metrics referred to in this manual are described in the sections below.

### B.1.4.1 A-weighted Sound Level: The Basic Noise Unit

The basic noise unit for transit noise is the A-weighted sound level and is described in ANSI S1.1-1994 (49). It describes the noise level at the receiver at any moment in time and can be read directly from noise-monitoring equipment when frequency weighting is set to A-weighting. Figure B-5 shows examples of typical A-weighted sound levels for both transit and non-transit sources, ranging from approximately 30 dBA (very quiet) to 90 dBA (very loud).

The unit dBA denotes the decibel level is A-weighted. The letter "A" indicates that the sound has been filtered to reduce the strength of very low and very high-frequency sounds to emulate the human response to sound levels as described in Appendix B.1.2. This allows for events that are out of the range of human hearing, such as high-frequency dog whistles and low-frequency seismic disturbances, to be filtered out. On average, each A-weighted sound level increase of 10 dB corresponds to an approximate doubling of subjective loudness.

01-31 Cont.

A-weighted sound levels are adopted as the basic noise unit for transit noise impact assessments because they:

- Can be measured easily,
- Approximate the human ear's sensitivity to sounds of different frequencies,
- Match attitudinal-survey tests of annoyance better than other basic units,
- Have been in use since the early 1930s, and
- Are endorsed as the proper basic unit for environmental noise by most agencies concerned with community noise throughout the world.

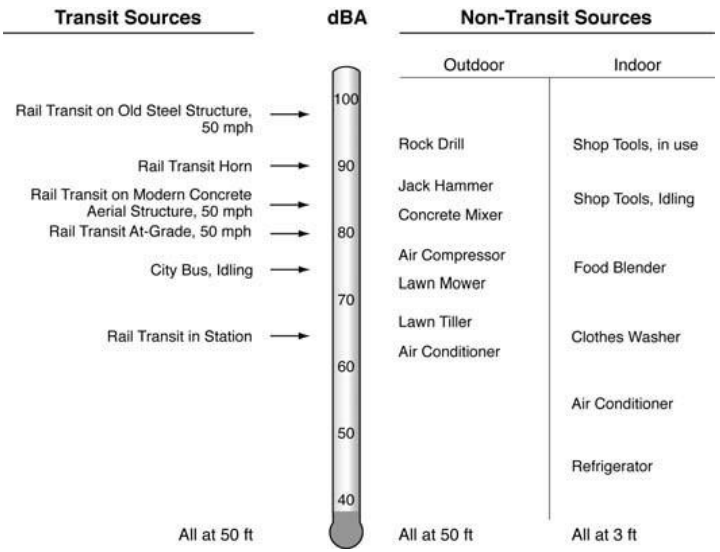


**Figure B-5 Typical A-weighted Sound Levels**

## B.1.4.2 Maximum Sound Level ($L_{max}$) During a Single Noise Event

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As a transit vehicle approaches, passes by, and then recedes into the distance, the A-weighted sound level rises, reaches a maximum, and then fades into the background noise. The maximum A-weighted sound level reached during this passby is called the maximum sound level, [49] abbreviated here as $L_{max}$. $L_{max}$ is illustrated in Figure B-6 where time is plotted horizontally, and A-weighted sound level is plotted vertically.

Although $L_{max}$ is commonly used in vehicle-noise specifications,[xvi] it is not used for transit environmental noise impact assessment. $L_{max}$ does not include the number and duration of transit events, which are important for assessing people's reactions to noise. It also cannot be normalized to a one-hour or 24-hour cumulative measure of impact, and therefore, is not conducive to comparison among different transportation modes. For example, cumulative noise metrics commonly used in highway noise assessments are $L_{eq(1hr)}$ and $L_{10}$, the noise level exceeded for 10 percent of the peak hour.

[xvi] For noise compliance tests of transient sources, such as moving transit vehicles under controlled conditions with smooth wheel and rail conditions, $L_{max}$ is typically measured with the sound level meter's time weighting set to "fast." However, for tests of continuous or stationary transit sources, it is usually more appropriate to use the "slow" setting. When set to "slow," sound level meters ignore some of the very-transient fluctuations, which are negligible when assessing the overall noise level.

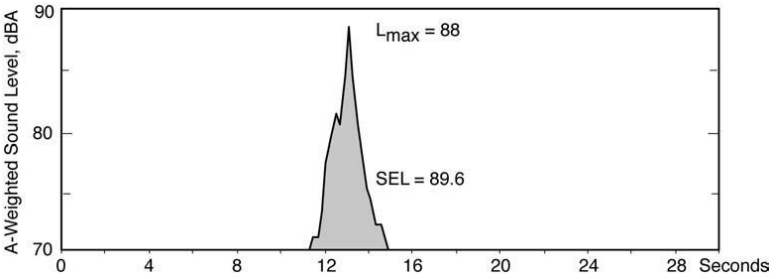


**Figure B-6 Typical Transit-Vehicle Passby**

## B.1.4.3 Sound Exposure Level (SEL): Exposure from a Single Noise Event

Sound exposure level, abbreviated here as SEL, is the cumulative noise exposure from a single noise event, normalized to one second (49). SEL contains the same overall sound energy as the actual varying sound energy during the event. It is the primary metric for the measurement of transit vehicle noise emissions and an intermediate metric in the measurement and calculation of both $L_{eq(1hr)}$ and $L_{dn}$. The SEL metric is A-weighted and is expressed in the unit dBA.

This concept is illustrated in Figure B-6 and Figure B-7 where the shaded regions are the sound exposure during and event. The example in Figure B-6 is a transit-vehicle passby and Figure B-7 is an example of a fixed-transit facility as a transit bus is started, warmed up, and then driven away. For this event, the noise exposure is large due to duration of the event.

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Cont.

SEL is an A-weighted cumulative measure that is referenced to one second. Louder events have greater SELs than quieter events, and events of longer duration have greater SELs than shorter events. This is generally consistent with community response to noise. Noise events of longer duration are considered more disruptive than events of shorter duration with equal maximum A-weighted sound levels.

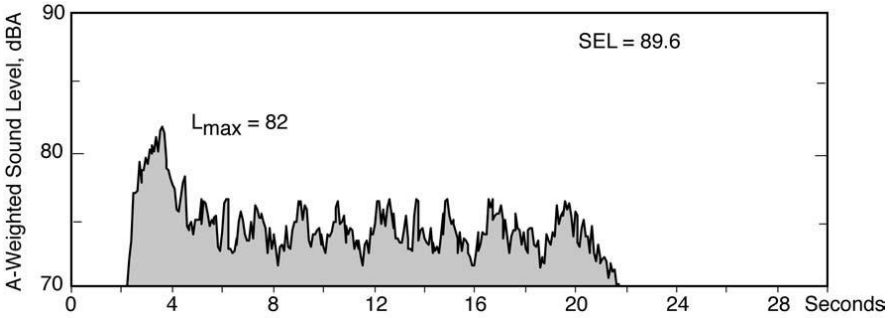


**Figure B-7 Typical Fixed-Facility Noise Event**

Conceptually, the sound exposure level can be expressed as:

$$SEL = 10log_{10}(\frac{Total\ sound\ energy}{during\ the\ event})$$

Mathematically, the sound exposure level is computed as follows:

$$SEL = 10log_{10}(\sum_{i=1}^{N} 10^{(L_i/10)}) \quad \textbf{Eq. B-6}$$

where

$SEL$ = Sound exposure level, dBA
$N$ = number of samples
$i$ = index of summation
$L_i$ = individual A-weighted sound level, dBA

The events shown in Figure B-6 and Figure B-7 are compared graphically in Figure B-8 using a logarithmic vertical scale. The shaded zones in these figures indicate noise exposure over time. The actual event shows the noise exposure over the time of the event, and the equivalent SEL shows the total noise exposure normalized to one second. Note that events 1 and 2 in Figure B-8 have different time periods and noise levels throughout the event, but the same resulting SEL.

SEL is used in transit noise analyses because it:

1. Accounts for both the duration and amplitude of an event,
2. Allows a uniform assessment method for both transit-vehicle passbys and fixed-facility noise events, and
3. Can be used to calculate the one-hour and 24-hour cumulative metrics for comparison across different transportation modes.

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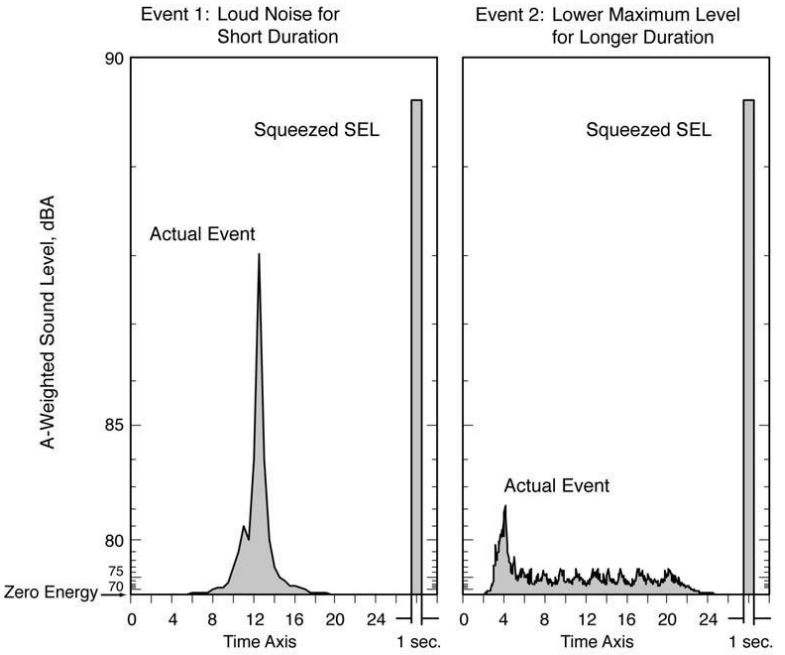


**Figure B-8 An Energy View of Noise Events**

## B.1.4.4 Equivalent Sound Level ($L_{eq(t)}$)

The metric for cumulative noise exposure over a specific time interval is the equivalent sound level (49). It is a single decibel value that accounts for total sound energy from all sound levels over a specified time interval (or time period). The time period associated with the equivalent sound level metric can vary for different types of analyses. This metric is abbreviated as $L_{eq(t)}$, where "t" is the duration of the time period. $L_{eq(t)}$ represents a hypothetical constant sound level and contains the same overall sound energy as the actual varying sound energy during the time period "t". For most transit noise analyses, an A-weighted, hourly equivalent sound level is used, abbreviated here as $L_{eq(1hr)}$. $L_{eq(1hr)}$ is expressed in the unit, dBA.

Figure B-9 shows examples of typical unmitigated hourly $L_{eq(1hr)}$'s, both for transit and non-transit sources ranging from 40 (quiet) to 80 dB (loud). Note that these $L_{eq(1hr)}$'s depend upon both the number of events during the hour as well as each event's duration, which is affected by vehicle speed. For example, doubling the number of events during the hour will increase the $L_{eq(1hr)}$ by 3 decibels, as will doubling the duration of each individual event.

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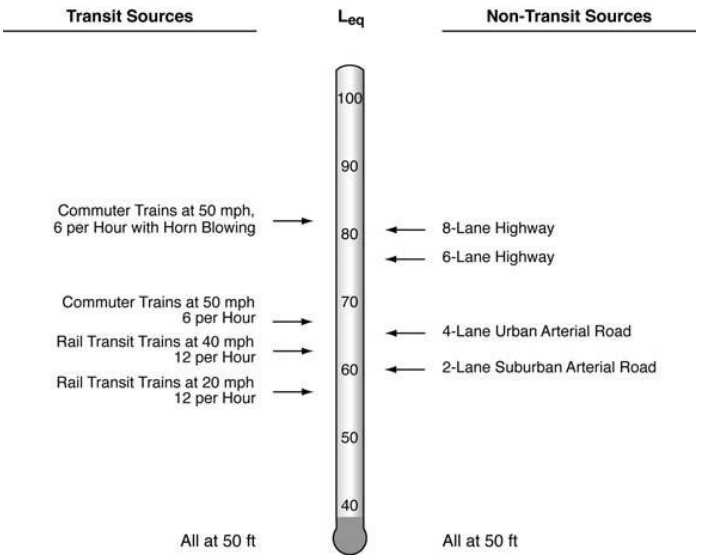


**Figure B-9 Typical Hourly $L_{eq(1hr)}$'s**

An example of sound levels over time for a single noise event such as a train passing on nearby tracks is illustrated in the top frame of Figure B-10. As the train approaches, passes by, and then recedes into the distance, the A-weighted sound level rises, reaches a maximum, and then fades into the background noise. The equivalent sound level is shown for three different time periods Figure B-10. The area under the curve in this top frame is the noise that reaches the receiver (noise exposure) over this five-minute period. The center frame of the figure shows sound levels over the one-hour period, including the five-minute period from the top frame. The area under the curve represents the noise exposure for one hour. The bottom frame shows sound levels over a full 24-hour period and is discussed in Appendix B.1.4.5.

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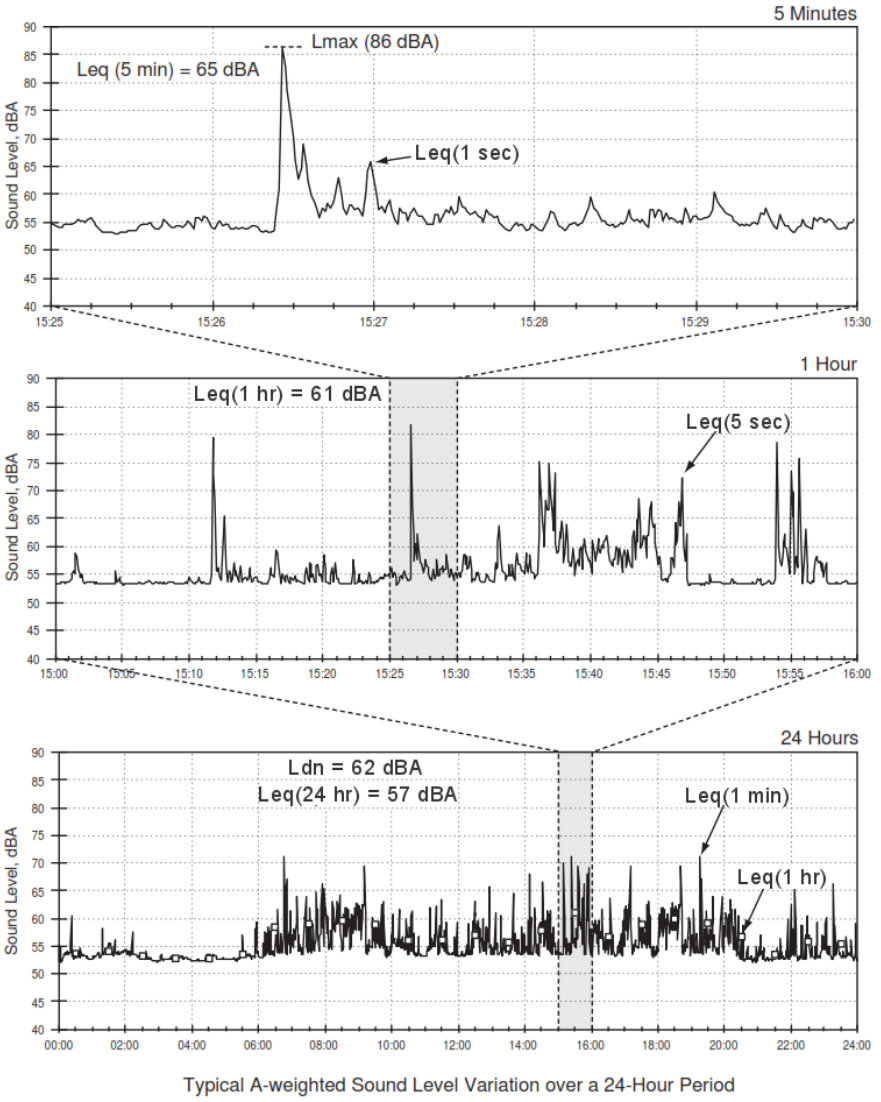


**Figure B-10 Example A-weighted Sound Level Time Histories**

Conceptually, the equivalent sound level can be expressed as:

$$L_{eq}(t) = 10log_{10}(\frac{Total\ Sound\ Energy}{Time\ Period})$$

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Mathematically, the equation is as follows:

$$L_{eq}(t) = 10log_{10}(\frac{1}{T}\sum_{i=1}^{N} 10^{(L_i/10)})$$

where

$L_{eq(t)}$ = equivalent sound level of time period "t", dBA
$T$ = time period, sec (3600 for an hourly $L_{eq(1hr)}$)
$N$ = number of samples, sec (3600 for an hourly $L_{eq(1hr)}$)
$i$ = index of summation
$L_i$ = individual A-weighted sound level, dBA

The equation above can be rewritten as follows for a one-hour time period:

$$L_{eq}(1h) = 10log_{10}[Total\ Sound\ Energy\ in\ 1\ hr] - 35.6 \quad \textbf{Eq. B-7}$$

where

*35.6* = numerical adjustment for a time period of 1 hour ($10log_{10}(t)$)

The sound energy is totaled over a full hour (3600 seconds) and is accumulated for all noise events during that hour. When computing the equivalent sound level for a time period other than one hour, T is modified in the equation to the duration of the time period in seconds. The numerical adjustment (35.6) accounts for time period of interest, in this case, one hour.

01-31 Cont.

An alternate way for computing $L_{eq(1hr)}$ for a series of transit-noise events using sound exposure levels can be expressed conceptually as follows:

$$L_{eq}(1h) = 10log_{10}(\begin{matrix}Energy\ Sum\ of \\ all\ SELs\end{matrix}) - 35.6$$

Mathematically, the equation is as follows:

$$L_{eq}(t) = 10log_{10}(\frac{1}{T}\sum_{i=1}^{N} 10^{(SEL_i/10)}) \quad \textbf{Eq. B-8}$$

where

$L_{eq(t)}$ = equivalent sound level of time period "t", dBA
$T$ = time period, sec (3600 for an hourly $L_{eq(1hr)}$)
$N$ = number of sample, sec (3600 for an hourly $L_{eq(1hr)}$)
$i$ = index of summation
$SEL$ = individual sound exposure level, dBA

Hourly $L_{eq(1hr)}$ is adopted as the measure of cumulative noise impact for non-residential land uses (those not involving sleep) because $L_{eq(1hr)}$:

- Correlates well with speech interference in conversation and on the telephone – as well as interruption of TV, radio, and music enjoyment;
- Increases with the duration of transit events;
- Accounts for the number of transit events over the hour, which is also important to people's reactions; and

- Is used by the Federal Highway Administration in assessing highway-traffic noise impact.(Thus, this noise metric can be used for directly comparing and contrasting highway, transit, and multimodal alternatives).

## B.1.4.5 Day-Night Sound Level ($L_{dn}$): 24-Hour Exposure from All Events

The metric for cumulative 24-hour exposure is the Day-Night Sound Level, [49] abbreviated here as $L_{dn}$. It is a single, A-weighted decibel value that accounts for total sound energy from all sound sources over 24 hours and is expressed in the unit, dBA. Events between 10 p.m. and 7 a.m. are increased by 10 dB to account for people's greater nighttime sensitivity to noise.

Figure B-11 shows examples of typical $L_{dn}$'s, both for transit and non-transit sources, ranging from 50 to 80 dB, where 50 is considered a quiet 24-hour period and 80 a loud 24-hour period. Note that these $L_{dn}$'s depend upon the number of events during day and night separately, including each event's duration, which is affected by vehicle speed.

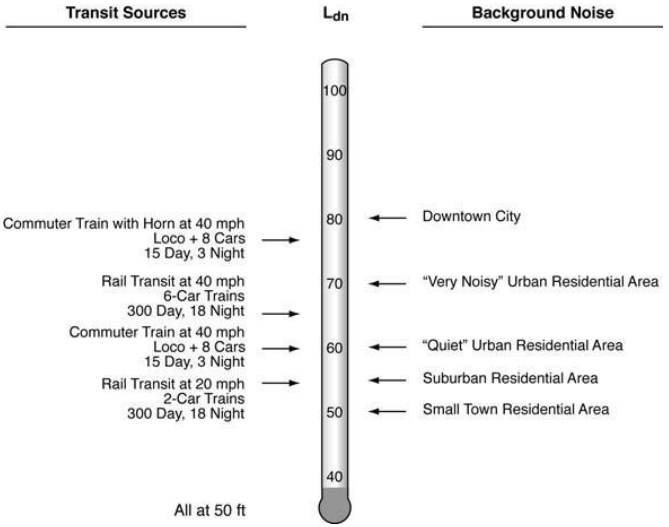


**Figure B- 11 Typical $L_{dn}$'s**

An example of sound level variation over 24 hours is visualized in the bottom frame of Figure B-10. The area under the curve represents the receiver's noise exposure over the 24 hours. Note that some vehicle passbys occur at night, when the background noise is typically lower and the 10 dB adjustment is applied.

Conceptually, the day-night level can be expressed as:

$$L_{dn} = 10log_{10}(\frac{Total\ Sound\ Energy_{Day}}{Time\ Period_{Day}\ (seconds)} + \frac{n_{adj,n} \times Total\ Sound\ Energy_{Night}}{Time\ Period_{Night}\ (seconds)})$$

01-31 Cont.

Mathematically, the equation is as follows:

$$L_{dn} = 10log_{10}(\frac{1}{T_d}\sum_{i=1}^{N} t_i \times 10^{(L_{d,i}/10)} + \frac{1}{T_n}\sum_{j=1}^{M} t_j \times 10^{((L_{n,j}+n_{adj,n})/10)}) \quad \textbf{Eq. B-9}$$

where

$L_{dn}$ = cumulative 24-hour exposure (day-night sound level), dBA
$T_d$ = time period during the daytime, between 7 a.m. and 10 p.m. sec (54,000)
$N$ = number of samples during the daytime (54,000)
$i$ = index of summation
$t_i$ = time interval of measurements in seconds (1)
$L_{d,i}$ = individual A-weighted sound level during the daytime, dBA
$T_n$ = time period during the nighttime, between 10 p.m. and 7 p.m. sec (32,400)
$M$ = number of samples during the nighttime (32,400)
$j$ = index of summation
$t_j$ = time interval of measurements, sec (1)
$L_{n,j}$ = individual A-weighted sound level during the nighttime, dBA
$n_{adj,n}$ = nighttime noise adjustment (10 dB)

The equation above can be rewritten as follows:

$$L_{dn} = 10log_{10}[\,(15 * Total\ Sound\ Energy_{Day}) + (9 * n_{adj,n} * Total\ Sound\ Energy_{Night})] - 49.4$$

The sound energy is totaled over a full 24 hours, and the sound energy is accumulated from all noise events during that time period. The numerical adjustment (49.4) accounts for time period of interest, in this case, 24 hours.

01-31 Cont.

An alternative way of computing $L_{dn}$ from twenty-four hourly $L_{eq(1hr)}$'s can be expressed conceptually as follows:

$$L_{dn} = 10log_{10}(\frac{Energy\ sum\ of\ daytime, hourly\ Leqs + (n_{adj,n} * Energy\ sum\ of\ nighttime, hourly\ Leqs)}{Time\ period\ (seconds)})$$

The equation above can be rewritten as:

$$L_{dn} = 10log_{10}(\frac{Energy\ sum\ of\ daytime, hourly\ Leqs + (n_{adj,n} * Energy\ sum\ of\ nighttime, hourly\ Leqs)}{(\frac{86400}{3600})})$$

The equation above can be reduced further and rewritten as:

$$L_{dn} = 10log_{10}(Energy\ sum\ of\ daytime, hourly\ Leqs + (n_{adj,n} * Energy\ sum\ of\ nighttime, hourly\ Leqs)) - 13.8 \quad \textbf{Eq. B-10}$$

$L_{dn}$ due to a series of transit-noise events can also be computed in terms of SEL. The equation below assumes that transit noise dominates the 24-hour noise environment, where nighttime SELs are increased by 10 dB before totaling:

$$L_{dn} = 10log_{10}(\frac{Energy\ sum\ of}{all\ daytime\ SELs} + (n_{adj,n} * \frac{Energy\ sum\ of}{all\ nighttime\ SELs})) - 49.4 \quad \textbf{Eq. B-11}$$

$L_{dn}$ is adopted as the measure of cumulative noise impact for residential land uses (those involving sleep), because it:

- Correlates well with the results of attitudinal surveys of residential noise impact
- Increases with the duration of transit events
- Accounts for the number of transit events over the full twenty-four hours
- Accounts for the increased sensitivity to noise at night, when most people are asleep
- Allows composite measurements to capture all sources of community noise combined
- Allow quantitative comparison of transit noise with other community noises
- Is the designated metric of choice of other Federal agencies (e.g., HUD, FAA, and EPA) and has wide international acceptance

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Cont.

# Appendix C: Background for Transit Noise Impact Criteria

The noise criteria presented in Section 4.1 of this manual have been developed based on well-documented criteria and research on human response to community noise. The primary goals in developing the noise criteria were to ensure that the impact limits are firmly founded in scientific studies, realistically based on noise levels associated with new transit projects, and represent a reasonable balance between community benefit and project costs. This appendix provides background information on the development of these criteria.

## C.1 Relevant Literature

The following is an annotated list of the documents that are particularly relevant to the noise impact criteria:

1. **U.S. EPA's "Levels Document"**[74]
   This report identifies noise levels consistent with the protection of public health and welfare against hearing loss, annoyance, and activity interference. It has been used as the basis of numerous community noise standards and ordinances.

2. **Committee on Hearing, Bioacoustics and Biomechanics (CHABA) Working Group 69, "Guidelines for Preparing Environmental Impact Statements on Noise"**[75]
   This report was the result of deliberations by a group of leading acoustical scientists with the goal of developing a uniform national method for noise impact assessment. Although the CHABA's proposed approach has not been adopted, the report serves as an excellent resource documenting research in noise effects. It provides a strong scientific basis for quantifying impacts in terms of $L_{dn}$.

3. **American Public Transportation Association (APTA) Guidelines for Design of Rapid Transit Facilities**[76]
   The noise and vibration sections of the APTA Guidelines have been used successfully in the past for the design of rail transit facilities. The APTA Guidelines include criteria for acceptable community noise and vibration. Experience has shown that meeting the APTA Guidelines will usually result in acceptable noise levels; but the metric used in the APTA Guidelines is not appropriate for environmental assessment purposes.

   The APTA Guidelines criteria are in terms of $L_{max}$ for conventional RRT vehicles, and they cannot be used to compare among different modes of transit. Since the APTA Guidelines are expressed in terms of maximum passby noise, they are not sensitive to the frequency or duration of noise events for transit modes other than conventional RRT operations with 5 to 10 minute headways. Therefore, the APTA criteria are questionable for assessing the noise impact of other transit modes that differ from conventional rapid transit with respect to source emission levels and operating characteristics (e.g., commuter rail, AGT, and a variety of bus projects).

4. **Synthesis of Social Surveys on Noise Annoyance**[77]
   In 1978, Theodore J. Schultz, an internationally known acoustical scientist, synthesized the results of a large number of social surveys concerning annoyance due to transportation noise. A group of these surveys were remarkably consistent, and the author proposed that their average

01-31 Cont.

results be taken as the best available prediction of transportation noise annoyance. This synthesis has received essentially unanimous acceptance by acoustical scientists and engineers. The "universal" transportation response curve developed by Schultz (Figure 3-7) shows that the percent of the population highly annoyed by transportation noise increases from zero at an $L_{dn}$ of approximately 50 dBA to 100% when $L_{dn}$ is approximately 90 dBA. Most importantly, this curve indicates that for the same increase in $L_{dn}$, there is a greater increase in the number of people highly annoyed at high noise levels than at low noise levels. For example, a 5 dB increase at low ambient levels (40 - 50 dB) has less impact than at higher ambient levels (65 - 75 dB). A recent update of the original research containing several railroad, transit, and street traffic noise surveys, confirming the shape of the original Schultz curve [12].

5. **HUD's Standards**[19]
   HUD has developed noise standards, criteria, and guidelines to ensure that housing projects supported by HUD achieve the goal of a suitable living environment. The HUD acceptability standards define 65 dB ($L_{dn}$) as the threshold for a normally unacceptable living environment (moderate impact for FTA) and 75 dB ($L_{dn}$) as the threshold for an unacceptable living environment (severe impact for FTA).

## C.2 Basis for Noise Impact Criteria Curves

The lower curve in Figure 4-2 represents the onset of moderate impact and is based on the following considerations:

- The EPA finding that a community noise level of $L_{dn}$ less than or equal to 55 dBA is "requisite to protect public health and welfare with an adequate margin of safety."[72]
- The conclusion by EPA and others that a 5 dB increase in $L_{dn}$ or $L_{eq(1hr)}$ is the minimum required for a change in community reaction.
- The research concludes that there are very few people highly annoyed when the $L_{dn}$ is 50 dBA, and that an increase in $L_{dn}$ from 50 dBA to 55 dBA results in an average of 2% more people highly annoyed (Figure 3-7).

01-31 Cont.

The increase in noise level from an existing ambient level of 50 dBA to a cumulative level of 55 dBA because of a project is found to cause minimal impact, with 2% of people highly annoyed, as described in the bullets above. This is considered the lowest threshold where impact starts to occur. Therefore, for an existing ambient noise level of 50 dBA, the curve representing the onset of moderate impact is at 53 dBA, the combination of which yields a cumulative level of 55 dBA by decibel addition. The remainder of the lower curve in Figure 4-2 was determined from the annoyance curve (Figure 3-7) by allowing a fixed 2% increase in annoyance at other levels of existing ambient noise. As cumulative noise increases, the increment to attain the same 2% increase in highly annoyed people is smaller. While it takes a 5-dB noise increase to cause a 2% increase in highly annoyed people at an existing ambient noise level of 50 dB, an increase of only 1 dB causes a 2% increase of highly annoyed people at an existing ambient noise level of 70 dBA.

The upper curve in Figure 4-2 represents the onset of severe impact based on a total noise level, corresponding to a higher degree of impact. The severe noise impact curve is based on the following considerations:

- HUD defines an $L_{dn}$ of 65 as the onset of a normally unacceptable noise zone (moderate impact for FTA) in its environmental noise standards [19]. FAA considers that residential land uses are not compatible with noise environments where $L_{dn}$ is greater than 65 dBA (20).

- An increase of 5 dB in $L_{dn}$ or $L_{eq(t)}$ is commonly assumed as the minimum required increase for a change in community reaction.
- The research concludes that an increase of 5 dB in $L_{dn}$ or $L_{eq(t)}$ represents a 6.5% increase in the number of people highly annoyed (Figure 3-7).

The increase in noise level from an existing ambient level of 60 dBA to a cumulative level of 65 dBA caused by a project represents a change from an acceptable noise environment to the threshold of an unacceptable noise environment. This is considered the level at which severe impact starts to occur with a 6.5% increase in the number of people highly annoyed as described in the bullets above. Therefore, for an existing ambient noise level of 60 dBA, the curve representing the onset of severe impact is at 63 dBA, the combination of which yields a cumulative level of 65 dBA by decibel addition. The remainder of the upper curve in Figure 4-2 was determined from the annoyance curve (Figure 3-7) by allowing a fixed increase of the 6.5% increase in annoyance at all existing ambient noise levels.

Both curves incorporate a maximum limit for the transit project noise in noise-sensitive areas. Independent of existing noise levels, moderate impact for land use categories 1 and 2 is considered to occur whenever the transit $L_{dn}$ equals or exceeds 65 dBA, and severe impact occurs whenever the transit $L_{dn}$ equals or exceeds 75 dBA. These absolute limits are intended to restrict activity interference caused by the transit project alone.

Both curves also incorporate a maximum limit for cumulative noise increase at low existing noise levels (below approximately 45 dBA). This is a conservative limit that reflects the lack of social survey data on people's reactions to noise at such low ambient levels. Like the FHWA approach in assessing the relative impact of a highway project, the transit noise criteria include limits on noise increase of 10 dB and 15 dB for moderate impact and severe impact, respectively, relative to the existing noise level.

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Note that due to the types of land use included in category 3, the criteria allow the project noise for category 3 sites to be 5 dB greater than for category 1 and category 2 sites. This difference is reflected by the offset in the vertical scale on the right side of Figure 4-2. Aside from active parks, which are clearly less sensitive to noise than category 1 and 2 sites, category 3 sites include primarily indoor activities. Therefore, the criteria account for some noise reduction from the building structure.

## C.3 Equations for Noise Impact Criteria Curves

The equations for the noise impact criteria curves shown in Figure 4-2 are included in this section. These equations may be useful when performing the noise assessment methodology using spreadsheets, computer programs, or other analysis tools. Otherwise, such mathematical detail is generally not necessary to implement the criteria, and direct use of Figure 4-2 is adequate and less time-consuming.

A total of four continuous curves are included in the criteria, creating two threshold curves for moderate and severe impact for category 1 and 2, and two curves for category 3 (See Table C-1). Note that for each level of impact, the overall curves for categories 1 and 2 are offset by 5 dB from category 3. While each curve is graphically continuous, each one is defined by a set of three discrete equations. These equations are approximately continuous at the transition points. The following is a description of the three equations:

- The first equation in each set is a linear relationship, representing the portion of the curve in which the existing noise exposure is low, and the allowable increase is limited to 10 dB and 15 dB for moderate impact and severe impact, respectively.

- The second equation in each set represents the impact threshold over the range of existing noise exposure for which a fixed percentage of increase in annoyance is allowed, as described in Appendix C.2. This curve is a third-order, polynomial approximation derived from the Schultz curve(75) and covers the range of noise exposure encountered in most populated areas. This curve is used for determining noise impact in most cases for transit projects.
- The third equation represents the absolute limit of project noise imposed by the criteria for areas with high existing noise exposure. For land use category 1 and 2, the absolute limit is 65 dBA for moderate impact and 70 dBA for severe impact. For land use category 3, the absolute limit is 75 dBA for moderate impact and 80 dBA for severe impact.

**Table C-1 Threshold of Moderate and Severe Impacts**

**Threshold of Moderate Impact**

***Category 1 and 2***

$$L_p = \begin{cases} 11.450 + 0.953L_E, & L_E < 42 \\ 71.662 - 1.164L_E + 0.018{L_E}^2 - 4.088 \times 10^{-5}{L_E}^3, & 42 \le L_E \le 71 \\ 65, & L_E > 71 \end{cases} \quad \textbf{Eq. C- 12}$$

***Category 3***

$$L_p = \begin{cases} 16.450 + 0.953L_E, & L_E < 42 \\ 76.662 - 1.164L_E + 0.018{L_E}^2 - 4.088 \times 10^{-5}{L_E}^3, & 42 \le L_E \le 71 \\ 70, & L_E > 71 \end{cases} \quad \textbf{Eq. C- 13}$$

**Threshold of Severe Impact**

***Category 1 and 2***

$$L_p = \begin{cases} 17.322 + 0.940L_E, & L_E < 44 \\ 96.725 - 1.992L_E + 3.02 \times 10^{-2}{L_E}^2 - 1.043 \times 10^{-4}{L_E}^3, & 44 \le L_E \le 77 \\ 75, & L_E > 77 \end{cases} \quad \textbf{Eq. C- 14}$$

***Category 3***

$$L_p = \begin{cases} 22.322 + 0.940L_E, & L_E < 44 \\ 101.725 - 1.992L_E + 3.02 \times 10^{-2}{L_E}^2 - 1.043 \times 10^{-4}{L_E}^3, & 44 \le L_E \le 77 \\ 80, & L_E > 77 \end{cases} \quad \textbf{Eq. C- 15}$$

$L_E$ = the existing noise exposure in terms of $L_{dn}$ or $L_{eq(1hr)}$
$L_p$ = the project noise exposure which determines impact in terms of $L_{dn}$ or $L_{eq(1hr)}$)

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# Appendix D: Clustering Receivers of Interest

This appendix supplements the information in Section 4.5 on clustering receivers of interest.

The general approach to selecting noise-sensitive receivers in the study area is included in Section 4.5, Step 1. General guidelines are as follows:

- Select the following types of receivers to evaluate individually:
  - Every major noise-sensitive public building
  - Every isolated residence
  - Every relatively small outdoor noise-sensitive area
- Residential neighborhoods and relatively large outdoor noise-sensitive areas can often be clustered and represented by a single receiver.

Clustering similar receivers reduces the number of computations needed later, especially for large-scale projects where a greater number of noise-sensitive sites may be affected. For this approach to be effective, it is essential that the representative receiver accurately represents the noise environment of the cluster.

The major steps in clustering receivers include:

1. First, cluster receivers according to approximately equal exposure to the primary project noise source. These areas typically run parallel to a linear project or circle major stationary sources relative to the proposed project.
2. Next, cluster receivers according to major sources of ambient noise. These areas typically run parallel to or encircle major sources of ambient noise.
3. Then, cluster receivers according to changes in the project layout or operations along the corridor.
4. Finally, select a representative receiver for each cluster.

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Cont.

The major steps are expanded below and include instructions on how to draw cluster boundaries on a map.

1. **Boundaries along the proposed project** – Draw cluster boundaries along the proposed project as described below to separate clusters based on distance from the project. Draw these cluster boundaries for the project sources listed as major in Table 4-19.

   **Within both residential and noise-sensitive outdoor areas:**
   - **Primary project source**
     Draw cluster boundaries at the following distances from the near edge of the primary project source: 0 ft, 50 ft, 100 ft, 200 ft, 400 ft, and 800 ft. For linear sources, such as a rail line, draw these boundaries as lines parallel to the proposed ROW line. For stationary sources, draw these boundaries as approximate circles around the source, starting at the property line.

     Do not extend boundaries beyond the noise study area, identified in the Noise Screening Procedure in Section 4.3 or the General Noise Assessment of Section 4.4.

- **Remaining project sources** – Repeat the process for the primary project source for all other project listed as major in Table 4-19, such as substations and crossing signals. If several project sources are located approximately together, only consider one source, since the others would produce approximately the same boundary.

  It is good practice to optimize the number of clusters for a project to simplify the procedure.

**Where rows of buildings parallel the transit corridor:**

- Ensure that cluster boundaries fall between the following rows of buildings, counting back away from the proposed project:
  - Between rows 1 and 2
  - Between rows 2 and 3
  - Between rows 3 and 4
- Add cluster boundaries between these rows if not already included.

2. **Boundaries along sources of ambient noise** – Draw cluster boundaries along all major sources of ambient noise based upon distance from these sources, as described below.
   - Draw cluster boundaries along all interstates and major roadway arterials at the following distances from the near edge of the roadway: 0 ft, 100 ft, 200 ft, and 500 ft.
   - Draw cluster boundaries along all other roadways that have state or county numbering at 0 ft and 100 ft from the near edge of the roadway.
   - For all major industrial sources of noise, draw cluster boundaries that encircle the source at the following distances from the near property line of the source: 0 ft, 100 ft, 200 ft, and 400 ft.

3. **Boundaries based on changes in project layout or operations** – Further subdivision is needed to account for changes in project noise where proposed project layout or operating conditions change considerably along the corridor. Draw a cluster boundary perpendicular to the corridor extending straight outward to both sides at the following locations:
   - Where parallel tracks previously separated by more than approximately 100 ft are moved closer together
   - Approximately where speed and/or throttle are reduced when approaching stations and where steady service speed is reached after departing stations
   - Approximately 200 ft up and down the line from grade crossing bells
   - At transitions from jointed to welded rail
   - At transitions from one type of cross section to another including on structure, on fill, at-grade and in cut
   - At transitions from open terrain to heavily wooded terrain
   - At transitions between areas free of locomotive horn noise and areas subject to this noise source
   - Any other positions along the line where project noise is expected to change considerably, such as up and down the line from tight curves where wheels may squeal

4. **Selection of a representative receiver from each cluster** – Determine a representative receiver for each cluster boundary drawn in the steps above.
   - **Residential clusters**
     Select a representative receiver within the cluster at the house closest to the proposed project. If this receiver is not the clear choice, select the receiver furthest from major sources of ambient noise.
   - **Outdoor noise-sensitive clusters (e.g., urban park or amphitheater)**

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Cont.

Select a representative receiver within the cluster at the closest point of active noise-sensitive use. If this receiver is not the clear choice, select the receiver farther from major sources of ambient noise.

Note that some clusters may fall between areas with receivers of interest. This could occur when operational changes or track layouts change in an open, undeveloped area. Retain these clusters. Do not merge them with adjacent clusters. Do not select a representative receiver of interest from them.

## Example D-1 Clustering Receivers

**Receivers of Interest and Clustering Receivers**

In this hypothetical situation, a new rail transit line, labeled "new rail line" in Figure D-1, is proposed along a major urban street with commercial land use. A residential area is located adjacent to the commercial strip, located approximately one-half block from the proposed transit alignment. A major arterial, labeled "highway," crosses the alignment.

**Cluster Receivers Along the Primary Project Source**

*Primary Project Source*

The primary project source in this example is the new rail line. Boundaries are first drawn at distances of 0 ft from the right-of- way line (edge of the street in this example), 50 ft, 100 ft, 200 ft, 400 ft, and 800 ft, (Figure D-1). Distances are labeled at the top of the figure.

This is proposed to be a constant speed section of track, so there are no changes in boundaries due to changes in operations along the corridor. Moreover, no other project sources are shown here, but if there had been a station with a parking lot, lines would have been drawn enveloping the station site at the specified distances from the property line.

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*Rows of Buildings Parallel to the Transit Corridor*

This example includes rows of buildings parallel to the transit corridor. The first set of boundary lines satisfies the requirement that cluster boundaries fall between rows 1 and 2, and between rows 2 and 3, but there is no line between rows 4 and 5. Consequently, a cluster boundary labeled "R" at the top of the figure has been drawn between the 4th and 5th row of buildings.

**Cluster Receivers Along the Primary Project Source**

The roadway arterial (labeled "highway") is the only major source of ambient noise shown.

Cluster boundaries are drawn at 0 ft, 100 ft, 200 ft and 500 ft from the near edge of the roadway on both sides. These lines are shown with distances labeled at the side of the figure.

**Select a Representative Receiver from Each Cluster**

Representative receivers are shown as filled circles in Figure D-1. Note that the receivers labeled with "REC" are primarily for use in Appendix E.

Locate receiver, "REC 3". Note that this cluster is located at the outer edge of influence from the major source ("highway") where local street traffic is the dominant source for ambient noise (in practice, this would be verified by a measurement).

"REC 3" is chosen to represent this cluster because it is among the houses closest to the proposed project source in this cluster and it is in the middle of the block affected by the dominant local street. Ambient noise levels at one end of the cluster may be influenced more by the highway and the other end may be affected more by the cross street, but the majority of the cluster would be represented by receiver site "REC 3."

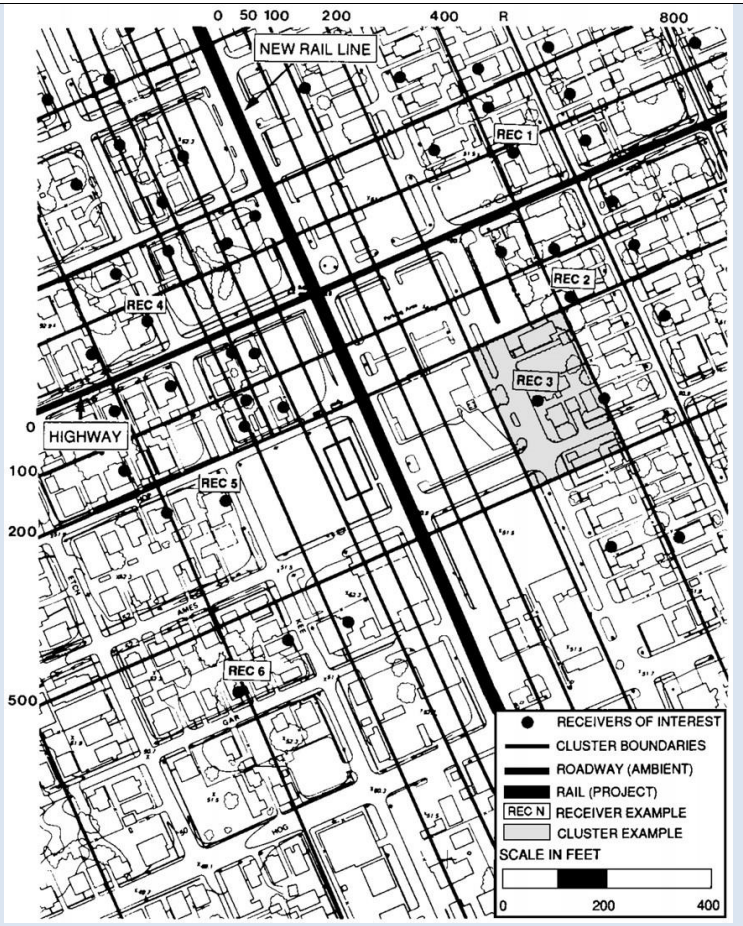


**Figure D-1 Example of Receiver Map Showing Cluster Boundaries**

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Cont.

# Appendix E: Determining Existing Noise

Different options of determining existing noise, including full measurement, computation from partial measurements, and tabular look-up, are described in Section 4.5, Step 5. This appendix provides additional details associated with each method and examples of when each method could be used.

Additional details on the methods for estimating existing noise are provided below:

**Option 1: $L_{eq(1hr)}$ measurement (non-residential)** – Full one-hour measurements are recommended to determine existing noise for non-residential receivers of interest. These measurements are preferred over all other options and will accurately represent the $L_{eq(1hr)}$. The following procedures apply to these full-duration measurements:

- Measure $L_{eq(1hr)}$ at the receiver of interest during a typical hour of use on two non-successive days. Choose the hour in which maximum project activity will occur. The $L_{eq(1hr)}$ will be accurately represented using this method. Typically, measuring between noon Monday and noon Friday is recommended, but weekend days may be more appropriate for places of worship.
- Position the measurement microphone for all sites as shown in Figure 4-19, considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.

**Option 2: $L_{dn}$ measurement (residential) –** Full 24-hour measurements are recommended to determine ambient noise for residential receivers of interest. These measurements are preferred over all other options and will accurately represent the $L_{dn}$. The following procedures apply to these full-duration measurements:

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- Measure a full 24-hour $L_{dn}$ at the receiver of interest for a single weekday (generally between noon Monday and noon Friday).
- Position the measurement microphone for all sites as shown in Figure 4-19 considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.

**Option 3: $L_{dn}$ computation of $L_{dn}$ from 3 partial $L_{eq(1hr)}$ measurements (residential)** – An alternative way to determine $L_{dn}$ is to measure $L_{eq(1hr)}$ for three typical hours of the day, then compute the $L_{dn}$ from these three $L_{eq(1hr)}$ measurements. This method is less precise than its full-duration measurement. The following procedures apply to this partial-duration measurement method for $L_{dn}$:

- Measure the $L_{eq(1hr)}$ during each of the following time periods:
  - During peak-hour roadway traffic
  - Midday, between the morning and afternoon roadway-traffic peak hours
  - During late night between midnight and 5 a.m.
- Position the measurement microphone for all sites as shown in Figure 4-19 considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.
- Compute the $L_{dn}$ using the equation below

$$L_{dn} \approx 10\log(3 \times 10^{\frac{L_{eq.peakhour}-2}{10}} + 12 \times 10^{\frac{L_{eq.midday}-2}{10}} + 9 \times 10^{\frac{L_{eq.latenight}+8}{10}}) - 13.8 \quad \textbf{Eq. E-1}$$

The resulting $L_{dn}$ will be slightly underestimated due to the adjustment to the measured levels in these equations. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$. If using this method, a minimum time duration of one hour should be used for each measurement period in computing an Ldn.

**Option 4: Computation of $L_{dn}$ from 1 partial $L_{eq(1hr)}$ measurement (residential)** – $L_{dn}$ can also be determined by measuring $L_{eq(1hr)}$ for one hour of the day, and then computing $L_{dn}$ from the $L_{eq(1hr)}$. This method is less precise than computing $L_{dn}$ from 3 $L_{eq(1hr)}$ measurements. This method may be useful for projects with are many sites assessed by the General Noise Assessment. This method may also be appropriate when determining if a particular receiver of interest represents a cluster in a Detailed Noise Analysis. The following procedures apply to this partial-duration measurement option for $L_{dn}$:

- Measure the $L_{eq(1hr)}$ for the loudest hour of project-related activity during hours of noise sensitivity. If this hour is not selected, other hours may be used with the understanding that the estimate is less precise.
- Position the measurement microphone for all sites as shown in Figure 4-19, considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.
- Convert the measured hourly $L_{eq(1hr)}$ to $L_{dn}$ with the appropriate equation below.

For measurements between 7 a.m. and 7 p.m.:

$$L_{dn} \approx L_{eq} - 2 \quad \textbf{Eq. E-2}$$

For measurements between 7 p.m. and 10 p.m.:

$$L_{dn} \approx L_{eq} + 3 \quad \textbf{Eq. E-3}$$

For measurements between 10 p.m. and 7 a.m.:

$$L_{dn} \approx L_{eq} + 8 \quad \textbf{Eq. E-4}$$

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The resulting $L_{dn}$ will be moderately underestimated due to the use of the adjustment constants in these equations. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$. If using this method, a minimum time duration of one hour should be used for each measurement period in computing an Ldn.

**Option 5: Computation of $L_{eq(1hr)}$ or $L_{dn}$ from $L_{eq(1hr)}$ or $L_{dn}$ of a comparable site (all land uses)** – Computing $L_{eq(1hr)}$ or $L_{dn}$ from the $L_{eq(1hr)}$ or $L_{dn}$ of a comparable site where the ambient noise is dominated by the same source that is comparable in precision to Option 4. This method can be used to characterize noise in several neighborhoods by using a single representative receiver. It is critical that the measurement site has a similar noise environment to all areas represented. If measurements made by others are available and the sites are equivalent, the existing measurements can be used to reduce the amount of project noise monitoring. The following procedures apply to this method of determining of ambient noise:

- Choose another receiver that is comparable to the receiver (CompRec) of interest with the following:
  - The same source of dominant ambient noise

- The ambient level of the comparable receiver was measured according to Option 1 or Option 2 above
- The ambient measurement at the comparable receiver was made in direct view of the major source of ambient noise, unshielded by noise barriers, terrain, rows of buildings, or dense tree zones

- Determine the following from a plan or aerial photograph:
  - The distance ($D_{CompRec}$) from the comparable receiver to the near edge of the ambient source
  - The distance ($D_{Rec}$) from this receiver of interest to the near edge of the ambient source
- Determine the number of rows of buildings (N) that intervene between the receiver of interest and the ambient source.
- Compute the ambient level at the receiver of interest (Rec) with the appropriate equation below

If roadway sources dominate:

$$L_{Rec} \approx L_{CompRec} - 15\log(\frac{D_{Rec}}{D_{CompRec}}) - 3N \qquad \textbf{Eq. E-5}$$

If other sources dominate:

$$L_{Rec} \approx L_{CompRec} - 25\log(\frac{D_{Rec}}{D_{CompRec}}) - 3N \qquad \textbf{Eq. E-6}$$

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The resulting $L_{Rec}$ will be moderately underestimated. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$.

**Option 6: Estimation of $L_{dn}$ by table look-up (all land uses)** – The least precise way to determine the ambient noise is to estimate the level using a table. A tabular look-up can be used to establish baseline conditions for a General Noise Assessment if a noise measurement cannot be made. This method should not be used for a Detailed Noise Analysis. The following instruction applies to this method of determining of ambient noise:

Estimate either the $L_{eq(1hr)}$ or the $L_{dn}$ using Table 4-17 based on distance from major roadways, rail lines, or upon population densities. In general, these tabulated values are substantially underestimated.

The underestimation is intended to compensate for the reduced precision of the estimated ambients.

**Examples –** Examples of when each method of determining existing noise may be appropriate are provided below using the example from Appendix D. Existing noise at the receivers labeled "REC" in Figure D-1 could be estimated as follows:

- **Option 1: $L_{eq(1hr)}$ measurement** – Existing noise at REC 1 is due to the highway at the side of this church. $L_{eq(1hr)}$ can be measured during a typical church hour.
- **Option 2: $L_{dn}$ measurement –** Existing noise at the residence REC 2 is due to a combination of the highway and local streets. $L_{dn}$ can be measured for a full 24-hours.
- **Option 3: $L_{dn}$ computation of $L_{dn}$ from 3 partial $L_{eq(1hr)}$ measurements** – Existing noise at the residence REC 3 is due to the street in front of this residence. $L_{dn}$ can be computed from three $L_{eq(1hr)}$ measurements.

- **Option 4: Computation of $L_{dn}$ from 1 partial $L_{eq(1hr)}$ measurement** – Existing noise at the residence REC 4 is due to the highway. Because the highway has a predictable diurnal pattern, $L_{dn}$ can be computed from one $L_{eq(1hr)}$ measurement.
- **Option 5: Computation of $L_{dn}$ from $L_{dn}$ of a comparable site** – Existing noise at the residence REC 5 is due to Kee Street. REC 3 is also affected by local street traffic and is a comparable distance from the highway. $L_{dn}$ for REC 5 can be computed based on the $L_{dn}$ at REC-3.
- **Option 6: Estimation of $L_{dn}$ by table look-up** – Existing noise at the residence REC 6 is due to local traffic. $L_{dn}$ can be estimated by tables based on population density along this corridor.

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Cont.

# Appendix F: Computing Source Levels from Measurements

This appendix contains the procedures for computing source reference levels ($SEL_{ref}$) from source measurements in cases where the source reference tables in Section 4.5, Step 2 indicate measurements are preferred, data are not available for the source of interest, or more precise data are required than available in the table.

Close-by source measurements for vehicle passbys may capture either the vehicle's sound exposure level (SEL) or maximum noise level ($L_{max}$). Both metrics can be measured directly by commonly available sound level meters. While the $L_{max}$ metric is not used for transit noise impact assessments, it can be used to compute SEL source reference levels. $L_{max}$ measurements are often available from transit-equipment manufacturers and some transit system equipment specifications may limit close-by $L_{max}$ levels.

Close-by source measurements for stationary sources capture the source's SEL over one source event, where the event duration may be chosen based on measurement convenience. The duration will factor out of the computation when the measured value is converted to reference operating conditions.

This manual does not specify elaborate methods for undertaking the close-by source measurements, but rather, provides general processes. It is required that all measurements conform to good engineering practice, guided by the standards of the American National Standards Institute and other such organizations (27, 28, 29).

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This appendix presents information according to noise source as follows:

- Appendix F.1: Highway and rail vehicle passbys for vehicles of the same type
- Appendix F.2: Stationary sources
- Appendix F.3: $L_{max}$ for single train passbys (for trains of mixed consists)

## F. 1 Highway and Rail Vehicle Passbys

This section provides information on appropriate conditions for vehicle passby measurements, instructions on converting measurements made under non-reference conditions to source reference levels, and examples of these computations.

The following conditions are required for vehicle passbys, in addition to good engineering practice:

- Measured vehicles must be representative of project vehicles in all aspects, including representative acceleration and speed conditions for buses.
- Track must be relatively free of corrugations and train wheels relatively free of flats, unless these conditions are typical of the proposed project.
- Road surfaces must be smooth and dry, unless these conditions are typical of the proposed project.
- Perpendicular distance between the measurement position and the source's centerline must be 100 ft or less.
- Vehicle speed must be 30 mph or greater, unless typical project speeds are less than that.
- No noise barriers, terrain, buildings, or dense tree zones may break the lines-of-sight between the source and the measurement position.

When close-by source measurements are made under non-reference conditions, use the instructions below and the equations in Table F-1 to convert the measured values to source reference levels. For rail vehicles, measure/convert a group of locomotives or a group of cars separately. This computation requires that all measured vehicles be of the same type. For trains of mixed consists, see Appendix F.3.

**SEL measured for a highway-vehicle passby, or a passby of a group of identical rail vehicles**

- Collect the following input information:
  - $SEL_{meas}$, the measured SEL for the vehicle passby
  - N, the consist of the measured group of rail cars or group of locomotives
  - T, the average throttle setting of the measured diesel-powered locomotive(s)
  - $S_{meas}$, the measured passby speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the Source Reference Level $SEL_{ref}$, using Eq. F-1.

**$L_{max}$ measured for a passby of a group of identical rail vehicles**

- Collect the following input information:
  - $L_{max}$, measured for the group passby
  - N, the consist of the measured group of rail cars or group of locomotives
  - T, the average throttle setting of the measured diesel-powered locomotive(s)
  - $S_{meas}$, the measured passby speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
  - $L_{meas}$, the total length of the measured group of locomotives or group of rail cars, in feet
- Compute the Source Reference Level $SEL_{ref}$, using either Eq. F-2 or Eq. F-3, as appropriate, for locomotives or rail cars.

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**$L_{max}$ measured for a highway-vehicle passby**

- Collect the following input information:
  - $L_{max}$, measured for the highway-vehicle passby
  - $S_{meas}$, the vehicle speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the Source Reference Level, SELref, using Eq. F-4.

**Table F-1 Conversion to Source Reference Levels at 50 ft – Highway and Rail Sources**

| Measured | Source | Equation | |
|---|---|---|---|
| SEL | Vehicle passby | $SEL_{ref} = SEL_{meas} + 10\log(\frac{S_{meas}}{50}) + 10log(\frac{D_{meas}}{50}) + C_{consist} + C_{emissions}$ | **Eq. F-1** |
| $L_{max}$ | Rail-vehicle passby, locomotives only | $SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log(2 \propto) + C_{consist} + C_{emissions} + 3.3$ | **Eq. F-2** |
| | Rail-vehicle passby, cars only | $SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log\ [2 \propto + \sin(2 \propto)] + C_{consist} + C_{emissions} + 3.3$ | **Eq. F-3** |
| | Highway-vehicle passby | $SEL_{ref} = L_{Amax} + 20\log(\frac{D_{meas}}{50}) + C_{emissions} + 3.3$ | **Eq. F-4** |

$S_{meas}$ = speed of measured vehicle(s), mph

$D_{meas}$ = closest distance between measurement position and source, ft

$C_{consist}$ = 0 for buses and automobiles
$-10\log(N_{Cars})$ for locomotives and rail cars
where N is the number of locomotives or rail cars in the measured group

$C_{emissions}$ = 0 for T < 6 for locomotives
-2 (T-5) for T ≥ 6
where T is average throttle setting of measured diesel – electric locomotive(s)

$-30\log(\frac{S_{meas}}{50})$ for rail cars

$-25\log(\frac{S_{meas}}{50})$ for buses

$-38.1\log(\frac{S_{meas}}{50})$ for automobiles

$E_{meas}$ = event duration of measurement, sec

$L_{meas}$ = total length of measured group of locomotives *or* rail cars, ft

$\propto$ = arctan( $\frac{L_{meas}}{2D_{meas}}$), rad

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## Example F-1 Calculate $SEL_{ref}$ – Locomotives

**Computation of $SEL_{ref}$ from SEL Measurement of Fixed-guideway Source**

SEL was measured for a passby of two diesel-powered locomotives with the following conditions:

$SEL_{meas}$ = 90 dBA
$N_{Cars}$ = 2
T = 6
$S_{meas}$ = 55 mph
$D_{meas}$ = 65 ft

Compute the source reference level using Eq. F-1.

$$SEL_{ref} = SEL_{meas} + 10\log(\frac{S_{meas}}{50}) + 10log(\frac{D_{meas}}{50}) + C_{consist} + C_{emissions}$$
$$= 90 + 10\log\left(\frac{55}{50}\right) + 10\log\left(\frac{65}{50}\right) - 10\log(2) + (-2(6-5))$$
$$= 86.5 \text{ dBA}$$

## Example F-2 Calculate $SEL_{ref}$ – Rail Cars

**Computation of $SEL_{ref}$ from $L_{max}$ Measurement of Fixed-Guideway Source**

$L_{max}$ was measured for a passby of a 4-car consist of 70-ft long rail cars with the following conditions:

$L_{max}$ = 90 dBA
$N_{Cars}$ = 4
$S_{meas}$ = 70 mph
$D_{meas}$ = 65 ft
$L_{meas}$ = 280 ft
$\propto$ = 1.14

Compute the source reference level using Eq. F-3.

$$SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log\,[2 \propto + \sin(2 \propto)] + C_{consist} + C_{emissions} + 3.3$$
$$= 90 + 10\log(\frac{280}{50}) + 10\log(\frac{65}{50}) - 10\log\,\left[2(1.14) + \sin\left(2(1.14)\right)\right] - 10\log(4) - 30\log(\frac{70}{50}) + 3.3$$
$$= 86.7 \text{ dBA}$$

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## Example F-3 Calculate $SEL_{ref}$ – Bus

**Computation of $SEL_{ref}$ from $L_{max}$ Measurement of Highway Vehicle Source**

$L_{max}$ was measured for a bus with the following conditions:

$L_{max}$ = 78 dBA
$D_{meas}$ = 80 ft
$S_{meas}$ = 40 mph

Compute the source reference level using Eq. F-4

$$SEL_{ref} = L_{max} + 20\log(\frac{D_{meas}}{50}) + C_{emissions} + 3.3$$
$$= 78 + 20\log(\frac{80}{50}) - 25\log(\frac{40}{50}) + 3.3$$
$$= 87.8 \text{ dBA}$$

## F.2 Stationary Sources

This section provides information on appropriate conditions for stationary source measurements, instructions on converting measurements made under non-reference conditions to source reference levels, and an example of this type of computation.

The following conditions are required for stationary sources, in addition to good engineering practice:

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- Measured source operations must be representative of project operations in all aspects.
- The following ratio must be 2 or less, and the distance to the closest source component must be 200 ft or less.

$$\frac{Distance\ to\ the\ farthest\ source\ component}{Distance\ to\ the\ closest\ source\ component}$$

  If both conditions cannot simultaneously be met, separate close-by measurements of individual components of this source must be made, for which these distance conditions can be met.

- The following ratio must be 2 or less:

$$\frac{Lateral\ length\ of\ the\ source\ area}{Distance\ to\ the\ closest\ source\ component}$$

  The lateral length of the source area is measured perpendicular to the general line-of-sight between source and measurement positions.

  If this condition cannot be met, then make separate close-by measurements of individual components of this source, for which this condition can be met.

- No noise barriers, terrain, buildings, or dense tree zones may break the lines-of-sight between the source and the measurement position.

When close-by source measurements are made under non-reference conditions, use the instructions below and the equation in Table F- 2 to convert the measured values to source reference levels.

**SEL was measured for a stationary noise source**

- Collect the following input information:
  - $SEL_{meas}$, the measured SEL for the noise source, for whatever source "event" is convenient to measure
  - $E_{meas}$, the event duration, in seconds
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the source reference level, SELref using Eq. F- 5.

**Table F-2 Conversion to Source Reference Levels at 50 ft - Stationary Sources**

| Measured | Source | Equation | |
|---|---|---|---|
| SEL | Stationary noise source | $SEL_{ref} = SEL_{meas} - 10\log(\frac{E_{meas}}{3600}) + 20\log(\frac{D_{meas}}{50})$ | **Eq. F- 5** |

$S_{meas}$ = speed of measured vehicle(s), in miles per hour
$E_{meas}$ = event duration of measurement, in seconds
$D_{meas}$ = closest distance between measurement position and source, in feet

## Example F-4 Calculate $SEL_{ref}$ – Signal Crossing

**Computation of $SEL_{ref}$ from SEL Measurement of Stationary Source**

SEL was measured for a signal crossing with the following conditions:

$SEL_{meas}$ = 70 dBA
$E_{meas}$ = 10 sec
$D_{meas}$ = 65 ft

Compute the source reference level using Eq. F-5.

$$SEL_{ref} = SEL_{meas} - 10\log(\frac{E_{meas}}{3600}) + 20\log(\frac{D_{meas}}{50})$$
$$= 70 - 10\log(\frac{10}{3600}) + 20\log(\frac{65}{50})$$
$$= 97.8 \text{ dBA}$$

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## F.3 $L_{max}$ for Single Train Passby

This section provides procedures for the computation of $L_{max}$ for a single train passby. This procedure can be used to characterize trains of mixed consists using $L_{max}$. Follow the instructions below.

- Collect the following input information:
  - $SEL_{ref}$, from Section 4.5, specific to both the locomotive type and car type of the train
  - $N_{loco}$, the number of locomotives in the train
  - $N_{cars}$, the number of cars in the train
  - $L_{loco}$, the total length of the train's locomotive(s), in feet (or $N_{loco}$ unit length)
  - $L_{cars}$, the total length of the train's set of rail car(s), in feet (or $N_{cars}$ unit length)
  - S, the train speed, in miles per hour
  - D, the closest distance between the receiver of interest and the train, in feet

- Use the equations in Table F-3 to compute the following:
  - $L_{max.loco}$ for the locomotive(s) using Eq. F-6

- $L_{max.cars}$ for the rail car(s) using the Eq. F-7
- $L_{max.total}$, the larger $L_{max}$ from the locomotives(s) and rail car(s) is the $L_{max}$ for the total train passby, see Eq. F- 8.

**Table F-3 Conversion to Lmax at the Receiver, for a Single Train Passby**

| Source | Equation | |
|---|---|---|
| Locomotives | $L_{max.Loco} = SEL_{locos} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto) - 3.3$ | **Eq. F-6** |
| Rail Cars | $L_{max.Rcars} = SEL_{Rcars} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto + \sin(2 \propto)) - 3.3$ | **Eq. F-7** |
| Total Train | $L_{max.total} = max(L_{max.Loco}\ or\ L_{max.RCars})$ | **Eq. F-8** |

L = total length of measured group of locomotive(s) or rail car(s), ft

S = vehicle speed, mph

$\propto$ = arctan $\left(\frac{L}{2D}\right)$, rad

D = closest distance between receiver and source, ft

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## Example F-5 Calculate $L_{max}$ – Train Passby

**Computation of $L_{max}$ for Train Passby**

Calculate the $L_{max}$ of commuter train at receiver of interest according to the following conditions:

$SEL_{ref}$ = 92 dBA for locomotives
= 82 dBA for rail cars
$N_{Loco}$ = 1
$N_{Cars}$ = 6
S = 43 miles per hour
D = 125 ft
$\propto_{locos}$ = 0.27
$\propto_{cars}$ = 1.03

The locomotive and rail cars each have a unit length (L) of 70 ft.

Determine the total length of the locomotive and rail cars.

$L_{Loco}$ = 70 ft
$L_{cars}$ = 420 ft

Compute $L_{max}$ for the locomotive using Eq. F-6:

$$L_{max.Loco} = SEL_{loco} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto) - 3.3$$
$$= 92 + 10log\left(\frac{43}{50}\right) - 10log\left(\frac{70}{50}\right) + 10\log(2 \times 0.27) - 3.3$$
$$= 84.0 \text{ dBA}$$

Compute $L_{max}$ for the rail cars using Eq. F-7:

$$L_{max.Rcars} = SEL_{Rcars} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto + \sin(2 \propto)) - 3.3$$
$$= 82 + 10log\left(\frac{43}{50}\right) - 10log\left(\frac{420}{50}\right) + 10\log((2 \times 1.03) + \sin(2 \times 1.03)) - 3.3$$
$$= 73.5 \text{ dBA}$$

Find the total $L_{max}$ for the train passby using Eq. F-8.

$$L_{max.total} = max(L_{max.Loco} \text{ or } L_{max.Rcars})$$
$$= 84.0 \text{ dBA}$$

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# Appendix G: Non-Standard Modeling Procedures and Methodology

This manual provides guidance for preparing and reviewing the noise and vibration sections of environmental documents, as well as FTA-approved methods and procedures to determine the level of noise and vibration impact resulting from most federally-funded transit projects. Situations may arise, however, that are not explicitly covered in this manual. Professional judgment may be used to extend the basic methods to cover these cases, when appropriate. It is important to note that each project is unique and must be evaluated on a case-by-case basis. This appendix provides procedures for the use of non-standard noise and vibration modeling procedures and methodologies on public transportation projects.

**Submittal Procedure** – The procedure for using non-standard modeling procedures and methodology is as follows:

1. The transit project manager should contact the FTA Regional office to discuss the proposed methods and/or data not described in this manual prior to use of the non-standard approach.
2. The non-standard methodology should be documented according to the guidelines below as part of the technical report described in Section 8.2.

**Examples of Methods that Require Communication and Documentation** – The following noise and vibration analysis methods and data require communication with the FTA Regional office and documentation:

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- Non-standard transit noise and vibration modeling and analysis methods not described in this manual (including non-standard adjustments, computations, and assumptions). This includes modifications to standard FTA noise and vibration methods.
- Non-standard transit noise and vibration reference data not described in this manual (including measured data, substitution data, data at non-standard reference distances and/or speeds, new transit noise sources, and transit noise sources operating in non-standard conditions).
- Non-standard transit noise and vibration impact criteria not described in this manual, including the maximum sound pressure level metric.
- Non-standard methods of evaluating construction noise, including non-standard construction noise impact criteria.
- Other noise modeling tools besides the FTA Noise Impact Assessment Spreadsheet or Traffic Noise Model (TNM®) for highway noise modeling, such as the development of a finite element method model.
- Any transit noise and vibration analysis that involves an impact area or noise source that is controversial.

**Documentation Guidelines** – The use of non-standard noise and vibration analysis methods or data requires the following documentation components in a technical memorandum attached to the environmental document:

- **Background**
  Briefly describe the transit project for which non-default methods or data are needed. State the dominant noise sources, type of analysis, and the impact criteria. Include any additional relevant information.

- **Statement of Benefit**
  Briefly describe the benefit of the non-default noise and vibration methods or data to the transit project. Describe the appropriateness of the non-default methods or data, as well as why the standard method or data are insufficient or problematic.

- **Non-standard Data Description**
  Describe the non-standard noise or vibration data in detail. Include source type, manufacturer, reference conditions (speed, distance, and operational conditions), name of data supplier, and a date associated with data development/measurement. For measured noise or vibration data, provide corresponding data documentation (such as a data measurement or a development report). For substitution data, a comparison between the non-standard data and corresponding standard data should be provided. Furthermore, if outside sources recommend the use of the non-standard data (such as a technical society, a standards organization, or a vehicle manufacturer), references for those recommendations should be included.

- **Non-standard Methods Description**
  Describe the non-standard noise or vibration analysis method in detail. This should include a detailed description and derivation of the method (including data used in the development of the method), a description of the usage of the method, and a comparison between the non-standard method and the corresponding standard method in the context of the transit analysis. If the method has been validated against measurement data, a description of that validation analysis should be provided. If the method is derived from another source (such as a different transportation noise or vibration method), provide corresponding documentation for that source. A description of how the method is conservative (for example, estimating the worst-case scenario) or some discussion on the probability of exceeding the predicted level should be provided. Furthermore, if outside sources recommend the use of the non-standard method (such as a technical society or standards organization), references for those recommendations should be included.

- **Non-standard Tools Description**
  Describe in detail any non-standard noise or vibration models that have not been explicitly recommended in this manual. This should include a detailed description of the tool (including data used, the computations implemented in the tool, any modifications or adjustments to the tool or the corresponding data, and the usage of the tool), a description of the validation of the tool (including reference documentation and validation analyses), and a comparison between the non-standard tool and the equivalent standard tool in the context of the transit analysis. Quantitative comparisons, such as the standard deviation of the non-standard tool and an estimate of the least mean square of differences between the standard and non-standard tools, should be provided and explained. A description of how the method is conservative (for example, estimating the worst-case scenario) or some discussion on the probability of exceeding the predicted level should be provided. If outside sources recommend the use of the non-standard tool (such as a technical society or standards organization), references for those recommendations should be included.

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Federal Transit Administration
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Washington, DC 20590
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# EXHIBIT E

# Conservancy Territory Map

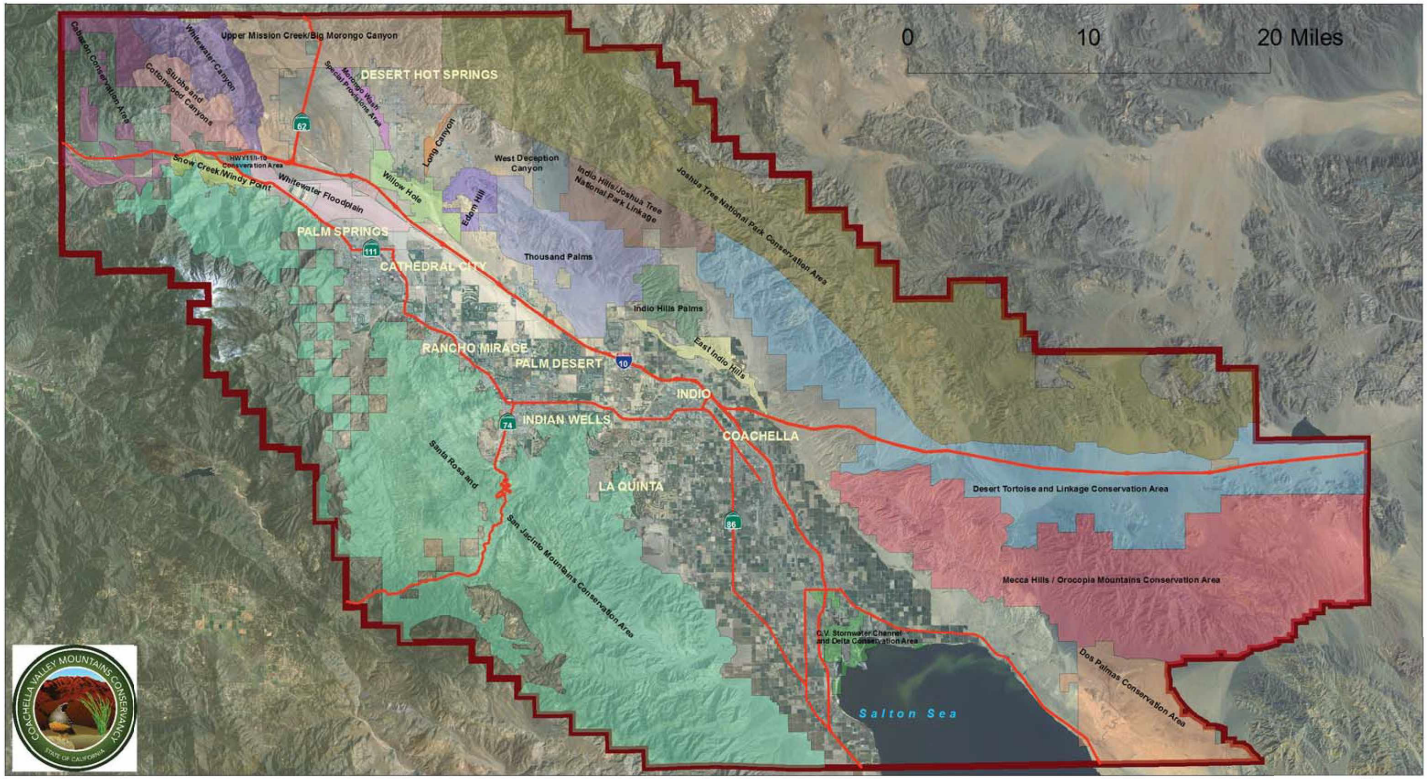


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**EXHIBIT F**

# Land Use and Zoning Map
## City of Rancho Mirage
69-825 Highway 111, Rancho Mirage, CA 92270

CITY OF RANCHO MIRAGE
Development Services Department

| | RESIDENTIAL | ACREAGE City | Sphere | Total |
|---|---|---|---|---|
| R-E | Residential Estate 1 du/ac Max. | 511 | | 511 |
| R-L-2 | Very Low Density 2 du/ac Max. | 2,102 | | 2,102 |
| R-L-3 | Low Density 3 du/ac Max. | 961 | | 961 |
| R-M | Medium Density 4 du/ac Max. | 1,154 | 801 | 1,955 |
| R-H | High Density 9 du/ac Max | 206 | 39 | 245 |
| MHP | Mobile Home Park 9 du/ac Max. | 95 | | 95 |
| R-H-E | Hillside Reserve 1 du/640 ac Max | 345 | | 345 |
| | Sub-Total | 5,374 | 840 | 6,214 |
| | **COMMERCIAL** | | | |
| O | Office | 112 | | 112 |
| C-N-C | Neighborhood Commercial | 103 | | 103 |
| C-G | General Commercial | 233 | | 233 |
| C-C-C | Community Commercial | 342 | 75 | 417 |
| R-H-T | Resort Hotel | 387 | | 387 |
| M-U-C | Mixed Use (Commercial/Office/Residential) | 71 | | 71 |
| R-I-C | Regional Interstate Commercial | 186 | | 186 |
| | Sub-Total | 1,435 | 75 | 1,510 |
| | **INSTITUTIONAL** | | | |
| P | Public/Quasi-Public | 83 | | 83 |
| P-C-H | City Hall | 9 | | 9 |
| P-F-S | Fire Station | 4 | | 4 |
| P-H | Hospital | 132 | | 132 |
| P-S | School | 83 | 39 | 121 |
| P-L | Library | 10 | | 10 |
| P-P-O | Post Office | 3 | | 3 |
| P-U-S | Utility Station | 9 | | 9 |
| | Sub-Total | 332 | 39 | 371 |
| | **OPEN SPACE** | | | |
| O-S | Public Park | 55 | 41 | 96 |
| M-R | Mountain Reserve | 5,175 | | 5,175 |
| O-S-P-V | Private Open Space | 2,129 | 181 | 2,311 |
| W-W-C | Floodways and Drainage Channels | 332 | | 332 |
| | Sub-Total | 7,691 | 222 | 7,913 |
| ROW | Right of Way | 1,239 | 27 | 1,265 |
| | **Totals** | 16,070 | 1,202 | 17,272 |
| | | 25 | 2 | 27 Sq. Miles |

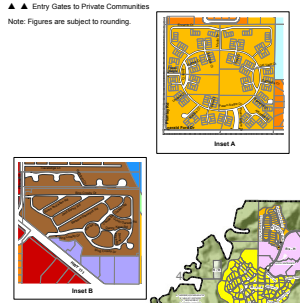
**OVERLAYS***

| | | |
|---|---|---|
| | Senior Overlay | 8 ac |
| | Special Corner | 122 ac |
| | 111 West Specific Plan | 121 ac |
| | 111 East Specific Plan | 248 ac |
| | Agua Caliente Band of Cahuilla Indians | 2,027 ac |

*These acreages are included in land use acreages above.

▲ ▲ Entry Gates to Private Communities

Note: Figures are subject to rounding.




01-33

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January 9, 2025

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**Re: Agenda Item #3 – Comments on the Ritz-Carlton Rancho Mirage Project (SCH 2024030267; Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004, and TPM23-0002).**

Dear Planning Commission Members, Ms. Ramos, and Mr. Torres:

We are writing on behalf of Californians Allied for a Responsible Economy ("CARE CA") to provide comments on the Ritz-Carlton Rancho Mirage Project (SCH 2024030267; Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004, and TPM23-0002) ("Project"), proposed by Kam Sang International ("Applicant"). The Project will be considered at the January 9, 2025, City of Rancho Mirage ("City") Planning Commission meeting as Agenda Item #3. The Planning Commission will consider whether to recommend approval of the Project's General Plan Zoning Map Amendment, Tentative Parcel Map, Major Modification, and Amendment to the existing Development Agreement. 02-1

The City previously circulated an Initial Study/Mitigated Negative Declaration ("IS/MND") for public comment from March 11 to April 9, 2024, and revised and recirculated the IS/MND from July 22, 2024 to August 2024 ('Revised MND"). CARE CA submitted timely comments on the IS/MND's which provided substantial evidence supporting a fair argument that the Project would have 02-2



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potentially significant environmental impacts on public health, air quality, energy, and transportation. The Final IS/MND, attached to the Staff Report for this Planning Commission meeting, includes responses to CARE CA's comments.

We reviewed the Final IS/MND with the assistance of noise expert Jack Meighan,[1] air quality and health risk expert Paul E. Rosenfeld, PhD from Soil / Water / Air Protection Enterprise ("SWAPE").[2] CARE CA reserves the right to supplement these comments at later proceedings and hearings related to the Project.[3]

02-2 Cont.

The instant comments demonstrate that the Final IS/MND fails to resolve the flaws identified in CARE CA's prior comments. Emissions from the Project's construction and operation would result significant, unmitigated health risk impacts on people living just 21 feet from the Project site.[4] SWAPE's quantitative analysis of the Project's emissions demonstrates that health risk impacts would exceed the City's 10 in one million cancer risk significance threshold, even with the mitigation proposed in the Final IS/MND. Due to the proximity of residences to the Project site, construction and operational noise impacts would also be significant. Construction noise would increase ambient noise levels by over 20 decibels, which the City acknowledges would be a significant impact. And during operations, stationary equipment like HVAC systems would exceed the 45 decibel nighttime noise standards at the nearby residences. CARE CA's comments also demonstrate that the Final IS/MND would have significant, unmitigated transportation and energy impacts.

02-3

The California Environmental Quality Act ("CEQA") requires the lead agency to prepare an environmental impact report ("EIR") whenever substantial evidence supports a fair argument that a project may have a significant effect on the environment.[5] Here, substantial evidence supports a fair argument that the Project would result in potentially significant impacts. The City cannot approve the Project until the Project's impacts are analyzed in an EIR. Because the Project would have

02-4

[1] Mr. Meighan's comments and curricula vitae are attached hereto as **Exhibit A** ("Meighan Comments").
[2] Dr. Rosenfeld's comments and curricula vitae are attached hereto as **Exhibit B** ("SWAPE Comments").
[3] Gov. Code § 65009(b); PRC § 21177(a); *Bakersfield Citizens for Local Control v. Bakersfield ("Bakersfield")* (2004) 124 Cal. App. 4th 1184, 1199-1203; *see Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal. App. 4th 1109, 1121.
[4] Final IS/MND, pg. 147.
[5] Pub. Resources Code, § 21080 (d).



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unmitigated impacts and relies on an insufficient environmental document, the Planning Commission lacks substantial evidence to recommend approval of the Project's General Plan Zoning Map Amendment, Tentative Parcel Map, Major Modification, and Amendment to the existing Development Agreement. CARE CA respectfully requests that the Commission continue today's hearing to require the City to comply with CEQA before the Project is considered for approval.

02-4 Cont.

## I. STATEMENT OF INTEREST

CARE CA is an unincorporated association of individuals and labor organizations that may be adversely affected by the potential public and worker health and safety hazards, and the environmental impacts of the Project. The coalition includes Rancho Mirage residents Norman Gerler and Michael Sanholtzer, the District Council of Ironworkers and Southern California Pipe Trades DC 16, along with their members, their families, and other individuals who live and work in the City of Rancho Mirage and in Riverside County.

CARE CA advocates for protecting the environment and the health of their communities' workforces. CARE CA seeks to ensure a sustainable construction industry over the long-term by supporting projects that offer genuine economic and employment benefits, and which minimize adverse environmental and other impacts on local communities. CARE CA members live, work, recreate, and raise their families in the City of Rancho Mirage and surrounding communities. Accordingly, they would be directly affected by the Project's environmental and health and safety impacts. Individual members may also work on the Project itself. They will be first in line to be exposed to any health and safety hazards that exist onsite.

In addition, CARE CA has an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for its members. Environmentally detrimental projects can jeopardize future jobs by making it more difficult and more expensive for business and industry to expand in the region, and by making the area less desirable for new businesses and new residents. Indeed, continued environmental degradation can, and has, caused construction moratoriums and other restrictions on growth that, in turn, reduce future employment opportunities.

02-5



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## II. THE CITY MUST PREPARE AN ENVIRONMENTAL IMPACT REPORT TO COMPLY WITH CEQA

CEQA requires that lead agencies analyze any project with potentially significant environmental impacts in an EIR.[6] CEQA's purpose and goals must be met through the preparation of an EIR, except in certain limited circumstances.[7] CEQA contains a strong presumption in favor of requiring a lead agency to prepare an EIR. This presumption is reflected in the "fair argument" standard. Under that standard, a lead agency "shall" prepare an EIR whenever substantial evidence in the whole record before the agency supports a fair argument that a project may have a significant effect on the environment.[8] The fair argument standard creates a "low threshold" favoring environmental review through an EIR, rather than through issuance of a negative declaration.[9] An agency's decision not to require an EIR can be upheld only when there is no credible evidence to the contrary.[10]

02-6

With respect to this Project, a fair argument can be made that the Project may cause significant noise, health risk, air quality, energy, and transportation impacts requiring the preparation of an EIR.

[6] *See* Pub. Resources Code, § 21000; CEQA Guidelines, § 15002.
[7] *See* Pub. Resources Code, § 21100
[8] Pub. Resources Code, §§ 21080, subd. (d), 21082.2, subd. (d); CEQA Guidelines, §§ 15002, subd. (k)(3), 15064, subds. (f)(1), (h)(1); *Laurel Heights Improvement Assn. v. Regents of the Univ. of Cal.* ("*Laurel Heights II*") (1993) 6 Cal.4th 1112, 1123; *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 75, 82; *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 150-151; *Quail Botanical Gardens Found., Inc. v. City of Encinitas* ("*Quail Botanical*") (1994) 29 Cal.App.4th 1597, 1601- 1602.
[9] *Citizens Action to Serve All Students v. Thornley* (1990) 222 Cal.App.3d 748, 754
[10] *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th, 1307, 1318; *see also Friends of B Street v. City of Hayward* (1980) 106 Cal.App.3d 988, 1002 ("*Friends of B Street*") ("If there was substantial evidence that the proposed project might have a significant environmental impact, evidence to the contrary is not sufficient to support a decision to dispense with preparation of an EIR and adopt a negative declaration, because it could be 'fairly argued' that the project might have a significant environmental impact").



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### A. The Project Still Has Potentially Significant, Unmitigated Noise Impacts

#### 1. The Final IS/MND Still Applies An Unsubstantiated Significance Threshold

The Draft and Revised IS/MND found that construction noise impacts would be less than significant because impacts would not exceed an 85 dBA maximum threshold.[11] CARE CA demonstrated that this threshold was not supported by substantial evidence because (1) the threshold was developed as a threshold to prevent occupational noise-induced hearing loss,[12] and (2) the threshold failed to account for increases in noise over ambient levels.[13] In response, the Final IS/MND attaches a new noise memorandum that applies a new threshold.[14] The new threshold provides that construction noise would constitute a significant impact if it exceeds an 80 dBA maximum level or increases ambient noise levels by 20 dBA.[15] However, the Final IS/MND was not revised to reflect the new threshold and still states that the 85 dBA threshold is the applicable threshold.[16] The Final IS/MND must be revised to be internally consistent and apply a legally adequate threshold.

02-7

#### 2. Construction Noise Impacts Would Exceed the IS/MND's New Significance Thresholds

The new noise memorandum in Appendix E-2 of the Final IS/MND estimates that construction noise would not exceed the 20 dBA threshold.[17] As shown below, Appendix E-2 claims that construction activities would result in noise increases of 19.5 dBA at receptors R3 and R5, and 19.9 dBA at R4, barely below the threshold.[18] But substantial evidence demonstrates that the Final IS/MND's calculations are underestimated and erroneous.

02-8

[11] IS/MND, pg. 145.
[12]
[13]
[14] Final IS/MND, Appendix E-2.
[15] Final IS/MND, Appendix E-2, pg. 2.
[16] Final IS/MND, pg. 144.
[17] Final IS/MND, Appendix E-2, pg. 8.
[18] *Id.*



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**TABLE 3: DAYTIME CONSTRUCTION NOISE LEVEL INCREASES**

| Receiver Location[1] | Highest Construction Noise Level[2] | Maximum Limit (dBA $L_{eq}$) | Threshold Exceeded?[4] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|---|---|
| R1 | 51.5 | 80.0 | No | L1 | 49.7 | 53.7 | 4.0 | 20.0 | No |
| R2 | 69.2 | 80.0 | No | L2 | 53.4 | 69.3 | 15.9 | 20.0 | No |
| R3 | 69.9 | 80.0 | No | L3 | 50.4 | 69.9 | 19.5 | 20.0 | No |
| R4 | 70.3 | 80.0 | No | L3 | 50.4 | 70.3 | 19.9 | 20.0 | No |
| R5 | 69.9 | 80.0 | No | L3 | 50.4 | 69.9 | 19.5 | 20.0 | No |
| R6 | 64.8 | 80.0 | No | L3 | 50.4 | 65.0 | 14.6 | 20.0 | No |
| R7 | 66.2 | 80.0 | No | L3 | 50.4 | 66.3 | 15.9 | 20.0 | No |
| R8 | 55.7 | 80.0 | No | L3 | 50.4 | 56.8 | 6.4 | 20.0 | No |

02-8 Cont.

Mr. Meighan demonstrates that the City's analysis underestimates construction noise impacts, which would exceed the 20 dBA threshold. Mr. Meighan observes that while the Final IS/MND claims that the highest construction noise level at Receptor R3 (21 feet away from the Project site) would be 69.9 dBA, the Final IS/MND elsewhere states that the composite source noise level at 50 feet varies between 76.2 and 84.4 dBA.[19] Mr. Meighan explains that because there is no evidence in the record to support the IS/MND's assumption that noise impacts would be lower at 21 feet than at 50 feet, the 69.9 dBA estimate underestimates impacts. Construction noise impacts of 76.2 and 84.4 dBA would exceed the Final IS/MND's new thresholds. Mr. Meighan shows that construction noise can be as high as 31 dBA over ambient levels at receiver R3.[20]

02-9

And as demonstrated in CARE CA's comments on the Revised IS/MND, construction noise impacts would be even higher if blasting is required. Response O5-13 claims that blasting is not proposed by the Project, but the Final IS/MND's geotechnical report states that "[s]ome blasting may be necessary in the deeper cut areas of the site, and may be desirable from an efficiency standpoint even where ripping with heavy equipment is feasible."[21] The Response does not contain evidence or reasoned analysis contradicting the evidence in the geotechnical report.

Because construction noise would exceed the Final IS/MND's 20 dBA significance threshold, substantial evidence supports a fair argument that

[19] Meighan Comments, pg. 2.
[20] Meighan Comments, pg. 2.
[21] Revised IS/MND, Appendix G, pg. 17.



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construction noise impacts are potentially significant and unmitigated. As a result, the City must analyze the Project's impacts in an EIR.

02-9 Cont.

### 3. The Final IS/MND's Unsupported Construction Noise Threshold Masks Potentially Significant Noise Impacts

Appendix E-2 states that construction noise would constitute a significant impact if it exceeds an 80 dBA maximum level or increases ambient noise levels by 20 dBA. But substantial evidence demonstrates that significant construction noise impacts would occur at lower noise levels. Mr. Meighan explains that an increase of 10 dB causes a doubling of perceived loudness and represents a ten-fold increase in sound level.[22] 20 dBA represents noise that is 100 times louder and is perceived as four times as loud as ambient conditions.[23] Figure 3-6 of the FTA Manual presents data from case studies showing that community reactions to increases in noise between 5 to 10 dBA above existing levels vary from "widespread complaints" to "threats of legal action."[24] Other agencies have adopted significance thresholds for construction noise that identify an increase of 10 dBA as significant.[25]

02-10

The CEQA Guidelines provide that, although significance thresholds may assist lead agencies in determining whether a project may cause a significant impact, "[c]ompliance with the threshold does not relieve a lead agency of the obligation to consider substantial evidence indicating that the project's environmental effects may still be significant."[26] Courts have held that a threshold of significance based on lead agency policies may not be applied in a way that

02-11

[22] Meighan Comments, pg. 2.
[23] *Id.*
[24] Federal Transit Administration, Transit Noise And Vibration Impact Assessment Manual, September 2018, 18, Figure 3-6 (Community Reaction to New Noise, Relative to Existing Noise in a Residential Urban Environment), available at https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.
[25] City of Los Angeles, CEQA Thresholds Guide, pg. I.1-3, available at https://planning.lacity.gov/eir/CrossroadsHwd/deir/files/references/A07.pdf (A project would normally have a significant impact on noise levels from construction if: • Construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise sensitive use; • Construction activities lasting more than 10 days in a three month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise sensitive use; or • Construction activities would exceed the ambient noise level by 5 dBA at a noise sensitive use between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or at any time on Sunday).
[26] .



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forecloses any consideration of evidence an impact is significant in the context of a particular project.[27]

02-11 Cont.

Courts typically require an EIR to be prepared when the record contains substantial evidence of a significant noise impact – regardless of conformity with the lead agency's adopted thresholds. In *Oro Fino Gold Mining Corp. v. County of El Dorado* ("*Oro Fino*"),[28] a mining company applied for a special use permit for drilling holes to explore for minerals.[29] The mining company argued the proposed mitigated negative declaration prohibited noise levels above the applicable county general plan noise standard maximum of 50 dBA and, therefore, there could be no significant noise impact.[30] The court rejected this argument on two grounds. "Initially, we note that conformity with a general plan does not insulate a project from EIR review where it can be fairly argued that the project will generate significant environmental effects."[31] Second, the court reviewed the record and, like the trial court, concluded it contained substantial evidence supporting a fair argument that noise from drilling would exceed the county standard of 50 dBA.[32] Thus, the court concluded an EIR was required.

In *Citizens for Responsible & Open Government v. City of Grand Terrace* ("*Grand Terrace*"),[33] the city approved a 120-unit senior housing facility based on a mitigated negative declaration.[34] A citizen's group argued substantial evidence supported a fair argument that the project would result in significant environmental impacts, including the impact of noise from air conditioners.[35] The

02-12

[27] *See East Sacramento Partnership for a Livable City v City of Sacramento* (2016) 5 CA5th 281, 300 (general plan traffic policy, standing alone, was not sufficient to support EIR's finding that certain traffic impacts were less than significant, given absence of any evidence or analysis supporting use of general plan policy as a threshold of significance); see also *Save Our Capitol! v Department of Gen. Servs.* (2023) 87 CA5th 655, 695-696 (project compliance with LEED and CALGreen building standards did not excuse EIR's failure to analyze whether light and glare impacts would be significant).

[28] (1990) 225 Cal.App.3d 872.
[29] *Id.* at pg. 876.
[30] *Oro Fino, supra.*
[31] *Id.* at pp. 881–882.
[32] *Id.* at pg. 882.
[33] (2008) 160 Cal.App.4th 1323.
[34] *Id.* at pg. 1327.
[35] *Id.*



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trial court agreed and issued a writ of mandate requiring the preparation of an EIR.[36] The appellate court affirmed.[37]

In *Grand Terrace*, the noise element of the city's general plan stated exterior noise levels in residential areas should be limited to 65 dB CNEL.[38] The initial study concluded the facility's air conditioner units would cause noise impacts, but with mitigating measures the project would operate within the general plan's noise standard. Mitigation measures specified as conditions of approval included "shielding" the units, having self-contained condensers that would not transmit noise outside, reducing the number of units near residences, including a buffer setback, planting trees as a noise buffer, etc.[39] However, a community member who had been in the HVAC business for 30 years stated that the type of air conditioning units proposed by the project "sound like airplanes."[40] And at a city council public hearing, community and city council members expressed concern that the air conditioners would be noisy.[41] The public was not able to analyze numerical data about the noise generated by the air conditioners because the project proponent "did not provide a noise rating on the units"[42]

O2-12
Cont.

The appellate court cited *Oro Fino* for the principle that "'conformity with a general plan does not insulate a project from EIR review where it can be fairly argued that the project will generate significant environmental effects.'"[43] The court considered the testimony about the noise generated by the proposed air conditioners, took into account the mitigation measures, and concluded "there is substantial evidence that it can be fairly argued that the Project may have a significant environmental noise impact."[44]

Here, the record contains stronger evidence of significant noise impacts than in *Grand Terrace*, as impacts would exceed the Final IS/MND's construction noise thresholds, and would be significant at lower levels. An EIR must be prepared that analyzes and mitigates the Project's potentially significant noise impacts.

[36] *Id.* at pp. 1326–1327.
[37] *Id.* at pg. 1327.
[38] *Grand Terrace, supra*, 160 Cal.App.4th at pg. 1338.
[39] *Id.* at 1339-1340.
[40] *Id.* at 1338-1339.
[41] *Id.* at 1338.
[42] *Id.* at pp. 1339, 1340.
[43] *Grand Terrace, supra*, at pg. 1338.
[44] *Id.* at p. 1341.



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**4. Operational Noise Impacts Remain Potentially Significant and Unmitigated**

The Revised IS/MND provided that operational noise impacts would be significant if Project-related operational (stationary-source) noise levels exceed the base exterior noise level standard of 45 dBA Leq during the nighttime hours (10:00 p.m. to 7:00 a.m.) for noise-sensitive residential and institutional uses in the Project study area.[45] CARE CA's comments on the Revised IS/MND demonstrated that, if the Project's HVAC units ran for just 4 more minutes per hour (32/60 minutes) than assumed in the IS/MND (28/60 minutes), the 45 dBA threshold would be exceeded. Response O5-12 is nonresponsive to CARE CA's comments on this issue:

> The comment states that the MND does not address or mitigate noise impacts from HVAC systems. The comment states that the assumptions for the operation time per hour is longer, and would result in potentially significant impacts. The author of the noise and vibration study report (Urban Crossroads) states that they have tested many HVAC systems and spoken with many manufacturers about this, and they have concluded that an HVAC unit would fail to function in a year if it were to run at 100 percent all the time. They have empirical measurements on hot days and the typical run time has been found to be 45 minutes or less during daytime hours and 30 minutes or less at night.[46]

02-13

As shown above, Response O5-12 states that HVAC systems cannot be expected to run constantly. This does not address that a significant nighttime noise impact would occur if HVAC systems ran for 32 minutes in an hour, as estimated by Mr. Meighan.[47] And by stating that the typical HVAC runs for 30 minutes or less at night, the Response actually corroborates that it is reasonably foreseeable that HVAC systems could run for 32 minutes at night.

The City's response is also inadequate because it is not supported by substantial evidence. An EIR must contain facts and analysis, not just an agency's bare conclusions or opinions.[48] Response O5-12 alludes to "empirical measurements" but fails to enter these empirical measurements into the record.

[45] Revised IS/MND, Appendix E, pg. 21.
[46] Agenda Packet, pg. 3-3154.
[47] Meighan Comments, pg. 2.
[48] *Sierra Club v County of Fresno* (2018) 6 C5th 502, 522; *Citizens of Goleta Valley v Board of Supervisors* (1990) 52 C3d 553, 568.



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The Response alludes to conversations with HVAC manufacturers but fails to provide any information regarding the conversations with HVAC manufacturers, such as how many manufacturers were contacted or how recent these conversations were.

O2-13 Cont.

In sum, noise from HVAC systems remains a potentially significant impact that must be analyzed in an EIR.

**B. Health Risk Remains Significant and Unmitigated**

CARE CA's comments on the Revised IS/MND introduced substantial evidence demonstrating that the Project would have significant, unmitigated health risks from construction and operational emissions. SWAPE calculated the Project's operational cancer risk (42.4 in one million) and added the Project's mitigated construction-related cancer risk (6.65 in one million, as estimated by the Revised IS/MND), to find that the excess cancer risk is approximately 49 in one million. This cancer risk exceeds the IS/MND's 10 in one million significance threshold, resulting in a significant impact.

O2-14

Response O2-7 states that a quantitative health risk analysis is not required for this Project because proposed construction activities would not generate emissions of PM10 in excess of Localized Significance Thresholds ("LSTs").[49] But as stated in the same response, the City's own construction health risk assessment, prepared in response to CARE CA's comments, found that impacts would be significant.[50] This is because LSTs apply only to criteria pollutants, and do not apply to DPM and other TACs which cause increased health risk, as explained in CARE CA's comments on the Draft IS/MND. The City's response is misleading and inaccurate.

Response O5-17 states that there is no need to analyze the combined health risk of Project construction and operations because there would be no overlap between these phases.[51] This argument also fails because sensitive receptors would be exposed to emissions from both phases, whereas the City's approach would ignore this combined impact. And as explained in SWAPE's comments on the Draft IS/MND, guidance from the Office of Environmental Health Hazard Assessment

O2-15

[49] Agenda Packet, pg. 3-2513.
[50] *Id.*
[51] *Id.* at 3-3155.



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("OEHHA") provides that "the excess cancer risk is calculated separately for each age grouping and then summed to yield cancer risk at the receptor location."[52]

02-15 Cont.

In response to CARE CA's comments, the Final IS/MND includes a screening-level analysis reflecting intermittent maintenance and testing of the diesel-fired emergency generator (which would be limited to 50 hours of testing annually).[53] Response O2-27 states that impacts from testing of the generator would result in a 0.57 in one million cancer risk.[54] The Response concludes that this impact summed with the mitigated construction-related cancer risk (6.65 in one million) would not exceed the 10 in one million significance threshold. The Final IS/MND underestimates operational health risk impacts in two critical ways.

First, the 0.57 in one million operational cancer risk only reflects backup generator emissions. The Project would have other sources of TAC emissions that would add to this impact, including diesel trucks and other potential stationary equipment.[55] The AERSCREEN model used in SWAPE's analysis relies on data reflecting the proposed land use, which includes other sources of TACs than a single generator. Thus, whereas the IS/MND's screening analysis omits analysis of all potential sources of operational emissions, SWAPE's analysis of operational emissions is supported by substantial evidence.

02-16

Second, the operational HRA's analysis of the emergency generator only accounts for emissions from 50 hours of testing, and not from any reasonably foreseeable emergency use.[56] The HRA must also analyze the generator's use in emergencies. The emergency use of backup generators is a reasonably foreseeable activity during Project operation due to the prevalence of power safety shutoffs, extreme heat events, and other emergencies which lead to temporary losses of power.

02-17

In *East Oakland Stadium Alliance v. City of Oakland*,[57] the Court of Appeal upheld an EIR's analysis of emissions from backup generators. The EIR's analysis assumed that generators would operate for 50 hours of testing and maintenance

[52] "Guidance Manual for preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf pg. 8-4; SWAPE Comments, pg. 2.
[53] Agenda Packet, pg. 3-2519; HRA available in Final IS/MND, Appendix A-2.
[54] *Id.*
[55] SWAPE comments, pg. 2.
[56] Agenda Packet, pg. 3-562
[57] (2023) 889 Cal. App. 5th 1226.



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annually, while allocating no time for actual emergency use. In discussing the lead agency's duty to analyze backup generator emissions, the Court stated that "if the annual need for emergency generator use is reasonably foreseeable, the EIR was not entitled to disregard such use merely because it would occur at unpredictable times."[58] The Court explained that use of a generator was reasonably foreseeable because, "[a]s noted in the EIR, some parts of the Bay Area are subject to predictable, sustained power outages undertaken to reduce the risk of fire."[59] Thus, "[t]he EIR was required to make neither a generally applicable nor a worst-case assumption; rather it was required to make a reasonable estimate of likely annual use of the generators at the project site."[60]

Here, as in *East Oakland Stadium Alliance*, backup generator emissions are a reasonably foreseeable consequence of the Project due to increasingly common Public Safety Power Shutoff ("PSPS") events and extreme heat events ("EHE"). EHEs are defined as periods where in the temperatures throughout California exceed 100 degrees Fahrenheit.[61] The Project's electricity would be supplied by Southern California Edison.[62] From January 2019 through December 2019, Southern California Edison reported 158 of their circuits underwent a PSP event.[63] In Los Angeles County, two circuits had 4 PSPS events during that period, lasting an average of 35 to 38 hours. The total duration of the PSPS events lasted between 141 hours to 154 hours in 2019. According to the California Public Utilities Commission de-energization report[64] in October 2019, there were almost 806 PSPS events that impacted almost 973,000 customers (~7.5% of households in California). The California Air Resources Board estimates that with 973,000 customers impacted by PSPS events in October 2019, approximately 125,000 back-up generators were used by customers to provide electricity during power outages.[65] The widespread use of back-up generators to adapt to PSPS and EHE events

O2-17
Cont.

[58] *Id.* at 1252.
[59] *Id.* at 1253.
[60] *Id.*
[61] Governor of California. 2021. Proclamation of a state of emergency. June 17, 2021.
[62] Agenda Packet, pg. 3-564.
[63] SCAQMD. 2020. Proposed Amendment To Rules (PARS) 1110.2, 1470, and 1472. Dated December 10, 2020. http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1110.2/1110-2_1470_1472/par1110-2_1470_wgm_121020.pdf?sfvrsn=6.
[64] https://www.cpuc.ca.gov/deenergization/ as cited in CARB, 2020. Potential Emission Impact of Public Safety Power Shutoff (PSPS), Emission Impact: Additional Generator Usage associated With Power Outage.
[65] California Air Resources Board, Emission Impact: Additional Generator Usage Associated with Power Outage (January 30, 2020), available at https://ww2.arb.ca.gov/resources/documents/emissions-impact-generator-usage-during-psps.



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suggests that back-up generators are a reasonably foreseeable consequence of the Project.

The City's operational HRA underestimates health risks by not including emissions from emergency use. Generators can emit criteria air pollutants, greenhouse gases, and toxic air contaminants. This equipment commonly relies on fuels such as natural gas or diesel,[66] and thus can significantly impact public health through DPM emissions.[67] This equipment can emit significant amounts of NOx, sulfur dioxides ("SO2"), particulate matter ("PM10"), carbon dioxide ("CO2"), carbon monoxide ("CO"), volatile organic compounds ("VOC"), particulate matter less than 10 microns ("$PM_{10}$"), PM less than 2.5 microns ("$PM_{2.5}$"), and air toxins such as DPM.[68] The IS/MND's failure to analyze emergency generator use thus results in an underestimation of the Project's air quality, greenhouse gas, and health risk impacts.

O2-17 Cont.

[66] SCAQMD, Fact Sheet on Emergency Backup Generators, http://www.aqmd.gov/home/permits/emergency-generators ("Most of the existing emergency backup generators use diesel as fuel").

[67] California Air Resources Board, Emission Impact: Additional Generator Usage Associated with Power Outage (January 30, 2020), available at https://ww2.arb.ca.gov/resources/documents/emissions-impact-generator-usage-during-psps (showing that generators commonly rely on gasoline or diesel, and that use of generators during power outages results in excess emissions); California Air Resources Board, Use of Back-up Engines for Electricity Generation During Public Safety Power Shutoff Events (October 25, 2019), available at https://ww2.arb.ca.gov/resources/documents/use-back-engines-electricity-generation-during-public-safety-power-shutoff ("When electric utilities de-energize their electric lines, the demand for back-up power increases. This demand for reliable back-up power has health impacts of its own. Of particular concern are health effects related to emissions from diesel back-up engines. Diesel particulate matter (DPM) has been identified as a toxic air contaminant, composed of carbon particles and numerous organic compounds, including over forty known cancer-causing organic substances. The majority of DPM is small enough to be inhaled deep into the lungs and make them more susceptible to injury. Much of the back-up power produced during PSPS events is expected to come from engines regulated by CARB and California's 35 air pollution control and air quality management districts (air districts)").

[68] University of California, Riverside Bourns College of Engineering—Center for Environmental Research and Technology, Air Quality Implications Of Backup Generators In California, (March 2005), pg. 8, available at https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=84c8463118e4813a117db3d768151a8622c4bf6b; South Coast AQMD, Fact Sheet on Emergency Backup Generators ("Emissions of Nitrogen Oxides (NOx) from diesel-fired emergency engines are 200 to 600 times greater, per unit of electricity produced, than new or controlled existing central power plants fired on natural gas. Diesel-fired engines also produce significantly greater amounts of fine particulates and toxics emissions compared to natural gas fired equipment."), available at http://www.aqmd.gov/home/permits/emergency-generators#Fact2.



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In sum, substantial evidence in the record still demonstrates that health risks from construction and operations are potentially significant and unmitigated. Although the Final IS/MND calculates a less than significant impact, the MND's analysis underestimates impacts. Conversely, SWAPE's assessment of the Project's combined health risk impacts is supported by substantial evidence. An EIR must be prepared to analyze and mitigate the potentially significant health risk impact. 02-18

**1. The Final IS/MND's Health Risk Mitigation is Not Binding and Ineffective**

The Final IS/MND proposes to mitigate the Project's significant construction health risk impact with Mitigation Measure MM-AQ-1. MM-AQ-1 calls for use of Tier 4 equipment, but permits use of alternative methods to meet the numeric cancer risk standards established by the South Coast Air Quality Management District. CARE CA's comments on the Revised IS/MND explained that Mitigation Measure MM-AQ-1 constituted nonbinding and improperly deferred mitigation.[69] The Final IS/MND fails to correct this error.

Courts have held that deferral of mitigation may be permitted only where the lead agency: (1) undertakes a complete analysis of the significance of the environmental impact; (2) proposes potential mitigation measures early in the planning process; and (3) articulates specific performance criteria that would ensure that adequate mitigation measures were eventually implemented.[70]

CARE CA explained that MM-AQ-1 does not meet this standard because it does not identify alternative emissions reduction methods able to achieve the necessary emissions reductions. O5-15 states that the City need not identify any alternative emissions reductions methods because it would need to meet the SCAQMD significance threshold.[71] But this argument ignores that deferred mitigation is only permitted when the lead agency "identifies the type(s) of potential action(s) that can feasibly achieve that performance standard."[72] 02-19

[69] CEQA Guidelines, § 15126.4, subd. (a)(2) (CEQA documents, including EIRs and MNDs, must mitigate significant impacts through measures that are "fully enforceable through permit conditions, agreements, or other legally binding instruments").
[70] Cal. Code Regs. tit. 14 § 15126.4; *Comtys. for a Better Env't v. City of Richmond* (2010) 184 Cal.App.4th 70, 95; *Cal. Native Plant Socy' v. City of Rancho Cordova* (2009) 172 Cal.App.4th 603, 621.
[71] Agenda Packet, pg. 3-3155.
[72] Cal. Code Regs. tit. 14 § 15126.4.



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CARE CA also explained that MM-AQ-1 fails to articulate specific performance criteria that would ensure that adequate mitigation measures are implemented. MM-AQ-1 requires that if Tier 4 equipment is not available, "[d]ocumentation using industry-standard emission estimation methodologies shall be furnished to the City demonstrating that estimated project-generated construction emissions would not exceed the applicable SCAQMD cancer risk threshold." This is not adequate performance criteria because the City continues to claim that emissions that do not exceed LSTs cannot result in a significant health risk impact.[73] To ensure that health risk impacts would be reduced below the 10 in one million significance thresholds, MM-AQ-1 must be revised to require a quantitative HRA that considers all components of the Project before any alternative construction methods can be approved.

O2-19 Cont.

**C. The Final IS/MND Still Fails to Include Sufficient Investigation into Energy Conservation Measures**

CARE CA's comments on the Draft IS/MND explained that the IS/MND fails to include sufficient investigation into energy conservation measures that might be available or appropriate for the Project. Such measures include solar facilities, electric vehicle charging infrastructure above what is required by existing regulations, use of alternate fuel sources, or passive energy efficiency measures to ensure the Project's energy consumption would not be wasteful, inefficient, or unnecessary.

Response O2-14 claims that on-site renewable energy systems are not considered feasible for the proposed project, but fails to provide any evidence in support of this claim. The response does not substantiate why solar facilities cannot be installed on rooftops, over parking facilities, or ground level. The response's conclusory discussion fails to meet the standards of Appendix F of the CEQA Guidelines.

O2-20

Response O2-15 claims that the Project would provide electric vehicle charging as required by law, and further analysis is not required because energy impacts have been determined to be less than significant.[74] This claim ignores the caselaw discussed in CARE CA's comments, which hold that compliance with building standards alone does not constitute an adequate energy analysis, and that

[73] *See* Response O2-7.
[74] Agenda Packet, pg. 3-2517.



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even projects that find a less-than-significant energy impact must "discuss whether any renewable energy features could be incorporated into the project."[75]

Response O2-16 claims that the IS/MND need not analyze alternative fuel sources for the emergency generator because the "the use of alternative fuel does not evaluate the efficient use of energy" and air quality impacts would be less than significant.[76] The response is incorrect because analysis of "[a]lternate fuels (particularly renewable ones) or energy systems" is called for in Appendix F of the CEQA Guidelines.[77] The response's reference to less than significant air quality impacts is also incorrect, as the Project's health risk impacts are potentially significant.

An EIR must be prepared that adequately evaluates the feasibility of reducing the Project's energy consumption. The EIR should evaluate the feasibility of meeting voluntary Tier 1 or 2 standards described in Appendix A5, Nonresidential Voluntary Measures, of the 2022 California Green Building Standards Code. These standards include consumption measures addressing many different aspects of nonresidential developments. CALGreen Sections A5.106.5.1.1 and A5.106.5.1.2 call for increased number of designated parking spaces for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles. Tier 1 standards require 35% of spaces to be reserved for clean air vehicles, and Tier 2 standards require 50%. CALGreen Section A5.106.5.3 calls for an increased number of EV capable spaces. The number of EV capable spaces required by these sections depends on the total number of spaces.[78] Tier 1 standards require large projects with 201 or more parking spaces to provide 30% EV capable spaces, and Tier 2 standards require 45% to be EV capable.[79] CALGreen Section A5.203.1.2 sets energy budgets that are less than permitted by the mandatory Title 24 energy standards.[80] CALGreen Section A5.303.2.3 calls for reductions in water consumption by require plumbing fixtures and fixture fittings that would reduce the use of potable water by 12%, in the case of Tier 1 standards, and 20%, in the case of

O2-20 Cont.

[75] *League to Save Lake Tahoe Mtn. Area Preservation Found. v County of Placer* (2022) 75 CA5th 63, 167–68; *see California Clean Energy Commission v. City of Woodland* (2014) 225 CA4th 173; *Ukiah Citizens for Safety First v. City of Ukiah* (2016) 248 CA4th 256; *Spring Valley Lake Ass'n v. City of Victorville* (2016) 248 CA4th 91; *Tracy First v. City of Tracy* (2009) 177 Cal.App.4th 912, 930.
[76] Agenda Packet, pg. 3-2517.
[77] CEQA Guidelines, Appendix F, II (D)(4).
[78] CALGreen, Table A5.106.5.3.1 Tier 1
[79] Table A5.106.5.3.1, A5.106.5.3.2.
[80] CALGreen Sections A5.203.1.2.1, A5.203.1.2.2.



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Tier 2.[81] There is no evidence in the record demonstrating that these measures would be infeasible for this Project.

02-20 Cont.

## III. THE PLANNING COMMISSION LACKS SUBSTANTIAL EVIDENCE TO MAKE THE REQUIRED FINDINGS TO RECOMMEND APPROVAL OF THE PROJECT ENTITLEMENTS

The draft resolution that will be considered by the Planning Commission lists various findings that the Commission must make to recommend approval of the Project's entitlements.[82] These include several findings relating to environmental impacts:

> f) That the design of the subdivision or the proposed improvements is not likely to cause substantial environmental damage or substantially and avoidably injure fish or wildlife or their habitat;
>
> g) That the design of the subdivision or type of improvements is not likely to cause serious public health problems;
>
> h) That the design of the subdivision or the type of improvements will not conflict with easements, acquired by the public at large, for access through or use of, property within the proposed subdivision;
> q) That the Proposed Project have been reviewed in compliance with the provisions of the California Environmental Quality Act (CEQA) and CEQA Guidelines…[83]

02-21

As shown herein and in CARE CA's prior comments, substantial evidence demonstrates that the Project would result in significant environmental and public health impacts. The Project has not been reviewed in compliance with CEQA because an EIR has not been prepared for the Project. As such, the Planning Commission lacks substantial evidence to support approval findings for the Project's entitlements.

[81] CALGreen Sections A5.303.2.3.1, A5.303.2.3.2
[82] Agenda Packet, pg. 3-3223.
[83] Agenda Packet, pg. 3-3226 to 3227.



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## IV. CONCLUSION

Substantial evidence supports a fair argument that the Project would have significant, unmitigated health risk, air quality, noise, and transportation impacts. Due to the Project's potentially significant impacts, CEQA requires the City to analyze the Project's impacts in an EIR. And as a consequence of the Project's impacts, the City cannot make the requisite findings under the City's Municipal Code to approve the Project's entitlements. CARE CA urges the Planning Commission not to recommend approval of the Project until the Project is analyzed in an EIR. This is the only way the City and the public can ensure the Project's significant environmental impacts are fully mitigated. 02-22

Sincerely,



Aidan P. Marshall

Attachment
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# EXHIBIT A

WILSON IHRIG
ACOUSTICS, NOISE & VIBRATION

CALIFORNIA
WASHINGTON
NEW YORK

WI #25-001.01

January 8th, 2025

Mr. Aidan P. Marshall
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080

**SUBJECT:** **Racho Mirage Ritz**
**Initial Study/Mitigated Negative Declaration (IS/MND).**
**Response to Comments on the Noise Analysis**

Below is our response to comments on the letter we sent on August 20th 2024 regarding noise impacts caused by the Rancho Mirage Ritz development

## Response to Comment 01-14 & 05-8 & 05-9

02-23

These comments are in response to our concerns about construction noise levels greatly exceeding ambient values, with the response to our comments pointing to a new noise analysis in Appendix E-2.

02-24

The new analysis in Appendix E-2 states that "many jurisdictions across California set construction noise level limits around 75 to 80 dBA Leq and only allow construction during daytime hours (e.g., City and County of Los Angeles City and County of San Diego, City and County of San Francisco, etc.)" (page 2). This is not true. The County of Los Angeles allows for nighttime construction and sets nighttime noise limits at 50 dBA and daytime noise limits at 60 dBA for single-family residential[1]. The City of Los Angeles has a CEQA thresholds guide that recommends a 10 dBA increase over ambient limits[2]. Both of these thresholds would be exceeded by the analysis shown in Tables 2 and 3 of Appendix E2[3]. Similarly, San Francisco has a construction noise threshold of a 5 dBA increase over ambient conditions[4]

The document then states that "many jurisdictions across California set residential daytime noise level limits around 55 dBA Leq during daytime hours" (page 2). This would then imply that many "California communities consider an increase of 20 dBA over the daytime limit an acceptable temporary increase for construction activities" (page 2) based on the 75 to 80 dBA construction noise

[1] https://library.municode.com/ca/los_angeles_county/codes/code_of_ordinances?nodeId=TIT12ENPR_CH12.08NOCO_PT4SPNORE_12.08.440CONO

[2] https://planning.lacity.gov/eir/CrossroadsHwd/deir/files/references/A07.pdf . Page I.1-3

[3] The 60 dBA LA County threshold is for periods of 10 days or longer, and every construction phase at receiver R4 is over 60 dBA via Table 2 in Appendix E-2.

[4] https://sfpublicworks.org/sites/default/files/Noise_Control_Ordinance_0.pdf

limits referred to in Appendix E-2. However, this is unsupported as numerous examples given have construction noise thresholds much more stringent than as cited in the document.

This 20 dBA increase in the noise threshold is extreme. An increase of 10 dB causes a doubling of perceived loudness and represents a ten-fold increase in sound level. 20 dBA represents noise that is 100 times louder and is perceived as four times as loud as ambient conditions.[5] Having construction noise thresholds that are more lenient than operational noise thresholds is common due to the short-term nature of construction noise. However, most construction noise thresholds are capped at 10 dBA, which represents half the increase as the proposed 20 dBA threshold.

This standard disregards the cumulative and contextual nature of noise disturbances, which CEQA is designed to evaluate comprehensively. By allowing a substantial increase before requiring mitigation, this threshold undermines CEQA's intent to prevent significant environmental impacts and compromises the well-being of affected communities.

Additionally, the construction noise may be over the 20 dBA limit as presented. In our original letter, we detail that noise can be as high as 31 dBA over ambient levels at receiver R3. In the new analysis, receiver 3 is stated to be "approximately 21 feet from the Project site" (page 3) with a highest construction noise level of 69.9 dBA (Table 2). Yet, in Table 1, the composite source noise level at 50 feet varies between 76.2 and 84.4 dBA. It is unclear why the noise level at 50 feet is greater than the noise level at 21 feet, as no barriers were used and the closest distance between construction and R3 is relatively flat. This would constitute an unreported impact if fixed.

O2-24 Cont.

## Response to Comment 05-12

This comment is in response to our statement that the MND may be underestimating the time HVAC systems are running under worst-case conditions in the notoriously hot Coachella Valley region. The comment states "author of the noise and vibration study report" has "concluded that an HVAC unit would fail to function in a year if it were to run at 100 percent all the time" which is backed by both conversations with "many manufacturers" and "measurements on hot days and the typical run time has been found to be 45 minutes or less during daytime hours and 30 minutes or less at night."

An HVAC system would not run 100 percent of the time – but it could for a full hour or more under worst case conditions. On days that are exceptionally hot, which is common in Rancho Mirage as documented in our letter, to have a full hour of continuous air conditioning operation is entirely possible. If the assertation otherwise is backed up by measurements, the environment of those measurements should be documented in the IS/MND, giving the temperature, setting, and other details so decision makers and people in the affected environment can decide if the same situation is applicable for the new development.

As it stands, 100 percent usage of an HVAC system would increase noise levels over the noise threshold if running for 32 minutes in an hour, as documented in our previous letter. We believe that saying that an HVAC system would never run for more than 30 minutes at night is an unrealistic assumption, and thus is an unreported significant impact.

O2-25

[5] https://www.nps.gov/subjects/sound/understandingsound.htm

## Conclusion

We believe that there is a good chance that the project may create significant noise impacts, considering an improper construction noise threshold, inconstancies in the noise analysis, and incorrect assumptions about operational noise sources. As such, this project should be analyzed in an environmental impact report.

Very truly yours,

WILSON IHRIG



Jack Meighan
Associate

02-26

# EXHIBIT B

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

2656 29th Street, Suite 201
Santa Monica, CA 90405

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Paul E. Rosenfeld, PhD
(310) 795-2335
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January 8, 2025

Aidan Marshall
Adams Broadwell Joseph & Cardozo
601 Gateway Blvd #1000
South San Francisco, CA 94080

**Subject: Comments on the Rancho Mirage Ritz-Carlton Project RTC**

Dear Mr. Marshall,

We have reviewed the August 2024 Response to Comments ("RTC") and the February 2024 Initial Study/Mitigated Negative Declaration ("IS/MND") for the Rancho Mirage Ritz-Carlton Project ("Project") for the Rancho Mirage Ritz-Carlton Project ("Project") and have determined that the RTC is still insufficient in addressing the Project's potential health risk impacts. As stated in our March 8th, 2024 comment letter, we maintain that an Environmental Impact Report ("EIR") should be prepared to adequately assess and mitigate the potential health risk impacts that the Project may have. 02-26 Cont.

## Air Quality

### Diesel Particulate Matter Emissions Inadequately Evaluated

As discussed in our March 8th, 2024 comment letter, the IS/MND failed to adequately evaluate the potential health risk impacts associated with Project construction and operation. In our March 8th, 2024 letter, we conducted a screening-level risk assessment that estimates Project construction and operation could result in a total excess cancer risk of approximately 42.4 in one million, which exceeds the applicable South Coast Air Quality Management District ("SCAQMD") threshold of 10 in one million. 02-27

The RTC responds with its own screening-level health risk assessment ("HRA"), stating:

> "The Risk Assessment Tool, a spreadsheet program, was used to perform a screening level evaluation of the cancer and non-cancer health effects of the emergency generator emissions pursuant to Rule 1401, see Appendix B for program results" (p. 3-2519).

Upon review of the subsequent screening-level HRA conducted by the Project Applicant, we found it to be insufficient for two reasons.

First, the screening-level analysis conducted only accounts for emergency generators, as described above. By assessing emissions solely from one source type, the RTC's HRA ignores the other potential future sources of harmful emissions. The IS/MND estimates the Project would generate 1,068 daily weekday operational vehicles trips (p. 173, Table 17-5). Furthermore, the Project includes "Sky Mesa Restaurant" as a proposed future land use. The HRA therefore fails to consider the potential health risk impacts from mobile sources and sources related to the proposed restaurant. These omissions show a failure of the RTC's analysis to follow the California Environmental Quality Act's ("CEQA")'s requirement to correlate the increase in emissions that the Project would generate to the adverse impacts on human health caused by those emissions.[1]

02-27 Cont.

Second, our March 8th, 2024 comment letter explains that, following the United States Environmental Protection Agency ("U.S. EPA") guidance, a screening level HRA is used to show a link between Project-generated emissions and potential adverse health risk impacts, and that a significant output warrants a refined modeling approach. [2] The RTC relies upon its own screening-level analysis, rather than adopting our determination or conducting a more refined model.

02-28

The results of future construction-related and operational HRAs should then be summed up and compared to the SCAQMD threshold of 10 in a million, in line with SCAQMD guidance.[3] We maintain that an EIR should be prepared to include a refined health risk analysis which adequately and accurately evaluates health risk impacts associated with both Project construction and operation.

02-29

## Mitigation

### Feasible Mitigation Measures Available to Reduce Emissions

CEQA Guidelines explain that to properly address the Project's potential health risks, the RTC and associated documents must review all feasible mitigation measures.[4] We maintain that the IS/MND consider implementing the following measures to mitigate the DPM emissions associated with Project construction (see list below).

The Southern California Association of Governments ("SCAG")'s 2020 Regional Transportation Plan/Sustainable Communities Strategy Program EIR provides the following mitigation measures:[5]

02-30

[1] "Sierra Club v. County of Fresno." Supreme Court of California, December 2018, a*vailable at:* https://ceqaportal.org/decisions/1907/Sierra%20Club%20v.%20County%20of%20Fresno.pdf.
[2] "Exposure Assessment Tools by Tiers and Types - Screening-Level and Refined." U.S. EPA, *available at:* https://www.epa.gov/expobox/exposure-assessment-tools-tiers-and-types-screening-level-and-refined.
[3] "South Coast AQMD Air Quality Significance Thresholds.", SCAQMD, March 2023, *available at*: https://www.aqmd.gov/docs/default-source/ceqa/handbook/south-coast-aqmd-air-quality-significance-thresholds.pdf?sfvrsn=25.
[4] "Mitigation Measures and Control Efficiencies.", SCAQMD, *available at*: https://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies.
[5] "4.0 Mitigation Measures." Connect SoCal Program Environmental Impact Report Addendum #1, September 2020, *available at*: https://scag.ca.gov/sites/main/files/file-

- Minimize unnecessary vehicular and machinery activities.
- Require contractors to assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that could be used an aggregate of 40 or more hours for the construction project.
- Ensure all construction equipment is properly tuned and maintained.
- Minimizing idling time to 5 minutes or beyond regulatory requirements —saves fuel and reduces emissions.
- Utilize existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.
- Develop a traffic plan to minimize community impacts because of traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites. Project sponsors should consider developing a goal for the minimization of community impacts.

O2-30 Cont.

The California Emissions Estimator Model ("CalEEMod") User Guide confirms that the methods for mitigating DPM emissions include the use of "alternative fuel, electric equipment, diesel particulate filters (DPF), oxidation catalysts, newer tier engines, and dust suppression."[6]

These SCAG measures offer feasible methods of to reduce Project construction-related DPM emissions, corroborated by the CalEEMod User Guide. We hold that an EIR should be conducted that includes all feasible mitigation measures to ensure emissions are reduced to the maximum extent feasible. The updated analysis should also demonstrate a commitment to implementing these measures before Project approval to ensure that potentially significant emissions are minimized.

## Disclaimer

SWAPE has received limited documentation regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or

O2-31

attachments/fpeir_connectsocal_addendum_4_mitigationmeasures.pdf?1606004420, p. 4.0-2 – 4.0-10; 4.0-19 – 4.0-23; See also: "Certified Final Connect SoCal Program Environmental Impact Report." SCAG, May 2020, *available at:* https://scag.ca.gov/peir.

[6] "Calculation Details for CalEEMod." CAPCOA, May 2021, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-a2020-4-0.pdf?sfvrsn=6, Appendix A, p. 60.

otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

Sincerely,



Matt Hagemann, P.G., C.Hg.



Paul E. Rosenfeld, Ph.D.

02-31
Cont.

**Attachment A: Matt Hagemann CV**
**Attachment B: Paul Rosenfeld CV**

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**Geologic and Hydrogeologic Characterization**
**Investigation and Remediation Strategies**
**Litigation Support and Testifying Expert**
**Industrial Stormwater Compliance**
**CEQA Review**

**Education:**

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

**Professional Certifications:**

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

02-32

**Professional Experience:**

Matt has 30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring. For the past 15 years, as a founding partner with SWAPE, Matt has developed extensive client relationships and has managed complex projects that include consultation as an expert witness and a regulatory specialist, and a manager of projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2104, 2017;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

**Senior Regulatory and Litigation Support Analyst:**

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 300 environmental impact reports and negative declarations since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at more than 100 industrial facilities.
- Expert witness on numerous cases including, for example, perfluorooctanoic acid (PFOA) contamination of groundwater, MTBE litigation, air toxins at hazards at a school, CERCLA compliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.

O2-32 Cont.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

**Executive Director:**

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

**Hydrogeology:**

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

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- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted

public hearings, and responded to public comments from residents who were very concerned about the impact of designation.
- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:
- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:
- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

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**Policy:**

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9.

Activities included the following:
- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific

principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

**Geology:**

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

**Teaching:**

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt is currently a part time geology instructor at Golden West College in Huntington Beach, California where he taught from 2010 to 2014 and in 2017.

**Invited Testimony, Reports, Papers and Presentations:**

**Hagemann, M.F**., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

**Hagemann, M.F**., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

**Hagemann, M.F.,** 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

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**Hagemann, M.F.**, 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

**Hagemann, M.F.,** 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

**Hagemann, M.F**., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

**Hagemann, M.F**., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

**Hagemann, M.F**., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

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**Hagemann, M.F**., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

**Hagemann, M.F**., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

**Hagemann, M.F**., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

**Hagemann, M.F**., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

**Hagemann, M.F**., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

**Hagemann, M.F**., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

**Hagemann, M.F**., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

**Hagemann, M.F**., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

**Hagemann, M.F**., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

**Hagemann, M.F**., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

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**Hagemann, M.F**., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

**Hagemann, M.F**., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

**Hagemann, M. F**., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

**Hagemann, M.F**., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

**Hagemann, M.**F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

**Hagemann, M.F**., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

**Hagemann, M.F**., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

**Other Experience:**

Selected as subject matter expert for the California Professional Geologist licensing examinations, 2009-2011.

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SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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Fax: (310) 452-5550
**Email:** prosenfeld@swape.com

# *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**Risk Assessment & Remediation Specialist**

## Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Focus on wastewater treatment.

## Professional Experience

Dr. Rosenfeld has over 25 years of experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, industrial, military and agricultural sources, unconventional oil drilling operations, and locomotive and construction engines. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities. Dr. Rosenfeld has also successfully modeled exposure to contaminants distributed by water systems and via vapor intrusion.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, creosote, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at sites and has testified as an expert witness on numerous cases involving exposure to soil, water and air contaminants from industrial, railroad, agricultural, and military sources.

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## Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex $H_2O$ Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

## Publications:

**Rosenfeld P. E.,** Spaeth K., Hallman R., Bressler R., Smith, G., (2022) Cancer Risk and Diesel Exhaust Exposure Among Railroad Workers. *Water Air Soil Pollution.* **233,** 171.

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P**., (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

**Rosenfeld, P.E**. & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health*. 73(6), 34-46.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry*. Amsterdam: Elsevier Publishing.

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Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution,* 123 (17), 319-327.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

**Rosenfeld, P.E.,** J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

**Rosenfeld, P. E.,** M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities.* Boston Massachusetts: Elsevier Publishing

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

**Rosenfeld P. E.,** J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004.* New Orleans, October 2-6, 2004.

**Rosenfeld, P.E.,** and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49( 9), 171-178.

**Rosenfeld, P. E**., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

**Rosenfeld, P.E.,** Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

**Rosenfeld, P.E**., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

**Rosenfeld, P.E.,** and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality.* 29, 1662-1668.

**Rosenfeld, P.E.,** C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

**Rosenfeld, P.E.,** and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

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**Rosenfeld, P.E.,** and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

Chollack, T. and **P. Rosenfeld. (**1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

**Rosenfeld, P. E.** (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

**Rosenfeld, P. E.** (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

**Rosenfeld, P. E. (**1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

**Rosenfeld, P. E.** (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

**Rosenfeld, P. E. (**1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

## Presentations:

**Rosenfeld, P.E**., "The science for Perfluorinated Chemicals (PFAS): What makes remediation so hard?" Law Seminars International, (May 9-10, 2018) 800 Fifth Avenue, Suite 101 Seattle, WA.

**Rosenfeld, P.E.,** Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society.* Lecture conducted from Santa Clara, CA.

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Cont.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution.* Lecture conducted from Boston, MA.

**Rosenfeld, P.E**. (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

**Rosenfeld, P.E.** (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

**Rosenfeld, P. E.** (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water.* Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld P. E.** (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

**Rosenfeld P. E.** (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting.* Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition.* Lecture conducted from Boston Massachusetts.

**Paul Rosenfeld Ph.D**. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference.* Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

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**Paul Rosenfeld Ph.D**. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference.* Lecture conducted from Hilton Hotel in Irvine, California.

**Paul Rosenfeld Ph.D**. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference.* Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

**Paul Rosenfeld Ph.D**. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference.* Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

**Paul Rosenfeld, Ph.D.** (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

**Paul Rosenfeld, Ph.D.** (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

**Rosenfeld, P. E**., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

**Paul Rosenfeld, Ph.D.** (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

**Paul Rosenfeld, Ph.D**. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

02-32
Cont.

**Rosenfeld, P.E.** and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

**Rosenfeld, P.E**. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conferenc*e. Lecture conducted from Indianapolis, Maryland.

**Rosenfeld. P.E.** (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

**Rosenfeld. P.E. (**October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

**Rosenfeld, P.E. (**2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

**Rosenfeld, P.E.**, C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

**Rosenfeld, P.E,** C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

## Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

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Cont.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

## Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

## Deposition and/or Trial Testimony:

In the Superior Court of the State of California, County of San Bernardino
Billy Wildrick, Plaintiff vs. BNSF Railway Company
Case No. CIVDS1711810
Rosenfeld Deposition 10-17-2022

In the State Court of Bibb County, State of Georgia
Richard Hutcherson, Plaintiff vs Norfolk Southern Railway Company
Case No. 10-SCCV-092007
Rosenfeld Deposition 10-6-2022

In the Civil District Court of the Parish of Orleans, State of Louisiana
Millard Clark, Plaintiff vs. Dixie Carriers, Inc. et al.
Case No. 2020-03891
Rosenfeld Deposition 9-15-2022

In The Circuit Court of Livingston County, State of Missouri, Circuit Civil Division
Shirley Ralls, Plaintiff vs. Canadian Pacific Railway and Soo Line Railroad
Case No. 18-LV-CC0020
Rosenfeld Deposition 9-7-2022

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Cont.

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jonny C. Daniels, Plaintiff vs. CSX Transportation Inc.
Case No. 20-CA-5502
Rosenfeld Deposition 9-1-2022

In The Circuit Court of St. Louis County, State of Missouri
Kieth Luke et. al. Plaintiff vs. Monsanto Company et. al.
Case No. 19SL-CC03191
Rosenfeld Deposition 8-25-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jeffery S. Lamotte, Plaintiff vs. CSX Transportation Inc.
Case No. NO. 20-CA-0049
Rosenfeld Deposition 8-22-2022

In State of Minnesota District Court, County of St. Louis Sixth Judicial District
Greg Bean, Plaintiff vs. Soo Line Railroad Company
Case No. 69-DU-CV-21-760
Rosenfeld Deposition 8-17-2022

In United States District Court Western District of Washington at Tacoma, Washington
John D. Fitzgerald Plaintiff vs. BNSF
Case No. 3:21-cv-05288-RJB
Rosenfeld Deposition 8-11-2022

In Circuit Court of the Sixth Judicial Circuit, Macon Illinois
Rocky Bennyhoff Plaintiff vs. Norfolk Southern
Case No. 20-L-56
Rosenfeld Deposition 8-3-2022

In Court of Common Pleas, Hamilton County Ohio
Joe Briggins Plaintiff vs. CSX
Case No. A2004464
Rosenfeld Deposition 6-17-2022

In the Superior Court of the State of California, County of Kern
George LaFazia vs. BNSF Railway Company.
Case No. BCV-19-103087
Rosenfeld Deposition 5-17-2022

In the Circuit Court of Cook County Illinois
Bobby Earles vs. Penn Central et. al.
Case No. 2020-L-000550
Rosenfeld Deposition 4-16-2022

In United States District Court Easter District of Florida
Albert Hartman Plaintiff vs. Illinois Central
Case No. 2:20-cv-1633
Rosenfeld Deposition 4-4-2022

In the Circuit Court of the 4th Judicial Circuit, in and For Duval County, Florida
Barbara Steele vs. CSX Transportation
Case No.16-219-Ca-008796
Rosenfeld Deposition 3-15-2022

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Cont.

In United States District Court Easter District of New York
Romano et al. vs. Northrup Grumman Corporation
Case No. 16-cv-5760
Rosenfeld Deposition 3-10-2022

In the Circuit Court of Cook County Illinois
Linda Benjamin vs. Illinois Central
Case No. No. 2019 L 007599
Rosenfeld Deposition 1-26-2022

In the Circuit Court of Cook County Illinois
Donald Smith vs. Illinois Central
Case No. No. 2019 L 003426
Rosenfeld Deposition 1-24-2022

In the Circuit Court of Cook County Illinois
Jan Holeman vs. BNSF
Case No. 2019 L 000675
Rosenfeld Deposition 1-18-2022

In the State Court of Bibb County State of Georgia
Dwayne B. Garrett vs. Norfolk Southern
Case No. 20-SCCV-091232
Rosenfeld Deposition 11-10-2021

In the Circuit Court of Cook County Illinois
Joseph Ruepke vs. BNSF
Case No. 2019 L 007730
Rosenfeld Deposition 11-5-2021

In the United States District Court For the District of Nebraska
Steven Gillett vs. BNSF
Case No. 4:20-cv-03120
Rosenfeld Deposition 10-28-2021

In the Montana Thirteenth District Court of Yellowstone County
James Eadus vs. Soo Line Railroad and BNSF
Case No. DV 19-1056
Rosenfeld Deposition 10-21-2021

In the Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al.cvs. Cerro Flow Products, Inc.
Case No. 0i9-L-2295
Rosenfeld Deposition 5-14-2021
Trial October 8-4-2021

In the Circuit Court of Cook County Illinois
Joseph Rafferty vs. Consolidated Rail Corporation and National Railroad Passenger Corporation d/b/a AMTRAK,
Case No. 18-L-6845
Rosenfeld Deposition 6-28-2021

In the United States District Court For the Northern District of Illinois
Theresa Romcoe vs. Northeast Illinois Regional Commuter Railroad Corporation d/b/a METRA Rail
Case No. 17-cv-8517
Rosenfeld Deposition 5-25-2021

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Cont.

In the Superior Court of the State of Arizona In and For the Cunty of Maricopa
Mary Tryon et al. vs. The City of Pheonix v. Cox Cactus Farm, L.L.C., Utah Shelter Systems, Inc.
Case No. CV20127-094749
Rosenfeld Deposition 5-7-2021

In the United States District Court for the Eastern District of Texas Beaumont Division
Robinson, Jeremy et al vs. CNA Insurance Company et al.
Case No. 1:17-cv-000508
Rosenfeld Deposition 3-25-2021

In the Superior Court of the State of California, County of San Bernardino
Gary Garner, Personal Representative for the Estate of Melvin Garner vs. BNSF Railway Company.
Case No. 1720288
Rosenfeld Deposition 2-23-2021

In the Superior Court of the State of California, County of Los Angeles, Spring Street Courthouse
Benny M Rodriguez vs. Union Pacific Railroad, A Corporation, et al.
Case No. 18STCV01162
Rosenfeld Deposition 12-23-2020

In the Circuit Court of Jackson County, Missouri
Karen Cornwell, Plaintiff, vs. Marathon Petroleum, LP, Defendant.
Case No. 1716-CV10006
Rosenfeld Deposition 8-30-2019

In the United States District Court For The District of New Jersey
Duarte et al, Plaintiffs, vs. United States Metals Refining Company et. al. Defendant.
Case No. 2:17-cv-01624-ES-SCM
Rosenfeld Deposition 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" Defendant.
Case No. 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No. BC615636
Rosenfeld Deposition 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No. BC646857
Rosenfeld Deposition 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiffs vs. The 3M Company et al., Defendants
Case No. 1:16-cv-02531-RBJ
Rosenfeld Deposition 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No. 1923
Rosenfeld Deposition 11-17-2017

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Cont.

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintifs vs. Chevron Corporation, et al., Defendants
Cause No. C12-01481
Rosenfeld Deposition 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition 8-23-2017

In United States District Court For The Southern District of Mississippi
Guy Manuel vs. The BP Exploration et al., Defendants
Case No. 1:19-cv-00315-RHW
Rosenfeld Deposition 4-22-2020

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No. LC102019 (c/w BC582154)
Rosenfeld Deposition 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., Plaintiffs, vs. Meritor Inc., et al., Defendants
Case No. 4:16-cv-52-DMB-JVM
Rosenfeld Deposition July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No. RG14711115
Rosenfeld Deposition September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No. LALA002187
Rosenfeld Deposition August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action No. 14-C-30000
Rosenfeld Deposition June 2015

In The Iowa District Court for Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No. 4980
Rosenfeld Deposition May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case No. CACE07030358 (26)
Rosenfeld Deposition December 2014

In the County Court of Dallas County Texas
Lisa Parr et al, Plaintiff, vs. Aruba et al, Defendant.
Case No. cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., Plaintiffs, vs. Republic Services, Inc., et al., Defendants
Case No. 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition October 2012

In the United States District Court for the Middle District of Alabama, Northern Division
James K. Benefield, et al., Plaintiffs, vs. International Paper Company, Defendant.
Civil Action No. 2:09-cv-232-WHA-TFM
Rosenfeld Deposition July 2010, June 2011

In the Circuit Court of Jefferson County Alabama
Jaeanette Moss Anthony, et al., Plaintiffs, vs. Drummond Company Inc., et al., Defendants
Civil Action No. CV 2008-2076
Rosenfeld Deposition September 2010

In the United States District Court, Western District Lafayette Division
Ackle et al., Plaintiffs, vs. Citgo Petroleum Corporation, et al., Defendants.
Case No. 2:07CV1052
Rosenfeld Deposition July 2009

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Cont.

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**From:** Deb Windham <drdeb4u@hotmail.com>
**Sent:** Monday, January 6, 2025 12:47 PM
**To:** Kristie Ramos, CMC <kristier@RanchoMirageCA.gov>
**Subject:** city council meeting reg Ritz expansion,Jan 9, 2pm, Mirada concerns

**CAUTION:** This email originated from outside The City of Rancho Mirage. **DO NOT CLICK links** or open **attachments** unless you recognize the sender and know the content is safe.

hello Kristie, We are hoping to read this letter reg Ritz, which speaks to our neighborhood

I1-1

concerns.
please enter this into the agenda.

**Subject: Concerns Regarding Environmental Impact of Ritz-Carlton Expansion and Proposed Mitigation Measures**

**Dear Members of the Rancho Mirage City Council and Representatives of The Ritz-Carlton,**

**I am writing to express my concerns about the proposed expansion of The Ritz-Carlton, Rancho Mirage, which includes the addition of pools, restaurants, parking facilities, and 106 condominiums. As a resident of the Mirada Estates, (and Mirada Villas) community , I am deeply concerned about the potential environmental and infrastructural impacts this project may have on our neighborhood.**

I1-1 Cont.

**Impact on Traffic and Emergency Services**

**The increased construction activity and subsequent rise in visitor numbers are likely to significantly affect ingress and egress via Frank Sinatra Drive. This thoroughfare is crucial for daily commutes and, more importantly, for emergency vehicle access. Many residents in our community are elderly and rely on prompt emergency services. Obstructions or delays on this route could have serious consequences.**

I1-2

**Environmental Concerns**

**The construction phase is expected to introduce substantial noise, dust, debris, and general disruption, which threaten the tranquility and environmental quality that residents currently enjoy. Such disturbances could also have adverse effects on local wildlife and the natural landscape.**

I1-3

**Proposed Mitigation Measure**

**To address these concerns, I propose that the existing , paved service road located behind The Ritz-Carlton be expanded and utilized for all construction-related activities. It is unused currently, and leads directly to the dirt area where the expansion is to take place. This would include the transportation of heavy equipment, steel girders, concrete, materials, and construction personnel. By diverting construction traffic away from Frank Sinatra Drive, we can:**

- **Maintain Unobstructed Access: Ensure that residents and emergency vehicles retain uninterrupted access to our community.**

I1-4

- **Reduce Environmental Impact: Minimize noise, dust, and debris in residential areas, preserving the peaceful environment we value.**
- **Enhance Safety: Decrease the risk of accidents or delays associated with increased traffic on public roads.**

I1-4 Cont.

**I kindly request that the City Council and The Ritz-Carlton consider this proposal and provide detailed plans on how they intend to mitigate the impacts of the expansion on our community. Transparency in this process is essential, and I urge you to involve community members in discussions to develop effective solutions.**

**Thank you for your attention to these pressing matters. I look forward to your response and to working together to ensure that the development proceeds in a manner that respects and preserves the well-being of our community.**

I1-5

**Sincerely,**
**Dr. Deb Windham,**
**Dr Brian Herman (Chairman of Radiology at Eisenhower Medical Center)**
**Bob Greenbaum**
**Debbi Melman**

**Residents of MiradaEstates**
**Rancho Mirage, CA**

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Some or all of the content of this e-mail and its attachments may be subject to disclosure pursuant to the California Public Records Act (Government Code section 7920-7931, et seq.)

**From:** Deb Windham <drdeb4u@hotmail.com>
**Sent:** Monday, January 6, 2025 12:37 PM
**To:** Maryann Hoss <mhoss@drminternet.com>; Bob Greenbaum <bobgreenbaumrealtor@gmail.com>; Big B <doctorherman@gmail.com>; Maureen Shapiro <moshapiro@gmail.com>; Jeff Engler <jte@borderfoods.com>; boutress@gmaul.com; bbcmd1105@gmail.com; City Clerk <cityclerk@ranchomirageca.gov>
**Subject:** Fw: Here's my thoughts on a Letter to Ritz reg expansion / city council meeting Jan 9th, 2 pm

**CAUTION:** This email originated from outside The City of Rancho Mirage. **DO NOT CLICK links** or open **attachments**

unless you recognize the sender and know the content is safe.

To mirada residents and City Council, see letter below, I feel we can work amicably with them if they can accommodate.

---

Hi neighbors, feel free to add any thoughts or concerns.
We looked at the fire road coming off 111, it is behind the spa, leads directly up to the dirt area and is paved, nobody uses it.
We believe they can
Letter we drafted to Ritz

# Subject: Concerns Regarding Environmental Impact of Ritz-Carlton Expansion and Proposed Mitigation Measures

## Dear Members of the Rancho Mirage City Council and Representatives of The Ritz-Carlton,

## I am writing to express my concerns about the proposed expansion of The Ritz-Carlton, Rancho Mirage, which includes the addition of pools, restaurants, parking facilities, and 106 condominiums. As a resident of the Mirada Estates, (and Mirada Villas) community , I am deeply concerned about the potential environmental and infrastructural impacts this project may have on our neighborhood.

I2-1

## Impact on Traffic and Emergency Services

**The increased construction activity and subsequent rise in visitor numbers are likely to significantly affect ingress and egress via Frank Sinatra Drive. This thoroughfare is crucial for daily commutes and, more importantly, for emergency vehicle access. Many residents in our community are elderly and rely on prompt emergency services. Obstructions or delays on this route could have serious consequences.**

I2-2

## Environmental Concerns

**The construction phase is expected to introduce substantial noise, dust, debris, and general disruption, which threaten the tranquility and environmental quality that residents currently enjoy. Such disturbances could also have adverse effects on local wildlife and the natural landscape.**

I2-3

## Proposed Mitigation Measure

I2-4

**To address these concerns, I propose that the existing , paved service road located behind The Ritz-Carlton be expanded and utilized for all construction-related activities. It is unused currently, and leads directly to the diet area where the expansion is to take place. This would include the transportation of heavy equipment, steel girders, concrete, materials, and construction personnel. By diverting construction traffic away from Frank Sinatra Drive, we can:**

- **Maintain Unobstructed Access: Ensure that residents and emergency vehicles retain uninterrupted access to our community.**
- **Reduce Environmental Impact: Minimize noise, dust, and debris in residential areas, preserving the peaceful environment we value.**
- **Enhance Safety: Decrease the risk of accidents or delays associated with increased traffic on public roads.**

I2-4 Cont.

**I kindly request that the City Council and The Ritz-Carlton consider this proposal and provide detailed plans on how they intend to mitigate the**

I2-5

**impacts of the expansion on our community. Transparency in this process is essential, and I urge you to involve community members in discussions to develop effective solutions.**

**Thank you for your attention to these pressing matters. I look forward to your response and to working together to ensure that the development proceeds in a manner that respects and preserves the well-being of our community.**

I2-5
Cont.

**Sincerely,**

**Dr. Deb Windham,**

**Dr Brian Herman (Chairman of Radiology at Eisenhower Medical Center)**

**Resident of MiradaEstates**

**Rancho Mirage, CA**

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-----Original Message-----
From: Dr Deb windham <drdebwindham@gmail.com>
Sent: Thursday, January 2, 2025 6:19 PM
To: City Clerk <cityclerk@ranchomirageca.gov>
Subject: Ritz expansion

CAUTION: This email originated from outside The City of Rancho Mirage. DO NOT CLICK links or open attachments unless you recognize the sender and know the content is safe.

Hello, we live in mirada estates, and are concerned about trucks, heavy equipment, bulldozers, steel, concrete , workers, traffic , congestion, trash, dirt, debris, utilizing Frank Sinatra on both sides, affecting egress and ingress, delays, noise, safety, comfort, .. we know theres a back road near the back of property by spa, hopefully this will be expanded to handle this incredibly large and lengthy construction, to send all the construction traffic and large trucks through a back entrance, to ensure safety and security for all residents that live up here and the villas. We would assume there has been some plan to address this uncomfortable , unpleasant, and hazardous situation.
Thank you Drs Deb Windham and Brian Herman Sent from my iPhone

I3-1

I3-2

# PUBLIC COMMENTS

**BRUCE T. BAUER, ESQ.**
Of Counsel

REPLY TO:
74774 Hwy 111
Indian Wells, California 92210
T (760) 322-2275
bauer@sbemp.com

December 12, 2025

*Via Email & U.S. Mail*
Mayor Lynn Mallotto (lynnm@ranchomirageca.gov)
Mayor Pro Tem Michael O'Keefe (michaelo@ranchomirageca.gov)
Councilmember Ted Weill (tedw@ranchomirageca.gov)
Councilmember Eve Fromberg Edelstein (evef@RanchoMirageCA.gov)
Councilmember Steve Downs (steved@ranchomirageca.gov)
Kristie Ramos, City Clerk (kristier@ranchomirageca.gov)
Ben Torres, Planning Manager (bent@RanchoMirageCA.gov)
City of Rancho Mirage
69-825 California Highway 111
Rancho Mirage, CA 92270

RE: City Council Meeting December 18, 2025
Ritz Carlton Rancho Mirage - Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21-0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case Number TPM23-0002 (TPM38768).

Dear Mayor Mallotto, Mayor Pro Tem O'Keefe, Honorable Members of the City Council, City Clerk and Mr.Torres:

Our office represents The Mirada Custom Lot Association ("Mirada Estates"). Mirada Estates, also known as "The Mountain Sanctuary," is in the Santa Rosa Mountains and is adjacent to the Ritz Carlton Resort. Mirada Estates is a small enclave of custom homes built by owners and developers and was inspired by the natural beauty of 272,000 acres of surrounding pristine wilderness. The residents of Mirada Estates selected property in that neighborhood because of the solitude that exists in that area.

This letter is sent on behalf of the residents of Mirada Estates regarding problems with the below-described project that that is proposed in the City of Rancho Mirage ("City"). The proposed project involves construction described as the Ritz-Carlton Residences Rancho Mirage and the Sky Mesa Recreation Center on a 16.3 -acre site located at 68900 Frank Sinatra Drive, Rancho Mirage, CA 92270 ("Proposed Project"). *The Proposed Project is scheduled to be considered at the City Council meeting scheduled for December 18, 2025.* The Proposed Project will consist of 106 residential suites and hotel villas (totaling approximately 200,474 square feet), approximately 23,840 -square feet of event space, approximately 6,273-square feet of restaurant/ commercial space,

and approximately 5,510square feet of amenity space. The overall Proposed Project site includes an existing hotel that opened as a Ritz -Carlton in 1988. The Proposed Project would also provide a total of 499 vehicle parking spaces.

Before those problems with the Proposed Project are addressed below, it is important to note that the residents of Mirada Estates are, in general, not opposed to the principal of development, nor are the residents of Mirada Estates opposed the Proposed Project, in particular. The Ritz-Carlton has been a wonderful neighbor of the Mirada Estates. However, there are several issues that Mirada Estates believes the City, and the developer, need to address concerning the Proposed Project before it proceeds and that is the purpose of this letter.

A. <u>The Proposed Project.</u>

On January 9, 2025, as part of the Proposed Project, the City's Planning Commission considered the following requests from the developer of the Proposed Project:

(1) General Plan Zoning Map Amendment to amend the Mountain Reserve (MR) designation for the project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014).

(2) A Tentative Parcel Map (TPM38768) to establish three parcels (excluding Sky Mesa area) with Parcel 3 of the map containing condo units (Ritz Carlton residences).

(3) Lastly, a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment") is proposed. Please note that the Proposed Project (excluding Sky Mesa) is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums.

Additionally, the City's Planning Commission voted on January 9, 2025, to recommend that the Proposed Project move forward and approved the following resolutions and actions:

(1) A resolution approving the mitigation monitoring and reporting program and mitigated negative declaration (sch# 2024030267) for the Proposed Project based on environmental assessment case no. EA21- 0002.

(2) A resolution approving general plan zoning map amendment (GPZMA21-0001), tentative parcel map case no.TPM23- 0002, and major modification case no. MOD21- 0004.
(3) And ordinance approving development agreement amendment (DA21-0002).

B. The City's Analysis of the Proposed Project.

In March 2024, the City released the first Initial study result of the Proposed Project. That study resulted in a recommendation to adopt a Mitigated Negative Declaration (MND) for the Proposed Project. In July 2024, the City released a Recirculated Initial Study / Mitigated Negative Declaration ("RMND") for the Proposed Project. Thereafter, the City issued its December 2024 Final Initial Study / Mitigated Negative Declaration ("FMND") for the Proposed Project.

Mirada Estates is concerned that the City's Planning Commission has approved this Proposed Project without addressing numerous problems that will arise with the Proposed Project as detailed in the following section.

C. Problems with the Proposed Project.

The Proposed Project will significantly impact the Mirada Estates. The residents of the Mirada Estates are concerned about the environmental and infrastructural impacts this Proposed Project may have on its neighborhood. In particular, the residents of Mirada Estates are concerned about the Proposed Project moving forward with respect to following areas:

(1) Construction phase of the Proposed Project and impact on Frank Sinatra Drive;
(2) Pedestrian traffic on Frank Sinatra Drive;
(3) Construction noise; and,
(4) The Proposed Project buildings will obstruct resident's views.

We will address each of these points further below.

(1) CONSTRUCTION PHASE OF THE PROJECT AND IMPACT ON FRANK SINATRA DRIVE

One of the primary problems with the Proposed Project will be the increased construction activity that will arise because of the construction necessary to bring about this enormous Proposed Project into fruition. Since Frank Sinatra Drive will be the main arterial for construction traffic into the Proposed Project, traffic will be enormously and negatively impacted in that area. This construction traffic will impact the residents of Mirada Estates greatly since the visitor numbers are likely to significantly affect ingress and egress via Frank Sinatra Drive[1]. The chief entry point to the Proposed Project will be Frank Sinatra Drive. As this street is shared by both the existing Ritz-Carlton, and

[1] Frank Sinatra drive is an east west major collector running through the City. Most of Frank Sinatra drive is constructed to its ultimate design standards with 100 foot right of way. However, Frank Sinatra drive, West of Hwy 111, is designed as a two-lane roadway in the general plan.

the residents of Mirada Estates, this additional stress on that artery would overload its capabilities. This thoroughfare is crucial for daily commutes and, more importantly, for emergency vehicle access. Many of the residents in Mirada Estates are elderly and rely on prompt emergency services. Obstructions or delays on this route could have serious consequences.

To address the above concerns, we would propose that the paved service road located behind the Ritz-Carlton be expanded and utilized for all construction-related activities. It is unused currently and leads directly to the area where the planned Project will be built. This would include the transportation of heavy equipment, steel girders, concrete, materials, and construction personnel. By diverting construction traffic away from Frank Sinatra Drive, construction on the Project can proceed but residents and emergency vehicles can retain uninterrupted access to our community. Additionally, this proposed solution would help to minimize noise, dust, and debris in residential areas, preserving the peaceful environment we value. Finally, this solution would decrease the risk of accidents or delays associated with increased traffic on Frank Sinatra Drive.

There are additionally other means to address the above concerns as follows:

- Minimize unnecessary vehicle and machinery activities.
Require contractors to assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that could be used an aggregate of 40 or more hours for the construction project.

- Ensure all construction equipment is properly tuned and maintained
.
- Minimizing idling time to 5 minutes or beyond regulatory requirements — saves fuel and reduces emissions.

- Develop a traffic plan to minimize community impacts because of traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through- traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites. Project sponsors should consider developing a goal for the minimization of community impacts.

(2) <u>PEDESTRIAN TRAFFIC ON FRANK SINATRA DRIVE</u>

The residents of Mirada Estates are very concerned about pedestrian traffic coming up Frank Sinatra Road. As you undoubtedly know, there are no sidewalks that frame Frank Sinatra Road from Highway 111 to the Ritz-Carlton. Despite the absence of sidewalks on that artery, presently there are numerous pedestrians that utilize the road

itself to walk and down its length. These pedestrians are often hotel guests unfamiliar with the dangers that await them down the circuitous and steep decline of the road in that area. This foot traffic is guaranteed to increase with the construction of the Proposed Project since more residents/visitors will translate to more pedestrians along Frank Sinatra Drive. This increased pedestrian traffic will, then, predictably result in more injuries and accidents in this area. The residents of Mirada Estates do not believe that the City, nor the applicant for the Proposed Project, has properly analyzed, let alone address, this serious safety concern.

To address this concern, it is urged that a protected pedestrian sidewalk be constructed on either side of Frank Sinatra Drive.

(3) CONSTRUCTION NOISE

The construction of this Proposed Project will take place over months and years. The construction phase then will introduce substantial noise, dust, debris, and general disruption into the surrounding area which threaten the tranquility and environmental quality that residents currently enjoy.

In correspondence addressing problems with the Proposed Project, dated January 9, 2025, the group “Californians Allied for a Responsible Economy” (“CARE”), noted that City's analysis underestimates construction noise impacts for the Proposed Project. In that letter (p. 2), CARE noted that “[d]ue to the proximity of residences to the Proposed Project site, construction and operational noise impacts would also be significant. Construction noise would increase ambient noise levels by over 20 decibels, which the City acknowledges would have a significant impact[2].

The problems with construction noise were also extensively highlighted by the letter submitted by 28-page letter from Mitchell M. Tsai law firm, submitted on behalf of the Western States Regional Council of Carpenters ("WSRCC"). In that letter (at p. 19-21), WSRCC focused on problems with the City’s analysis of ambient noise problems with the Proposed Project and its utilization of improper data to analyze the noise problems at the Proposed Project:

> Meanwhile, as I understand it, no noise measurements have been taken along the southern border of the two parcels on the Project site designated for the resort villa development identified as the Ritz -Carlton Residences (APN 6308932-06- and 630893-208) which are directly

[2] And during operations, stationary equipment like HVAC systems would exceed the 45 decibel nighttime noise standards at the nearby residences.” CARE highlighted evidence (at p. 6) that the highest construction noise would be 69.9 dBA, the Final IS/MND elsewhere states that the composite source noise level at 50 feet varies between 76.2 and 84.4 dBA.

adjacent to numerous private residences. Thus, the FMND has inexplicably declined to measure the ambient noise levels in the area adjacent to the most sensitive uses abutting the Project area, namely, numerous private residences. (Id.) Based on the current land -uses proximate to this sensitive residential area, it is exceedingly likely that this zone at the southern edge of the Proposed Project
site would have the lowest ambient noise levels of any Project-adjacent area. In spite of these facts, however, the FMND continues to inaccurately claim that " The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the project site." (FMND at p. 145.)

The City's continuing failure and refusal to update the Project's noise studies to address these deficiencies is glaring, and the City's responses to comments fail to address the lack of study of the ambient noise levels at positions closest to the Project's nearby sensitive receptors. (See FMND, Appendix J, Responses to Comments, Response to Comment Letter O1, pp. RTC -839 - 840.) The City cannot be permitted to shirk the performance of proper environmental analysis for the Project in order to conceal the Project's true impacts.

The FMND has then continued to utilize this faulty and incomplete ambient noise survey data to conclude that there will be no significant impact to the surrounding sensitive receptors from the Project's construction noise. The FMND adopted the Criteria for Recommended Standard: Occupational Noise Exposure prepared by the National Institute for Occupational Safety and Health (NIOSH) as the threshold for whether the anticipated construction noise from the Project will have a significant impact upon the Project nearby sensitive receptors. (FMND at p. 149.) The FMND then concludes that the threshold of 85 dBA Leq qualifies as an " acceptable threshold for construction noise at the nearby sensitive receiver locations," and the noise sensitive residential receiver locations will satisfy the 85 dBA Leq significance threshold," such that the Project will have a less than significant construction noise impact upon the sensitive receiver locations. (*Id*.)

WSRCC reiterates that the NIOSH Occupational Noise Exposure standard has no proper place in evaluating the significance of construction noise impacts on nearby sensitive receptors. Rather, the NIOSH standard is aimed at protecting workers/laborers exposed to noise during the course job duties and preventing occupational harm/injury from occurring. It has no bearing upon external noise levels that would be suitable for maintaining the quiet enjoyment of an individual's private property. In that regard, the selection of 85 dBA Leq by the MND, RMND, and now the

> FMND as an acceptable threshold of significant construction noise impact is not only arbitrary, but it is also entirely unfounded.
>
> The Federal Transit Administration's (“FTA") Transit Noise and Vibration Impact Assessment provides superior source of federal regulatory authority regarding a project's noise impacts and their significance on sensitive receptors. To that end, the FTA guidance on noise level impacts notes that the impacts should be assessed as a function of their increase over existing noise exposure, and that any noise increase of 15 dBA or greater for a residence is considered a " severe impact." (See Exhibit D-FTA Transit Noise and Vibration Impact Assessment, pp. 17-18, 23-31.) The MND/RMND/FMND arbitrarily elected to use the inapplicable NIOSH standard to assess the noise impacts of the Project, without considering the widely accepted guidance on noise impacts put forth by the FTA. This added lack of study and analysis enlarges the scope of the fair argument that the Project may have significant noise impacts on the environment.
>
> Applying the FTA noise impact guidance, WSRCC maintains that the FMND's dBA estimates for anticipated Project -attributed construction noise exposure levels at the inadequately selected survey locations (L1, L2, and L3) still have the potential to exceed an FTA guidance - based threshold of "severe impact" and thereby cause a significant noise impact in the surrounding environment. (FMND at p. 146, Table 13-2; compare FMND at p. 149, Table 13-3.) Indeed, comparison of the dBA values set forth in Table 12-3 and Table 13-3 confirm that the construction noise levels nearest to the vast majority of the Project's adjacent sensitive residential receptors are anticipated to increase by greater than 15 dBA from the ambient levels detected at L1, L2, and L3. (See id.) Put simply, after applying the FTA guidance to the FMND noise threshold," such that the Project will have a less than significant construction noise impact upon the sensitive receiver locations. (Id.)

Construction work on the Project is also to occur (is also exempt from provisions in the City’s noise code), within allowable hours of 7 am to 7 pm (and is prohibited to occur on Sundays and holidays.)

One does not need to be a scientist schooled in the above to know that there will be a large amount of construction noise attendant to the construction of the Proposed Project that is deleterious to the environment of the Mirada Estates. Because construction noise will undoubtedly exceed a significant threshold, it must be mitigated in some reasonable manner.

To address this concern, it is urged that the City restrict the hours of construction by limiting the window under which construction is permitted by allowing construction to begin at 8:00 am, and end at 6:00 pm.

(4) THE PROJECT'S BUILDINGS WILL OBSTRUCT THE VIEW OF RESIDENTS...

Finally, the residents of Mirada Estates are concerned about the Proposed Project because construction of proposed buildings will undoubtedly impact the views of numerous residents in its neighborhood. In particular, the residents of Mirada Estates are concerned about the view of residents of dwellings located at the north-east corner of Mirada Estates along Mirada Circle and Grand View Court. It does not appear that the City property analyzed the impact of the Proposed Project on the view of those homeowners. If indeed, those homeowners' views are negatively impacted, then the City, and the applicant for the Proposed Project, should (1) make those impacts clear; (2) if so negatively impacted, and determine whether alternative exists that would allay those impacts/obstructed views.

## CONCLUSION

In closing, the residents of Mirada Estates want to again make clear that they are not opposed to the Proposed Project, only those portions of the Proposed Project that impact them directly. Those impacts need to be addressed as set forth above. Due to the Proposed Project's potentially significant impact on the areas described above, the residents of Mirada Estates urge the City not to recommend approval of the Proposed Project until the problems and impacts outlined above are properly addressed and are fully mitigated.

Sincerely,
**SBEMP LLP**



BY: Bruce T. Bauer

CC: Isaiah Hagerman, City Manager (isaiahh@ranchomirageca.gov)

**From:** Kristie Ramos, CMC
**To:** Planning Division
**Subject:** FW: December 18th Public Hearing - Ritz Carlton
**Date:** Thursday, December 11, 2025 1:25:56 PM
**Attachments:** city_seal_transparent_2__4b81bffe-bb95-4b18-a74a-4086edea3b60.png
scan_20251210025346.pdf

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Good afternoon,

Please see below.

Thank you,


**Kristie Ramos, CMC**
City Clerk
Phone: 760-324-4511 Ext. 488
E-mail: kristier@RanchoMirageCA.gov
69-825 Highway 111, Rancho Mirage, California, 92270
www.RanchoMirageCa.gov



**TRANSPARENCY NOTICE**

Some or all of the content of this e-mail and its attachments may be subject to disclosure pursuant to the California Public Records Act (Government Code section 7920-7931, et seq.)


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**From:** roncal89@aol.com <roncal89@aol.com>
**Sent:** Thursday, December 11, 2025 1:20 PM
**To:** City Clerk <cityclerk@ranchomirageca.gov>
**Cc:** Brenthab <brenthab@aol.com>; Ivonne Romano <iromano@drminternet.com>; Roy Keith <roykeith@aol.com>
**Subject:** December 18th Public Hearing - Ritz Carlton


**CAUTION:** This email originated from outside The City of Rancho Mirage. **DO NOT CLICK links** or open **attachments** unless you recognize the sender and know the content is safe.


City Clerk-

Attached please find the notification of the upcoming 12/18/2025 public hearing for the Ritz Carlton project proposed by the Sam Kang Company that our neighbor was kind enough to share with us. We have owned our home in the Villas of Mirada (1 Santa Rosa Mountain Lane) since 2018 and we did not receive this notice nor did we ever receive copies of the two 30-day comment period notices referenced in this communication.

A portion of the proposed site plan is directly above our home and our community, in general. As such, given the potential impact on all of us, I would assume that we should

have been sent these documents and been provided with an opportunity to provide comments. To date, we have not been given that opportunity and this particular notice does not include sufficient detail of the placement of the proposed structures/elements for us to do so.

Can you please send and/or let us know how we can access additional details of this proposed project so we can provide appropriate and informed commentary? Until such time, we stand in opposition to the project moving forward.

Thank you.

Ron Smith and Brent Haberman

December 10, 2025

*Via Email & U.S. Mail*

Mayor Lynn Mallotto (lynnm@ranchomirageca.gov)
City of Rancho Mirage
69-825 California Highway 111
Rancho Mirage, CA 92270

RE: Ritz Carlton Rancho Mirage - Environmental Assessment Case No. EA21-0002, General Plan Zoning Map Amendment Case No. GPZMA21-0001, Development Agreement Amendment Case No. DA21-0002, Major Modification Case No. MOD21-0004, & Tentative Parcel Map Case Number TPM23-0002 (TPM38768).

Dear Mayor Lynn Mallotto:

My family and I have been residents of Mirada Estates since 1996. Known as "The Mountain Sanctuary," Mirada Estates is located in the Santa Rosa Mountains and is adjacent to the Ritz Carlton Resort. Our neighborhood is a small enclave of custom homes built by owners and developers and was inspired by the natural beauty of 272,000 acres of surrounding pristine wilderness. The residents of my community have selected this neighborhood because of the solitude that exists in our area. This prized solitude is the one of chief reasons, among others, that I write this letter concerning problems with the below project that that is proposed in the City of Rancho Mirage ("City").

A. The Proposed Project.

I am writing to you concerning the proposed development project at the Ritz-Carlton Rancho Mirage. The proposed project involves construction described as the Ritz-Carlton Residences Rancho Mirage and the Sky Mesa Recreation Center on a 16.3 -acre site located at 68900 Frank Sinatra Drive, Rancho Mirage, CA 92270 ("Project"). The Project will consist of 106 residential suites and hotel villas (totaling approximately 200,474-square feet), approximately 23,840 -square feet of event space, approximately 6,273-square feet of restaurant/ commercial space, and approximately 5,510-square feet of amenity space. The overall Project site includes an existing hotel that opened as a Ritz -Carlton in 1988. The Project would also provide a total of 499 vehicle parking spaces.

As part of the proposed Project, the developer requested a General Plan Zoning Map Amendment to amend the City's Mountain Reserve (MR) designation for the Project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres.

B. The City's Analysis of the Project.

In March 2024, the City released the first Initial study result of the Project. That study resulted in a recommendation to adopt a Mitigated Negative Declaration (MND) for the Project. In July 2024, the City released a Recirculated Initial Study / Mitigated Negative Declaration ("RMND") for the Project. Thereafter, the City issued its December 2024 Final Initial Study / Mitigated Negative Declaration ("FMND") for the Project.

C. Planning Commission Approval of Project.

On January 9, 2025, as party of the proposed Project, the City's Planning Commission considered the following requests from the developer of the Project:

(1) General Plan Zoning Map Amendment to amend the Mountain Reserve (MR) designation for the project's Sky Mesa Recreational area to Resort Hotel (Rs-H) on approximately 3.88 acres (APNs: 689-020-012 & 689-020-014).

(2) A Tentative Parcel Map (TPM38768) to establish three parcels (excluding Sky Mesa area) with Parcel 3 of the map containing condo units (Ritz Carlton residences).

(3) Lastly, a 10th Amendment to the existing Development Agreement with Newage Rancho Mirage, LLC (the "10th Amendment") is proposed. Please note that the proposed project (excluding Sky Mesa) is a modification to the originally approved 2006 project entitlements that included residential villas and condominiums.

It is my understanding that the City's Planning Commission previously voted on January 9, 2025, to recommend that this Project move forward and approved the following resolutions and actions:

(1) A resolution approving the mitigation monitoring and reporting program and mitigated negative declaration (sch# 2024030267) for the Project based on environmental assessment case no. EA21- 0002.

(2) A resolution approving general plan zoning map amendment (GPZMA21- 0001), tentative parcel map case no.TPM23- 0002, and major modification case no. MOD21- 0004.

(3) And ordinance approving development agreement amendment (DA21-0002).

D. Problems with the Project.

I am concerned that the City's Planning Commission has approved this Project without addressing numerous problems that will arise with the Project. Before I address those problems, I want to make it abundantly clear that I am not opposed to the Project. The Ritz-Carlton has been a wonderful neighbor. I am not opposed to principal of development at all, and think this will be great for Rancho Mirage overall. However, there are a number of issues that I think the City, and the developer, need to address concerning the Project before it proceeds and that is the purpose of this letter.

The proposed Project will significantly impact my neighborhood. In particular, I am deeply concerned about the environmental and infrastructural impacts this Project may have on our neighborhood. I am concerned about this Project moving forward in the follow areas:

(1) Construction phase of the Project and impact on Frank Sinatra Drive;
(2) Pedestrian traffic on Frank Sinatra Drive; and
(3) Construction noise; and,
(4) The Project buildings will obstruct resident's views.

I will address each of these points further below.

(1) CONSTRUCTION PHASE OF THE PROJECT AND IMPACT ON FRANK SINATRA DRIVE

One of the primary problems with the Project will be the increased construction activity that will arise as a result of the construction necessary to bring about this enormous Project into fruition. Since Frank Sinatra Drive will be the main arterial for construction traffic into the Project, traffic will be enormously and negatively impacted in that area. This construction traffic will impact my neighborhood greatly since the visitor numbers are likely to significantly affect ingress and egress via Frank Sinatra Drive[1]. The chief entry point to the Project will be Frank Sinatra Drive. As this street is shared by both the existing Ritz-Carlton, and my neighborhood, this additional stress on that artery would overload its capabilities. This thoroughfare is crucial for daily commutes and, more importantly, for emergency vehicle access. Many of the residents in my community are elderly and rely on prompt emergency services. Obstructions or delays on this route could have serious consequences.

*To address the above concerns, I would propose that the paved service road located behind the Ritz-Carlton be expanded and utilized for all construction-related activities. It is unused currently, and leads directly to the area where the planned Project will be built. This would include the transportation of heavy equipment, steel girders, concrete,*

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*There are additionally other means to address the above concerns as follows:*

- *Minimize unnecessary vehicular and machinery activities. Require contractors to assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that could be used an aggregate of 40 or more hours for the construction project.*

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- *Develop a traffic plan to minimize community impacts because of traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through- traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites. Project sponsors should consider developing a goal for the minimization of community impacts.*

(2) <u>PEDESTRIAN TRAFFIC ON FRANK SINATRA DRIVE</u>

I am very concerned about pedestrian traffic coming up Frank Sinatra Road. As you undoubtedly know, there are no sidewalks that frame Frank Sinatra Road from Highway 111 to the Ritz-Carlton. Despite the absence of sidewalks on that artery, presently there are numerous pedestrians that utilize the road itself to walk and down its length. These pedestrians are often hotel guests unfamiliar with the dangers that await them down the circuitous and steep decline of the road in that area. This foot traffic is guaranteed to increase with the construction of the Project since more residents/visitors will translate to more pedestrians along Frank Sinatra Drive. This increased pedestrian traffic will, then, predictably result in more injuries and accidents in this area. I do not believe that the City, nor the applicant for the Project, has properly analyzed, let alone address, this serious safety concern.

*To address this concern, it is urged that a protected pedestrian sidewalk be constructed on either side of Frank Sinatra Drive.*

(3) CONSTRUCTION NOISE

The construction of this Project will take place over months and years. The construction phase then will introduce substantial noise, dust, debris, and general disruption into the surrounding area which threaten the tranquility and environmental quality that residents currently enjoy.

In correspondence addressing problems with the Project, dated January 9, 2025, the group “Californians Allied for a Responsible Economy” (“CARE”), noted that City's analysis underestimates construction noise impacts for the Project. In that letter (p. 2), CARE noted that “[d]ue to the proximity of residences to the Project site, construction and operational noise impacts would also be significant. Construction noise would increase ambient noise levels by over 20 decibels, which the City acknowledges would be a significant impact[2].

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> standard to assess the noise impacts of the Project, without considering the widely accepted guidance on noise impacts put forth by the FTA. This added lack of study and analysis enlarges the scope of the fair argument that the Project may have significant noise impacts on the environment.
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One does not need to be a scientist schooled in the above to know that there will be a large amount of construction noise attendant to the construction of the Project that is deleterious to the environment of my community. Because construction noise will undoubtedly exceed a significant threshold, it must be mitigated in some reasonable manner.

*Construction work on the Project is also to occur (is also exempt from provisions in the City's noise code), within allowable hours of 7 am to 7 pm (and is prohibited to occur on Sundays and holidays.) To address this concern, it is urged that the City restrict the hours of construction by limiting the window under which construction is permitted by allowing construction to begin at 8:00 am, and end at 6:00 pm.*

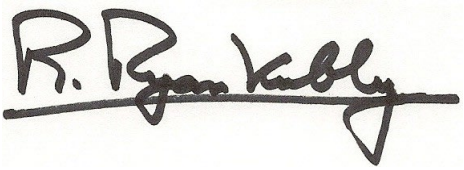
(4) <u>THE PROJECT'S BUILDINGS WILL OBSTRUCT THE VIEW OF RESIDENTS...</u>

Finally, I am concerned about the Project because construction of proposed buildings will undoubtedly impact the views of numerous residents in my community. In particular, I am concerned about the view of residents of dwellings located at the north-east corner of Mirada Estates along Mirada Circle and Grand View Court. It does not appear that the City property analyzed the impact of the Project on the view of those homeowners. If indeed, those homeowner's view are negatively impacted, then the City, and the applicant for the Project, should (1) make those impacts clear; (2) if so negatively impacted, determine whether or not alternative exists that would allay those impacts/obstructed views.

## CONCLUSION

I want to again make clear that I am not opposed to the Project, only that portions of the Project, and its impacts, need to be addressed as set forth above. Due to the Project's potentially significant impact on the areas described above, I urge the City not to recommend approval of the Project until the problems and impacts outlined above are properly addressed and are fully mitigated.

Sincerely,



Raymond Ryan Kubly
19 Mesa Vista Lane
Rancho Mirage, CA 92270

CC: Isaiah Hagerman, City Manager (isaiahh@ranchomirageca.gov)

**From:** Kristie Ramos, CMC
**To:** Ben Torres
**Cc:** Majna Dukic; Colin Kirkpatrick
**Subject:** FW: city council meeting reg Ritz expansion,Jan 9, 2pm, Mirada concerns
**Date:** Monday, January 6, 2025 12:53:11 PM
**Attachments:** citysealtransparent_c1ae3cac-0f06-4116-be99-2608ac78b93e.png
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Please see message below.

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**Kristie Ramos, CMC**
City Clerk
Phone: 760-324-4511 Ext. 488
E-mail: kristier@RanchoMirageCA.gov
69-825 Highway 111, Rancho Mirage, California, 92270
www.RanchoMirageCa.gov

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**From:** Deb Windham <drdeb4u@hotmail.com>
**Sent:** Monday, January 6, 2025 12:47 PM
**To:** Kristie Ramos, CMC <kristier@RanchoMirageCA.gov>
**Subject:** city council meeting reg Ritz expansion,Jan 9, 2pm, Mirada concerns

**CAUTION:** This email originated from outside The City of Rancho Mirage. **DO NOT CLICK links** or open **attachments** unless you recognize the sender and know the content is safe.

hello Kristie, We are hoping to read this letter reg Ritz, which speaks to our neighborhood

concerns.
please enter this into the agenda.

**Subject: Concerns Regarding Environmental Impact of Ritz-Carlton Expansion and Proposed Mitigation Measures**

**Dear Members of the Rancho Mirage City Council and Representatives of The Ritz-Carlton,**

**I am writing to express my concerns about the proposed expansion of The Ritz-Carlton, Rancho Mirage, which includes the addition of pools, restaurants, parking facilities, and 106 condominiums. As a resident of the Mirada Estates, (and Mirada Villas) community , I am deeply concerned about the potential environmental and infrastructural impacts this project may have on our neighborhood.**

**Impact on Traffic and Emergency Services**

**The increased construction activity and subsequent rise in visitor numbers are likely to significantly affect ingress and egress via Frank Sinatra Drive. This thoroughfare is crucial for daily commutes and, more importantly, for emergency vehicle access. Many residents in our community are elderly and rely on prompt emergency services. Obstructions or delays on this route could have serious consequences.**

**Environmental Concerns**

**The construction phase is expected to introduce substantial noise, dust, debris, and general disruption, which threaten the tranquility and environmental quality that residents currently enjoy. Such disturbances could also have adverse effects on local wildlife and the natural landscape.**

**Proposed Mitigation Measure**

**To address these concerns, I propose that the existing , paved service road located behind The Ritz-Carlton be expanded and utilized for all construction-related activities. It is unused currently, and leads directly to the dirt area where the expansion is to take place. This would include the transportation of heavy equipment, steel girders, concrete, materials, and construction personnel. By diverting construction traffic away from Frank Sinatra Drive, we can:**

- **Maintain Unobstructed Access: Ensure that residents and emergency vehicles retain uninterrupted access to our community.**

- **Reduce Environmental Impact: Minimize noise, dust, and debris in residential areas, preserving the peaceful environment we value.**
- **Enhance Safety: Decrease the risk of accidents or delays associated with increased traffic on public roads.**

**I kindly request that the City Council and The Ritz-Carlton consider this proposal and provide detailed plans on how they intend to mitigate the impacts of the expansion on our community. Transparency in this process is essential, and I urge you to involve community members in discussions to develop effective solutions.**

**Thank you for your attention to these pressing matters. I look forward to your response and to working together to ensure that the development proceeds in a manner that respects and preserves the well-being of our community.**

**Sincerely,**
**Dr. Deb Windham,**
**Dr Brian Herman (Chairman of Radiology at Eisenhower Medical Center)**
**Bob Greenbaum**
**Debbi Melman**

**Residents of MiradaEstates**
**Rancho Mirage, CA**

**From:** Kristie Ramos, CMC
**To:** Ben Torres; Majna Dukic; Colin Kirkpatrick
**Subject:** FW: Here's my thoughts on a Letter to Ritz reg expansion / city council meeting Jan 9th, 2 pm
**Date:** Monday, January 6, 2025 12:54:07 PM
**Attachments:** citysealtransparent_c1ae3cac-0f06-4116-be99-2608ac78b93e.png
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FYI

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**From:** Deb Windham <drdeb4u@hotmail.com>
**Sent:** Monday, January 6, 2025 12:37 PM
**To:** Maryann Hoss <mhoss@drminternet.com>; Bob Greenbaum <bobgreenbaumrealtor@gmail.com>; Big B <doctorherman@gmail.com>; Maureen Shapiro <moshapiro@gmail.com>; Jeff Engler <jte@borderfoods.com>; boutress@gmaul.com; bbcmd1105@gmail.com; City Clerk <cityclerk@ranchomirageca.gov>
**Subject:** Fw: Here's my thoughts on a Letter to Ritz reg expansion / city council meeting Jan 9th, 2 pm

**CAUTION:** This email originated from outside The City of Rancho Mirage. **DO NOT CLICK links** or open **attachments**

unless you recognize the sender and know the content is safe.

To mirada residents and City Council, see letter below, I feel we can work amicably with them if they can accommodate.

---

Hi neighbors, feel free to add any thoughts or concerns.
We looked at the fire road coming off 111, it is behind the spa, leads directly up to the dirt area and is paved, nobody uses it.
We believe they can
Letter we drafted to Ritz

# Subject: Concerns Regarding Environmental Impact of Ritz-Carlton Expansion and Proposed Mitigation Measures

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**Sincerely,**

**Dr. Deb Windham,**

**Dr Brian Herman (Chairman of Radiology at Eisenhower Medical Center)**

**Resident of MiradaEstates**

**Rancho Mirage, CA**

Get Outlook for iOS

Majna,

Please see below. Would this be for you?

Thanks,




**Kristie Ramos, CMC**
City Clerk
Phone: 760-324-4511 Ext. 488
E-mail: kristier@RanchoMirageCA.gov
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-----Original Message-----
From: Dr Deb windham <drdebwindham@gmail.com>
Sent: Thursday, January 2, 2025 6:19 PM
To: City Clerk <cityclerk@ranchomirageca.gov>
Subject: Ritz expansion

CAUTION: This email originated from outside The City of Rancho Mirage. DO NOT CLICK links or open attachments unless you recognize the sender and know the content is safe.

Hello, we live in mirada estates, and are concerned about trucks, heavy equipment, bulldozers, steel, concrete , workers, traffic , congestion, trash, dirt, debris, utilizing Frank Sinatra on both sides, affecting egress and ingress, delays, noise, safety, comfort, .. we know theres a back road near the back of property by spa, hopefully this will be expanded to handle this incredibly large and lengthy construction, to send all the

construction traffic and large trucks through a back entrance, to ensure safety and security for all residents that live up here and the villas. We would assume there has been some plan to address this uncomfortable , unpleasant, and  hazardous situation.
Thank you Drs Deb Windham and Brian Herman Sent from my iPhone

ADAMS BROADWELL JOSEPH & CARDOZO
A PROFESSIONAL CORPORATION
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KEVIN T. CARMICHAEL
CHRISTINA M. CARO
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KELILAH D. FEDERMAN
RICHARD M. FRANCO
ANDREW J. GRAF
TANYA A. GULESSERIAN
DARION N. JOHNSTON
RACHAEL E. KOSS
AIDAN P. MARSHALL
ALAURA R. McGUIRE
TARA C. RENGIFO

*Of Counsel*
MARC D. JOSEPH
DANIEL L. CARDOZO

January 9, 2025

**Via Email and Hand Delivery**
City of Rancho Mirage Planning Commission
ATTN: Kristie Ramos, City Clerk
City of Rancho Mirage
69-825 Highway 111
Rancho Mirage, CA 92270
**Email:** CityClerk@RanchoMirageCA.gov;
kristier@ranchomirageca.gov

**Via Email Only**
Ben Torres, Planning Manager
**Email**: bent@ranchomirageca.gov

**Re: Agenda Item #3 – Comments on the Ritz-Carlton Rancho Mirage Project (SCH 2024030267; Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004, and TPM23-0002).**

Dear Planning Commission Members, Ms. Ramos, and Mr. Torres:

We are writing on behalf of Californians Allied for a Responsible Economy ("CARE CA") to provide comments on the Ritz-Carlton Rancho Mirage Project (SCH 2024030267; Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004, and TPM23-0002) ("Project"), proposed by Kam Sang International ("Applicant"). The Project will be considered at the January 9, 2025, City of Rancho Mirage ("City") Planning Commission meeting as Agenda Item #3. The Planning Commission will consider whether to recommend approval of the Project's General Plan Zoning Map Amendment, Tentative Parcel Map, Major Modification, and Amendment to the existing Development Agreement.

The City previously circulated an Initial Study/Mitigated Negative Declaration ("IS/MND") for public comment from March 11 to April 9, 2024, and revised and recirculated the IS/MND from July 22, 2024 to August 2024 ('Revised MND"). CARE CA submitted timely comments on the IS/MND's which provided substantial evidence supporting a fair argument that the Project would have



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potentially significant environmental impacts on public health, air quality, energy, and transportation. The Final IS/MND, attached to the Staff Report for this Planning Commission meeting, includes responses to CARE CA's comments.

We reviewed the Final IS/MND with the assistance of noise expert Jack Meighan,[1] air quality and health risk expert Paul E. Rosenfeld, PhD from Soil / Water / Air Protection Enterprise ("SWAPE").[2] CARE CA reserves the right to supplement these comments at later proceedings and hearings related to the Project.[3]

The instant comments demonstrate that the Final IS/MND fails to resolve the flaws identified in CARE CA's prior comments. Emissions from the Project's construction and operation would result significant, unmitigated health risk impacts on people living just 21 feet from the Project site.[4] SWAPE's quantitative analysis of the Project's emissions demonstrates that health risk impacts would exceed the City's 10 in one million cancer risk significance threshold, even with the mitigation proposed in the Final IS/MND. Due to the proximity of residences to the Project site, construction and operational noise impacts would also be significant. Construction noise would increase ambient noise levels by over 20 decibels, which the City acknowledges would be a significant impact. And during operations, stationary equipment like HVAC systems would exceed the 45 decibel nighttime noise standards at the nearby residences. CARE CA's comments also demonstrate that the Final IS/MND would have significant, unmitigated transportation and energy impacts.

The California Environmental Quality Act ("CEQA") requires the lead agency to prepare an environmental impact report ("EIR") whenever substantial evidence supports a fair argument that a project may have a significant effect on the environment.[5] Here, substantial evidence supports a fair argument that the Project would result in potentially significant impacts. The City cannot approve the Project until the Project's impacts are analyzed in an EIR. Because the Project would have

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[1] Mr. Meighan's comments and curricula vitae are attached hereto as **Exhibit A** ("Meighan Comments").
[2] Dr. Rosenfeld's comments and curricula vitae are attached hereto as **Exhibit B** ("SWAPE Comments").
[3] Gov. Code § 65009(b); PRC § 21177(a); *Bakersfield Citizens for Local Control v. Bakersfield ("Bakersfield")* (2004) 124 Cal. App. 4th 1184, 1199-1203; *see Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal. App. 4th 1109, 1121.
[4] Final IS/MND, pg. 147.
[5] Pub. Resources Code, § 21080 (d).



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unmitigated impacts and relies on an insufficient environmental document, the Planning Commission lacks substantial evidence to recommend approval of the Project's General Plan Zoning Map Amendment, Tentative Parcel Map, Major Modification, and Amendment to the existing Development Agreement. CARE CA respectfully requests that the Commission continue today's hearing to require the City to comply with CEQA before the Project is considered for approval.

## I. STATEMENT OF INTEREST

CARE CA is an unincorporated association of individuals and labor organizations that may be adversely affected by the potential public and worker health and safety hazards, and the environmental impacts of the Project. The coalition includes Rancho Mirage residents Norman Gerler and Michael Sanholtzer, the District Council of Ironworkers and Southern California Pipe Trades DC 16, along with their members, their families, and other individuals who live and work in the City of Rancho Mirage and in Riverside County.

CARE CA advocates for protecting the environment and the health of their communities' workforces. CARE CA seeks to ensure a sustainable construction industry over the long-term by supporting projects that offer genuine economic and employment benefits, and which minimize adverse environmental and other impacts on local communities. CARE CA members live, work, recreate, and raise their families in the City of Rancho Mirage and surrounding communities. Accordingly, they would be directly affected by the Project's environmental and health and safety impacts. Individual members may also work on the Project itself. They will be first in line to be exposed to any health and safety hazards that exist onsite.

In addition, CARE CA has an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for its members. Environmentally detrimental projects can jeopardize future jobs by making it more difficult and more expensive for business and industry to expand in the region, and by making the area less desirable for new businesses and new residents. Indeed, continued environmental degradation can, and has, caused construction moratoriums and other restrictions on growth that, in turn, reduce future employment opportunities.



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## II. THE CITY MUST PREPARE AN ENVIRONMENTAL IMPACT REPORT TO COMPLY WITH CEQA

CEQA requires that lead agencies analyze any project with potentially significant environmental impacts in an EIR.[6] CEQA's purpose and goals must be met through the preparation of an EIR, except in certain limited circumstances.[7] CEQA contains a strong presumption in favor of requiring a lead agency to prepare an EIR. This presumption is reflected in the "fair argument" standard. Under that standard, a lead agency "shall" prepare an EIR whenever substantial evidence in the whole record before the agency supports a fair argument that a project may have a significant effect on the environment.[8] The fair argument standard creates a "low threshold" favoring environmental review through an EIR, rather than through issuance of a negative declaration.[9] An agency's decision not to require an EIR can be upheld only when there is no credible evidence to the contrary.[10]

With respect to this Project, a fair argument can be made that the Project may cause significant noise, health risk, air quality, energy, and transportation impacts requiring the preparation of an EIR.

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[6] *See* Pub. Resources Code, § 21000; CEQA Guidelines, § 15002.
[7] *See* Pub. Resources Code, § 21100
[8] Pub. Resources Code, §§ 21080, subd. (d), 21082.2, subd. (d); CEQA Guidelines, §§ 15002, subd. (k)(3), 15064, subds. (f)(1), (h)(1); *Laurel Heights Improvement Assn. v. Regents of the Univ. of Cal.* ("*Laurel Heights II*") (1993) 6 Cal.4th 1112, 1123; *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 75, 82; *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 150-151; *Quail Botanical Gardens Found., Inc. v. City of Encinitas* ("*Quail Botanical*") (1994) 29 Cal.App.4th 1597, 1601- 1602.
[9] *Citizens Action to Serve All Students v. Thornley* (1990) 222 Cal.App.3d 748, 754
[10] *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th, 1307, 1318; *see also Friends of B Street v. City of Hayward* (1980) 106 Cal.App.3d 988, 1002 ("*Friends of B Street*") ("If there was substantial evidence that the proposed project might have a significant environmental impact, evidence to the contrary is not sufficient to support a decision to dispense with preparation of an EIR and adopt a negative declaration, because it could be 'fairly argued' that the project might have a significant environmental impact").



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### A. The Project Still Has Potentially Significant, Unmitigated Noise Impacts

#### 1. The Final IS/MND Still Applies An Unsubstantiated Significance Threshold

The Draft and Revised IS/MND found that construction noise impacts would be less than significant because impacts would not exceed an 85 dBA maximum threshold.[11] CARE CA demonstrated that this threshold was not supported by substantial evidence because (1) the threshold was developed as a threshold to prevent occupational noise-induced hearing loss,[12] and (2) the threshold failed to account for increases in noise over ambient levels.[13] In response, the Final IS/MND attaches a new noise memorandum that applies a new threshold.[14] The new threshold provides that construction noise would constitute a significant impact if it exceeds an 80 dBA maximum level or increases ambient noise levels by 20 dBA.[15] However, the Final IS/MND was not revised to reflect the new threshold and still states that the 85 dBA threshold is the applicable threshold.[16] The Final IS/MND must be revised to be internally consistent and apply a legally adequate threshold.

#### 2. Construction Noise Impacts Would Exceed the IS/MND's New Significance Thresholds

The new noise memorandum in Appendix E-2 of the Final IS/MND estimates that construction noise would not exceed the 20 dBA threshold.[17] As shown below, Appendix E-2 claims that construction activities would result in noise increases of 19.5 dBA at receptors R3 and R5, and 19.9 dBA at R4, barely below the threshold.[18] But substantial evidence demonstrates that the Final IS/MND's calculations are underestimated and erroneous.

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[11] IS/MND, pg. 145.
[12]
[13]
[14] Final IS/MND, Appendix E-2.
[15] Final IS/MND, Appendix E-2, pg. 2.
[16] Final IS/MND, pg. 144.
[17] Final IS/MND, Appendix E-2, pg. 8.
[18] *Id.*



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**TABLE 3: DAYTIME CONSTRUCTION NOISE LEVEL INCREASES**

| Receiver Location[1] | Highest Construction Noise Level[2] | Maximum Limit (dBA $L_{eq}$) | Threshold Exceeded?[4] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|---|---|
| R1 | 51.5 | 80.0 | No | L1 | 49.7 | 53.7 | 4.0 | 20.0 | No |
| R2 | 69.2 | 80.0 | No | L2 | 53.4 | 69.3 | 15.9 | 20.0 | No |
| R3 | 69.9 | 80.0 | No | L3 | 50.4 | 69.9 | 19.5 | 20.0 | No |
| R4 | 70.3 | 80.0 | No | L3 | 50.4 | 70.3 | 19.9 | 20.0 | No |
| R5 | 69.9 | 80.0 | No | L3 | 50.4 | 69.9 | 19.5 | 20.0 | No |
| R6 | 64.8 | 80.0 | No | L3 | 50.4 | 65.0 | 14.6 | 20.0 | No |
| R7 | 66.2 | 80.0 | No | L3 | 50.4 | 66.3 | 15.9 | 20.0 | No |
| R8 | 55.7 | 80.0 | No | L3 | 50.4 | 56.8 | 6.4 | 20.0 | No |

Mr. Meighan demonstrates that the City's analysis underestimates construction noise impacts, which would exceed the 20 dBA threshold. Mr. Meighan observes that while the Final IS/MND claims that the highest construction noise level at Receptor R3 (21 feet away from the Project site) would be 69.9 dBA, the Final IS/MND elsewhere states that the composite source noise level at 50 feet varies between 76.2 and 84.4 dBA.[19] Mr. Meighan explains that because there is no evidence in the record to support the IS/MND's assumption that noise impacts would be lower at 21 feet than at 50 feet, the 69.9 dBA estimate underestimates impacts. Construction noise impacts of 76.2 and 84.4 dBA would exceed the Final IS/MND's new thresholds. Mr. Meighan shows that construction noise can be as high as 31 dBA over ambient levels at receiver R3.[20]

And as demonstrated in CARE CA's comments on the Revised IS/MND, construction noise impacts would be even higher if blasting is required. Response O5-13 claims that blasting is not proposed by the Project, but the Final IS/MND's geotechnical report states that "[s]ome blasting may be necessary in the deeper cut areas of the site, and may be desirable from an efficiency standpoint even where ripping with heavy equipment is feasible."[21] The Response does not contain evidence or reasoned analysis contradicting the evidence in the geotechnical report.

Because construction noise would exceed the Final IS/MND's 20 dBA significance threshold, substantial evidence supports a fair argument that

[19] Meighan Comments, pg. 2.
[20] Meighan Comments, pg. 2.
[21] Revised IS/MND, Appendix G, pg. 17.



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construction noise impacts are potentially significant and unmitigated. As a result, the City must analyze the Project's impacts in an EIR.

### 3. The Final IS/MND's Unsupported Construction Noise Threshold Masks Potentially Significant Noise Impacts

Appendix E-2 states that construction noise would constitute a significant impact if it exceeds an 80 dBA maximum level or increases ambient noise levels by 20 dBA. But substantial evidence demonstrates that significant construction noise impacts would occur at lower noise levels. Mr. Meighan explains that an increase of 10 dB causes a doubling of perceived loudness and represents a ten-fold increase in sound level.[22] 20 dBA represents noise that is 100 times louder and is perceived as four times as loud as ambient conditions.[23] Figure 3-6 of the FTA Manual presents data from case studies showing that community reactions to increases in noise between 5 to 10 dBA above existing levels vary from "widespread complaints" to "threats of legal action."[24] Other agencies have adopted significance thresholds for construction noise that identify an increase of 10 dBA as significant.[25]

The CEQA Guidelines provide that, although significance thresholds may assist lead agencies in determining whether a project may cause a significant impact, "[c]ompliance with the threshold does not relieve a lead agency of the obligation to consider substantial evidence indicating that the project's environmental effects may still be significant."[26] Courts have held that a threshold of significance based on lead agency policies may not be applied in a way that

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[22] Meighan Comments, pg. 2.
[23] *Id.*
[24] Federal Transit Administration, Transit Noise And Vibration Impact Assessment Manual, September 2018, 18, Figure 3-6 (Community Reaction to New Noise, Relative to Existing Noise in a Residential Urban Environment), available at https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.
[25] City of Los Angeles, CEQA Thresholds Guide, pg. I.1-3, available at https://planning.lacity.gov/eir/CrossroadsHwd/deir/files/references/A07.pdf (A project would normally have a significant impact on noise levels from construction if: • Construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise sensitive use; • Construction activities lasting more than 10 days in a three month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise sensitive use; or • Construction activities would exceed the ambient noise level by 5 dBA at a noise sensitive use between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or at any time on Sunday).
[26] 14 Cal Code Regs §15064(b)(2).



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forecloses any consideration of evidence an impact is significant in the context of a particular project.[27]

Courts typically require an EIR to be prepared when the record contains substantial evidence of a significant noise impact – regardless of conformity with the lead agency's adopted thresholds. In *Oro Fino Gold Mining Corp. v. County of El Dorado* ("*Oro Fino*"),[28] a mining company applied for a special use permit for drilling holes to explore for minerals.[29] The mining company argued the proposed mitigated negative declaration prohibited noise levels above the applicable county general plan noise standard maximum of 50 dBA and, therefore, there could be no significant noise impact.[30] The court rejected this argument on two grounds. "Initially, we note that conformity with a general plan does not insulate a project from EIR review where it can be fairly argued that the project will generate significant environmental effects."[31] Second, the court reviewed the record and, like the trial court, concluded it contained substantial evidence supporting a fair argument that noise from drilling would exceed the county standard of 50 dBA.[32] Thus, the court concluded an EIR was required.

In *Citizens for Responsible & Open Government v. City of Grand Terrace* ("*Grand Terrace*"),[33] the city approved a 120-unit senior housing facility based on a mitigated negative declaration.[34] A citizen's group argued substantial evidence supported a fair argument that the project would result in significant environmental impacts, including the impact of noise from air conditioners.[35] The

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[27] *See East Sacramento Partnership for a Livable City v City of Sacramento* (2016) 5 CA5th 281, 300 (general plan traffic policy, standing alone, was not sufficient to support EIR's finding that certain traffic impacts were less than significant, given absence of any evidence or analysis supporting use of general plan policy as a threshold of significance); see also *Save Our Capitol! v Department of Gen. Servs.* (2023) 87 CA5th 655, 695-696 (project compliance with LEED and CALGreen building standards did not excuse EIR's failure to analyze whether light and glare impacts would be significant).

[28] (1990) 225 Cal.App.3d 872.
[29] *Id.* at pg. 876.
[30] *Oro Fino, supra.*
[31] *Id.* at pp. 881–882.
[32] *Id.* at pg. 882.
[33] (2008) 160 Cal.App.4th 1323.
[34] *Id.* at pg. 1327.
[35] *Id.*



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trial court agreed and issued a writ of mandate requiring the preparation of an EIR.[36] The appellate court affirmed.[37]

In *Grand Terrace*, the noise element of the city's general plan stated exterior noise levels in residential areas should be limited to 65 dB CNEL.[38] The initial study concluded the facility's air conditioner units would cause noise impacts, but with mitigating measures the project would operate within the general plan's noise standard. Mitigation measures specified as conditions of approval included "shielding" the units, having self-contained condensers that would not transmit noise outside, reducing the number of units near residences, including a buffer setback, planting trees as a noise buffer, etc.[39] However, a community member who had been in the HVAC business for 30 years stated that the type of air conditioning units proposed by the project "sound like airplanes."[40] And at a city council public hearing, community and city council members expressed concern that the air conditioners would be noisy.[41] The public was not able to analyze numerical data about the noise generated by the air conditioners because the project proponent "did not provide a noise rating on the units"[42]

The appellate court cited *Oro Fino* for the principle that "'conformity with a general plan does not insulate a project from EIR review where it can be fairly argued that the project will generate significant environmental effects.'"[43] The court considered the testimony about the noise generated by the proposed air conditioners, took into account the mitigation measures, and concluded "there is substantial evidence that it can be fairly argued that the Project may have a significant environmental noise impact."[44]

Here, the record contains stronger evidence of significant noise impacts than in *Grand Terrace*, as impacts would exceed the Final IS/MND's construction noise thresholds, and would be significant at lower levels. An EIR must be prepared that analyzes and mitigates the Project's potentially significant noise impacts.

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[36] *Id.* at pp. 1326–1327.
[37] *Id.* at pg. 1327.
[38] *Grand Terrace, supra*, 160 Cal.App.4th at pg. 1338.
[39] *Id.* at 1339-1340.
[40] *Id.* at 1338-1339.
[41] *Id.* at 1338.
[42] *Id.* at pp. 1339, 1340.
[43] *Grand Terrace, supra*, at pg. 1338.
[44] *Id.* at p. 1341.



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### 4. Operational Noise Impacts Remain Potentially Significant and Unmitigated

The Revised IS/MND provided that operational noise impacts would be significant if Project-related operational (stationary-source) noise levels exceed the base exterior noise level standard of 45 dBA Leq during the nighttime hours (10:00 p.m. to 7:00 a.m.) for noise-sensitive residential and institutional uses in the Project study area.[45] CARE CA's comments on the Revised IS/MND demonstrated that, if the Project's HVAC units ran for just 4 more minutes per hour (32/60 minutes) than assumed in the IS/MND (28/60 minutes), the 45 dBA threshold would be exceeded. Response O5-12 is nonresponsive to CARE CA's comments on this issue:

> The comment states that the MND does not address or mitigate noise impacts from HVAC systems. The comment states that the assumptions for the operation time per hour is longer, and would result in potentially significant impacts. The author of the noise and vibration study report (Urban Crossroads) states that they have tested many HVAC systems and spoken with many manufacturers about this, and they have concluded that an HVAC unit would fail to function in a year if it were to run at 100 percent all the time. They have empirical measurements on hot days and the typical run time has been found to be 45 minutes or less during daytime hours and 30 minutes or less at night.[46]

As shown above, Response O5-12 states that HVAC systems cannot be expected to run constantly. This does not address that a significant nighttime noise impact would occur if HVAC systems ran for 32 minutes in an hour, as estimated by Mr. Meighan.[47] And by stating that the typical HVAC runs for 30 minutes or less at night, the Response actually corroborates that it is reasonably foreseeable that HVAC systems could run for 32 minutes at night.

The City's response is also inadequate because it is not supported by substantial evidence. An EIR must contain facts and analysis, not just an agency's bare conclusions or opinions.[48] Response O5-12 alludes to "empirical measurements" but fails to enter these empirical measurements into the record.

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[45] Revised IS/MND, Appendix E, pg. 21.
[46] Agenda Packet, pg. 3-3154.
[47] Meighan Comments, pg. 2.
[48] *Sierra Club v County of Fresno* (2018) 6 C5th 502, 522; *Citizens of Goleta Valley v Board of Supervisors* (1990) 52 C3d 553, 568.



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The Response alludes to conversations with HVAC manufacturers but fails to provide any information regarding the conversations with HVAC manufacturers, such as how many manufacturers were contacted or how recent these conversations were.

In sum, noise from HVAC systems remains a potentially significant impact that must be analyzed in an EIR.

### B. Health Risk Remains Significant and Unmitigated

CARE CA's comments on the Revised IS/MND introduced substantial evidence demonstrating that the Project would have significant, unmitigated health risks from construction and operational emissions. SWAPE calculated the Project's operational cancer risk (42.4 in one million) and added the Project's mitigated construction-related cancer risk (6.65 in one million, as estimated by the Revised IS/MND), to find that the excess cancer risk is approximately 49 in one million. This cancer risk exceeds the IS/MND's 10 in one million significance threshold, resulting in a significant impact.

Response O2-7 states that a quantitative health risk analysis is not required for this Project because proposed construction activities would not generate emissions of PM10 in excess of Localized Significance Thresholds ("LSTs").[49] But as stated in the same response, the City's own construction health risk assessment, prepared in response to CARE CA's comments, found that impacts would be significant.[50] This is because LSTs apply only to criteria pollutants, and do not apply to DPM and other TACs which cause increased health risk, as explained in CARE CA's comments on the Draft IS/MND. The City's response is misleading and inaccurate.

Response O5-17 states that there is no need to analyze the combined health risk of Project construction and operations because there would be no overlap between these phases.[51] This argument also fails because sensitive receptors would be exposed to emissions from both phases, whereas the City's approach would ignore this combined impact. And as explained in SWAPE's comments on the Draft IS/MND, guidance from the Office of Environmental Health Hazard Assessment

[49] Agenda Packet, pg. 3-2513.
[50] *Id.*
[51] *Id.* at 3-3155.



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("OEHHA") provides that "the excess cancer risk is calculated separately for each age grouping and then summed to yield cancer risk at the receptor location."[52]

In response to CARE CA's comments, the Final IS/MND includes a screening-level analysis reflecting intermittent maintenance and testing of the diesel-fired emergency generator (which would be limited to 50 hours of testing annually).[53] Response O2-27 states that impacts from testing of the generator would result in a 0.57 in one million cancer risk.[54] The Response concludes that this impact summed with the mitigated construction-related cancer risk (6.65 in one million) would not exceed the 10 in one million significance threshold. The Final IS/MND underestimates operational health risk impacts in two critical ways.

First, the 0.57 in one million operational cancer risk only reflects backup generator emissions. The Project would have other sources of TAC emissions that would add to this impact, including diesel trucks and other potential stationary equipment.[55] The AERSCREEN model used in SWAPE's analysis relies on data reflecting the proposed land use, which includes other sources of TACs than a single generator. Thus, whereas the IS/MND's screening analysis omits analysis of all potential sources of operational emissions, SWAPE's analysis of operational emissions is supported by substantial evidence.

Second, the operational HRA's analysis of the emergency generator only accounts for emissions from 50 hours of testing, and not from any reasonably foreseeable emergency use.[56] The HRA must also analyze the generator's use in emergencies. The emergency use of backup generators is a reasonably foreseeable activity during Project operation due to the prevalence of power safety shutoffs, extreme heat events, and other emergencies which lead to temporary losses of power.

In *East Oakland Stadium Alliance v. City of Oakland*,[57] the Court of Appeal upheld an EIR's analysis of emissions from backup generators. The EIR's analysis assumed that generators would operate for 50 hours of testing and maintenance

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[52] "Guidance Manual for preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf pg. 8-4; SWAPE Comments, pg. 2.
[53] Agenda Packet, pg. 3-2519; HRA available in Final IS/MND, Appendix A-2.
[54] *Id.*
[55] SWAPE comments, pg. 2.
[56] Agenda Packet, pg. 3-562
[57] (2023) 889 Cal. App. 5th 1226.



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annually, while allocating no time for actual emergency use. In discussing the lead agency's duty to analyze backup generator emissions, the Court stated that "if the annual need for emergency generator use is reasonably foreseeable, the EIR was not entitled to disregard such use merely because it would occur at unpredictable times."[58] The Court explained that use of a generator was reasonably foreseeable because, "[a]s noted in the EIR, some parts of the Bay Area are subject to predictable, sustained power outages undertaken to reduce the risk of fire."[59] Thus, "[t]he EIR was required to make neither a generally applicable nor a worst-case assumption; rather it was required to make a reasonable estimate of likely annual use of the generators at the project site."[60]

Here, as in *East Oakland Stadium Alliance*, backup generator emissions are a reasonably foreseeable consequence of the Project due to increasingly common Public Safety Power Shutoff ("PSPS") events and extreme heat events ("EHE"). EHEs are defined as periods where in the temperatures throughout California exceed 100 degrees Fahrenheit.[61] The Project's electricity would be supplied by Southern California Edison.[62] From January 2019 through December 2019, Southern California Edison reported 158 of their circuits underwent a PSP event.[63] In Los Angeles County, two circuits had 4 PSPS events during that period, lasting an average of 35 to 38 hours. The total duration of the PSPS events lasted between 141 hours to 154 hours in 2019. According to the California Public Utilities Commission de-energization report[64] in October 2019, there were almost 806 PSPS events that impacted almost 973,000 customers (~7.5% of households in California). The California Air Resources Board estimates that with 973,000 customers impacted by PSPS events in October 2019, approximately 125,000 back-up generators were used by customers to provide electricity during power outages.[65] The widespread use of back-up generators to adapt to PSPS and EHE events

[58] *Id.* at 1252.
[59] *Id.* at 1253.
[60] *Id.*
[61] Governor of California. 2021. Proclamation of a state of emergency. June 17, 2021.
[62] Agenda Packet, pg. 3-564.
[63] SCAQMD. 2020. Proposed Amendment To Rules (PARS) 1110.2, 1470, and 1472. Dated December 10, 2020. http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1110.2/1110-2_1470_1472/par1110-2_1470_wgm_121020.pdf?sfvrsn=6.
[64] https://www.cpuc.ca.gov/deenergization/ as cited in CARB, 2020. Potential Emission Impact of Public Safety Power Shutoff (PSPS), Emission Impact: Additional Generator Usage associated With Power Outage.
[65] California Air Resources Board, Emission Impact: Additional Generator Usage Associated with Power Outage (January 30, 2020), available at https://ww2.arb.ca.gov/resources/documents/emissions-impact-generator-usage-during-psps.



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suggests that back-up generators are a reasonably foreseeable consequence of the Project.

The City's operational HRA underestimates health risks by not including emissions from emergency use. Generators can emit criteria air pollutants, greenhouse gases, and toxic air contaminants. This equipment commonly relies on fuels such as natural gas or diesel,[66] and thus can significantly impact public health through DPM emissions.[67] This equipment can emit significant amounts of NOx, sulfur dioxides ("SO2"), particulate matter ("PM10"), carbon dioxide ("CO2"), carbon monoxide ("CO"), volatile organic compounds ("VOC"), particulate matter less than 10 microns ("$PM_{10}$"), PM less than 2.5 microns ("$PM_{2.5}$"), and air toxins such as DPM.[68] The IS/MND's failure to analyze emergency generator use thus results in an underestimation of the Project's air quality, greenhouse gas, and health risk impacts.

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[66] SCAQMD, Fact Sheet on Emergency Backup Generators, http://www.aqmd.gov/home/permits/emergency-generators ("Most of the existing emergency backup generators use diesel as fuel").

[67] California Air Resources Board, Emission Impact: Additional Generator Usage Associated with Power Outage (January 30, 2020), available at https://ww2.arb.ca.gov/resources/documents/emissions-impact-generator-usage-during-psps (showing that generators commonly rely on gasoline or diesel, and that use of generators during power outages results in excess emissions); California Air Resources Board, Use of Back-up Engines for Electricity Generation During Public Safety Power Shutoff Events (October 25, 2019), available at https://ww2.arb.ca.gov/resources/documents/use-back-engines-electricity-generation-during-public-safety-power-shutoff ("When electric utilities de-energize their electric lines, the demand for back-up power increases. This demand for reliable back-up power has health impacts of its own. Of particular concern are health effects related to emissions from diesel back-up engines. Diesel particulate matter (DPM) has been identified as a toxic air contaminant, composed of carbon particles and numerous organic compounds, including over forty known cancer-causing organic substances. The majority of DPM is small enough to be inhaled deep into the lungs and make them more susceptible to injury. Much of the back-up power produced during PSPS events is expected to come from engines regulated by CARB and California's 35 air pollution control and air quality management districts (air districts)").

[68] University of California, Riverside Bourns College of Engineering—Center for Environmental Research and Technology, Air Quality Implications Of Backup Generators In California, (March 2005), pg. 8, available at https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=84c8463118e4813a117db3d768151a8622c4bf6b; South Coast AQMD, Fact Sheet on Emergency Backup Generators ("Emissions of Nitrogen Oxides (NOx) from diesel-fired emergency engines are 200 to 600 times greater, per unit of electricity produced, than new or controlled existing central power plants fired on natural gas. Diesel-fired engines also produce significantly greater amounts of fine particulates and toxics emissions compared to natural gas fired equipment."), available at http://www.aqmd.gov/home/permits/emergency-generators#Fact2.



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In sum, substantial evidence in the record still demonstrates that health risks from construction and operations are potentially significant and unmitigated. Although the Final IS/MND calculates a less than significant impact, the MND's analysis underestimates impacts. Conversely, SWAPE's assessment of the Project's combined health risk impacts is supported by substantial evidence. An EIR must be prepared to analyze and mitigate the potentially significant health risk impact.

### 1. The Final IS/MND's Health Risk Mitigation is Not Binding and Ineffective

The Final IS/MND proposes to mitigate the Project's significant construction health risk impact with Mitigation Measure MM-AQ-1. MM-AQ-1 calls for use of Tier 4 equipment, but permits use of alternative methods to meet the numeric cancer risk standards established by the South Coast Air Quality Management District. CARE CA's comments on the Revised IS/MND explained that Mitigation Measure MM-AQ-1 constituted nonbinding and improperly deferred mitigation.[69] The Final IS/MND fails to correct this error.

Courts have held that deferral of mitigation may be permitted only where the lead agency: (1) undertakes a complete analysis of the significance of the environmental impact; (2) proposes potential mitigation measures early in the planning process; and (3) articulates specific performance criteria that would ensure that adequate mitigation measures were eventually implemented.[70]

CARE CA explained that MM-AQ-1 does not meet this standard because it does not identify alternative emissions reduction methods able to achieve the necessary emissions reductions. O5-15 states that the City need not identify any alternative emissions reductions methods because it would need to meet the SCAQMD significance threshold.[71] But this argument ignores that deferred mitigation is only permitted when the lead agency "identifies the type(s) of potential action(s) that can feasibly achieve that performance standard."[72]

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[69] CEQA Guidelines, § 15126.4, subd. (a)(2) (CEQA documents, including EIRs and MNDs, must mitigate significant impacts through measures that are "fully enforceable through permit conditions, agreements, or other legally binding instruments").
[70] Cal. Code Regs. tit. 14 § 15126.4; *Comtys. for a Better Env't v. City of Richmond* (2010) 184 Cal.App.4th 70, 95; *Cal. Native Plant Socy' v. City of Rancho Cordova* (2009) 172 Cal.App.4th 603, 621.
[71] Agenda Packet, pg. 3-3155.
[72] Cal. Code Regs. tit. 14 § 15126.4.



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CARE CA also explained that MM-AQ-1 fails to articulate specific performance criteria that would ensure that adequate mitigation measures are implemented. MM-AQ-1 requires that if Tier 4 equipment is not available, "[d]ocumentation using industry-standard emission estimation methodologies shall be furnished to the City demonstrating that estimated project-generated construction emissions would not exceed the applicable SCAQMD cancer risk threshold." This is not adequate performance criteria because the City continues to claim that emissions that do not exceed LSTs cannot result in a significant health risk impact.[73] To ensure that health risk impacts would be reduced below the 10 in one million significance thresholds, MM-AQ-1 must be revised to require a quantitative HRA that considers all components of the Project before any alternative construction methods can be approved.

### C. The Final IS/MND Still Fails to Include Sufficient Investigation into Energy Conservation Measures

CARE CA's comments on the Draft IS/MND explained that the IS/MND fails to include sufficient investigation into energy conservation measures that might be available or appropriate for the Project. Such measures include solar facilities, electric vehicle charging infrastructure above what is required by existing regulations, use of alternate fuel sources, or passive energy efficiency measures to ensure the Project's energy consumption would not be wasteful, inefficient, or unnecessary.

Response O2-14 claims that on-site renewable energy systems are not considered feasible for the proposed project, but fails to provide any evidence in support of this claim. The response does not substantiate why solar facilities cannot be installed on rooftops, over parking facilities, or ground level. The response's conclusory discussion fails to meet the standards of Appendix F of the CEQA Guidelines.

Response O2-15 claims that the Project would provide electric vehicle charging as required by law, and further analysis is not required because energy impacts have been determined to be less than significant.[74] This claim ignores the caselaw discussed in CARE CA's comments, which hold that compliance with building standards alone does not constitute an adequate energy analysis, and that

[73] *See* Response O2-7.
[74] Agenda Packet, pg. 3-2517.



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even projects that find a less-than-significant energy impact must "discuss whether any renewable energy features could be incorporated into the project."[75]

Response O2-16 claims that the IS/MND need not analyze alternative fuel sources for the emergency generator because the "the use of alternative fuel does not evaluate the efficient use of energy" and air quality impacts would be less than significant.[76] The response is incorrect because analysis of "[a]lternate fuels (particularly renewable ones) or energy systems" is called for in Appendix F of the CEQA Guidelines.[77] The response's reference to less than significant air quality impacts is also incorrect, as the Project's health risk impacts are potentially significant.

An EIR must be prepared that adequately evaluates the feasibility of reducing the Project's energy consumption. The EIR should evaluate the feasibility of meeting voluntary Tier 1 or 2 standards described in Appendix A5, Nonresidential Voluntary Measures, of the 2022 California Green Building Standards Code. These standards include consumption measures addressing many different aspects of nonresidential developments. CALGreen Sections A5.106.5.1.1 and A5.106.5.1.2 call for increased number of designated parking spaces for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles. Tier 1 standards require 35% of spaces to be reserved for clean air vehicles, and Tier 2 standards require 50%. CALGreen Section A5.106.5.3 calls for an increased number of EV capable spaces. The number of EV capable spaces required by these sections depends on the total number of spaces.[78] Tier 1 standards require large projects with 201 or more parking spaces to provide 30% EV capable spaces, and Tier 2 standards require 45% to be EV capable.[79] CALGreen Section A5.203.1.2 sets energy budgets that are less than permitted by the mandatory Title 24 energy standards.[80] CALGreen Section A5.303.2.3 calls for reductions in water consumption by require plumbing fixtures and fixture fittings that would reduce the use of potable water by 12%, in the case of Tier 1 standards, and 20%, in the case of

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[75] *League to Save Lake Tahoe Mtn. Area Preservation Found. v County of Placer* (2022) 75 CA5th 63, 167–68; *see California Clean Energy Commission v. City of Woodland* (2014) 225 CA4th 173; *Ukiah Citizens for Safety First v. City of Ukiah* (2016) 248 CA4th 256; *Spring Valley Lake Ass'n v. City of Victorville* (2016) 248 CA4th 91; *Tracy First v. City of Tracy* (2009) 177 Cal.App.4th 912, 930.
[76] Agenda Packet, pg. 3-2517.
[77] CEQA Guidelines, Appendix F, II (D)(4).
[78] CALGreen, Table A5.106.5.3.1 Tier 1
[79] Table A5.106.5.3.1, A5.106.5.3.2.
[80] CALGreen Sections A5.203.1.2.1, A5.203.1.2.2.



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Tier 2.[81] There is no evidence in the record demonstrating that these measures would be infeasible for this Project.

## III. THE PLANNING COMMISSION LACKS SUBSTANTIAL EVIDENCE TO MAKE THE REQUIRED FINDINGS TO RECOMMEND APPROVAL OF THE PROJECT ENTITLEMENTS

The draft resolution that will be considered by the Planning Commission lists various findings that the Commission must make to recommend approval of the Project's entitlements.[82] These include several findings relating to environmental impacts:

> f) That the design of the subdivision or the proposed improvements is not likely to cause substantial environmental damage or substantially and avoidably injure fish or wildlife or their habitat;
>
> g) That the design of the subdivision or type of improvements is not likely to cause serious public health problems;
>
> h) That the design of the subdivision or the type of improvements will not conflict with easements, acquired by the public at large, for access through or use of, property within the proposed subdivision;
> q) That the Proposed Project have been reviewed in compliance with the provisions of the California Environmental Quality Act (CEQA) and CEQA Guidelines…[83]

As shown herein and in CARE CA's prior comments, substantial evidence demonstrates that the Project would result in significant environmental and public health impacts. The Project has not been reviewed in compliance with CEQA because an EIR has not been prepared for the Project. As such, the Planning Commission lacks substantial evidence to support approval findings for the Project's entitlements.

[81] CALGreen Sections A5.303.2.3.1, A5.303.2.3.2
[82] Agenda Packet, pg. 3-3223.
[83] Agenda Packet, pg. 3-3226 to 3227.



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## IV. CONCLUSION

Substantial evidence supports a fair argument that the Project would have significant, unmitigated health risk, air quality, noise, and transportation impacts. Due to the Project's potentially significant impacts, CEQA requires the City to analyze the Project's impacts in an EIR. And as a consequence of the Project's impacts, the City cannot make the requisite findings under the City's Municipal Code to approve the Project's entitlements. CARE CA urges the Planning Commission not to recommend approval of the Project until the Project is analyzed in an EIR. This is the only way the City and the public can ensure the Project's significant environmental impacts are fully mitigated.

Sincerely,



Aidan P. Marshall

Attachment
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# EXHIBIT A

WILSON IHRIG
ACOUSTICS, NOISE & VIBRATION

CALIFORNIA
WASHINGTON
NEW YORK

WI #25-001.01

January 8th, 2025

Mr. Aidan P. Marshall
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080

**SUBJECT:** **Racho Mirage Ritz**
**Initial Study/Mitigated Negative Declaration (IS/MND).**
**Response to Comments on the Noise Analysis**

Below is our response to comments on the letter we sent on August 20th 2024 regarding noise impacts caused by the Rancho Mirage Ritz development

## Response to Comment 01-14 & 05-8 & 05-9

These comments are in response to our concerns about construction noise levels greatly exceeding ambient values, with the response to our comments pointing to a new noise analysis in Appendix E-2.

The new analysis in Appendix E-2 states that "many jurisdictions across California set construction noise level limits around 75 to 80 dBA Leq and only allow construction during daytime hours (e.g., City and County of Los Angeles City and County of San Diego, City and County of San Francisco, etc.)" (page 2). This is not true. The County of Los Angeles allows for nighttime construction and sets nighttime noise limits at 50 dBA and daytime noise limits at 60 dBA for single-family residential[1]. The City of Los Angeles has a CEQA thresholds guide that recommends a 10 dBA increase over ambient limits[2]. Both of these thresholds would be exceeded by the analysis shown in Tables 2 and 3 of Appendix E2[3]. Similarly, San Francisco has a construction noise threshold of a 5 dBA increase over ambient conditions[4]

The document then states that "many jurisdictions across California set residential daytime noise level limits around 55 dBA Leq during daytime hours" (page 2). This would then imply that many "California communities consider an increase of 20 dBA over the daytime limit an acceptable temporary increase for construction activities" (page 2) based on the 75 to 80 dBA construction noise

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[1] https://library.municode.com/ca/los_angeles_county/codes/code_of_ordinances?nodeId=TIT12ENPR_CH12.08NOCO_PT4SPNORE_12.08.440CONO

[2] https://planning.lacity.gov/eir/CrossroadsHwd/deir/files/references/A07.pdf . Page I.1-3

[3] The 60 dBA LA County threshold is for periods of 10 days or longer, and every construction phase at receiver R4 is over 60 dBA via Table 2 in Appendix E-2.

[4] https://sfpublicworks.org/sites/default/files/Noise_Control_Ordinance_0.pdf

limits referred to in Appendix E-2. However, this is unsupported as numerous examples given have construction noise thresholds much more stringent than as cited in the document.

This 20 dBA increase in the noise threshold is extreme. An increase of 10 dB causes a doubling of perceived loudness and represents a ten-fold increase in sound level. 20 dBA represents noise that is 100 times louder and is perceived as four times as loud as ambient conditions.[5] Having construction noise thresholds that are more lenient than operational noise thresholds is common due to the short-term nature of construction noise. However, most construction noise thresholds are capped at 10 dBA, which represents half the increase as the proposed 20 dBA threshold.

This standard disregards the cumulative and contextual nature of noise disturbances, which CEQA is designed to evaluate comprehensively. By allowing a substantial increase before requiring mitigation, this threshold undermines CEQA's intent to prevent significant environmental impacts and compromises the well-being of affected communities.

Additionally, the construction noise may be over the 20 dBA limit as presented. In our original letter, we detail that noise can be as high as 31 dBA over ambient levels at receiver R3. In the new analysis, receiver 3 is stated to be "approximately 21 feet from the Project site" (page 3) with a highest construction noise level of 69.9 dBA (Table 2). Yet, in Table 1, the composite source noise level at 50 feet varies between 76.2 and 84.4 dBA. It is unclear why the noise level at 50 feet is greater than the noise level at 21 feet, as no barriers were used and the closest distance between construction and R3 is relatively flat. This would constitute an unreported impact if fixed.

## Response to Comment 05-12

This comment is in response to our statement that the MND may be underestimating the time HVAC systems are running under worst-case conditions in the notoriously hot Coachella Valley region. The comment states "author of the noise and vibration study report" has "concluded that an HVAC unit would fail to function in a year if it were to run at 100 percent all the time" which is backed by both conversations with "many manufacturers" and "measurements on hot days and the typical run time has been found to be 45 minutes or less during daytime hours and 30 minutes or less at night."

An HVAC system would not run 100 percent of the time – but it could for a full hour or more under worst case conditions. On days that are exceptionally hot, which is common in Rancho Mirage as documented in our letter, to have a full hour of continuous air conditioning operation is entirely possible. If the assertation otherwise is backed up by measurements, the environment of those measurements should be documented in the IS/MND, giving the temperature, setting, and other details so decision makers and people in the affected environment can decide if the same situation is applicable for the new development.

As it stands, 100 percent usage of an HVAC system would increase noise levels over the noise threshold if running for 32 minutes in an hour, as documented in our previous letter. We believe that saying that an HVAC system would never run for more than 30 minutes at night is an unrealistic assumption, and thus is an unreported significant impact.

[5] https://www.nps.gov/subjects/sound/understandingsound.htm

## Conclusion

We believe that there is a good chance that the project may create significant noise impacts, considering an improper construction noise threshold, inconstancies in the noise analysis, and incorrect assumptions about operational noise sources. As such, this project should be analyzed in an environmental impact report.

Very truly yours,

WILSON IHRIG



Jack Meighan
Associate

# EXHIBIT B

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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January 8, 2025

Aidan Marshall
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601 Gateway Blvd #1000
South San Francisco, CA 94080

**Subject: Comments on the Rancho Mirage Ritz-Carlton Project RTC**

Dear Mr. Marshall,

We have reviewed the August 2024 Response to Comments ("RTC") and the February 2024 Initial Study/Mitigated Negative Declaration ("IS/MND") for the Rancho Mirage Ritz-Carlton Project ("Project") for the Rancho Mirage Ritz-Carlton Project ("Project") and have determined that the RTC is still insufficient in addressing the Project's potential health risk impacts. As stated in our March 8th, 2024 comment letter, we maintain that an Environmental Impact Report ("EIR") should be prepared to adequately assess and mitigate the potential health risk impacts that the Project may have.

# Air Quality

## Diesel Particulate Matter Emissions Inadequately Evaluated

As discussed in our March 8th, 2024 comment letter, the IS/MND failed to adequately evaluate the potential health risk impacts associated with Project construction and operation. In our March 8th, 2024 letter, we conducted a screening-level risk assessment that estimates Project construction and operation could result in a total excess cancer risk of approximately 42.4 in one million, which exceeds the applicable South Coast Air Quality Management District ("SCAQMD") threshold of 10 in one million.

The RTC responds with its own screening-level health risk assessment ("HRA"), stating:

> "The Risk Assessment Tool, a spreadsheet program, was used to perform a screening level evaluation of the cancer and non-cancer health effects of the emergency generator emissions pursuant to Rule 1401, see Appendix B for program results" (p. 3-2519).

Upon review of the subsequent screening-level HRA conducted by the Project Applicant, we found it to be insufficient for two reasons.

First, the screening-level analysis conducted only accounts for emergency generators, as described above. By assessing emissions solely from one source type, the RTC's HRA ignores the other potential future sources of harmful emissions. The IS/MND estimates the Project would generate 1,068 daily weekday operational vehicles trips (p. 173, Table 17-5). Furthermore, the Project includes "Sky Mesa Restaurant" as a proposed future land use. The HRA therefore fails to consider the potential health risk impacts from mobile sources and sources related to the proposed restaurant. These omissions show a failure of the RTC's analysis to follow the California Environmental Quality Act's ("CEQA")'s requirement to correlate the increase in emissions that the Project would generate to the adverse impacts on human health caused by those emissions.[1]

Second, our March 8th, 2024 comment letter explains that, following the United States Environmental Protection Agency ("U.S. EPA") guidance, a screening level HRA is used to show a link between Project-generated emissions and potential adverse health risk impacts, and that a significant output warrants a refined modeling approach. [2] The RTC relies upon its own screening-level analysis, rather than adopting our determination or conducting a more refined model.

The results of future construction-related and operational HRAs should then be summed up and compared to the SCAQMD threshold of 10 in a million, in line with SCAQMD guidance.[3] We maintain that an EIR should be prepared to include a refined health risk analysis which adequately and accurately evaluates health risk impacts associated with both Project construction and operation.

# Mitigation

## Feasible Mitigation Measures Available to Reduce Emissions

CEQA Guidelines explain that to properly address the Project's potential health risks, the RTC and associated documents must review all feasible mitigation measures.[4] We maintain that the IS/MND consider implementing the following measures to mitigate the DPM emissions associated with Project construction (see list below).

The Southern California Association of Governments ("SCAG")'s 2020 Regional Transportation Plan/Sustainable Communities Strategy Program EIR provides the following mitigation measures:[5]

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[1] "Sierra Club v. County of Fresno." Supreme Court of California, December 2018, a*vailable at:* https://ceqaportal.org/decisions/1907/Sierra%20Club%20v.%20County%20of%20Fresno.pdf.
[2] "Exposure Assessment Tools by Tiers and Types - Screening-Level and Refined." U.S. EPA, *available at:* https://www.epa.gov/expobox/exposure-assessment-tools-tiers-and-types-screening-level-and-refined.
[3] "South Coast AQMD Air Quality Significance Thresholds.", SCAQMD, March 2023, *available at*: https://www.aqmd.gov/docs/default-source/ceqa/handbook/south-coast-aqmd-air-quality-significance-thresholds.pdf?sfvrsn=25.
[4] "Mitigation Measures and Control Efficiencies.", SCAQMD, *available at*: https://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies.
[5] "4.0 Mitigation Measures." Connect SoCal Program Environmental Impact Report Addendum #1, September 2020, *available at*: https://scag.ca.gov/sites/main/files/file-

- Minimize unnecessary vehicular and machinery activities.
- Require contractors to assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that could be used an aggregate of 40 or more hours for the construction project.
- Ensure all construction equipment is properly tuned and maintained.
- Minimizing idling time to 5 minutes or beyond regulatory requirements —saves fuel and reduces emissions.
- Utilize existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.
- Develop a traffic plan to minimize community impacts because of traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites. Project sponsors should consider developing a goal for the minimization of community impacts.

The California Emissions Estimator Model ("CalEEMod") User Guide confirms that the methods for mitigating DPM emissions include the use of "alternative fuel, electric equipment, diesel particulate filters (DPF), oxidation catalysts, newer tier engines, and dust suppression."[6]

These SCAG measures offer feasible methods of to reduce Project construction-related DPM emissions, corroborated by the CalEEMod User Guide. We hold that an EIR should be conducted that includes all feasible mitigation measures to ensure emissions are reduced to the maximum extent feasible. The updated analysis should also demonstrate a commitment to implementing these measures before Project approval to ensure that potentially significant emissions are minimized.

## Disclaimer

SWAPE has received limited documentation regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or

attachments/fpeir_connectsocal_addendum_4_mitigationmeasures.pdf?1606004420, p. 4.0-2 – 4.0-10; 4.0-19 – 4.0-23; See also: "Certified Final Connect SoCal Program Environmental Impact Report." SCAG, May 2020, *available at:* https://scag.ca.gov/peir.

[6] "Calculation Details for CalEEMod." CAPCOA, May 2021, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-a2020-4-0.pdf?sfvrsn=6, Appendix A, p. 60.

otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

Sincerely,



Matt Hagemann, P.G., C.Hg.



Paul E. Rosenfeld, Ph.D.

**Attachment A: Matt Hagemann CV**
**Attachment B: Paul Rosenfeld CV**

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## Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

**Geologic and Hydrogeologic Characterization**
**Investigation and Remediation Strategies**
**Litigation Support and Testifying Expert**
**Industrial Stormwater Compliance**
**CEQA Review**

**Education:**

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

**Professional Certifications:**

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

**Professional Experience:**

Matt has 30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring. For the past 15 years, as a founding partner with SWAPE, Matt has developed extensive client relationships and has managed complex projects that include consultation as an expert witness and a regulatory specialist, and a manager of projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2104, 2017;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

**Senior Regulatory and Litigation Support Analyst:**

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 300 environmental impact reports and negative declarations since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at more than 100 industrial facilities.
- Expert witness on numerous cases including, for example, perfluorooctanoic acid (PFOA) contamination of groundwater, MTBE litigation, air toxins at hazards at a school, CERCLA compliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

**Executive Director:**

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

**Hydrogeology:**

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted

public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

**Policy:**

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9.

Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific

principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

**Geology:**

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

**Teaching:**

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt is currently a part time geology instructor at Golden West College in Huntington Beach, California where he taught from 2010 to 2014 and in 2017.

**Invited Testimony, Reports, Papers and Presentations:**

**Hagemann, M.F**., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

**Hagemann, M.F**., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

**Hagemann, M.F.,** 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

**Hagemann, M.F.**, 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

**Hagemann, M.F.,** 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

**Hagemann, M.F**., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

**Hagemann, M.F**., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

**Hagemann, M.F**., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

**Hagemann, M.F**., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

**Hagemann, M.F**., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

**Hagemann, M.F**., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

**Hagemann, M.F**., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

**Hagemann, M.F**., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

**Hagemann, M.F**., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

**Hagemann, M.F**., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

**Hagemann, M.F**., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

**Hagemann, M.F**., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

**Hagemann, M.F**., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

**Hagemann, M.F**., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

**Hagemann, M.F**., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

**Hagemann, M. F**., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

**Hagemann, M.F**., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

**Hagemann, M.**F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

**Hagemann, M.F**., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

**Hagemann, M.F**., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

**Other Experience:**

Selected as subject matter expert for the California Professional Geologist licensing examinations, 2009-2011.

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# *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**Risk Assessment & Remediation Specialist**

## Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Focus on wastewater treatment.

## Professional Experience

Dr. Rosenfeld has over 25 years of experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, industrial, military and agricultural sources, unconventional oil drilling operations, and locomotive and construction engines. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities. Dr. Rosenfeld has also successfully modeled exposure to contaminants distributed by water systems and via vapor intrusion.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, creosote, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at sites and has testified as an expert witness on numerous cases involving exposure to soil, water and air contaminants from industrial, railroad, agricultural, and military sources.

## Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex $H_2O$ Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

## Publications:

**Rosenfeld P. E.,** Spaeth K., Hallman R., Bressler R., Smith, G., (2022) Cancer Risk and Diesel Exhaust Exposure Among Railroad Workers. *Water Air Soil Pollution.* **233,** 171.

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P**., (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

**Rosenfeld, P.E**. & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

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Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry*. Amsterdam: Elsevier Publishing.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution,* 123 (17), 319-327.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

**Rosenfeld, P.E.,** J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

**Rosenfeld, P. E.,** M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities.* Boston Massachusetts: Elsevier Publishing

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

**Rosenfeld P. E.,** J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004.* New Orleans, October 2-6, 2004.

**Rosenfeld, P.E.,** and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49( 9), 171-178.

**Rosenfeld, P. E**., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

**Rosenfeld, P.E.,** Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

**Rosenfeld, P.E**., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

**Rosenfeld, P.E.,** and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality.* 29, 1662-1668.

**Rosenfeld, P.E.,** C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

**Rosenfeld, P.E.,** and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

**Rosenfeld, P.E.,** and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

Chollack, T. and **P. Rosenfeld. (**1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

**Rosenfeld, P. E.** (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

**Rosenfeld, P. E.** (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

**Rosenfeld, P. E. (**1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

**Rosenfeld, P. E.** (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

**Rosenfeld, P. E. (**1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

## Presentations:

**Rosenfeld, P.E**., "The science for Perfluorinated Chemicals (PFAS): What makes remediation so hard?" Law Seminars International, (May 9-10, 2018) 800 Fifth Avenue, Suite 101 Seattle, WA.

**Rosenfeld, P.E.,** Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society.* Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution.* Lecture conducted from Boston, MA.

**Rosenfeld, P.E**. (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

**Rosenfeld, P.E.** (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

**Rosenfeld, P. E.** (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water.* Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld P. E.** (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

**Rosenfeld P. E.** (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting.* Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition.* Lecture conducted from Boston Massachusetts.

**Paul Rosenfeld Ph.D**. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference.* Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference.* Lecture conducted from Hilton Hotel in Irvine, California.

**Paul Rosenfeld Ph.D**. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference.* Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

**Paul Rosenfeld Ph.D**. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference.* Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

**Paul Rosenfeld, Ph.D.** (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

**Paul Rosenfeld, Ph.D.** (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

**Rosenfeld, P. E**., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

**Paul Rosenfeld, Ph.D.** (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

**Paul Rosenfeld, Ph.D**. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

**Rosenfeld, P.E**. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conferenc*e. Lecture conducted from Indianapolis, Maryland.

**Rosenfeld. P.E.** (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

**Rosenfeld. P.E. (**October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

**Rosenfeld, P.E. (**2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

**Rosenfeld, P.E.**, C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

**Rosenfeld, P.E,** C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

## Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

## Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

## Deposition and/or Trial Testimony:

In the Superior Court of the State of California, County of San Bernardino
Billy Wildrick, Plaintiff vs. BNSF Railway Company
Case No. CIVDS1711810
Rosenfeld Deposition 10-17-2022

In the State Court of Bibb County, State of Georgia
Richard Hutcherson, Plaintiff vs Norfolk Southern Railway Company
Case No. 10-SCCV-092007
Rosenfeld Deposition 10-6-2022

In the Civil District Court of the Parish of Orleans, State of Louisiana
Millard Clark, Plaintiff vs. Dixie Carriers, Inc. et al.
Case No. 2020-03891
Rosenfeld Deposition 9-15-2022

In The Circuit Court of Livingston County, State of Missouri, Circuit Civil Division
Shirley Ralls, Plaintiff vs. Canadian Pacific Railway and Soo Line Railroad
Case No. 18-LV-CC0020
Rosenfeld Deposition 9-7-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jonny C. Daniels, Plaintiff vs. CSX Transportation Inc.
Case No. 20-CA-5502
Rosenfeld Deposition 9-1-2022

In The Circuit Court of St. Louis County, State of Missouri
Kieth Luke et. al. Plaintiff vs. Monsanto Company et. al.
Case No. 19SL-CC03191
Rosenfeld Deposition 8-25-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jeffery S. Lamotte, Plaintiff vs. CSX Transportation Inc.
Case No. NO. 20-CA-0049
Rosenfeld Deposition 8-22-2022

In State of Minnesota District Court, County of St. Louis Sixth Judicial District
Greg Bean, Plaintiff vs. Soo Line Railroad Company
Case No. 69-DU-CV-21-760
Rosenfeld Deposition 8-17-2022

In United States District Court Western District of Washington at Tacoma, Washington
John D. Fitzgerald Plaintiff vs. BNSF
Case No. 3:21-cv-05288-RJB
Rosenfeld Deposition 8-11-2022

In Circuit Court of the Sixth Judicial Circuit, Macon Illinois
Rocky Bennyhoff Plaintiff vs. Norfolk Southern
Case No. 20-L-56
Rosenfeld Deposition 8-3-2022

In Court of Common Pleas, Hamilton County Ohio
Joe Briggins Plaintiff vs. CSX
Case No. A2004464
Rosenfeld Deposition 6-17-2022

In the Superior Court of the State of California, County of Kern
George LaFazia vs. BNSF Railway Company.
Case No. BCV-19-103087
Rosenfeld Deposition 5-17-2022

In the Circuit Court of Cook County Illinois
Bobby Earles vs. Penn Central et. al.
Case No. 2020-L-000550
Rosenfeld Deposition 4-16-2022

In United States District Court Easter District of Florida
Albert Hartman Plaintiff vs. Illinois Central
Case No. 2:20-cv-1633
Rosenfeld Deposition 4-4-2022

In the Circuit Court of the 4th Judicial Circuit, in and For Duval County, Florida
Barbara Steele vs. CSX Transportation
Case No.16-219-Ca-008796
Rosenfeld Deposition 3-15-2022

In United States District Court Easter District of New York
Romano et al. vs. Northrup Grumman Corporation
Case No. 16-cv-5760
Rosenfeld Deposition 3-10-2022

In the Circuit Court of Cook County Illinois
Linda Benjamin vs. Illinois Central
Case No. No. 2019 L 007599
Rosenfeld Deposition 1-26-2022

In the Circuit Court of Cook County Illinois
Donald Smith vs. Illinois Central
Case No. No. 2019 L 003426
Rosenfeld Deposition 1-24-2022

In the Circuit Court of Cook County Illinois
Jan Holeman vs. BNSF
Case No. 2019 L 000675
Rosenfeld Deposition 1-18-2022

In the State Court of Bibb County State of Georgia
Dwayne B. Garrett vs. Norfolk Southern
Case No. 20-SCCV-091232
Rosenfeld Deposition 11-10-2021

In the Circuit Court of Cook County Illinois
Joseph Ruepke vs. BNSF
Case No. 2019 L 007730
Rosenfeld Deposition 11-5-2021

In the United States District Court For the District of Nebraska
Steven Gillett vs. BNSF
Case No. 4:20-cv-03120
Rosenfeld Deposition 10-28-2021

In the Montana Thirteenth District Court of Yellowstone County
James Eadus vs. Soo Line Railroad and BNSF
Case No. DV 19-1056
Rosenfeld Deposition 10-21-2021

In the Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al.cvs. Cerro Flow Products, Inc.
Case No. 0i9-L-2295
Rosenfeld Deposition 5-14-2021
Trial October 8-4-2021

In the Circuit Court of Cook County Illinois
Joseph Rafferty vs. Consolidated Rail Corporation and National Railroad Passenger Corporation d/b/a AMTRAK,
Case No. 18-L-6845
Rosenfeld Deposition 6-28-2021

In the United States District Court For the Northern District of Illinois
Theresa Romcoe vs. Northeast Illinois Regional Commuter Railroad Corporation d/b/a METRA Rail
Case No. 17-cv-8517
Rosenfeld Deposition 5-25-2021

In the Superior Court of the State of Arizona In and For the Cunty of Maricopa
Mary Tryon et al. vs. The City of Pheonix v. Cox Cactus Farm, L.L.C., Utah Shelter Systems, Inc.
Case No. CV20127-094749
Rosenfeld Deposition 5-7-2021

In the United States District Court for the Eastern District of Texas Beaumont Division
Robinson, Jeremy et al vs. CNA Insurance Company et al.
Case No. 1:17-cv-000508
Rosenfeld Deposition 3-25-2021

In the Superior Court of the State of California, County of San Bernardino
Gary Garner, Personal Representative for the Estate of Melvin Garner vs. BNSF Railway Company.
Case No. 1720288
Rosenfeld Deposition 2-23-2021

In the Superior Court of the State of California, County of Los Angeles, Spring Street Courthouse
Benny M Rodriguez vs. Union Pacific Railroad, A Corporation, et al.
Case No. 18STCV01162
Rosenfeld Deposition 12-23-2020

In the Circuit Court of Jackson County, Missouri
Karen Cornwell, Plaintiff, vs. Marathon Petroleum, LP, Defendant.
Case No. 1716-CV10006
Rosenfeld Deposition 8-30-2019

In the United States District Court For The District of New Jersey
Duarte et al, Plaintiffs, vs. United States Metals Refining Company et. al. Defendant.
Case No. 2:17-cv-01624-ES-SCM
Rosenfeld Deposition 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" Defendant.
Case No. 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No. BC615636
Rosenfeld Deposition 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No. BC646857
Rosenfeld Deposition 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiffs vs. The 3M Company et al., Defendants
Case No. 1:16-cv-02531-RBJ
Rosenfeld Deposition 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No. 1923
Rosenfeld Deposition 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintifs vs. Chevron Corporation, et al., Defendants
Cause No. C12-01481
Rosenfeld Deposition 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition 8-23-2017

In United States District Court For The Southern District of Mississippi
Guy Manuel vs. The BP Exploration et al., Defendants
Case No. 1:19-cv-00315-RHW
Rosenfeld Deposition 4-22-2020

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No. LC102019 (c/w BC582154)
Rosenfeld Deposition 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., Plaintiffs, vs. Meritor Inc., et al., Defendants
Case No. 4:16-cv-52-DMB-JVM
Rosenfeld Deposition July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No. RG14711115
Rosenfeld Deposition September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No. LALA002187
Rosenfeld Deposition August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action No. 14-C-30000
Rosenfeld Deposition June 2015

In The Iowa District Court for Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No. 4980
Rosenfeld Deposition May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case No. CACE07030358 (26)
Rosenfeld Deposition December 2014

In the County Court of Dallas County Texas
Lisa Parr et al, Plaintiff, vs. Aruba et al, Defendant.
Case No. cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., Plaintiffs, vs. Republic Services, Inc., et al., Defendants
Case No. 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition October 2012

In the United States District Court for the Middle District of Alabama, Northern Division
James K. Benefield, et al., Plaintiffs, vs. International Paper Company, Defendant.
Civil Action No. 2:09-cv-232-WHA-TFM
Rosenfeld Deposition July 2010, June 2011

In the Circuit Court of Jefferson County Alabama
Jaeanette Moss Anthony, et al., Plaintiffs, vs. Drummond Company Inc., et al., Defendants
Civil Action No. CV 2008-2076
Rosenfeld Deposition September 2010

In the United States District Court, Western District Lafayette Division
Ackle et al., Plaintiffs, vs. Citgo Petroleum Corporation, et al., Defendants.
Case No. 2:07CV1052
Rosenfeld Deposition July 2009

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**VIA EMAIL**

January 9, 2025

Planning Commission
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**RE: City of Rancho Mirage January 9, 2025, Planning Commission Meeting – Agenda Item No. 3: Ritz-Carlton Phase II Expansion Project.**

Dear Honorable Planning Commissioners, City Clerk Ramos, and Ben Torres:

On behalf of the Western States Regional Council of Carpenters ("**WSRCC**"), our firm is submitting these comments in connection with the City of Rancho Mirage's ("**City**" or "**Lead Agency**") January 9, 2025, Planning Commission hearing pertaining to the Ritz-Carlton Phase II Expansion Project (Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004) ("**Project**") and the December 2024 Final Initial Study / Mitigated Negative Declaration ("**FMND**") published in connection therewith.

The Project involves the construction of the Ritz-Carlton Residences Rancho Mirage and the Sky Mesa Recreation Center on a 16.13-acre site located at 68900 Frank Sinatra Drive, Rancho Mirage, CA 92270 (APNs: 689-330-026, -028, -031, -032, -034; 689-020-012, -014; 689-331-001, -018) in Riverside County. Nestled in the foothills of the Santa Rosa Mountains 650 feet above the Coachella Valley below, the 236,748-square-foot Project will consist of 106 residential suites and hotel villas (totaling approximately 200,474-square feet), approximately 23,840-square feet of event space, approximately 6,273-square feet of restaurant/commercial space, and approximately 5,510-square feet of amenity space. The overall Project Site includes an existing hotel

that opened as a Ritz-Carlton in 1988. The Project would provide a total of 106 new units and 499 vehicle parking spaces.

In March 2024, the City released the first Initial Study / Mitigated Negative Declaration ("MND") for the Project. On April 9, 2024, WSRCC submitted written comments to the MND during the comment period specified by the City, and raised various concerns as to deficiencies noted in the Project's environmental review. Purportedly based on certain comments raised during the MND's comment period, in July 2024, the City released a Recirculated Initial Study / Mitigated Negative Declaration ("RMND") for the Project. On August 20, 2024, WSRCC submitted written comments to the RMND during the comment period specified by the City, which again highlighted ongoing deficiencies in the RMND and Project's environmental review.

Notwithstanding WSRCC's prior meritorious comments and concerns, the FMND does not address and resolve any of the concerns previously raised by WSRCC in its prior comments, including issues related to the Project's impacts on biological resources, cultural resources, noise, GHG emissions, energy use, land use. WSRCC expressly reiterates and incorporates its prior comments in the foregoing correspondence, and urges the City to give them full consideration as part of the CEQA environmental review process.

WSRCC is a labor union representing over 63,000 union carpenters in 10 states, including California, and has a strong interest in well-ordered land use planning and in addressing the environmental impacts of development projects. Some WSRCC members live, work, and recreate in the City and the surrounding communities and would be directly affected by the Project's environmental impacts.

WSRCC expressly reserves the right to supplement these comments at or prior to hearings on the Project, and at any later hearing and proceeding related to this Project. Gov. Code, § 65009(b); PRC, § 21177(a); see *Bakersfield Citizens for Local Control v. Bakersfield* (2004) 124 Cal.App.4th 1184, 1199-1203; see also *Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal.App.4th 1109, 1121.

WSRCC incorporates by reference all comments raising issues regarding the Project and its environmental review and associated documents and reports (including the City's Staff Report), or lack thereof. See *Citizens for Clean Energy v. City of Woodland* (2014) 225 Cal.App.4th 173, 191 (finding that any party who has objected to the

project's environmental documentation may assert any issue timely raised by other parties).

Moreover, WSRCC requests that the City provide notice for any and all notices referring or related to the Project issued under the California Environmental Quality Act ("**CEQA**") (Public Resources Code, § 21000 et seq.), and the California Planning and Zoning Law ("**Planning and Zoning Law**") (Gov. Code, §§ 65000–65010). California Public Resources Code, sections 21092.2 and 21167, subsection (f) and California Government Code, section 65092 require agencies to mail such notices to any person who has filed a written request for them with the clerk of the agency's governing body.

## I. THE CITY SHOULD REQUIRE THE USE OF A LOCAL WORKFORCE TO BENEFIT THE COMMUNITY'S ECONOMIC DEVELOPMENT AND ENVIRONMENT.

The City should require that the Project be built using local workers who have graduated from a Joint Labor-Management Apprenticeship Program approved by the State of California, have at least as many hours of on-the-job experience in the applicable craft which would be required to graduate from such a program, or are registered apprentices in such a program.

Community benefits such as local hire can also be helpful to reduce environmental impacts and improve the positive economic impacts of the Project. Local hire provisions requiring that a certain percentage of workers reside within 10 miles or less of the Project site can reduce the length of vendor trips, reduce greenhouse gas emissions, and provide localized economic benefits. As environmental consultants Matt Hagemann and Paul E. Rosenfeld note:

> [A]ny local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

March 8, 2021, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling.

Workforce requirements promote the development of skilled trades that yield sustainable economic development. As the California Workforce Development Board

and the University of California, Berkeley Center for Labor Research and Education concluded:

> [L]abor should be considered an investment rather than a cost—and investments in growing, diversifying, and upskilling California's workforce can positively affect returns on climate mitigation efforts. In other words, well-trained workers are key to delivering emissions reductions and moving California closer to its climate targets.[1]

Furthermore, workforce policies have significant environmental benefits given that they improve an area's jobs-housing balance, decreasing the amount and length of job commutes and the associated greenhouse gas ("**GHG**") emissions. In fact, on May 7, 2021, the South Coast Air Quality Management District found that that the "[u]se of a local state-certified apprenticeship program" can result in air pollutant reductions.[2]

Locating jobs closer to residential areas can have significant environmental benefits. As the California Planning Roundtable noted in 2008:

> People who live and work in the same jurisdiction would be more likely to take transit, walk, or bicycle to work than residents of less balanced communities and their vehicle trips would be shorter. Benefits would include potential reductions in both vehicle miles traveled and vehicle hours traveled.[3]

Moreover, local hire mandates and skill-training are critical facets of a strategy to reduce vehicle miles traveled ("**VMT**"). As planning experts Robert Cervero and Michael Duncan have noted, simply placing jobs near housing stock is insufficient to achieve VMT reductions given that the skill requirements of available local jobs must

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[1] California Workforce Development Board (2020) Putting California on the High Road: A Jobs and Climate Action Plan 2030 at p. ii, *available at* https://laborcenter.berkeley.edu/wp-content/uploads/2020/09/Putting-California-on-the-High-Road.pdf.

[2] South Coast Air Quality Management District (May 7, 2021) Certify Final Environmental Assessment and Adopt Proposed Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions Program, and Proposed Rule 316 – Fees for Rule 2305, Submit Rule 2305 for Inclusion Into the SIP, and Approve Supporting Budget Actions, *available at* http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-May7-027.pdf?sfvrsn=10.

[3] California Planning Roundtable (2008) Deconstructing Jobs-Housing Balance at p. 6, *available at* https://cproundtable.org/static/media/uploads/publications/cpr-jobs-housing.pdf

match those held by local residents.[4] Some municipalities have even tied local hire and other workforce policies to local development permits to address transportation issues. Cervero and Duncan note that:

> In nearly built-out Berkeley, CA, the approach to balancing jobs and housing is to create local jobs rather than to develop new housing. The city's First Source program encourages businesses to hire local residents, especially for entry- and intermediate-level jobs, and sponsors vocational training to ensure residents are employment-ready. While the program is voluntary, some 300 businesses have used it to date, placing more than 3,000 city residents in local jobs since it was launched in 1986. When needed, these carrots are matched by sticks, since the city is not shy about negotiating corporate participation in First Source as a condition of approval for development permits.

Recently, the State of California verified its commitment towards workforce development through the Affordable Housing and High Road Jobs Act of 2022, otherwise known as Assembly Bill No. 2011 (AB2011). AB2011 amended the Planning and Zoning Law to allow ministerial, by-right approval for projects being built alongside commercial corridors that meet affordability and labor requirements.

The City should consider utilizing local workforce policies and requirements to benefit the local area economically and to mitigate GHG emissions, improve air quality, and reduce transportation impacts.

## II. THE CITY SHOULD INCORPORATE LANGUAGE IMPOSING TRAINING REQUIREMENTS FOR CONSTRUCTION ACTIVITIES TO PREVENT COMMUNITY SPREAD OF COVID-19 AND OTHER INFECTIOUS DISEASES INTO THE DEVELOPMENT AGREEMENT.

Construction work has been defined as a Lower to High-risk activity for COVID-19 spread by the Occupations Safety and Health Administration. Recently, several

[4] Cervero, Robert and Duncan, Michael (2006) Which Reduces Vehicle Travel More: Jobs-Housing Balance or Retail-Housing Mixing? Journal of the American Planning Association 72 (4), 475-490, 482, *available at* http://reconnectingamerica.org/assets/Uploads/UTCT-825.pdf.

construction sites have been identified as sources of community spread of COVID-19.[5]

Western Carpenters recommend that the City adopt additional requirements to mitigate public health risks from various residential, commercial and mixed-use development construction activities. Western Carpenters requests that the City require safe on-site construction work practices as well as training and certification for any construction workers on residential, commercial and mixed-use developments within the City's General Plan Area.

In particular, based upon Western Carpenters' experience with safe construction site work practices, Western Carpenters recommends that the City require that while construction activities are being conducted at the proposed Project ("**Project Site**"):

**Construction Site Design:**

- The Project Site will be limited to two controlled entry points.
- Entry points will have temperature screening technicians taking temperature readings when the entry point is open.
- The Temperature Screening Site Plan shows details regarding access to the Project Site and Project Site logistics for conducting temperature screening.
- A 48-hour advance notice will be provided to all trades prior to the first day of temperature screening.
- The perimeter fence directly adjacent to the entry points will be clearly marked indicating the appropriate 6-foot social distancing position for when you approach the screening area. Please reference the Apex temperature screening site map for additional details.
- There will be clear signage posted at the project site directing you through temperature screening.

[5] Santa Clara County Public Health (June 12, 2020) COVID-19 CASES AT CONSTRUCTION SITES HIGHLIGHT NEED FOR CONTINUED VIGILANCE IN SECTORS THAT HAVE REOPENED, *available at* https://www.sccgov.org/sites/covid19/Pages/press-release-06-12-2020-cases-at-construction-sites.aspx.

- Provide hand washing stations throughout the construction site.

**Testing Procedures:**

- The temperature screening being used are non-contact devices.
- Temperature readings will not be recorded.
- Personnel will be screened upon entering the testing center and should only take 1-2 seconds per individual.
- Hard hats, head coverings, sweat, dirt, sunscreen or any other cosmetics must be removed on the forehead before temperature screening.
- Anyone who refuses to submit to a temperature screening or does not answer the health screening questions will be refused access to the Project Site.
- Screening will be performed at both entrances from 5:30 am to 7:30 am.; main gate [ZONE 1] and personnel gate [ZONE 2]
- After 7:30 am only the main gate entrance [ZONE 1] will continue to be used for temperature testing for anybody gaining entry to the project site such as returning personnel, deliveries, and visitors.
- If the digital thermometer displays a temperature reading above 100.0 degrees Fahrenheit, a second reading will be taken to verify an accurate reading.
- If the second reading confirms an elevated temperature, DHS will instruct the individual that he/she will not be allowed to enter the Project Site. DHS will also instruct the individual to promptly notify his/her supervisor and his/her human resources (HR) representative and provide them with a copy of Annex A.

**Planning**

- Require the development of an Infectious Disease Preparedness and Response Plan that will include basic infection prevention measures (requiring the use of personal protection equipment), policies and procedures for prompt identification and isolation of sick individuals, social distancing (prohibiting gatherings of no

> more than 10 people including all-hands meetings and all-hands lunches) communication and training and workplace controls that meet standards that may be promulgated by the Center for Disease Control, Occupational Safety and Health Administration, Cal/OSHA, California Department of Public Health or applicable local public health agencies.[6]

The United Brotherhood of Carpenters and Carpenters International Training Fund has developed COVID-19 Training and Certification to ensure that Carpenter union members and apprentices conduct safe work practices. The City should require that all construction workers undergo COVID-19 Training and Certification before being allowed to conduct construction activities at the Project Site.

Western Carpenters has also developed a rigorous Infection Control Risk Assessment ("**ICRA**") training program to ensure it delivers a workforce that understands how to identify and control infection risks by implementing protocols to protect themselves and all others during renovation and construction projects in healthcare environments.[7]

ICRA protocols are intended to contain pathogens, control airflow, and protect patients during the construction, maintenance and renovation of healthcare facilities. ICRA protocols prevent cross contamination, minimizing the risk of secondary infections in patients at hospital facilities.

The City should incorporate language in the Development Agreement requiring that the Project be built using a workforce trained in ICRA protocols.

## III. THE CITY'S RESPONSES TO COMMENTS INCORRECTLY AND CONCLUSORILY CLAIM THAT ULTIMATE APPROVAL OF THE PROJECT WOULD NOT REQUIRE A TWO-THIRDS VOTE BY THE RANCHO MIRAGE ELECTORATE.

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[6] *See also* The Center for Construction Research and Training, North America's Building Trades Unions (April 27 2020) NABTU and CPWR COVIC-19 Standards for U.S Constructions Sites, *available at* https://www.cpwr.com/sites/default/files/NABTU_CPWR_Standards_COVID-19.pdf; Los Angeles County Department of Public Works (2020) Guidelines for Construction Sites During COVID-19 Pandemic, *available at* https://dpw.lacounty.gov/building-and-safety/docs/pw_guidelines-construction-sites.pdf.

[7] For details concerning Western Carpenters' ICRA training program, *see* https://icrahealthcare.com/.

Based on the City's Responses to Comments in connection with the FMND, the City is under the mistaken impression that approval of the Project, based on its proposed rezoning and development of lands currently zoned as Mountain Reserve, would not be required to be authorized by a two-thirds vote of the Rancho Mirage electorate. (See FMND, Appendix J, Responses to Comments, Response to Comment Letter O1, p. RTC-842.) Indeed, the City's Responses to Comments baldly states "[t]he project site is not considered mountainous lands and would not require the project to be approved by a two-thirds vote of the electorate," without providing any further justification for how lands zoned as "Mountain Reserve (MR)" should not be "considered mountainous lands." (*Id.*) In taking this incorrect conclusory position without offering any substantive basis for support whatsoever, the City appears to be charting a course toward directly violating its own Code of Ordinances in pursuing the approval of the Project and its entitlements.

Notably, and as previously indicated by WSRCC, the City's Code of Ordinances § 7.06.010 provides as follows:

> All discretionary approvals, including but not limited to development agreements, general plan amendments, zone changes, development permits, grading permits and use permits approved by the city council on or after July 3, 1992 and having no building permit issued, shall require the approval of the city council, and thereafter a two-thirds vote of the electorate of the city to be considered an approved application, if the approval is an application on property located within the city "mountainous lands" area of the Santa Rosa and San Jacinto Mountains, as described within the Coachella Valley Mountains Conservancy legislative map, as of November 3, 1992.

(Rancho Mirage Code of Ordinances § 7.06.010.) Again, the Project site sits within the boundary of the Coachella Valley Mountains Conservancy territory map. (Exhibit E – Coachella Valley Mountains Conservancy Territory Map.) As confirmed in the MND, the RMDN, and the FMND, the portion of the Project proposed for parcels 689-020-012 and 689-020-014 (the Sky Mesa Recreational Area) unequivocally has a General Plan Land Use designation of "Open Space: Mountain Reserve (MR)." (See FMND, Figure 1-12, at p. 49; See also Exhibit F – Rancho Mirage Land Use and Zoning Map.) Moreover, the Rancho Mirage General Plan sets forth the following stated goal for the land use(s) applicable to the Mountain Reserve (MR) zone:

> ***This designation is assigned to*** public lands or ***property subject to conservation easements in the Santa Rosa Mountains***. Uses are limited to recreational activities, such as hiking or equestrian and non-motorized bike trails and facilities consistent with the need to protect sensitive biological resources. Vehicular access is not permitted in this designation.

(See Rancho Mirage 2017 General Plan, p. 10.) Accordingly, given the location of the Project site, coupled with the established boundaries of the Coachella Valley Mountains Conservancy and the site's land use designation under the City's General Plan, the site falls within the definition of the "city 'mountainous lands' area of the Santa Rosa…Mountains" and is therefore subject to the approval proscriptions of Code of Ordinances § 7.06.010. The City's attempts to circumvent a conservation easement in the Santa Rosa Mountains located on the Project Site cannot be countenanced, and the City's general public cannot be denied its statutory right to vote on the proposed development contemplated by the Project.

As such, the Project as contemplated must ultimately be approved by a two-thirds vote of the Rancho Mirage electorate. WSRCC's comments in this regard should not be construed as a waiver of its other arguments regarding the inadequacies identified in the FMND and the need for the City to complete a legally-compliant EIR, nor should it be construed as a recommendation that the Project be approved via the FMND by the Planning Commission and the City Council. Rather, WSRCC is providing comments on this particular issue out of an abundance of caution to ensure that the City's proper approval procedures are followed, particularly given the Project's stated intention to re-zone and develop mountainous lands within the Santa Rosa Mountains that are currently zoned as Mountain Reserve, located within the boundaries of the Coachella Valley Mountains Conservancy, and subject to a conservation easement. WSRCC's concerns in this regard have been heightened by the flippant and unsupported refusal by the City's planning staff to acknowledge the applicability of Code of Ordinances § 7.06.010 to the Project as presently proposed.

## IV. THE CALIFORNIA ENVIRONMENTAL QUALITY ACT.

### A. Background Concerning Environmental Impacts Reports Under CEQA.

CEQA is a California statute designed to inform decision-makers and the public about the potential significant environmental effects of a project. 14 Cal. Code of Regulations ("**CEQA Guidelines**"), § 15002(a)(1).[8] At its core, its purpose is to "inform the public and its responsible officials of the environmental consequences of their decisions *before* they are made." *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564.

CEQA directs public agencies to avoid or reduce environmental damage, when possible, by requiring alternatives or mitigation measures. CEQA Guidelines, § 15002(a)(2)-(3); see also *Berkeley Keep Jets Over the Bay Committee v. Board of Port Comes* (2001) 91 Cal.App.4th 1344, 1354; *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553; *Laurel Heights Improvement Assn.*, 47 Cal.3d at p. 400. The Environmental Impact Report ("**EIR**") serves to provide public agencies and the public in general with information about the effect that a proposed project is likely to have on the environment and to "identify ways that environmental damage can be avoided or significantly reduced." CEQA Guidelines, § 15002, subd. (a)(2). If the project has a significant effect on the environment, the agency may approve the project only upon finding that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns" specified in Public Resources Code section 21081. See CEQA Guidelines, §§ 15092, subds. (b)(2)(A)-(B).

While the courts review an EIR using an 'abuse of discretion' standard, the reviewing court is not to *uncritically* rely on every study or analysis presented by a project proponent in support of its position. *Berkeley Jets*, 91 Cal.App.4th at p. 1355 (quoting *Laurel Heights Improvement Assn.*, 47 Cal.3d at pp. 391, 409 fn. 12) (internal quotations omitted). A clearly inadequate or unsupported study is entitled to no judicial deference. *Id.* Drawing this line and determining whether the EIR complies with CEQA's information disclosure requirements presents a question of law subject to independent review by the courts. *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 515; *Madera Oversight Coalition, Inc. v. County of Madera* (2011) 199 Cal.App.4th 48, 102, 131. As the court stated in *Berkeley Jets*, prejudicial abuse of discretion occurs if the failure to include relevant information precludes informed decision-making and

[8] The CEQA Guidelines, codified in Title 14 of the California Code of Regulations, section 15000 et seq., are regulatory guidelines promulgated by the state Natural Resources Agency for the implementation of CEQA. PRC, § 21083. The CEQA Guidelines are given "great weight in interpreting CEQA except when . . . clearly unauthorized or erroneous." *Center for Biological Diversity v. Dept. of Fish & Wildlife* (2015) 62 Cal.4th 204, 217.

informed public participation, thereby thwarting the statutory goals of the EIR process. 91 Cal.App.4th at p. 1355 (internal quotations omitted).

The preparation and circulation of an EIR is more than a set of technical hurdles for agencies and developers to overcome. *Communities for a Better Environment v. Richmond* (2010) 184 Cal.App.4th 70, 80 (quoting *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 449-450). The EIR's function is to ensure that government officials who decide to build or approve a project do so with a full understanding of the environmental consequences and, equally important, that the public is assured those consequences have been considered. *Id.* For the EIR to serve these goals it must present information so that the foreseeable impacts of pursuing the project can be understood and weighed, and the public must be given an adequate opportunity to comment on that presentation before the decision to go forward is made. *Id.* The EIR requirement "is the heart of CEQA." CEQA Guidelines, § 15003(a).

Thus, a strong presumption in favor of requiring preparation of an EIR is built into CEQA. This presumption is reflected in what is known as the "fair argument" standard under which an EIR must be prepared whenever substantial evidence in the record supports a fair argument that a project may have a significant effect on the environment. *Quail Botanical Gardens Found., Inc. v. City of Encinitas* (1994) 29 Cal.App.4th 1597, 1602; *Friends of "B" St.* v. *City of Hayward* (1980) 106 Cal.3d 988, 1002.

The fair argument test stems from the statutory mandate that an EIR be prepared for any project that "may have a significant effect on the environment." PRC, § 21151; see *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.App.3d 68, 75; accord *Jensen v. City of Santa Rosa* (2018) 23 Cal.App.5th 877, 884. Under this test, if a proposed project is not exempt and may cause a significant effect on the environment, the lead agency must prepare an EIR. PRC, §§ 21100, subd. (a), 21151; CEQA Guidelines, §§ 15064, subds. (a)(1), (f)(1). An EIR may be dispensed with only if the lead agency finds no substantial evidence in the initial study or elsewhere in the record that the project may have a significant effect on the environment. *Parker Shattuck Neighbors v. Berkeley City Council* (2013) 222 Cal.App.4th 768, 785. In such a situation, the agency must adopt a negative declaration. PRC, § 21080, subd. (c)(1); CEQA Guidelines, §§ 15063, subd. (b)(2), 15064, subd. (f)(3).

"Significant effect upon the environment" is defined as "a substantial or potentially substantial adverse change in the environment." PRC, § 21068; CEQA Guidelines, § 15382. A project "may" have a significant effect on the environment if there is a "reasonable probability" that it will result in a significant impact. *No Oil, Inc.*, 13 Cal.3d at p. 83 fn. 16; see *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 309. If any aspect of the project may result in a significant impact on the environment, an EIR must be prepared even if the overall effect of the project is beneficial. CEQA Guidelines, § 15063(b)(1); see *County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1580.

This standard sets a "low threshold" for preparation of an EIR. *Consolidated Irrigation Dist. v. City of Selma* (2012) 204 Cal.App.4th 187, 207; *Nelson v. County of Kern* (2010) 190 Cal.App.4th 252; *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 928; *Bowman v. City of Berkeley* (2004) 122 Cal.App.4th 572, 580; *Citizen Action to Serve All Students v. Thornley* (1990) 222 Cal.App.3d 748, 754; *Sundstrom*, 202 Cal.App.3d at p. 310. If substantial evidence in the record supports a fair argument that the project may have a significant environmental effect, the lead agency must prepare an EIR even if other substantial evidence before it indicates the project will have no significant effect. See *Jensen,* 23 Cal.App.5th at p. 886; *Clews Land & Livestock v. City of San Diego* (2017) 19 Cal.App.5th 161, 183; *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 150; *Brentwood Assn. for No Drilling, Inc. v. City of Los Angeles* (1982) 134 Cal.App.3d 491; *Friends of "B" St.*, 106 Cal.App.3d 988; CEQA Guidelines, § 15064(f)(1). Substantial evidence includes "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached." CEQA Guidelines, § 15384(a).

### B. Background Concerning Initial Studies, Negative Declarations, and Mitigated Negative Declarations.

CEQA and CEQA Guidelines are strict and unambiguous about when an MND may be used. A lead agency may adopt an MND only if "there is no substantial evidence that the project will have a significant effect on the environment." CEQA Guidelines, § 15074(b).

Evidence supporting a fair argument of a significant environmental impact triggers preparation of an EIR regardless of whether the record contains contrary evidence. *League for Protection of Oakland's Architectural and Historical Resources v. City of Oakland*

(1997) 52 Cal.App.4th 896, 904-905. "Where the question is the sufficiency of the evidence to support a fair argument, deference to the agency's determination is not appropriate[.]" *County Sanitation*, 127 Cal.App.4th at 1579 (quoting *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th 1307, 1317-1318).

Further, it is the duty of the lead agency, not the public, to conduct the proper environmental studies. "The agency should not be allowed to hide behind its own failure to gather relevant data." *Sundstrom*, 202 Cal.App.3d at p. 311. "Deficiencies in the record may actually enlarge the scope of fair argument by lending a logical plausibility to a wider range of inferences." *Id*; see also *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1382 (lack of study enlarges the scope of the fair argument which may be made based on the limited facts in the record).

Thus, refusal to complete recommended studies lowers the already low threshold to establish a fair argument. The court may not exercise its independent judgment on the omitted material by determining whether the ultimate decision of the lead agency would have been affected had the law been followed. *Environmental Protection Information Center v. Cal. Dept. of Forestry* (2008) 44 Cal.4th 459, 486 (internal citations and quotations omitted). The remedy for this deficiency would be for the trial court to issue a writ of mandate. *Id.*

Both the review for failure to follow CEQA's procedures and the fair argument test are questions of law, thus, the de novo standard of review applies. *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 435. "Whether the agency's record contains substantial evidence that would support a fair argument that the project may have a significant effect on the environment is treated as a question of law. *Consolidated Irrigation Dist.*, 204 Cal.App.4th at p. 207; Kostka and Zischke, Practice Under the Environmental Quality Act (2017, 2d ed.) at § 6.76.

In the MND context, courts give no deference to the agency. The agency or the court should not weigh expert testimony or decide on the credibility of such evidence—this is the EIR's responsibility. As stated in *Pocket Protectors v. City of Sacramento*:

> Unlike the situation where an EIR has been prepared, neither the lead agency nor a court may "weigh" conflicting substantial evidence to determine whether an EIR must be prepared in the first instance. Guidelines section 15064, subdivision (f)(1) provides in pertinent part: if a lead agency is presented with a fair argument that a project may have a

> significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect. Thus, as *Claremont* itself recognized, [c]onsideration is not to be given contrary evidence supporting the preparation of a negative declaration.

(2004) 124 Cal.App.4th 903, 935 (internal citations and quotations omitted).

In cases where it is not clear whether there is substantial evidence of significant environmental impacts, CEQA requires erring on the side of a "preference for resolving doubts in favor of environmental review." *Mejia v. City of Los Angeles* (2005) 130 Cal.App.4th 322, 332. "The foremost principle under CEQA is that the Legislature intended the act to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language. *Friends of Mammoth v. Bd. of Supervisors* (1972) 8 Cal.3d 247, 259.

## IV. THE PROJECT WOULD BE APPROVED IN VIOLATION OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

### A. The City Must Prepare an Environmental Impact Report for the Project.

WSRCC reiterates that it would be unlawful for the City to approve the Project in reliance on the incomplete and flawed FMND. As explained below, the FMND continues its failure to support all of its findings with sufficient analysis and substantial evidence and fails to incorporate adequate mitigation measures. Moreover, there is substantial evidence on the face of the FMND that the Project will, in fact, have a significant impact on the surrounding environment. Indeed, the Project involves the new construction, use, and maintenance of a 150,000-square-foot structure with 106 units, subterranean parking for 381 automobiles, 28,843 square feet of event space, 6,273 square feet of restaurant space, and 5,513 square feet for amenities, and the alteration and removal of existing landscaping on a 35.07-acre site, a significant portion of which is currently zoned as protected Mountain Reserve land. Considering these details, along with the pristine and natural surroundings of the Site, the City must prepare and circulate a thorough, Project-specific EIR. As set forth in greater detail below, there is a fair argument that the Project will have a significant effect on the environment, triggering the "low threshold" standard for the City's preparation and circulation of an EIR for the Project.

1. The FMND Perpetuates the City's Failure to Adequately Analyze the Project and Omits Information

If a project has a significant effect on the environment, an agency may approve the project only upon finding that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns." CEQA Guidelines § 15092(b)(2)(A–B).

CEQA mitigation measures proposed and adopted are required to describe what actions will be taken to reduce or avoid an environmental impact. (CEQA Guidelines § 15126.4(a)(1)(B) [providing "[f]ormulation of mitigation measures should not be deferred until some future time."].) While the same Guidelines section 15126.5(a)(1)(B) acknowledges an exception to the rule against deferrals, such exception is narrowly proscribed to situations where it is impractical or infeasible to include those details during the project's environmental review.

Here, the FMND's mitigation measures still fail to adequately analyze and/or mitigate the Project's impacts and are improperly deferred, such that an EIR is required.

*i. Biological Resources*

CEQA requires that an environmental document identify and discuss the significant effects of a Project, alternatives and how those significant effects can be mitigated or avoided. CEQA Guidelines § 15126.2; PRC §§ 21100(b)(1), 21002.1(a). An environmental document's discussion of potentially significant effects must "provide an adequate analysis to inform the public how its bare numbers translate to create potential adverse impacts, or it must adequately explain what the agency does know and why, given existing scientific constraints, it cannot translate potential [environmental] impacts further." *Sierra Club v. County of Fresno* (2018) 6 Cal. 5th 502, 521; *see also* citing *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 405; *see also* PRC §§ 21002.1(e), 21003(b). An EIR may not set an impermissibly narrow threshold of significance for biological impacts. *Endangered Habitats League, Inc. v. County of Orange* (2005) 131 Cal.App.4th 777.

Here, the FMND has still failed to provide analysis on the Project's biological resource impacts in accordance with the above, and continues to admit that, despite the documented potential for occurrence of special-status wildlife species within the vicinity of the Project Site, no focused special-status wildlife surveys were conducted.

(Appendix B to FMND, p. 9, Attachment F, pp. 1-3.) Indeed, the FMND's biological resources study found potential for the occurrence of several special status species, including Peninsular bighorn sheep (moderate potential to occur), red diamondback rattlesnake (moderate potential to occur), burrowing owl (low potential to occur), loggerhead shrike (low potential to occur), LeConte's thrasher (moderate potential to forage), and pocketed free-tailed bat (moderate potential to forage within Project site). (Appendix B to FMND, pp. 14-15.) Despite this likelihood of occurrence, the FMND still makes no provision for specific studies to confirm whether any special-status species are inhabiting the proposed Project Area. Moreover, the City's responses to comments incorrectly assert, without any legal authority or other evidence, that "…focused species surveys are not required by CEQA to assess the impacts to species with the potential to occur." (See FMND, Appendix J, Responses to Comments, Response to Comment Letter O1, p. RTC-838 - 839.) The City's own consultants have indicated the likelihood of special status species to occur on the Project Site, and they have further fashioned mitigation measures to address the potential discovery of such special-status species during the construction process. The fact that these mitigation measures have already been crafted for certain special-status species that were not identified in the initial biological survey conducted for the Project directly contradicts the position the City has now taken in its responses to comments that additional mitigation efforts (in the form of focused surveys) need not be undertaken as to species that were not identified in the that initial biological survey. The City's position on this issue is logically inconsistent and wholly unsupported. WSRCC resubmits that FMND cannot properly conclude that its proposed mitigation measures will reduce biological resource impacts to less than significant levels without first conducting field surveys and subsequent comprehensive analysis regarding these special status species.

Given the overall potential for the occurrence of special-status species in the proposed Project area, WSRCC maintains that the Project should be subject to more comprehensive EIR review. Again, under California law, the threshold for requiring preparation of an EIR for a project is low, and here, there is a fair argument, based on the anticipated presence of special status species on the Project Site (as documented by the City's own consultant), that the Project as proposed will have significant environmental impacts. In the alternative, and at a minimum, the pre-construction biological survey specifications that WSRCC contends should be incorporated are necessary to ensure the overall adequacy of the FMND's proposed mitigation

measures. Absent inclusion of such specifications in the Project's mitigation measures, there is a fair argument that the Project may have a significant environmental impact.

*ii. Cultural Resources*

In order to mitigate impacts related to the inadvertent discovery of yet unknown historical/cultural resources, the FMND requires implementation of MM-CUL-1 and MM-CUL-2. (FMND at 96-97.) However, and despite other revisions made to the mitigation measures in response to other comments concerning the Project, the FMND's proposed mitigation measures still do not provide for any pre-construction training for the Project's construction workers that will otherwise permit laborers on the Project to properly identify and address any sensitive cultural resources or human remains that may be encountered during course of construction. Moreover, in response to WSRCC's prior comments on this issue, the City mistakenly asserts that the Project's construction workers and the archaeological and tribal consultants should not be tasked with developing any plans for the handling of any human remains that may be discovered on the Project Site during the course of construction. WSRCC is not advocating for any such action by the Project's construction workers to be incorporated into the mitigation measures. This discussion by the City in its response to comments misses the point, which is that the Project's construction workers must be adequately trained prior to construction in order to be able to initially identify sensitive cultural resources and/or human remains so they are not inadvertently destroyed during the construction process. As it stands, the Project's mitigation measures still fail to take this essential step, without which the efficacy of the existing mitigation measures are substantially impaired.

Accordingly, the scope of the FMND's contemplated mitigation measures is inadequate. The proposed mitigation measures MM-CUL-1 and MM-CUL-2 remain deficient in their current form and must, at a minimum, be revised to adequately mitigate against any potentially significant impacts to cultural resources.

*iii. Noise*

WSRCC resubmits that there is also a fair argument that the Project may have a significant noise impact, such that an EIR must be prepared for the Project. To that end, the FMND has maintained its failure to measure ambient noise levels near the proposed Project's most sensitive uses/receptors at the southern edge of the proposed Project Site, and no additional noise study has been performed. (See FMND, Figure

13-1, p. 156; see also FMND, p. 145-48, Table 13-2.) Instead, the FMND only measured ambient noise levels at three locations: L1 - located in a graded area where no construction work is being contemplated for the project; L2 – at the southeastern corner of the existing Ritz-Carlton hotel property; and L3 – on the central west edge of the primary villa/residences development site and adjacent to the primary roadway for the development. (*Id.*) Meanwhile, still no noise measurements have been taken along the southern border of the two parcels on the Project site designated for the resort villa development identified as the Ritz-Carlton Residences (APN 689-330-026 and 689-330-028), which are directly adjacent to numerous private residences. Thus, the FMND has inexplicably declined to measure the ambient noise levels in the area adjacent to the most sensitive uses abutting the Project area, namely, numerous private residences. (*Id.*) Based on the current land-uses proximate to this sensitive residential area, it is exceedingly likely that this zone at the southern edge of the proposed Project site would have the lowest ambient noise levels of any Project-adjacent area. In spite of these facts, however, the FMND continues to inaccurately claim that "The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the project site." (FMND at p. 145.) The City's continuing failure and refusal to update the Project's noise studies to address these deficiencies is glaring, and the City's responses to comments fail to address the lack of study of the ambient noise levels at positions closest to the Project's nearby sensitive receptors. (See FMND, Appendix J, Responses to Comments, Response to Comment Letter O1, pp. RTC-839 - 840.) The City cannot be permitted to shirk the performance of proper environmental analysis for the Project in order to conceal the Project's true impacts.

The FMND has then continued to use this faulty and incomplete ambient noise survey data to conclude that there will be no significant impact to the surrounding sensitive receptors from the Project's construction noise. In that regard, the FMND adopts the Criteria for Recommended Standard: Occupational Noise Exposure prepared by the National Institute for Occupational Safety and Health (NIOSH) as the threshold for whether the anticipated construction noise from the Project will have a significant impact upon the Project nearby sensitive receptors. (FMND at p. 149.) The FMND then concludes that the threshold of 85 dBA Leq qualifies as an "acceptable threshold[] for construction noise at the nearby sensitive receiver locations," and the "noise sensitive residential receiver locations will satisfy the 85 dBA Leq significance

threshold," such that the Project will have a less than significant construction noise impact upon the sensitive receiver locations. (*Id.*)

WSRCC reiterates that the NIOSH Occupational Noise Exposure standard has no proper place in evaluating the significance of construction noise impacts on nearby sensitive receptors. Rather, the NIOSH standard is aimed at protecting workers/laborers exposed to noise during the course job duties and preventing occupational harm/injury from occurring. It has no bearing upon external noise levels that would be suitable for maintaining the quiet enjoyment of an individual's private property. In that regard, the selection of 85 dBA Leq by the MND, RMND, and now the FMND as an acceptable threshold of significant construction noise impact is not only arbitrary, but it is also entirely unfounded.

The Federal Transit Administration's ("FTA") Transit Noise and Vibration Impact Assessment provides superior source of federal regulatory authority regarding a project's noise impacts and their significance on sensitive receptors. To that end, the FTA guidance on noise level impacts notes that the impacts should be assessed as a function of their increase over existing noise exposure, and that any noise increase of 15 dBA or greater for a residence is considered a "severe impact." (See Exhibit D - FTA Transit Noise and Vibration Impact Assessment, pp. 17-18, 23-31.) The MND/RMND/FMND have arbitrarily elected to use the inapplicable NIOSH standard to assess the noise impacts of the Project, without considering the widely accepted guidance on noise impacts put forth by the FTA. This added lack of study and analysis enlarges the scope of the fair argument that the Project may have significant noise impacts on the environment.

Applying the FTA noise impact guidance, WSRCC maintains that the FMND's dBA estimates for anticipated Project-attributed construction noise exposure levels at the inadequately selected survey locations (L1, L2, and L3) still have the potential to exceed an FTA guidance-based threshold of "severe impact" and thereby cause a significant noise impact in the surrounding environment. (FMND at p. 146, Table 13-2; compare FMND at p. 149, Table 13-3.) Indeed, comparison of the dBA values set forth in Table 13-2 and Table 13-3 confirm that the construction noise levels nearest to the vast majority of the Project's adjacent sensitive residential receptors are anticipated to increase by greater than 15 dBA from the ambient levels detected at L1, L2, and L3. (See *id.*) Put simply, after applying the FTA guidance to the FMND noise

data, there is a fair argument that the Project will have a significant noise impact on nearby sensitive residential receptors.

Notwithstanding these demonstrable noise impacts posed by the Project, the FMND's only mitigation measure in this category pertains to vibration, requiring that large-loaded trucks and dozers not be used within 50 feet of the southern edge of the property line, substituting instead "small rubber-tired or alternative equipment...to reduce vibration effects." The mitigation measure, on its face, appears to address primarily vibration concerns, and would have little to no mitigating effect on the exposure of nearby sensitive receptors to overall project construction noise. Indeed, the southern border of the two parcels designated for the resort villa development identified as the Ritz-Carlton Residences (APN 689-330-026 and 689-330-028) are directly adjacent to numerous private residences.

As such, the FMND provides no tangible accommodation for the burden of construction noise exposure to be borne by the Project's adjacent residential properties. In cases where construction noise impacts are anticipated to affect nearby sensitive uses (i.e., residents, schools, hospitals, etc.) noise barriers are routinely implemented as a CEQA mitigation measure during construction in order to minimize the impingement on nearby residents' use and enjoyment of their property. The Project in this case necessitates, at a minimum, the same level of consideration and accommodation for the property owners adjacent to the Project site's southern edge. Currently, however, MM-NOI-1 makes no provision for the placement of noise barriers of any kind at any location. The failure of the FMND to consider and incorporate the sensitive residential use into the scope of its noise mitigation measures is a critical deficiency that undermines any potential efficacy it may otherwise have in mitigating the Project's noise impacts, and the FMND's conclusion that the Project will have no significant noise impacts remains flawed and invalid for the reasons set forth at length above regarding the inadequate baseline study of these issues. Absent inclusion of an appropriate noise mitigation provision, the FMND remains legally inadequate as it cannot support a finding that the Project's noise impacts will not be significant.

The FMND's current lack of proper analysis and mitigation regarding construction noise impacts violates CEQA and warrants full environmental review via the preparation of an EIR. Alternatively, and at a minimum, the FMND must be further

revised and supplemented to include noise mitigation measures that will in fact protect nearby residents from the impacts of the Project's construction noise.

*iv. Greenhouse Gas Emissions and Energy Use*

The Project requires additional measures aimed at reducing operational GHG emissions and energy use that are not specified in the FMND. Specifically, the Project is slated to develop the second of two hotel buildings with 106 rooms and 499 vehicle parking spaces, yet the FMND still provides no specification or associated mitigation measures identifying how many or which of those parking spaces must be capable of supporting electric vehicle charging stations ("**EVCS**") and ready to be compliant with the 2022 Green Building Code ("**GBC**"). In fact, the FMND provides no specifics regarding any electric vehicle ("**EV**") accommodations to be constructed in connection with the Project. In its response to comments, the City takes the position that the Project is more akin to "commercial hotel use," such that the CARB Scoping Plan recommendations "are not appropriate." (See FMND, Appendix J, Responses to Comments, Response to Comment Letter O1, pp. RTC-841.) However, this position fails to consider, and is contradicted by, the fact that the Project, by its own proposed plans, identifies the new units to be built as "residences" and a "condominium project." (See FMND at pp. 41, 48.) The City's responses to comments still do not otherwise address whether any EVCS will be constructed in connection with the Project, and if so, how many.

The GBC, which became effective January 1, 2023, requires new buildings to designate 20% of the total number of parking spaces as EV-capable. See GBC 5.106.5.31. Therefore, if the Project develops 499 additional parking spaces, approximately 100 of those spaces must have electrical panel space and load capacity to support EV charging. Additionally, this must all be set forth in sufficient detail for the City and the public to thoroughly review, assess, and provide comments thereon.

Further, the GBC requires new buildings to designate 25% of the total number of EV-capable parking spaces as EV spaces with level 2 EV supply equipment ("**EVSE**"). *Ibid.* Hence, if the Project develops 499 additional parking spaces, 124 of those spaces must be equipped with a 208/240 volt 40-ampere branch circuit with the electric vehicle charging connectors, attachment plugs, and all other fittings, devices, and power outlets installed. The GBC also requires that new residential construction

with more than nine units be GPR certified at minimum 50 points, hold LEED Silver certification, or have Alternate Reference Standard[9] per Section 101.10.2.

The foregoing analysis was entirely absent from the MND, was also not performed for the RMND, and remains omitted from the FMND, thereby exposing the inherent flaws in the FMND's conclusions that the Project's will have a "less than significant impact" with regard to (1) the Project's generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment, (2) the Project's conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of GHGs (e.g., the 2022 GBC), (3) the Project's potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project operation, and (4) the Project's conflict with or obstruction of a state plan for renewable energy/energy efficiency. (See FMND, pp. 98, 111.) Indeed, the FMND states only in vague and inconclusive fashion that (1) the "project will be required to provide compliant … electric vehicle charging spaces" (pursuant to CAL Green Code §§ 5.106.4, 5.106.5.2, and 5.106.5.3), and (2) "[t]he Project would provide EV charging infrastructure that, meets the California Green Building Standards Code," while simultaneously concluding without justification or analysis that the Project's use will be more akin to a commercial hotel than traditional residential housing. (See Appendix A to RMND at 64; see also FMND at 120.) Upon reaching this factually and legally unsupported conclusion regarding the Project's future use, the FMND maintains its flawed determination that the EVCS guidance set forth in Appendix D to CARB's 2022 Scoping Plan is therefore "not appropriate" for the Project, and the Project should be relieved of the residential development requirements for EVCS under the GCB. (FMND at 120.)

These alleged findings in the FMND, and the grossly deficient information and analysis underpinning them, leave other stakeholder agencies and the general public

[9] According to Section 101.10.2 of the GBC, Applicant may request to apply an alternate green building standard for the Project in lieu of the minimum standards per Table 101.10. In making a determination in response to an application under this section, the Building Official may allow an alternate standard if they find that the proposed alternative standard complies with all of the following: (A) Addresses a comprehensive scope of green building issues including energy efficiency, water efficiency, resource efficient materials, and healthy building practices; (B) applies standards that are, when taken as a whole, as stringent as the GPR and LEED standards; (C) includes a formalized certification process that incorporates third party verification; and, (D) the project will advance the purposes of this Chapter. See Ord. 22-2245, part, 2022; Ord. 19-2193, § 2 (part), 2019.

with virtually no ability to assess the adequacy of the EVCS measures to be implemented in connection with the Project, and the City's responses to comments do nothing to address these concerns. Under the current framework in the FMND, the Applicant could very well construct no EVCS's whatsoever in connection with the Project while proclaiming it has provided "compliant…electric vehicle charging spaces" and met the Green Building Standards Code. Such an outcome has clear potential to result in significant impacts on the environment in the form of generating GHG emissions and conflict with the 2022 CARB Scoping Plan and the GBC.

Additionally, the FMND still provides no comparative analysis of the energy use and GHG emissions impacts of the inclusion and operation of the EVCS infrastructure in the completed Project relative to the operational energy use and GHG emissions that would arise from the omission of the EVCS infrastructure from the project. As such, and absent revision of the Project to incorporate an impact analysis of the inclusion and omission of the EVCS infrastructure, the Project as currently proposed violates the 2022 GBC and therefore result in a potentially significant impact on the issue of GHG emissions. In that regard, an EIR for the Project is currently required to be prepared and circulated before any approval by the City can ultimately be granted.

In sum, allowing the Project to commence without consideration and analysis of the EVCS issue and its associated energy use and GHG emissions considerations would result in significant and unavoidable impacts on the local community and environment as well as on global climate change due to cumulative GHG emissions from vehicle exhaust. Further, the Project would be out of compliance with the 2022 GBC and could provoke extensive litigation and unnecessary turbulence for both the Applicant and the City.

*v. Land Use and Planning*

Each California city and county must adopt a comprehensive, long-term general plan governing development. *Napa Citizens for Honest Gov. v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 352, *citing* Gov. Code §§ 65030, 65300. The general plan sits at the top of the land use planning hierarchy and serves as a "constitution" or "charter" for all future development. *DeVita v. County of Napa* (1995) 9 Cal.4th 763, 773; *Lesher Communications, Inc. v. City of Walnut Creek* (1990) 52 Cal.3d 531, 540.

General plan consistency is "the linchpin of California's land use and development laws; it is the principle which infused the concept of planned growth with the force of

law." *Debottari v. Norco City Council* (1985) 171 Cal.App.3d 1204, 1213. It is well established that development projects may not be approved if they interfere with, or frustrate, the general plan's policies and objectives. *See Napa Citizens*, 91 Cal.App.4th at 378-79; *see also Lesher*, 52 Cal.3d at 544.

Here, the FMND continues to admit the Project's direct conflict with the land use consistency prescribed by the City's General plan, in that the Project continues to call for approximately 4.5 acres of dedicated Mountain Reserve Land to be re-zoned and re-purposed for Resort/Hotel use. (FMND at p. 139-140.) Despite that, the FMND then maintains the perfunctory conclusion that the proposed development's conflict with the existing land use plan will not have significant environmental impacts because of the biological resources mitigation measures already proposed in the FMND. This conclusion is wholly unsupported, the analysis underpinning it is irreparably flawed, and the City's responses to comments wholly fail to dispose of this concern.

The FMND's rationale is misplaced and unsupported for purposes of CEQA analysis, as the City cannot properly justify the repurposing and destruction of natural reserve lands by claiming that its biological mitigation measures have already ameliorated any environmental impacts such that the land use impacts are "less than significant." By taking this position in the MND, RMND, and FMND, the City is acknowledging that, in fact, the re-zoning does have a significant impact that requires EIR review and substantial mitigation. Moreover, the City cannot permissibly conflate its mitigation measures aimed at limiting destruction of biological resources with preservation and/or creation of additional mountain reserve lands. Rather, the FMND cannot support a claim of no significant impact without the Project first creating protections for other comparable natural lands multiple times larger than the Mountain Reserve lands being targeted for development. Only then could the land use planning impacts of the development of the Mountain Reserve lands in question be properly mitigated to a less than significant level.

### B. The City Must, at a Minimum, Further Revise and Recirculate the FMND.

Section 15073.5 of the CEQA Guidelines provides that a negative declaration must be recirculated whenever the document must be substantially revised. A substantial revision includes the identification of new, avoidable significant effects requiring mitigation measures or project revisions to be added to reduce the effect to less than

significant levels or upon the agency determining that a proposed mitigation measure or project change would not reduce a potential impact to insignificance. *Id.*

Additionally, when new information is brought to light showing that an impact previously discussed in an MND and found to be insignificant with or without mitigation in the MND's analysis has the potential for a significant environmental impact supported by substantial evidence, the MND must consider and resolve the conflict in the evidence. See *Visalia Retail, L.P. v. City of Visalia* (2018) 20 Cal. App. 5th 1, 13, 17; see also *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal. App. 4th 1099, 1109.

Considering the FMND's ongoing failure to substantiate all of its findings, provide adequate mitigation measures, and fully analyze and assess all relevant factors as discussed in detail above, WSRCC reiterates that, at a minimum, the Project requires significant revisions and resolution of conflicts in evidence. Moreover, the FMND, which purports to have been prepared in December 2024, contains significant changes to the Project's proposed mitigation measures and adds incorporates new and additional impact studies in furtherance of the mitigation measures currently listed in the FMND. Meanwhile, and despite these significant changes, the City never circulated the FMND for further public review and comment, as required by CEQA. Therefore, even if the City refuses to prepare an EIR for the Project against WSRCC's objections, the City must at least further revise and recirculate the FMND if it does not prepare an EIR for the Project.

## V. THE PROJECT APPLICATION MATERIALS MUST INCLUDE AN ADEQUATE DESCRIPTION OF THE PROJECT.

A project description must be stable and finite in order to afford a lead agency and the public an adequate opportunity to assess and comment on the project and its impacts. "[A]n accurate, stable and finite project description is the sine qua non of an informative and legally sufficient" environmental document. *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 200. "A curtailed or distorted project description may stultify the objectives of the reporting process" as an accurate, stable, and finite project description is necessary to allow "affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance. *Ibid.* at pp. 192-93.

CEQA Guidelines, § 15124 requires that a description describe the project in enough detail to allow for evaluation of its potential environmental impacts: (a) the project's precise location and boundaries; (b) a clearly written statement of objectives sought by the proposed project; (c) a description of the project's technical, economic, and environmental characteristics; and, (d) a statement describing a list of agencies, permits, and approval which the project expects to use.

Here, WSRCC respectfully resubmits that the Project application must include an adequate and compliant Project description with the details listed above. Should the materials fail to comply with the CEQA Guidelines, the City should demand that the Applicant resubmit its application materials with CEQA-compliant parameters.

## VI. CONCLUSION.

In sum, WSRCC reiterates its requests that the City require a local workforce, that the City impose training requirements for the Project's construction activities to prevent community spread of COVID-19 and other infectious diseases, and that the City prepare and circulate a thorough EIR for the Project or, at a minimum, further revise and recirculate the RMND for the Project to address the aforementioned concerns. Should the City have any questions regarding this correspondence, please do not hesitate to contact our office.

Sincerely,

Jeremy Herwitt
Attorneys for Western States
Regional Council of Carpenters

Attached:

March 8, 2021, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling (Exhibit A);

Air Quality and GHG Expert Paul Rosenfeld CV (Exhibit B);

Air Quality and GHG Expert Matt Hagemann CV (Exhibit C);

FTA Transit Noise and Vibration Impact Assessment (Exhibit D);

Coachella Valley Mountains Conservancy Territory Map (Exhibit E); and

City of Rancho Mirage Land Use and Zoning Map (Exhibit F).

# EXHIBIT A

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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March 8, 2021

Mitchell M. Tsai
155 South El Molino, Suite 104
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**Subject: Local Hire Requirements and Considerations for Greenhouse Gas Modeling**

Dear Mr. Tsai,

Soil Water Air Protection Enterprise ("SWAPE") is pleased to provide the following draft technical report explaining the significance of worker trips required for construction of land use development projects with respect to the estimation of greenhouse gas ("GHG") emissions. The report will also discuss the potential for local hire requirements to reduce the length of worker trips, and consequently, reduced or mitigate the potential GHG impacts.

## Worker Trips and Greenhouse Gas Calculations

The California Emissions Estimator Model ("CalEEMod") is a "statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects."[1] CalEEMod quantifies construction-related emissions associated with land use projects resulting from off-road construction equipment; on-road mobile equipment associated with workers, vendors, and hauling; fugitive dust associated with grading, demolition, truck loading, and on-road vehicles traveling along paved and unpaved roads; and architectural coating activities; and paving.[2]

The number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[3]

[1] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[2] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[3] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.

Specifically, the number and length of vehicle trips is utilized to estimate the vehicle miles travelled ("VMT") associated with construction. Then, utilizing vehicle-class specific EMFAC 2014 emission factors, CalEEMod calculates the vehicle exhaust, evaporative, and dust emissions resulting from construction-related VMT, including personal vehicles for worker commuting.[4]

Specifically, in order to calculate VMT, CalEEMod multiplies the average daily trip rate by the average overall trip length (see excerpt below):

> "$VMT_d = \Sigma(\text{Average Daily Trip Rate}_i * \text{Average Overall Trip Length}_i)_n$
>
> Where:
>
> n = Number of land uses being modeled."[5]

Furthermore, to calculate the on-road emissions associated with worker trips, CalEEMod utilizes the following equation (see excerpt below):

> "$\text{Emissions}_{pollutant} = VMT * EF_{running,pollutant}$
>
> Where:
>
> $\text{Emissions}_{pollutant}$ = emissions from vehicle running for each pollutant
>
> VMT = vehicle miles traveled
>
> $EF_{running,pollutant}$ = emission factor for running emissions."[6]

Thus, there is a direct relationship between trip length and VMT, as well as a direct relationship between VMT and vehicle running emissions. In other words, when the trip length is increased, the VMT and vehicle running emissions increase as a result. Thus, vehicle running emissions can be reduced by decreasing the average overall trip length, by way of a local hire requirement or otherwise.

## Default Worker Trip Parameters and Potential Local Hire Requirements

As previously discussed, the number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[7] In order to understand how local hire requirements and associated worker trip length reductions impact GHG emissions calculations, it is important to consider the CalEEMod default worker trip parameters. CalEEMod provides recommended default values based on site-specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California Environmental Quality Act ("CEQA") requires that such changes be justified by substantial evidence.[8] The default number of construction-related worker trips is calculated by multiplying the

[4] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14-15.
[5] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 23.
[6] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[7] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[8] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 1, 9.

number of pieces of equipment for all phases by 1.25, with the exception of worker trips required for the building construction and architectural coating phases.[9] Furthermore, the worker trip vehicle class is a 50/25/25 percent mix of light duty autos, light duty truck class 1 and light duty truck class 2, respectively."[10] Finally, the default worker trip length is consistent with the length of the operational home-to-work vehicle trips.[11] The operational home-to-work vehicle trip lengths are:

> "[B]ased on the *location* and *urbanization* selected on the project characteristic screen. These values were *supplied by the air districts or use a default average for the state*. Each district (or county) also assigns trip lengths for urban and rural settings" (emphasis added). [12]

Thus, the default worker trip length is based on the location and urbanization level selected by the User when modeling emissions. The below table shows the CalEEMod default rural and urban worker trip lengths by air basin (see excerpt below and Attachment A).[13]

| Worker Trip Length by Air Basin | | |
|---|---|---|
| **Air Basin** | **Rural (miles)** | **Urban (miles)** |
| Great Basin Valleys | 16.8 | 10.8 |
| Lake County | 16.8 | 10.8 |
| Lake Tahoe | 16.8 | 10.8 |
| Mojave Desert | 16.8 | 10.8 |
| Mountain Counties | 16.8 | 10.8 |
| North Central Coast | 17.1 | 12.3 |
| North Coast | 16.8 | 10.8 |
| Northeast Plateau | 16.8 | 10.8 |
| Sacramento Valley | 16.8 | 10.8 |
| Salton Sea | 14.6 | 11 |
| San Diego | 16.8 | 10.8 |
| San Francisco Bay Area | 10.8 | 10.8 |
| San Joaquin Valley | 16.8 | 10.8 |
| South Central Coast | 16.8 | 10.8 |
| South Coast | 19.8 | 14.7 |
| **Average** | **16.47** | **11.17** |
| **Minimum** | **10.80** | **10.80** |
| **Maximum** | **19.80** | **14.70** |
| **Range** | **9.00** | **3.90** |

[9] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[10] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[11] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14.
[12] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 21.
[13] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-84 – D-86.

As demonstrated above, default rural worker trip lengths for air basins in California vary from 10.8- to 19.8-miles, with an average of 16.47 miles. Furthermore, default urban worker trip lengths vary from 10.8- to 14.7-miles, with an average of 11.17 miles. Thus, while default worker trip lengths vary by location, default urban worker trip lengths tend to be shorter in length. Based on these trends evident in the CalEEMod default worker trip lengths, we can reasonably assume that the efficacy of a local hire requirement is especially dependent upon the urbanization of the project site, as well as the project location.

## Practical Application of a Local Hire Requirement and Associated Impact

To provide an example of the potential impact of a local hire provision on construction-related GHG emissions, we estimated the significance of a local hire provision for the Village South Specific Plan ("Project") located in the City of Claremont ("City"). The Project proposed to construct 1,000 residential units, 100,000-SF of retail space, 45,000-SF of office space, as well as a 50-room hotel, on the 24-acre site. The Project location is classified as Urban and lies within the Los Angeles-South Coast County. As a result, the Project has a default worker trip length of 14.7 miles.[14] In an effort to evaluate the potential for a local hire provision to reduce the Project's construction-related GHG emissions, we prepared an updated model, reducing all worker trip lengths to 10 miles (see Attachment B). Our analysis estimates that if a local hire provision with a 10-mile radius were to be implemented, the GHG emissions associated with Project construction would decrease by approximately 17% (see table below and Attachment C).

| **Local Hire Provision Net Change** | |
|---|---|
| **Without Local Hire Provision** | |
| Total Construction GHG Emissions (MT $CO_2e$) | 3,623 |
| Amortized Construction GHG Emissions (MT $CO_2e$/year) | 120.77 |
| **With Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,024 |
| Amortized Construction GHG Emissions (MT $CO_2e$/year) | 100.80 |
| ***% Decrease in Construction-related GHG Emissions*** | ***17%*** |

As demonstrated above, by implementing a local hire provision requiring 10 mile worker trip lengths, the Project could reduce potential GHG emissions associated with construction worker trips. More broadly, any local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

This serves as an example of the potential impacts of local hire requirements on estimated project-level GHG emissions, though it does not indicate that local hire requirements would result in reduced construction-related GHG emission for all projects. As previously described, the significance of a local hire requirement depends on the worker trip length enforced and the default worker trip length for the project's urbanization level and location.

[14] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-85.

## Disclaimer

SWAPE has received limited discovery. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

Sincerely,



Matt Hagemann, P.G., C.Hg.



Paul E. Rosenfeld, Ph.D.

| Location Type | Location Name | Rural H-W (miles) | Urban H-W (miles) |
|---|---|---|---|
| Air Basin | Great Basin | 16.8 | 10.8 |
| Air Basin | Lake County | 16.8 | 10.8 |
| Air Basin | Lake Tahoe | 16.8 | 10.8 |
| Air Basin | Mojave Desert | 16.8 | 10.8 |
| Air Basin | Mountain | 16.8 | 10.8 |
| Air Basin | North Central | 17.1 | 12.3 |
| Air Basin | North Coast | 16.8 | 10.8 |
| Air Basin | Northeast | 16.8 | 10.8 |
| Air Basin | Sacramento | 16.8 | 10.8 |
| Air Basin | Salton Sea | 14.6 | 11 |
| Air Basin | San Diego | 16.8 | 10.8 |
| Air Basin | San Francisco | 10.8 | 10.8 |
| Air Basin | San Joaquin | 16.8 | 10.8 |
| Air Basin | South Central | 16.8 | 10.8 |
| Air Basin | South Coast | 19.8 | 14.7 |
| Air District | Amador County | 16.8 | 10.8 |
| Air District | Antelope Valley | 16.8 | 10.8 |
| Air District | Bay Area AQMD | 10.8 | 10.8 |
| Air District | Butte County | 12.54 | 12.54 |
| Air District | Calaveras | 16.8 | 10.8 |
| Air District | Colusa County | 16.8 | 10.8 |
| Air District | El Dorado | 16.8 | 10.8 |
| Air District | Feather River | 16.8 | 10.8 |
| Air District | Glenn County | 16.8 | 10.8 |
| Air District | Great Basin | 16.8 | 10.8 |
| Air District | Imperial County | 10.2 | 7.3 |
| Air District | Kern County | 16.8 | 10.8 |
| Air District | Lake County | 16.8 | 10.8 |
| Air District | Lassen County | 16.8 | 10.8 |
| Air District | Mariposa | 16.8 | 10.8 |
| Air District | Mendocino | 16.8 | 10.8 |
| Air District | Modoc County | 16.8 | 10.8 |
| Air District | Mojave Desert | 16.8 | 10.8 |
| Air District | Monterey Bay | 16.8 | 10.8 |
| Air District | North Coast | 16.8 | 10.8 |
| Air District | Northern Sierra | 16.8 | 10.8 |
| Air District | Northern | 16.8 | 10.8 |
| Air District | Placer County | 16.8 | 10.8 |
| Air District | Sacramento | 15 | 10 |

| | | | |
|---|---|---|---|
| Air District | San Diego | 16.8 | 10.8 |
| Air District | San Joaquin | 16.8 | 10.8 |
| Air District | San Luis Obispo | 13 | 13 |
| Air District | Santa Barbara | 8.3 | 8.3 |
| Air District | Shasta County | 16.8 | 10.8 |
| Air District | Siskiyou County | 16.8 | 10.8 |
| Air District | South Coast | 19.8 | 14.7 |
| Air District | Tehama County | 16.8 | 10.8 |
| Air District | Tuolumne | 16.8 | 10.8 |
| Air District | Ventura County | 16.8 | 10.8 |
| Air District | Yolo/Solano | 15 | 10 |
| County | Alameda | 10.8 | 10.8 |
| County | Alpine | 16.8 | 10.8 |
| County | Amador | 16.8 | 10.8 |
| County | Butte | 12.54 | 12.54 |
| County | Calaveras | 16.8 | 10.8 |
| County | Colusa | 16.8 | 10.8 |
| County | Contra Costa | 10.8 | 10.8 |
| County | Del Norte | 16.8 | 10.8 |
| County | El Dorado-Lake | 16.8 | 10.8 |
| County | El Dorado- | 16.8 | 10.8 |
| County | Fresno | 16.8 | 10.8 |
| County | Glenn | 16.8 | 10.8 |
| County | Humboldt | 16.8 | 10.8 |
| County | Imperial | 10.2 | 7.3 |
| County | Inyo | 16.8 | 10.8 |
| County | Kern-Mojave | 16.8 | 10.8 |
| County | Kern-San | 16.8 | 10.8 |
| County | Kings | 16.8 | 10.8 |
| County | Lake | 16.8 | 10.8 |
| County | Lassen | 16.8 | 10.8 |
| County | Los Angeles- | 16.8 | 10.8 |
| County | Los Angeles- | 19.8 | 14.7 |
| County | Madera | 16.8 | 10.8 |
| County | Marin | 10.8 | 10.8 |
| County | Mariposa | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Merced | 16.8 | 10.8 |
| County | Modoc | 16.8 | 10.8 |
| County | Mono | 16.8 | 10.8 |
| County | Monterey | 16.8 | 10.8 |
| County | Napa | 10.8 | 10.8 |

| | | | |
|---|---|---|---|
| County | Nevada | 16.8 | 10.8 |
| County | Orange | 19.8 | 14.7 |
| County | Placer-Lake | 16.8 | 10.8 |
| County | Placer-Mountain | 16.8 | 10.8 |
| County | Placer- | 16.8 | 10.8 |
| County | Plumas | 16.8 | 10.8 |
| County | Riverside- | 16.8 | 10.8 |
| County | Riverside- | 19.8 | 14.7 |
| County | Riverside-Salton | 14.6 | 11 |
| County | Riverside-South | 19.8 | 14.7 |
| County | Sacramento | 15 | 10 |
| County | San Benito | 16.8 | 10.8 |
| County | San Bernardino- | 16.8 | 10.8 |
| County | San Bernardino- | 19.8 | 14.7 |
| County | San Diego | 16.8 | 10.8 |
| County | San Francisco | 10.8 | 10.8 |
| County | San Joaquin | 16.8 | 10.8 |
| County | San Luis Obispo | 13 | 13 |
| County | San Mateo | 10.8 | 10.8 |
| County | Santa Barbara- | 8.3 | 8.3 |
| County | Santa Barbara- | 8.3 | 8.3 |
| County | Santa Clara | 10.8 | 10.8 |
| County | Santa Cruz | 16.8 | 10.8 |
| County | Shasta | 16.8 | 10.8 |
| County | Sierra | 16.8 | 10.8 |
| County | Siskiyou | 16.8 | 10.8 |
| County | Solano- | 15 | 10 |
| County | Solano-San | 16.8 | 10.8 |
| County | Sonoma-North | 16.8 | 10.8 |
| County | Sonoma-San | 10.8 | 10.8 |
| County | Stanislaus | 16.8 | 10.8 |
| County | Sutter | 16.8 | 10.8 |
| County | Tehama | 16.8 | 10.8 |
| County | Trinity | 16.8 | 10.8 |
| County | Tulare | 16.8 | 10.8 |
| County | Tuolumne | 16.8 | 10.8 |
| County | Ventura | 16.8 | 10.8 |
| County | Yolo | 15 | 10 |
| County | Yuba | 16.8 | 10.8 |
| Statewide | Statewide | 16.8 | 10.8 |

| Worker Trip Length by Air Basin | | |
|---|---|---|
| **Air Basin** | **Rural (miles)** | **Urban (miles)** |
| Great Basin Valleys | 16.8 | 10.8 |
| Lake County | 16.8 | 10.8 |
| Lake Tahoe | 16.8 | 10.8 |
| Mojave Desert | 16.8 | 10.8 |
| Mountain Counties | 16.8 | 10.8 |
| North Central Coast | 17.1 | 12.3 |
| North Coast | 16.8 | 10.8 |
| Northeast Plateau | 16.8 | 10.8 |
| Sacramento Valley | 16.8 | 10.8 |
| Salton Sea | 14.6 | 11 |
| San Diego | 16.8 | 10.8 |
| San Francisco Bay Area | 10.8 | 10.8 |
| San Joaquin Valley | 16.8 | 10.8 |
| South Central Coast | 16.8 | 10.8 |
| South Coast | 19.8 | 14.7 |
| **Average** | **16.47** | **11.17** |
| **Mininum** | **10.80** | **10.80** |
| **Maximum** | **19.80** | **14.70** |
| **Range** | **9.00** | **3.90** |

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1713 | 1.8242 | 1.1662 | 2.4000e-003 | 0.4169 | 0.0817 | 0.4986 | 0.1795 | 0.0754 | 0.2549 | 0.0000 | 213.1969 | 213.1969 | 0.0601 | 0.0000 | 214.6993 |
| 2022 | 0.6904 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.6826 | 1,721.6826 | 0.1294 | 0.0000 | 1,724.9187 |
| 2023 | 0.6148 | 3.3649 | 5.6747 | 0.0178 | 1.1963 | 0.0996 | 1.2959 | 0.3203 | 0.0935 | 0.4138 | 0.0000 | 1,627.5295 | 1,627.5295 | 0.1185 | 0.0000 | 1,630.4925 |
| 2024 | 4.1619 | 0.1335 | 0.2810 | 5.9000e-004 | 0.0325 | 6.4700e-003 | 0.0390 | 8.6300e-003 | 6.0400e-003 | 0.0147 | 0.0000 | 52.9078 | 52.9078 | 8.0200e-003 | 0.0000 | 53.1082 |
| **Maximum** | **4.1619** | **4.1142** | **6.1625** | **0.0189** | **1.3058** | **0.1201** | **1.4259** | **0.3460** | **0.1128** | **0.4588** | **0.0000** | **1,721.6826** | **1,721.6826** | **0.1294** | **0.0000** | **1,724.9187** |

## 2.1 Overall Construction

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1713 | 1.8242 | 1.1662 | 2.4000e-003 | 0.4169 | 0.0817 | 0.4986 | 0.1795 | 0.0754 | 0.2549 | 0.0000 | 213.1967 | 213.1967 | 0.0601 | 0.0000 | 214.6991 |
| 2022 | 0.6904 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.6823 | 1,721.6823 | 0.1294 | 0.0000 | 1,724.9183 |
| 2023 | 0.6148 | 3.3648 | 5.6747 | 0.0178 | 1.1963 | 0.0996 | 1.2959 | 0.3203 | 0.0935 | 0.4138 | 0.0000 | 1,627.5291 | 1,627.5291 | 0.1185 | 0.0000 | 1,630.4921 |
| 2024 | 4.1619 | 0.1335 | 0.2810 | 5.9000e-004 | 0.0325 | 6.4700e-003 | 0.0390 | 8.6300e-003 | 6.0400e-003 | 0.0147 | 0.0000 | 52.9077 | 52.9077 | 8.0200e-003 | 0.0000 | 53.1082 |
| **Maximum** | **4.1619** | **4.1142** | **6.1625** | **0.0189** | **1.3058** | **0.1201** | **1.4259** | **0.3460** | **0.1128** | **0.4588** | **0.0000** | **1,721.6823** | **1,721.6823** | **0.1294** | **0.0000** | **1,724.9183** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **1** | **9-1-2021** | **11-30-2021** | 1.4103 | 1.4103 |
| **2** | **12-1-2021** | **2-28-2022** | 1.3613 | 1.3613 |
| **3** | **3-1-2022** | **5-31-2022** | 1.1985 | 1.1985 |
| **4** | **6-1-2022** | **8-31-2022** | 1.1921 | 1.1921 |
| **5** | **9-1-2022** | **11-30-2022** | 1.1918 | 1.1918 |
| **6** | **12-1-2022** | **2-28-2023** | 1.0774 | 1.0774 |
| **7** | **3-1-2023** | **5-31-2023** | 1.0320 | 1.0320 |
| **8** | **6-1-2023** | **8-31-2023** | 1.0260 | 1.0260 |

| | | | | |
|---|---|---|---|---|
| **9** | **9-1-2023** | **11-30-2023** | 1.0265 | 1.0265 |
| **10** | **12-1-2023** | **2-29-2024** | 2.8857 | 2.8857 |
| **11** | **3-1-2024** | **5-31-2024** | 1.6207 | 1.6207 |
| | | **Highest** | 2.8857 | 2.8857 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0012** | **51.0012** | **0.0144** | **0.0000** | **51.3601** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.7000e-004 | 7.5000e-004 | 8.5100e-003 | 2.0000e-005 | 2.4700e-003 | 2.0000e-005 | 2.4900e-003 | 6.5000e-004 | 2.0000e-005 | 6.7000e-004 | 0.0000 | 2.2251 | 2.2251 | 7.0000e-005 | 0.0000 | 2.2267 |
| **Total** | **2.9000e-003** | **0.0641** | **0.0233** | **2.0000e-004** | **6.4100e-003** | **2.1000e-004** | **6.6200e-003** | **1.7300e-003** | **2.0000e-004** | **1.9300e-003** | **0.0000** | **19.6816** | **19.6816** | **1.2800e-003** | **0.0000** | **19.7136** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0011** | **51.0011** | **0.0144** | **0.0000** | **51.3600** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.7000e-004 | 7.5000e-004 | 8.5100e-003 | 2.0000e-005 | 2.4700e-003 | 2.0000e-005 | 2.4900e-003 | 6.5000e-004 | 2.0000e-005 | 6.7000e-004 | 0.0000 | 2.2251 | 2.2251 | 7.0000e-005 | 0.0000 | 2.2267 |
| **Total** | **2.9000e-003** | **0.0641** | **0.0233** | **2.0000e-004** | **6.4100e-003** | **2.1000e-004** | **6.6200e-003** | **1.7300e-003** | **2.0000e-004** | **1.9300e-003** | **0.0000** | **19.6816** | **19.6816** | **1.2800e-003** | **0.0000** | **19.7136** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7061** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |
| **Total** | **7.7000e-004** | **6.0000e-004** | **6.8100e-003** | **2.0000e-005** | **1.9700e-003** | **2.0000e-005** | **1.9900e-003** | **5.2000e-004** | **1.0000e-005** | **5.4000e-004** | **0.0000** | **1.7801** | **1.7801** | **5.0000e-005** | **0.0000** | **1.7814** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7060** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |
| **Total** | **7.7000e-004** | **6.0000e-004** | **6.8100e-003** | **2.0000e-005** | **1.9700e-003** | **2.0000e-005** | **1.9900e-003** | **5.2000e-004** | **1.0000e-005** | **5.4000e-004** | **0.0000** | **1.7801** | **1.7801** | **5.0000e-005** | **0.0000** | **1.7814** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3776 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5405** | **103.5405** | **0.0335** | **0.0000** | **104.3776** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |
| **Total** | **1.6400e-003** | **1.2700e-003** | **0.0144** | **4.0000e-005** | **4.1600e-003** | **3.0000e-005** | **4.2000e-003** | **1.1100e-003** | **3.0000e-005** | **1.1400e-003** | **0.0000** | **3.7579** | **3.7579** | **1.1000e-004** | **0.0000** | **3.7607** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5403** | **103.5403** | **0.0335** | **0.0000** | **104.3775** |

## 3.4 Grading - 2021

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |
| **Total** | **1.6400e-003** | **1.2700e-003** | **0.0144** | **4.0000e-005** | **4.1600e-003** | **3.0000e-005** | **4.2000e-003** | **1.1100e-003** | **3.0000e-005** | **1.1400e-003** | **0.0000** | **3.7579** | **3.7579** | **1.1000e-004** | **0.0000** | **3.7607** |

## 3.4 Grading - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |
| **Total** | **2.8000e-004** | **2.1000e-004** | **2.4400e-003** | **1.0000e-005** | **7.7000e-004** | **1.0000e-005** | **7.7000e-004** | **2.0000e-004** | **1.0000e-005** | **2.1000e-004** | **0.0000** | **0.6679** | **0.6679** | **2.0000e-005** | **0.0000** | **0.6684** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |
| **Total** | **2.8000e-004** | **2.1000e-004** | **2.4400e-003** | **1.0000e-005** | **7.7000e-004** | **1.0000e-005** | **7.7000e-004** | **2.0000e-004** | **1.0000e-005** | **2.1000e-004** | **0.0000** | **0.6679** | **0.6679** | **2.0000e-005** | **0.0000** | **0.6684** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1324** | **293.1324** | **0.0702** | **0.0000** | **294.8881** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.4088 | 0.3066 | 3.5305 | 0.0107 | 1.1103 | 8.8700e-003 | 1.1192 | 0.2949 | 8.1700e-003 | 0.3031 | 0.0000 | 966.8117 | 966.8117 | 0.0266 | 0.0000 | 967.4773 |
| **Total** | **0.4616** | **2.0027** | **3.9885** | **0.0152** | **1.2243** | **0.0121** | **1.2363** | **0.3278** | **0.0112** | **0.3390** | **0.0000** | **1,408.7952** | **1,408.7952** | **0.0530** | **0.0000** | **1,410.1208** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1321** | **293.1321** | **0.0702** | **0.0000** | **294.8877** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.4088 | 0.3066 | 3.5305 | 0.0107 | 1.1103 | 8.8700e-003 | 1.1192 | 0.2949 | 8.1700e-003 | 0.3031 | 0.0000 | 966.8117 | 966.8117 | 0.0266 | 0.0000 | 967.4773 |
| **Total** | **0.4616** | **2.0027** | **3.9885** | **0.0152** | **1.2243** | **0.0121** | **1.2363** | **0.3278** | **0.0112** | **0.3390** | **0.0000** | **1,408.7952** | **1,408.7952** | **0.0530** | **0.0000** | **1,410.1208** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2789** | **286.2789** | **0.0681** | **0.0000** | **287.9814** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.3753 | 0.2708 | 3.1696 | 0.0101 | 1.0840 | 8.4100e-003 | 1.0924 | 0.2879 | 7.7400e-003 | 0.2957 | 0.0000 | 909.3439 | 909.3439 | 0.0234 | 0.0000 | 909.9291 |
| **Total** | **0.4135** | **1.5218** | **3.5707** | **0.0144** | **1.1953** | **9.8700e-003** | **1.2051** | **0.3200** | **9.1400e-003** | **0.3292** | **0.0000** | **1,327.3369** | **1,327.3369** | **0.0462** | **0.0000** | **1,328.4916** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2785** | **286.2785** | **0.0681** | **0.0000** | **287.9811** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.3753 | 0.2708 | 3.1696 | 0.0101 | 1.0840 | 8.4100e-003 | 1.0924 | 0.2879 | 7.7400e-003 | 0.2957 | 0.0000 | 909.3439 | 909.3439 | 0.0234 | 0.0000 | 909.9291 |
| **Total** | **0.4135** | **1.5218** | **3.5707** | **0.0144** | **1.1953** | **9.8700e-003** | **1.2051** | **0.3200** | **9.1400e-003** | **0.3292** | **0.0000** | **1,327.3369** | **1,327.3369** | **0.0462** | **0.0000** | **1,328.4916** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |
| **Total** | **3.7000e-004** | **2.7000e-004** | **3.1200e-003** | **1.0000e-005** | **1.0700e-003** | **1.0000e-005** | **1.0800e-003** | **2.8000e-004** | **1.0000e-005** | **2.9000e-004** | **0.0000** | **0.8963** | **0.8963** | **2.0000e-005** | **0.0000** | **0.8968** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

## 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |
| **Total** | **3.7000e-004** | **2.7000e-004** | **3.1200e-003** | **1.0000e-005** | **1.0700e-003** | **1.0000e-005** | **1.0800e-003** | **2.8000e-004** | **1.0000e-005** | **2.9000e-004** | **0.0000** | **0.8963** | **0.8963** | **2.0000e-005** | **0.0000** | **0.8968** |

## 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |
| **Total** | **5.9000e-004** | **4.1000e-004** | **4.9200e-003** | **2.0000e-005** | **1.8100e-003** | **1.0000e-005** | **1.8200e-003** | **4.8000e-004** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **1.4697** | **1.4697** | **4.0000e-005** | **0.0000** | **1.4706** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |
| **Total** | **5.9000e-004** | **4.1000e-004** | **4.9200e-003** | **2.0000e-005** | **1.8100e-003** | **1.0000e-005** | **1.8200e-003** | **4.8000e-004** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **1.4697** | **1.4697** | **4.0000e-005** | **0.0000** | **1.4706** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |
| **Total** | **0.0101** | **6.9900e-003** | **0.0835** | **2.8000e-004** | **0.0307** | **2.3000e-004** | **0.0309** | **8.1500e-003** | **2.2000e-004** | **8.3700e-003** | **0.0000** | **24.9407** | **24.9407** | **6.1000e-004** | **0.0000** | **24.9558** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |
| **Total** | **0.0101** | **6.9900e-003** | **0.0835** | **2.8000e-004** | **0.0307** | **2.3000e-004** | **0.0309** | **8.1500e-003** | **2.2000e-004** | **8.3700e-003** | **0.0000** | **24.9407** | **24.9407** | **6.1000e-004** | **0.0000** | **24.9558** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Unmitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| NaturalGas Mitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |
| NaturalGas Unmitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

## 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Unmitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Unmitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Unmitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

## 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2769 | 46.4588 | 31.6840 | 0.0643 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,234.7974 | 6,234.7974 | 1.9495 | 0.0000 | 6,283.5352 |
| 2022 | 5.3304 | 38.8967 | 49.5629 | 0.1517 | 9.8688 | 1.6366 | 10.7727 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 15,251.5674 | 15,251.5674 | 1.9503 | 0.0000 | 15,278.5288 |
| 2023 | 4.8957 | 26.3317 | 46.7567 | 0.1472 | 9.8688 | 0.7794 | 10.6482 | 2.6381 | 0.7322 | 3.3702 | 0.0000 | 14,807.5269 | 14,807.5269 | 1.0250 | 0.0000 | 14,833.1521 |
| 2024 | 237.1630 | 9.5575 | 15.1043 | 0.0244 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,361.3989 | 2,361.3989 | 0.7177 | 0.0000 | 2,379.3421 |
| **Maximum** | **237.1630** | **46.4588** | **49.5629** | **0.1517** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **15,251.5674** | **15,251.5674** | **1.9503** | **0.0000** | **15,278.5288** |

## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2769 | 46.4588 | 31.6840 | 0.0643 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,234.7974 | 6,234.7974 | 1.9495 | 0.0000 | 6,283.5352 |
| 2022 | 5.3304 | 38.8967 | 49.5629 | 0.1517 | 9.8688 | 1.6366 | 10.7727 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 15,251.5674 | 15,251.5674 | 1.9503 | 0.0000 | 15,278.5288 |
| 2023 | 4.8957 | 26.3317 | 46.7567 | 0.1472 | 9.8688 | 0.7794 | 10.6482 | 2.6381 | 0.7322 | 3.3702 | 0.0000 | 14,807.5269 | 14,807.5269 | 1.0250 | 0.0000 | 14,833.1520 |
| 2024 | 237.1630 | 9.5575 | 15.1043 | 0.0244 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,361.3989 | 2,361.3989 | 0.7177 | 0.0000 | 2,379.3421 |
| **Maximum** | **237.1630** | **46.4588** | **49.5629** | **0.1517** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **15,251.5674** | **15,251.5674** | **1.9503** | **0.0000** | **15,278.5288** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0643 | 0.0442 | 0.6042 | 1.7100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 170.8155 | 170.8155 | 5.0300e-003 | | 170.9413 |
| **Total** | **0.1916** | **4.1394** | **1.5644** | **0.0136** | **0.4346** | **0.0139** | **0.4485** | **0.1176** | **0.0133** | **0.1309** | | **1,463.0568** | **1,463.0568** | **0.0927** | | **1,465.3750** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0643 | 0.0442 | 0.6042 | 1.7100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 170.8155 | 170.8155 | 5.0300e-003 | | 170.9413 |
| **Total** | **0.1916** | **4.1394** | **1.5644** | **0.0136** | **0.4346** | **0.0139** | **0.4485** | **0.1176** | **0.0133** | **0.1309** | | **1,463.0568** | **1,463.0568** | **0.0927** | | **1,465.3750** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| **Total** | **0.0772** | **0.0530** | **0.7250** | **2.0600e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **204.9786** | **204.9786** | **6.0400e-003** | | **205.1296** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| **Total** | **0.0772** | **0.0530** | **0.7250** | **2.0600e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **204.9786** | **204.9786** | **6.0400e-003** | | **205.1296** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0857 | 0.0589 | 0.8056 | 2.2900e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 6.7100e-003 | | 227.9217 |
| **Total** | **0.0857** | **0.0589** | **0.8056** | **2.2900e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **227.7540** | **227.7540** | **6.7100e-003** | | **227.9217** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0857 | 0.0589 | 0.8056 | 2.2900e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 6.7100e-003 | | 227.9217 |
| **Total** | **0.0857** | **0.0589** | **0.8056** | **2.2900e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **227.7540** | **227.7540** | **6.7100e-003** | | **227.9217** |

## 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 6.0600e-003 | | 219.8941 |
| **Total** | **0.0803** | **0.0532** | **0.7432** | **2.2100e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **219.7425** | **219.7425** | **6.0600e-003** | | **219.8941** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 6.0600e-003 | | 219.8941 |
| **Total** | **0.0803** | **0.0532** | **0.7432** | **2.2100e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **219.7425** | **219.7425** | **6.0600e-003** | | **219.8941** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 3.2162 | 2.1318 | 29.7654 | 0.0883 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,800.6857 | 8,800.6857 | 0.2429 | | 8,806.7582 |
| **Total** | **3.6242** | **15.3350** | **33.1995** | **0.1247** | **9.8688** | **0.0949** | **9.9637** | **2.6381** | **0.0883** | **2.7263** | | **12,697.2339** | **12,697.2339** | **0.4665** | | **12,708.8966** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 3.2162 | 2.1318 | 29.7654 | 0.0883 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,800.6857 | 8,800.6857 | 0.2429 | | 8,806.7582 |
| **Total** | **3.6242** | **15.3350** | **33.1995** | **0.1247** | **9.8688** | **0.0949** | **9.9637** | **2.6381** | **0.0883** | **2.7263** | | **12,697.2339** | **12,697.2339** | **0.4665** | | **12,708.8966** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 3.0203 | 1.9287 | 27.4113 | 0.0851 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 8,478.4408 | 8,478.4408 | 0.2190 | | 8,483.9160 |
| **Total** | **3.3229** | **11.9468** | **30.5127** | **0.1203** | **9.8688** | **0.0797** | **9.9485** | **2.6381** | **0.0738** | **2.7118** | | **12,252.3170** | **12,252.3170** | **0.4172** | | **12,262.7460** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 3.0203 | 1.9287 | 27.4113 | 0.0851 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 8,478.4408 | 8,478.4408 | 0.2190 | | 8,483.9160 |
| **Total** | **3.3229** | **11.9468** | **30.5127** | **0.1203** | **9.8688** | **0.0797** | **9.9485** | **2.6381** | **0.0738** | **2.7118** | | **12,252.3170** | **12,252.3170** | **0.4172** | | **12,262.7460** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0566 | 0.0361 | 0.5133 | 1.5900e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |
| **Total** | **0.0566** | **0.0361** | **0.5133** | **1.5900e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **158.7723** | **158.7723** | **4.1000e-003** | | **158.8748** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0566 | 0.0361 | 0.5133 | 1.5900e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |
| **Total** | **0.0566** | **0.0361** | **0.5133** | **1.5900e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **158.7723** | **158.7723** | **4.1000e-003** | | **158.8748** |

## 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0535 | 0.0329 | 0.4785 | 1.5400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |
| **Total** | **0.0535** | **0.0329** | **0.4785** | **1.5400e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **153.8517** | **153.8517** | **3.7600e-003** | | **153.9458** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0535 | 0.0329 | 0.4785 | 1.5400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |
| **Total** | **0.0535** | **0.0329** | **0.4785** | **1.5400e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **153.8517** | **153.8517** | **3.7600e-003** | | **153.9458** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5707 | 0.3513 | 5.1044 | 0.0165 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.0852 | 1,641.0852 | 0.0401 | | 1,642.0886 |
| **Total** | **0.5707** | **0.3513** | **5.1044** | **0.0165** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,641.0852** | **1,641.0852** | **0.0401** | | **1,642.0886** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5707 | 0.3513 | 5.1044 | 0.0165 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.0852 | 1,641.0852 | 0.0401 | | 1,642.0886 |
| **Total** | **0.5707** | **0.3513** | **5.1044** | **0.0165** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,641.0852** | **1,641.0852** | **0.0401** | | **1,642.0886** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| Unmitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2865 | 46.4651 | 31.6150 | 0.0642 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,221.4937 | 6,221.4937 | 1.9491 | 0.0000 | 6,270.2214 |
| 2022 | 5.7218 | 38.9024 | 47.3319 | 0.1455 | 9.8688 | 1.6366 | 10.7736 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 14,630.3099 | 14,630.3099 | 1.9499 | 0.0000 | 14,657.2663 |
| 2023 | 5.2705 | 26.4914 | 44.5936 | 0.1413 | 9.8688 | 0.7800 | 10.6488 | 2.6381 | 0.7328 | 3.3708 | 0.0000 | 14,210.3424 | 14,210.3424 | 1.0230 | 0.0000 | 14,235.9160 |
| 2024 | 237.2328 | 9.5610 | 15.0611 | 0.0243 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,352.4178 | 2,352.4178 | 0.7175 | 0.0000 | 2,370.3550 |
| **Maximum** | **237.2328** | **46.4651** | **47.3319** | **0.1455** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **14,630.3099** | **14,630.3099** | **1.9499** | **0.0000** | **14,657.2663** |

## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2865 | 46.4651 | 31.6150 | 0.0642 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,221.4937 | 6,221.4937 | 1.9491 | 0.0000 | 6,270.2214 |
| 2022 | 5.7218 | 38.9024 | 47.3319 | 0.1455 | 9.8688 | 1.6366 | 10.7736 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 14,630.3099 | 14,630.3099 | 1.9499 | 0.0000 | 14,657.2663 |
| 2023 | 5.2705 | 26.4914 | 44.5936 | 0.1413 | 9.8688 | 0.7800 | 10.6488 | 2.6381 | 0.7328 | 3.3708 | 0.0000 | 14,210.3424 | 14,210.3424 | 1.0230 | 0.0000 | 14,235.9160 |
| 2024 | 237.2328 | 9.5610 | 15.0611 | 0.0243 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,352.4178 | 2,352.4178 | 0.7175 | 0.0000 | 2,370.3550 |
| **Maximum** | **237.2328** | **46.4651** | **47.3319** | **0.1455** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **14,630.3099** | **14,630.3099** | **1.9499** | **0.0000** | **14,657.2663** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0715 | 0.0489 | 0.5524 | 1.6100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 160.8377 | 160.8377 | 4.7300e-003 | | 160.9560 |
| **Total** | **0.2019** | **4.1943** | **1.5706** | **0.0133** | **0.4346** | **0.0141** | **0.4487** | **0.1176** | **0.0135** | **0.1311** | | **1,430.6932** | **1,430.6932** | **0.0955** | | **1,433.0812** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0715 | 0.0489 | 0.5524 | 1.6100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 160.8377 | 160.8377 | 4.7300e-003 | | 160.9560 |
| **Total** | **0.2019** | **4.1943** | **1.5706** | **0.0133** | **0.4346** | **0.0141** | **0.4487** | **0.1176** | **0.0135** | **0.1311** | | **1,430.6932** | **1,430.6932** | **0.0955** | | **1,433.0812** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| **Total** | **0.0858** | **0.0587** | **0.6629** | **1.9400e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **193.0052** | **193.0052** | **5.6800e-003** | | **193.1472** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| **Total** | **0.0858** | **0.0587** | **0.6629** | **1.9400e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **193.0052** | **193.0052** | **5.6800e-003** | | **193.1472** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |
| **Total** | **0.0954** | **0.0652** | **0.7365** | **2.1500e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **214.4502** | **214.4502** | **6.3100e-003** | | **214.6080** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |
| **Total** | **0.0954** | **0.0652** | **0.7365** | **2.1500e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **214.4502** | **214.4502** | **6.3100e-003** | | **214.6080** |

## 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0896 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |
| **Total** | **0.0896** | **0.0589** | **0.6784** | **2.0800e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **206.9139** | **206.9139** | **5.7000e-003** | | **207.0563** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0896 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |
| **Total** | **0.0896** | **0.0589** | **0.6784** | **2.0800e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **206.9139** | **206.9139** | **5.7000e-003** | | **207.0563** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 3.5872 | 2.3593 | 27.1680 | 0.0832 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,286.9013 | 8,286.9013 | 0.2282 | | 8,292.6058 |
| **Total** | **4.0156** | **15.5266** | **30.9685** | **0.1186** | **9.8688** | **0.0957** | **9.9645** | **2.6381** | **0.0891** | **2.7271** | | **12,075.9763** | **12,075.9763** | **0.4663** | | **12,087.6341** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 3.5872 | 2.3593 | 27.1680 | 0.0832 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,286.9013 | 8,286.9013 | 0.2282 | | 8,292.6058 |
| **Total** | **4.0156** | **15.5266** | **30.9685** | **0.1186** | **9.8688** | **0.0957** | **9.9645** | **2.6381** | **0.0891** | **2.7271** | | **12,075.9763** | **12,075.9763** | **0.4663** | | **12,087.6341** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 3.3795 | 2.1338 | 24.9725 | 0.0801 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 7,983.7318 | 7,983.7318 | 0.2055 | | 7,988.8683 |
| **Total** | **3.6978** | **12.1065** | **28.3496** | **0.1144** | **9.8688** | **0.0803** | **9.9491** | **2.6381** | **0.0743** | **2.7124** | | **11,655.1325** | **11,655.1325** | **0.4151** | | **11,665.5099** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 3.3795 | 2.1338 | 24.9725 | 0.0801 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 7,983.7318 | 7,983.7318 | 0.2055 | | 7,988.8683 |
| **Total** | **3.6978** | **12.1065** | **28.3496** | **0.1144** | **9.8688** | **0.0803** | **9.9491** | **2.6381** | **0.0743** | **2.7124** | | **11,655.1325** | **11,655.1325** | **0.4151** | | **11,665.5099** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |
| **Total** | **0.0633** | **0.0400** | **0.4677** | **1.5000e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **149.5081** | **149.5081** | **3.8500e-003** | | **149.6043** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |
| **Total** | **0.0633** | **0.0400** | **0.4677** | **1.5000e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **149.5081** | **149.5081** | **3.8500e-003** | | **149.6043** |

## 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0601 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |
| **Total** | **0.0601** | **0.0364** | **0.4354** | **1.4500e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **144.8706** | **144.8706** | **3.5300e-003** | | **144.9587** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0601 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |
| **Total** | **0.0601** | **0.0364** | **0.4354** | **1.4500e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **144.8706** | **144.8706** | **3.5300e-003** | | **144.9587** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.6406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2262 |
| **Total** | **0.6406** | **0.3886** | **4.6439** | **0.0155** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,545.2860** | **1,545.2860** | **0.0376** | | **1,546.2262** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.6406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2262 |
| **Total** | **0.6406** | **0.3886** | **4.6439** | **0.0155** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,545.2860** | **1,545.2860** | **0.0376** | | **1,546.2262** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| Unmitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| SubCategory | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1704 | 1.8234 | 1.1577 | 2.3800e-003 | 0.4141 | 0.0817 | 0.4958 | 0.1788 | 0.0754 | 0.2542 | 0.0000 | 210.7654 | 210.7654 | 0.0600 | 0.0000 | 212.2661 |
| 2022 | 0.5865 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.6554 | 1,418.6554 | 0.1215 | 0.0000 | 1,421.6925 |
| 2023 | 0.5190 | 3.2850 | 4.7678 | 0.0147 | 0.8497 | 0.0971 | 0.9468 | 0.2283 | 0.0912 | 0.3195 | 0.0000 | 1,342.4412 | 1,342.4412 | 0.1115 | 0.0000 | 1,345.2291 |
| 2024 | 4.1592 | 0.1313 | 0.2557 | 5.0000e-004 | 0.0221 | 6.3900e-003 | 0.0285 | 5.8700e-003 | 5.9700e-003 | 0.0118 | 0.0000 | 44.6355 | 44.6355 | 7.8300e-003 | 0.0000 | 44.8311 |
| **Maximum** | **4.1592** | **4.0240** | **5.1546** | **0.0155** | **0.9509** | **0.1175** | **1.0683** | **0.2518** | **0.1103** | **0.3621** | **0.0000** | **1,418.6554** | **1,418.6554** | **0.1215** | **0.0000** | **1,421.6925** |

## 2.1 Overall Construction

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1704 | 1.8234 | 1.1577 | 2.3800e-003 | 0.4141 | 0.0817 | 0.4958 | 0.1788 | 0.0754 | 0.2542 | 0.0000 | 210.7651 | 210.7651 | 0.0600 | 0.0000 | 212.2658 |
| 2022 | 0.5865 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.6550 | 1,418.6550 | 0.1215 | 0.0000 | 1,421.6921 |
| 2023 | 0.5190 | 3.2850 | 4.7678 | 0.0147 | 0.8497 | 0.0971 | 0.9468 | 0.2283 | 0.0912 | 0.3195 | 0.0000 | 1,342.4409 | 1,342.4409 | 0.1115 | 0.0000 | 1,345.2287 |
| 2024 | 4.1592 | 0.1313 | 0.2557 | 5.0000e-004 | 0.0221 | 6.3900e-003 | 0.0285 | 5.8700e-003 | 5.9700e-003 | 0.0118 | 0.0000 | 44.6354 | 44.6354 | 7.8300e-003 | 0.0000 | 44.8311 |
| **Maximum** | **4.1592** | **4.0240** | **5.1546** | **0.0155** | **0.9509** | **0.1175** | **1.0683** | **0.2518** | **0.1103** | **0.3621** | **0.0000** | **1,418.6550** | **1,418.6550** | **0.1215** | **0.0000** | **1,421.6921** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **1** | **9-1-2021** | **11-30-2021** | 1.4091 | 1.4091 |
| **2** | **12-1-2021** | **2-28-2022** | 1.3329 | 1.3329 |
| **3** | **3-1-2022** | **5-31-2022** | 1.1499 | 1.1499 |
| **4** | **6-1-2022** | **8-31-2022** | 1.1457 | 1.1457 |
| **5** | **9-1-2022** | **11-30-2022** | 1.1415 | 1.1415 |
| **6** | **12-1-2022** | **2-28-2023** | 1.0278 | 1.0278 |
| **7** | **3-1-2023** | **5-31-2023** | 0.9868 | 0.9868 |
| **8** | **6-1-2023** | **8-31-2023** | 0.9831 | 0.9831 |

| | | | | |
|---|---|---|---|---|
| **9** | **9-1-2023** | **11-30-2023** | 0.9798 | 0.9798 |
| **10** | **12-1-2023** | **2-29-2024** | 2.8757 | 2.8757 |
| **11** | **3-1-2024** | **5-31-2024** | 1.6188 | 1.6188 |
| | | **Highest** | 2.8757 | 2.8757 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0012** | **51.0012** | **0.0144** | **0.0000** | **51.3601** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 5.3000e-004 | 6.0900e-003 | 2.0000e-005 | 1.6800e-003 | 1.0000e-005 | 1.6900e-003 | 4.5000e-004 | 1.0000e-005 | 4.6000e-004 | 0.0000 | 1.5281 | 1.5281 | 5.0000e-005 | 0.0000 | 1.5293 |
| **Total** | **2.6500e-003** | **0.0639** | **0.0209** | **2.0000e-004** | **5.6200e-003** | **2.0000e-004** | **5.8200e-003** | **1.5300e-003** | **1.9000e-004** | **1.7200e-003** | **0.0000** | **18.9847** | **18.9847** | **1.2600e-003** | **0.0000** | **19.0161** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0011** | **51.0011** | **0.0144** | **0.0000** | **51.3600** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 5.3000e-004 | 6.0900e-003 | 2.0000e-005 | 1.6800e-003 | 1.0000e-005 | 1.6900e-003 | 4.5000e-004 | 1.0000e-005 | 4.6000e-004 | 0.0000 | 1.5281 | 1.5281 | 5.0000e-005 | 0.0000 | 1.5293 |
| **Total** | **2.6500e-003** | **0.0639** | **0.0209** | **2.0000e-004** | **5.6200e-003** | **2.0000e-004** | **5.8200e-003** | **1.5300e-003** | **1.9000e-004** | **1.7200e-003** | **0.0000** | **18.9847** | **18.9847** | **1.2600e-003** | **0.0000** | **19.0161** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7061** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3500e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |
| **Total** | **5.8000e-004** | **4.3000e-004** | **4.8700e-003** | **1.0000e-005** | **1.3400e-003** | **1.0000e-005** | **1.3500e-003** | **3.6000e-004** | **1.0000e-005** | **3.7000e-004** | **0.0000** | **1.2225** | **1.2225** | **4.0000e-005** | **0.0000** | **1.2234** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7060** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3500e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |
| **Total** | **5.8000e-004** | **4.3000e-004** | **4.8700e-003** | **1.0000e-005** | **1.3400e-003** | **1.0000e-005** | **1.3500e-003** | **3.6000e-004** | **1.0000e-005** | **3.7000e-004** | **0.0000** | **1.2225** | **1.2225** | **4.0000e-005** | **0.0000** | **1.2234** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3776 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5405** | **103.5405** | **0.0335** | **0.0000** | **104.3776** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8600e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |
| **Total** | **1.2200e-003** | **9.0000e-004** | **0.0103** | **3.0000e-005** | **2.8300e-003** | **2.0000e-005** | **2.8600e-003** | **7.5000e-004** | **2.0000e-005** | **7.8000e-004** | **0.0000** | **2.5808** | **2.5808** | **8.0000e-005** | **0.0000** | **2.5828** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5403** | **103.5403** | **0.0335** | **0.0000** | **104.3775** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8600e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |
| **Total** | **1.2200e-003** | **9.0000e-004** | **0.0103** | **3.0000e-005** | **2.8300e-003** | **2.0000e-005** | **2.8600e-003** | **7.5000e-004** | **2.0000e-005** | **7.8000e-004** | **0.0000** | **2.5808** | **2.5808** | **8.0000e-005** | **0.0000** | **2.5828** |

## 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |
| **Total** | **2.1000e-004** | **1.5000e-004** | **1.7400e-003** | **1.0000e-005** | **5.2000e-004** | **0.0000** | **5.3000e-004** | **1.4000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4587** | **0.4587** | **1.0000e-005** | **0.0000** | **0.4590** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |
| **Total** | **2.1000e-004** | **1.5000e-004** | **1.7400e-003** | **1.0000e-005** | **5.2000e-004** | **0.0000** | **5.3000e-004** | **1.4000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4587** | **0.4587** | **1.0000e-005** | **0.0000** | **0.4590** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1324** | **293.1324** | **0.0702** | **0.0000** | **294.8881** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.3051 | 0.2164 | 2.5233 | 7.3500e-003 | 0.7557 | 6.2300e-003 | 0.7619 | 0.2007 | 5.7400e-003 | 0.2065 | 0.0000 | 663.9936 | 663.9936 | 0.0187 | 0.0000 | 664.4604 |
| **Total** | **0.3578** | **1.9125** | **2.9812** | **0.0119** | **0.8696** | **9.4100e-003** | **0.8790** | **0.2336** | **8.7800e-003** | **0.2424** | **0.0000** | **1,105.9771** | **1,105.9771** | **0.0451** | **0.0000** | **1,107.1039** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1321** | **293.1321** | **0.0702** | **0.0000** | **294.8877** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.3051 | 0.2164 | 2.5233 | 7.3500e-003 | 0.7557 | 6.2300e-003 | 0.7619 | 0.2007 | 5.7400e-003 | 0.2065 | 0.0000 | 663.9936 | 663.9936 | 0.0187 | 0.0000 | 664.4604 |
| **Total** | **0.3578** | **1.9125** | **2.9812** | **0.0119** | **0.8696** | **9.4100e-003** | **0.8790** | **0.2336** | **8.7800e-003** | **0.2424** | **0.0000** | **1,105.9771** | **1,105.9771** | **0.0451** | **0.0000** | **1,107.1039** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2789** | **286.2789** | **0.0681** | **0.0000** | **287.9814** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.2795 | 0.1910 | 2.2635 | 6.9100e-003 | 0.7377 | 5.9100e-003 | 0.7436 | 0.1960 | 5.4500e-003 | 0.2014 | 0.0000 | 624.5363 | 624.5363 | 0.0164 | 0.0000 | 624.9466 |
| **Total** | **0.3177** | **1.4420** | **2.6646** | **0.0112** | **0.8490** | **7.3700e-003** | **0.8564** | **0.2281** | **6.8500e-003** | **0.2349** | **0.0000** | **1,042.5294** | **1,042.5294** | **0.0392** | **0.0000** | **1,043.5090** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2785** | **286.2785** | **0.0681** | **0.0000** | **287.9811** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.2795 | 0.1910 | 2.2635 | 6.9100e-003 | 0.7377 | 5.9100e-003 | 0.7436 | 0.1960 | 5.4500e-003 | 0.2014 | 0.0000 | 624.5363 | 624.5363 | 0.0164 | 0.0000 | 624.9466 |
| **Total** | **0.3177** | **1.4420** | **2.6646** | **0.0112** | **0.8490** | **7.3700e-003** | **0.8564** | **0.2281** | **6.8500e-003** | **0.2349** | **0.0000** | **1,042.5294** | **1,042.5294** | **0.0392** | **0.0000** | **1,043.5090** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |
| **Total** | **2.8000e-004** | **1.9000e-004** | **2.2300e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.6156** | **0.6156** | **2.0000e-005** | **0.0000** | **0.6160** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

### 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |
| **Total** | **2.8000e-004** | **1.9000e-004** | **2.2300e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.6156** | **0.6156** | **2.0000e-005** | **0.0000** | **0.6160** |

### 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |
| **Total** | **4.4000e-004** | **2.9000e-004** | **3.5100e-003** | **1.0000e-005** | **1.2300e-003** | **1.0000e-005** | **1.2400e-003** | **3.3000e-004** | **1.0000e-005** | **3.4000e-004** | **0.0000** | **1.0094** | **1.0094** | **3.0000e-005** | **0.0000** | **1.0100** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |
| **Total** | **4.4000e-004** | **2.9000e-004** | **3.5100e-003** | **1.0000e-005** | **1.2300e-003** | **1.0000e-005** | **1.2400e-003** | **3.3000e-004** | **1.0000e-005** | **3.4000e-004** | **0.0000** | **1.0094** | **1.0094** | **3.0000e-005** | **0.0000** | **1.0100** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |
| **Total** | **7.4800e-003** | **4.9300e-003** | **0.0596** | **1.9000e-004** | **0.0209** | **1.6000e-004** | **0.0211** | **5.5500e-003** | **1.5000e-004** | **5.7000e-003** | **0.0000** | **17.1287** | **17.1287** | **4.3000e-004** | **0.0000** | **17.1394** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |
| **Total** | **7.4800e-003** | **4.9300e-003** | **0.0596** | **1.9000e-004** | **0.0209** | **1.6000e-004** | **0.0211** | **5.5500e-003** | **1.5000e-004** | **5.7000e-003** | **0.0000** | **17.1287** | **17.1287** | **4.3000e-004** | **0.0000** | **17.1394** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Unmitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| NaturalGas Mitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |
| NaturalGas Unmitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

## 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Unmitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Unmitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Unmitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

## 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2561 | 46.4415 | 31.4494 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,163.4166 | 6,163.4166 | 1.9475 | 0.0000 | 6,212.1039 |
| 2022 | 4.5441 | 38.8811 | 40.8776 | 0.1240 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,493.4403 | 12,493.4403 | 1.9485 | 0.0000 | 12,518.5707 |
| 2023 | 4.1534 | 25.7658 | 38.7457 | 0.1206 | 7.0088 | 0.7592 | 7.7679 | 1.8799 | 0.7136 | 2.5935 | 0.0000 | 12,150.4890 | 12,150.4890 | 0.9589 | 0.0000 | 12,174.4615 |
| 2024 | 237.0219 | 9.5478 | 14.9642 | 0.0239 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,313.1808 | 2,313.1808 | 0.7166 | 0.0000 | 2,331.0956 |
| **Maximum** | **237.0219** | **46.4415** | **40.8776** | **0.1240** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,493.4403** | **12,493.4403** | **1.9485** | **0.0000** | **12,518.5707** |

## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2561 | 46.4415 | 31.4494 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,163.4166 | 6,163.4166 | 1.9475 | 0.0000 | 6,212.1039 |
| 2022 | 4.5441 | 38.8811 | 40.8776 | 0.1240 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,493.4403 | 12,493.4403 | 1.9485 | 0.0000 | 12,518.5707 |
| 2023 | 4.1534 | 25.7658 | 38.7457 | 0.1206 | 7.0088 | 0.7592 | 7.7679 | 1.8799 | 0.7136 | 2.5935 | 0.0000 | 12,150.4890 | 12,150.4890 | 0.9589 | 0.0000 | 12,174.4615 |
| 2024 | 237.0219 | 9.5478 | 14.9642 | 0.0239 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,313.1808 | 2,313.1808 | 0.7166 | 0.0000 | 2,331.0955 |
| **Maximum** | **237.0219** | **46.4415** | **40.8776** | **0.1240** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,493.4403** | **12,493.4403** | **1.9485** | **0.0000** | **12,518.5707** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0487 | 0.0313 | 0.4282 | 1.1800e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 117.2799 | 117.2799 | 3.5200e-003 | | 117.3678 |
| **Total** | **0.1760** | **4.1265** | **1.3884** | **0.0131** | **0.3810** | **0.0135** | **0.3946** | **0.1034** | **0.0129** | **0.1163** | | **1,409.5212** | **1,409.5212** | **0.0912** | | **1,411.8015** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0487 | 0.0313 | 0.4282 | 1.1800e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 117.2799 | 117.2799 | 3.5200e-003 | | 117.3678 |
| **Total** | **0.1760** | **4.1265** | **1.3884** | **0.0131** | **0.3810** | **0.0135** | **0.3946** | **0.1034** | **0.0129** | **0.1163** | | **1,409.5212** | **1,409.5212** | **0.0912** | | **1,411.8015** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |
| **Total** | **0.0584** | **0.0375** | **0.5139** | **1.4100e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **140.7359** | **140.7359** | **4.2200e-003** | | **140.8414** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |
| **Total** | **0.0584** | **0.0375** | **0.5139** | **1.4100e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **140.7359** | **140.7359** | **4.2200e-003** | | **140.8414** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 156.3732 | 156.3732 | 4.6900e-003 | | 156.4904 |
| **Total** | **0.0649** | **0.0417** | **0.5710** | **1.5700e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **156.3732** | **156.3732** | **4.6900e-003** | | **156.4904** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 156.3732 | 156.3732 | 4.6900e-003 | | 156.4904 |
| **Total** | **0.0649** | **0.0417** | **0.5710** | **1.5700e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **156.3732** | **156.3732** | **4.6900e-003** | | **156.4904** |

## 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0607 | 0.0376 | 0.5263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |
| **Total** | **0.0607** | **0.0376** | **0.5263** | **1.5100e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **150.8754** | **150.8754** | **4.2400e-003** | | **150.9813** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0607 | 0.0376 | 0.5263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |
| **Total** | **0.0607** | **0.0376** | **0.5263** | **1.5100e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **150.8754** | **150.8754** | **4.2400e-003** | | **150.9813** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 2.4299 | 1.5074 | 21.0801 | 0.0607 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 6,042.5585 | 6,042.5585 | 0.1697 | | 6,046.8000 |
| **Total** | **2.8378** | **14.7106** | **24.5142** | **0.0971** | **7.0087** | **0.0741** | **7.0828** | **1.8799** | **0.0691** | **1.9490** | | **9,939.1067** | **9,939.1067** | **0.3933** | | **9,948.9384** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 2.4299 | 1.5074 | 21.0801 | 0.0607 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 6,042.5585 | 6,042.5585 | 0.1697 | | 6,046.8000 |
| **Total** | **2.8378** | **14.7106** | **24.5142** | **0.0971** | **7.0087** | **0.0741** | **7.0828** | **1.8799** | **0.0691** | **1.9490** | | **9,939.1067** | **9,939.1067** | **0.3933** | | **9,948.9384** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 2.2780 | 1.3628 | 19.4002 | 0.0584 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,821.4028 | 5,821.4028 | 0.1529 | | 5,825.2254 |
| **Total** | **2.5807** | **11.3809** | **22.5017** | **0.0936** | **7.0088** | **0.0595** | **7.0682** | **1.8799** | **0.0552** | **1.9350** | | **9,595.2790** | **9,595.2790** | **0.3511** | | **9,604.0554** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 2.2780 | 1.3628 | 19.4002 | 0.0584 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,821.4028 | 5,821.4028 | 0.1529 | | 5,825.2254 |
| **Total** | **2.5807** | **11.3809** | **22.5017** | **0.0936** | **7.0088** | **0.0595** | **7.0682** | **1.8799** | **0.0552** | **1.9350** | | **9,595.2790** | **9,595.2790** | **0.3511** | | **9,604.0554** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0427 | 0.0255 | 0.3633 | 1.0900e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |
| **Total** | **0.0427** | **0.0255** | **0.3633** | **1.0900e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **109.0150** | **109.0150** | **2.8600e-003** | | **109.0866** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0427 | 0.0255 | 0.3633 | 1.0900e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |
| **Total** | **0.0427** | **0.0255** | **0.3633** | **1.0900e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **109.0150** | **109.0150** | **2.8600e-003** | | **109.0866** |

## 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0403 | 0.0233 | 0.3384 | 1.0600e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |
| **Total** | **0.0403** | **0.0233** | **0.3384** | **1.0600e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **105.6336** | **105.6336** | **2.6300e-003** | | **105.6992** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0403 | 0.0233 | 0.3384 | 1.0600e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |
| **Total** | **0.0403** | **0.0233** | **0.3384** | **1.0600e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **105.6336** | **105.6336** | **2.6300e-003** | | **105.6992** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,126.7583 | 1,126.7583 | 0.0280 | | 1,127.4583 |
| **Total** | **0.4296** | **0.2481** | **3.6098** | **0.0113** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,126.7583** | **1,126.7583** | **0.0280** | | **1,127.4583** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,126.7583 | 1,126.7583 | 0.0280 | | 1,127.4583 |
| **Total** | **0.4296** | **0.2481** | **3.6098** | **0.0113** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,126.7583** | **1,126.7583** | **0.0280** | | **1,127.4583** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| Unmitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2621 | 46.4460 | 31.4068 | 0.0635 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,154.3377 | 6,154.3377 | 1.9472 | 0.0000 | 6,203.0186 |
| 2022 | 4.7966 | 38.8851 | 39.6338 | 0.1195 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,035.3440 | 12,035.3440 | 1.9482 | 0.0000 | 12,060.6013 |
| 2023 | 4.3939 | 25.8648 | 37.5031 | 0.1162 | 7.0088 | 0.7598 | 7.7685 | 1.8799 | 0.7142 | 2.5940 | 0.0000 | 11,710.4080 | 11,710.4080 | 0.9617 | 0.0000 | 11,734.4497 |
| 2024 | 237.0656 | 9.5503 | 14.9372 | 0.0238 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,307.0517 | 2,307.0517 | 0.7164 | 0.0000 | 2,324.9627 |
| **Maximum** | **237.0656** | **46.4460** | **39.6338** | **0.1195** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,035.3440** | **12,035.3440** | **1.9482** | **0.0000** | **12,060.6013** |

## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2621 | 46.4460 | 31.4068 | 0.0635 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,154.3377 | 6,154.3377 | 1.9472 | 0.0000 | 6,203.0186 |
| 2022 | 4.7966 | 38.8851 | 39.6338 | 0.1195 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,035.3440 | 12,035.3440 | 1.9482 | 0.0000 | 12,060.6013 |
| 2023 | 4.3939 | 25.8648 | 37.5031 | 0.1162 | 7.0088 | 0.7598 | 7.7685 | 1.8799 | 0.7142 | 2.5940 | 0.0000 | 11,710.4080 | 11,710.4080 | 0.9617 | 0.0000 | 11,734.4497 |
| 2024 | 237.0656 | 9.5503 | 14.9372 | 0.0238 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,307.0517 | 2,307.0517 | 0.7164 | 0.0000 | 2,324.9627 |
| **Maximum** | **237.0656** | **46.4460** | **39.6338** | **0.1195** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,035.3440** | **12,035.3440** | **1.9482** | **0.0000** | **12,060.6013** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0532 | 0.0346 | 0.3963 | 1.1100e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 110.4707 | 110.4707 | 3.3300e-003 | | 110.5539 |
| **Total** | **0.1835** | **4.1800** | **1.4144** | **0.0128** | **0.3810** | **0.0137** | **0.3948** | **0.1034** | **0.0131** | **0.1165** | | **1,380.3262** | **1,380.3262** | **0.0941** | | **1,382.6791** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0532 | 0.0346 | 0.3963 | 1.1100e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 110.4707 | 110.4707 | 3.3300e-003 | | 110.5539 |
| **Total** | **0.1835** | **4.1800** | **1.4144** | **0.0128** | **0.3810** | **0.0137** | **0.3948** | **0.1034** | **0.0131** | **0.1165** | | **1,380.3262** | **1,380.3262** | **0.0941** | | **1,382.6791** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0638 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |
| **Total** | **0.0638** | **0.0415** | **0.4755** | **1.3300e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **132.5649** | **132.5649** | **3.9900e-003** | | **132.6646** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0638 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |
| **Total** | **0.0638** | **0.0415** | **0.4755** | **1.3300e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **132.5649** | **132.5649** | **3.9900e-003** | | **132.6646** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |
| **Total** | **0.0709** | **0.0462** | **0.5284** | **1.4800e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **147.2943** | **147.2943** | **4.4300e-003** | | **147.4051** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |
| **Total** | **0.0709** | **0.0462** | **0.5284** | **1.4800e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **147.2943** | **147.2943** | **4.4300e-003** | | **147.4051** |

## 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |
| **Total** | **0.0665** | **0.0416** | **0.4861** | **1.4300e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **142.1207** | **142.1207** | **4.0000e-003** | | **142.2207** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |
| **Total** | **0.0665** | **0.0416** | **0.4861** | **1.4300e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **142.1207** | **142.1207** | **4.0000e-003** | | **142.2207** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 2.6620 | 1.6677 | 19.4699 | 0.0571 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 5,691.9354 | 5,691.9354 | 0.1602 | | 5,695.9408 |
| **Total** | **3.0904** | **14.8350** | **23.2704** | **0.0926** | **7.0087** | **0.0749** | **7.0836** | **1.8799** | **0.0699** | **1.9498** | | **9,481.0104** | **9,481.0104** | **0.3984** | | **9,490.9691** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 2.6620 | 1.6677 | 19.4699 | 0.0571 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 5,691.9354 | 5,691.9354 | 0.1602 | | 5,695.9408 |
| **Total** | **3.0904** | **14.8350** | **23.2704** | **0.0926** | **7.0087** | **0.0749** | **7.0836** | **1.8799** | **0.0699** | **1.9498** | | **9,481.0104** | **9,481.0104** | **0.3984** | | **9,490.9691** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 2.5029 | 1.5073 | 17.8820 | 0.0550 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,483.7974 | 5,483.7974 | 0.1442 | | 5,487.4020 |
| **Total** | **2.8211** | **11.4799** | **21.2591** | **0.0893** | **7.0088** | **0.0601** | **7.0688** | **1.8799** | **0.0557** | **1.9356** | | **9,155.1981** | **9,155.1981** | **0.3538** | | **9,164.0437** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 2.5029 | 1.5073 | 17.8820 | 0.0550 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,483.7974 | 5,483.7974 | 0.1442 | | 5,487.4020 |
| **Total** | **2.8211** | **11.4799** | **21.2591** | **0.0893** | **7.0088** | **0.0601** | **7.0688** | **1.8799** | **0.0557** | **1.9356** | | **9,155.1981** | **9,155.1981** | **0.3538** | | **9,164.0437** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |
| **Total** | **0.0469** | **0.0282** | **0.3349** | **1.0300e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **102.6928** | **102.6928** | **2.7000e-003** | | **102.7603** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |
| **Total** | **0.0469** | **0.0282** | **0.3349** | **1.0300e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **102.6928** | **102.6928** | **2.7000e-003** | | **102.7603** |

## 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0444 | 0.0257 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |
| **Total** | **0.0444** | **0.0257** | **0.3114** | **1.0000e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **99.5045** | **99.5045** | **2.4700e-003** | | **99.5663** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0444 | 0.0257 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |
| **Total** | **0.0444** | **0.0257** | **0.3114** | **1.0000e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **99.5045** | **99.5045** | **2.4700e-003** | | **99.5663** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,061.3818 | 1,061.3818 | 0.0264 | | 1,062.0410 |
| **Total** | **0.4734** | **0.2743** | **3.3220** | **0.0107** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,061.3818** | **1,061.3818** | **0.0264** | | **1,062.0410** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,061.3818 | 1,061.3818 | 0.0264 | | 1,062.0410 |
| **Total** | **0.4734** | **0.2743** | **3.3220** | **0.0107** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,061.3818** | **1,061.3818** | **0.0264** | | **1,062.0410** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| Unmitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

Attachment C

| Local Hire Provision Net Change | |
|---|---|
| **Without Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,623 |
| Amortized (MT CO2e/year) | 120.77 |
| **With Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,024 |
| Amortized (MT CO2e/year) | 100.80 |
| ***% Decrease in Construction-related GHG Emissions*** | ***17%*** |

**EXHIBIT B**

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

**SOIL WATER AIR PROTECTION ENTERPRISE**
2656 29th Street, Suite 201
Santa Monica, California 90405
Attn: Paul Rosenfeld, Ph.D.
Mobil: (310) 795-2335
Office: (310) 452-5555
Fax: (310) 452-5550
**Email:** prosenfeld@swape.com

# *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**Risk Assessment & Remediation Specialist**

## Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

## Professional Experience

Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from unconventional oil drilling operations, oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, and many other industrial and agricultural sources. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at dozens of sites and has testified as an expert witness on more than ten cases involving exposure to air contaminants from industrial sources.

## Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex $H_2O$ Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

## Publications:

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P**., (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

**Rosenfeld, P.E**. & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

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Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry*. Amsterdam: Elsevier Publishing.

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Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

**Rosenfeld, P.E.,** J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

**Rosenfeld, P. E.,** M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities.* Boston Massachusetts: Elsevier Publishing

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

**Rosenfeld P. E.,** J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004.* New Orleans, October 2-6, 2004.

**Rosenfeld, P.E.,** and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

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**Rosenfeld, P. E**., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

**Rosenfeld, P.E.,** Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

**Rosenfeld, P.E**., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

**Rosenfeld, P.E.,** and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality.* 29, 1662-1668.

**Rosenfeld, P.E.,** C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

**Rosenfeld, P.E.,** and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

**Rosenfeld, P.E.,** and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

Chollack, T. and **P. Rosenfeld. (**1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

**Rosenfeld, P. E.** (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

**Rosenfeld, P. E.** (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

**Rosenfeld, P. E. (**1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

**Rosenfeld, P. E.** (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

**Rosenfeld, P. E. (**1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

## Presentations:

**Rosenfeld, P.E.,** Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society.* Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution.* Lecture conducted from Boston, MA.

**Rosenfeld, P.E**. (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

**Rosenfeld, P.E.** (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

**Rosenfeld, P. E.** (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water.* Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld P. E.** (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

**Rosenfeld P. E.** (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting.* Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition.* Lecture conducted from Boston Massachusetts.

**Paul Rosenfeld Ph.D**. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference.* Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference.* Lecture conducted from Hilton Hotel in Irvine, California.

**Paul Rosenfeld Ph.D**. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference.* Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

**Paul Rosenfeld Ph.D**. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference.* Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

**Paul Rosenfeld, Ph.D.** (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

**Paul Rosenfeld, Ph.D.** (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

**Rosenfeld, P. E**., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

**Paul Rosenfeld, Ph.D.** (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

**Paul Rosenfeld, Ph.D**. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

**Rosenfeld, P.E**. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conferenc*e. Lecture conducted from Indianapolis, Maryland.

**Rosenfeld. P.E.** (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

**Rosenfeld. P.E. (**October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

**Rosenfeld, P.E. (**2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

**Rosenfeld, P.E.**, C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

**Rosenfeld, P.E,** C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

## Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

## Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

## Deposition and/or Trial Testimony:

In the United States District Court For The District of New Jersey
Duarte et al, *Plaintiffs,* vs. United States Metals Refining Company et. al. *Defendant.*
Case No.: 2:17-cv-01624-ES-SCM
Rosenfeld Deposition. 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk, *Plaintiffs,* vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" *Defendant.*
Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No.: No. BC615636
Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No.: No. BC646857
Rosenfeld Deposition, 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiff vs. The 3M Company et al., Defendants
Case: No 1:16-cv-02531-RBJ
Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No 1923
Rosenfeld Deposition, 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No C12-01481
Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 8-23-2017

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No.: LC102019 (c/w BC582154)
Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., *Plaintiffs,* vs. Meritor Inc., et al., *Defendants*
Case Number: 4:16-cv-52-DMB-JVM
Rosenfeld Deposition: July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No.: No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial, March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No.: RG14711115
Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No.: LALA002187
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Jerry Dovico, et al., Plaintiffs vs. Valley View Sine LLC, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Doug Pauls, et al.,, et al., Plaintiffs vs. Richard Warren, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action N0. 14-C-30000
Rosenfeld Deposition, June 2015

In The Third Judicial District County of Dona Ana, New Mexico
Betty Gonzalez, et al. Plaintiffs vs. Del Oro Dairy, Del Oro Real Estate LLC, Jerry Settles and Deward DeRuyter, Defendants
Rosenfeld Deposition: July 2015

In The Iowa District Court For Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No 4980
Rosenfeld Deposition: May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case Number CACE07030358 (26)
Rosenfeld Deposition: December 2014

In the United States District Court Western District of Oklahoma
Tommy McCarty, et al., Plaintiffs, v. Oklahoma City Landfill, LLC d/b/a Southeast Oklahoma City Landfill, et al. Defendants.
Case No. 5:12-cv-01152-C
Rosenfeld Deposition: July 2014

In the County Court of Dallas County Texas
Lisa Parr et al, *Plaintiff*, vs. Aruba et al, *Defendant.*
Case Number cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial: April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., *Plaintiffs,* vs. Republic Services, Inc., et al., *Defendants*
Case Number: 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition: October 2012

In the United States District Court of Southern District of Texas Galveston Division
Kyle Cannon, Eugene Donovan, Genaro Ramirez, Carol Sassler, and Harvey Walton, each Individually and on behalf of those similarly situated, *Plaintiffs,* vs. BP Products North America, Inc., *Defendant.*
Case 3:10-cv-00622
Rosenfeld Deposition: February 2012
Rosenfeld Trial: April 2013

In the Circuit Court of Baltimore County Maryland
Philip E. Cvach, II et al., *Plaintiffs* vs. Two Farms, Inc. d/b/a Royal Farms, Defendants
Case Number: 03-C-12-012487 OT
Rosenfeld Deposition: September 2013

# EXHIBIT C

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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## Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

**Geologic and Hydrogeologic Characterization**
**Industrial Stormwater Compliance**
**Investigation and Remediation Strategies**
**Litigation Support and Testifying Expert**
**CEQA Review**

**Education:**

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

**Professional Certifications:**

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

**Professional Experience:**

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2014;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

**Senior Regulatory and Litigation Support Analyst:**

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 100 environmental impact reports since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, Valley Fever, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Manager of a project to provide technical assistance to a community adjacent to a former Naval shipyard under a grant from the U.S. EPA.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.

- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

**Executive Director:**

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

**Hydrogeology:**

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

**Policy:**

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

**Geology:**

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

**Teaching:**

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt taught physical geology (lecture and lab and introductory geology at Golden West College in Huntington Beach, California from 2010 to 2014.

**Invited Testimony, Reports, Papers and Presentations:**

**Hagemann, M.F**., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

**Hagemann, M.F**., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

**Hagemann, M.F.,** 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

**Hagemann, M.F.**, 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

**Hagemann, M.F.,** 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

**Hagemann, M.F**., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

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**Hagemann, M.F**., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

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**Hagemann, M.F**., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

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**Hagemann, M.F**., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

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**Hagemann, M.F**., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

**Hagemann, M.F**., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

**Hagemann, M.F**., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

**Hagemann, M.F**., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

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**Hagemann, M. F**., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

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**Hagemann, M.F**., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

**Hagemann, M.F**., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

**Other Experience:**

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.

**EXHIBIT D**

FTA

FEDERAL TRANSIT ADMINISTRATION

# Transit Noise and Vibration Impact Assessment Manual

SEPTEMBER 2018

FTA Report No. 0123
Federal Transit Administration

**PREPARED BY**
John A. Volpe National Transportation Systems Center




U.S. Department of Transportation
**Federal Transit Administration**

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# Transit Noise and Vibration Impact Assessment Manual

SEPTEMBER 2018
FTA Report No. 0123

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## Metric Conversion Table

| SYMBOL | WHEN YOU KNOW | MULTIPLY BY | TO FIND | SYMBOL |
|---|---|---|---|---|
| | | **LENGTH** | | |
| **in** | inches | 25.4 | millimeters | mm |
| **ft** | feet | 0.305 | meters | m |
| **yd** | yards | 0.914 | meters | m |
| **mi** | miles | 1.61 | kilometers | km |
| | | **VOLUME** | | |
| **fl oz** | fluid ounces | 29.57 | milliliters | mL |
| **gal** | gallons | 3.785 | liters | L |
| **$ft^3$** | cubic feet | 0.028 | cubic meters | $m^3$ |
| **$yd^3$** | cubic yards | 0.765 | cubic meters | $m^3$ |
| | | NOTE: volumes greater than 1000 L shall be shown in $m^3$ | | |
| | | **MASS** | | |
| **oz** | ounces | 28.35 | grams | g |
| **lb** | pounds | 0.454 | kilograms | kg |
| **T** | short tons (2000 lb) | 0.907 | megagrams<br>(or "metric ton") | Mg (or "t") |
| | | **TEMPERATURE (exact degrees)** | | |
| **°F** | Fahrenheit | 5 (F-32)/9<br>or (F-32)/1.8 | Celsius | °C |

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**14. ABSTRACT**

This report is the third edition of a guidance manual originally issued in 1995. It includes clarifications to existing policy and updates to outdated references where applicable. Topics presented in this manual include procedures for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. Additional topics include descriptions of noise and vibration mitigation measures, construction noise and vibration, and how to present these analyses in the Federal Transit Administration's environmental documents. This guidance is for technical specialists who conduct the analyses, as well as project sponsor staff, Federal agency reviewers, and members of the general public who may be affected by the projects.

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## Abstract

This report is the third edition of a guidance manual originally issued in 1995. It includes clarifications to existing policy and updates to outdated references where applicable. Topics presented in this manual include procedures for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. Additional topics include descriptions of noise and vibration mitigation measures, construction noise and vibration, and how to present these analyses in the Federal Transit Administration's environmental documents. This guidance is for technical specialists who conduct the analyses, as well as project sponsor staff, Federal agency reviewers, and members of the general public who may be affected by the projects.



## Acknowledgments

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SECTION 1

# Introduction

## 1.1 Purpose

The Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of the National Environmental Policy Act of 1969 (NEPA)[1,2] require that a federally-funded project be assessed for its impact on the human and natural environment prior to implementation. The Federal Transit Administration (FTA), in conjunction with the Federal Highway Administration (FHWA), has issued detailed regulations implementing NEPA for transit and highway projects. The regulations are codified in part 771 of title 23, Code of Federal Regulations, and are titled "Environmental Impact and Related Procedures." (23 CFR part 771).[3]

The Federal Transit Administration (FTA) provides financial assistance for a range of public transportation projects from new rail rapid transit (RRT) systems to bus maintenance facilities and vehicle purchases. As required by NEPA and its implementing regulations, each project must undergo environmental review.

Noise and vibration are sometimes among the major concerns regarding the effects of a transit project on the surrounding community and are key elements of the environmental impact assessment process for public transportation projects. A transit system is often placed near population centers by necessity and may cause noise and vibration at nearby residences and other sensitive types of land use.

This manual provides technical guidance for conducting noise and vibration analyses for transit projects, as well as direction regarding preparation of the information for FTA's environmental documents. Some situations may not be explicitly covered in this manual; the exercise of professional judgment may be required to extend the basic methods in these cases and frequent consultation with FTA staff is important to ensure the methods used meet the requirements for environmental reviews. See Appendix G for information on using non-standard modeling procedures.

In general, the noise and vibration impact assessment process for projects includes the following steps:

1. Determine appropriate impact criteria (Section 4.1).
2. Conduct screening and determine appropriate level of noise analysis, analyze project noise impacts, and evaluate mitigation options if appropriate (Sections 4.2–4.5).
3. Determine appropriate level of vibration analysis, analyze project vibration impacts, and evaluate mitigation options if appropriate (Sections 6.1–6.5).
4. Analyze construction noise and vibration impacts (Section 7).
5. Document findings (Section 8).

## 1.2 Organization of the Manual

This guidance manual is organized by the following recommended analysis workflow. A glossary of terms used throughout this manual is available in Appendix A. Detailed information on the fundamentals of noise, noise impact criteria, clustering receivers, determining existing noise, computing source levels from measurements, and using non-standard methodology is available in the appendices.

**Section 2: Project Class of Action and Planning** – This section describes the first step in the analysis process that is applicable to both noise and vibration analyses.

**Section 3: Transit Noise** – This section provides the reader with background information specific to transit noise.

**Section 4: Noise Impact Analysis** – This section provides a general outline of the entire noise impact analysis process: guidelines on determining noise impact criteria, methods for choosing the appropriate level of noise analysis ("Screening," "General," or "Detailed"), steps for evaluating noise impacts with the Noise Screening Procedure (a simplified method of evaluating the potential for noise impact from transit projects), steps for evaluating noise impact with the General Noise Assessment procedure (a simplified assessment method to estimate noise impact and compare alternatives for transit projects), and steps for evaluating noise impact with the Detailed Noise Analysis procedure (a comprehensive assessment method to produce the most accurate estimates of noise impact intended for certain major public transportation projects).

**Section 5: Transit Vibration** – This section contains background information specific to transit vibration.

**Section 6: Vibration Impact Analysis –** This section provides a general outline of the entire vibration impact analysis process: guidelines on determining vibration impact criteria, methods for choosing the appropriate level of vibration analysis ("Screening," "General," or "Detailed"), steps for evaluating vibration impact with the vibration screening procedure (a simplified method of evaluating the potential for vibration impact from transit projects), steps for evaluating vibration impact with the general vibration assessment procedure (a simplified assessment method to estimate vibration impact and compare alternatives for transit projects), and steps for evaluating vibration impact with the detailed vibration analysis procedure (a comprehensive assessment method to produce the most accurate estimates of vibration impact intended for certain major public transportation projects).

**Section 7: Noise and Vibration During Construction** – This section presents the process of assessing noise and vibration impact during construction, including determination of level of assessment, source levels, impact criteria, and mitigation.

**Section 8: Documentation of Noise and Vibration Assessment** – This section includes guidance for documenting the noise and vibration assessment in technical reports and environmental documents.

SECTION 2

# Project Class of Action and Planning

The level of environmental analysis and review depends on the significance of any potential associated environmental impacts, which in turn depends in part on the scope and complexity of the proposed project. The goals of a transit noise and vibration impact assessment are to:

1. Determine existing noise and vibration levels.
2. Assess project noise and vibration for potential impact.
3. Evaluate the effect of mitigation options on impacts.

The class of action determination will inform the required level of analysis. The FTA Regional office[i] determines the class of action based on project information provided by the project sponsor. The following types of information can assist the FTA Regional office in an initial class of action determination for a project:

- Project description
- Project-specific graphics, including:
  - Project location/sizes
  - Known land use and environmental features
- Additional information, as appropriate:
  - Summary of prior planning
  - Draft purpose and need statement

Project classes of action are described in Section 2.1. Project planning and development guidelines are presented in Section 2.2.

## 2.1 Project Class of Action

FTA's environmental regulations classify projects by level of environmental analysis. The class of action will determine the appropriate level of analysis and documentation for a project. Details of each class are described in the following sections. For more information, review FTA's environmental impact and related procedures at 23 CFR part 771.

**Environmental Impact Statements**

Environmental impact statements (EISs) apply to projects that are expected to cause significant environmental effects in the NEPA context. Typical examples include new or extensions of fixed-guideway projects, such as heavy rail, light rail, commuter rail, and automated guideway transit (AGT) systems that are not located within existing transportation right-of-way (ROW). It is likely that for major infrastructure projects requiring an EIS, the most detailed treatment of noise and vibration impacts will often be required.

**Categorical Exclusions**

Categorical exclusions (CEs) cover actions that are excluded from requiring an EIS or environmental assessment (EA) because FTA has determined that they do

[i] http://www.fta.dot.gov/12926.html.

not routinely cause significant environmental impacts. FTA's CEs are located at 23 CFR §§ 771.118(c) and (d), commonly referred to as the c-list and d-list, respectively. Examples of projects that would normally be CEs include vehicle purchases, maintenance of equipment, vehicles, or facilities, and ROW acquisition.
In general, CEs for transit capital construction projects often require at least a screening of noise impacts.

**Environmental Assessments**
When a proposed project is presented to FTA and it is uncertain whether the project requires an EIS or qualifies for a CE, FTA will normally direct the project sponsor to prepare an environmental assessment (EA) to assist in making the determination. An EA may be prepared for any type of project if uncertainty exists about the magnitude or extent of the impacts. Generally, an EA is selected over a CE if FTA determines that several types of potential impacts require further investigation, for example, air quality, noise, wetlands, historic sites, and/or traffic, but FTA's environmental regulation does not list typical projects that require EAs.
Experience shows that most of the EAs prepared for transit projects require at least a general assessment of noise impacts.

## 2.2 Project Planning and Development

Capital transit projects are ordinarily developed initially from a comprehensive transportation planning process conducted in metropolitan areas (see 23 CFR § 450.300).[4] The metropolitan planning process often includes some early consideration of social, economic, and environmental effects of proposed major infrastructure improvements. At this stage, environmental effects are usually considered on a broad scale—for example, overall development patterns, impacts on green space, and regional air quality. Noise and vibration assessments are not typically performed at this stage because the proposed infrastructure improvements lack the necessary detail.

Once the need for a capital transit project in a corridor is established in the metropolitan transportation plan, the transit mode and general alignment best suited for the corridor are identified. The Screening and General noise assessment procedures and the vibration screening procedure described in this manual may be used to compare noise and vibration effects among different transit modes and alignments at an early stage of the project planning. The analysis that results is documented through the environmental review process.

NEPA establishes a broad policy regarding mitigation as a means of accomplishing its environmental objectives. Other Federal laws, such as Section 4(f) (49 U.S.C. 303) and Section 404 (33 U.S.C. 1344), have explicit mitigation requirements for certain resources. The decision to include noise or vibration mitigation for a project is made by FTA and the project sponsor after public review of the environmental document, as appropriate. If mitigation measures are deemed necessary to protect the environment or to satisfy statutory requirements, they will be incorporated as an integral part of the project and subsequent grant documents will reference these measures as contractual obligations on the part of the project sponsor. Through that process, FTA

ensures that the project sponsor complies with all design and mitigation commitments contained in the environmental record.

Once the project enters construction, noise or vibration may need to be reassessed in some circumstances. Some large construction projects in densely populated residential areas may require noise monitoring to ensure agreed-upon noise limits are not exceeded. Vibration testing may be needed in the final stages of construction to determine whether vibration control measures have the predicted effect.

Considering that transit projects must be located amid or very close to concentrations of people, noise and vibration impacts can be a concern throughout the environmental review process, design, and construction phases. This manual offers the flexibility to address noise and vibration at different stages in the development of a project and in different levels of detail.

## 2.3 Mitigation Policy Considerations

Because noise is frequently among the greatest environmental concerns of planned transit projects, FTA and the project sponsor should make reasonable efforts to reduce predicted noise to levels considered acceptable for affected noise-sensitive land uses. The need for noise mitigation is determined based on the magnitude of impact and consideration of factors specifically related to the proposed project and affected land uses.

The goal of providing noise mitigation is to gain substantial noise reduction, not simply to reduce the predicted levels to just below the "severe" impact threshold. For FTA to determine whether the mitigation is reasonable, the evaluation of specific mitigation measures should include the noise reduction potential, the cost, the effect on transit operations and maintenance, and any other relevant factors, such as any new environmental impacts that may be caused by the implementation of a noise reduction measure. A thorough evaluation enables FTA to make the findings required by NEPA and other statutes, such as Section 4(f) or Section 106 requirements and their implementing regulations.

Severe impacts have the greatest adverse impact on the community, and mitigation should be strongly considered. Areas with "moderate" impacts also have potential for effects on the community and therefore should also include consideration and possible adoption of mitigation measures when considered reasonable.

Since reasonableness is not strictly defined, FTA recommends that project sponsors work with the affected public and FTA staff during the environmental review process to decide appropriate mitigation strategies. A project sponsor may also consider developing and formally adopting a mitigation policy to aid in the determination of appropriate and applicable mitigation measures for current and proposed projects and anticipated impacts. Having such a policy in place can aid in the project planning up front and help to expedite mitigation decisions.

The following considerations can assist in determining circumstances that trigger the need for mitigation and include examples of how they can be applied in a noise mitigation policy:

- **Number of Noise-Sensitive Sites Affected**
  A row or cluster of residences adjacent to a rail transit line establishes a greater need for mitigation than one or several isolated residences in a mixed-use area. Single residences may not be able to meet a cost-effectiveness criterion for mitigation.

  ***Example Mitigation Policy Consideration:*** Set a minimum number of noise-sensitive sites as a threshold, combined with a reference to a cost-effectiveness criterion.

- **Increase over Existing Noise Levels**
  Since the noise impact criteria are delineated as bands or ranges, project noise can vary 5 to 7 decibels (dB) within the band of moderate impact at any specific ambient noise level. If the project and ambient noise plot falls just below the severe range, the need for mitigation is strongest for a moderate impact. Similarly, if the plot falls within the moderate range just above the no impact threshold, the impacts are expected to be less, so the justification for mitigation would not be as strong.

  ***Example Mitigation Policy Consideration:*** Set a strong need for mitigation when a moderate impact is 2 dB (for example) over the no impact threshold.

- **Noise Sensitivity of the Property**
  Section 4.1 includes a comprehensive list of noise-sensitive land uses, yet there can be differences in noise sensitivity depending on individual circumstances. For example, parks and recreational areas vary in their sensitivity depending on the type of use they experience (active vs. passive recreation) and the settings in which they are located.

  ***Example Mitigation Policy Consideration:*** Cite the use of the property as a determination of sensitivity for parks and recreational areas.

- **Effectiveness of the Mitigation Measure(s)**
  Determine the magnitude of the noise reduction that can be achieved, and consider whether there are conditions that limit effectiveness, such as noise barrier effectiveness for a multi-story apartment building.

  ***Example Mitigation Policy Consideration:*** Set a minimum reduction in noise level to be considered effective. A 5-dB reduction is typically considered an effective reduction from mitigation.

- **Feasibility of the Mitigation Measure(s)**
  Determine if the mitigation measure is feasible from an engineering, operations or safety perspective. In some cases, it may not be possible to construct mitigation (noise barriers) due to physical or structural limitations

or because of safety concerns, especially related to sight lines for pedestrians and vehicles.

***Example Mitigation Policy Consideration:*** State that the engineering design of the mitigation must be feasible, that it must be implementable in light of operations, and that mitigation must not compromise safety.

- **Fairness and Equity of the Mitigation Measure(s)**
  Ensure that mitigation measures are applied in a fair and equitable manner. In many cases, small differences in distances or operations can result in small differences in projected noise levels. For example, all the residences in a row could have a projected moderate impact except for one residence at the end of the row that falls just under the moderate criteria due to being set slightly further back from the alignment. In a case like this, mitigation should be applied for the entire row of residences if possible.

  ***Example Mitigation Policy Consideration:*** State that mitigation should be applied equitably.

- **Existing Transportation Noise**
  Neighborhoods with ambient noise levels already heavily influenced by transportation noise, especially the same type of noise source as the project, should be considered. Often adding a new similar noise source will not add to the ambient noise levels or only slightly increase it to within acceptable levels. Whereas, impacts would be more likely, if the new noise was added to a neighborhood with minimal transportation noise. However, it is important to note that per (Section 4.1, Step 3) the higher the existing noise, the lower the allowable noise increase from new sources. A new cumulative noise environment may be very objectionable because people will not be compartmentalizing the existing noise versus the new noise and reacting only to the new noise. In this circumstance, impacts predicted in the moderate range could be treated as if they were severe.

  ***Example Mitigation Policy Consideration:*** Set a policy that moderate impacts under these circumstances be treated as severe and cite the potential for reducing noise from existing transportation noise, as well as from project noise.

- **Community Views**
  This manual provides the methodology to make an objective assessment of the need for noise mitigation. However, the views of the community should be considered where there are potential noise impacts predicted through this manual. The NEPA compliance process provides the framework for hearing the community's concerns about a proposed project and then making a good-faith effort to address those concerns. Many projects can be expected to have projected noise levels within the moderate impact range and, where possible, decisions regarding mitigation should be made after considering input from the affected public, relevant government agencies, and community organizations. There have been cases where the solution to the noise problem, a noise barrier, was not preferable to community members because of perceived adverse visual effects.

***Example Mitigation Policy Consideration:*** State that community input in determining the need for mitigation will be included whenever possible.

- **Implementation Cost**
  Cost is an important consideration in reaching decisions about noise mitigation measures. One guideline for gauging the reasonableness of the cost of mitigation is the state DOT's procedures on the subject. Many states have established their own cost threshold per benefited residence for determining whether installation of noise barriers for noise reduction is a reasonable expenditure. Several airport authorities have placed limits on the costs they will incur for sound insulation per residence for homes, and FTA assesses cost in a similar manner by benefited residence. Higher costs may be justified depending on the specific set of circumstances of a project.

  ***Example Mitigation Policy Consideration:*** State the adopted cost threshold per benefited receiver for typical circumstances.

SECTION 3

# Transit Noise

This section presents the basic concepts of transit noise as background for computation methods and transit noise assessment procedures presented in Section 4. An overview of fundamental noise topics, including amplitude, frequency, time pattern, and decibel addition, is presented in Appendix B.

The Source-Path-Receiver framework for noise illustrated in Figure 3-1 is central to all environmental noise studies. Each transit source generates noise that depends upon the type of source and its operating characteristics. Along the propagation path, between all sources and receivers, noise levels can be reduced (attenuated) by distance depending on ground type, intervening obstacles, and other factors. Finally, noise combines from multiple sources at each receiver and potentially interferes with activities at that location.

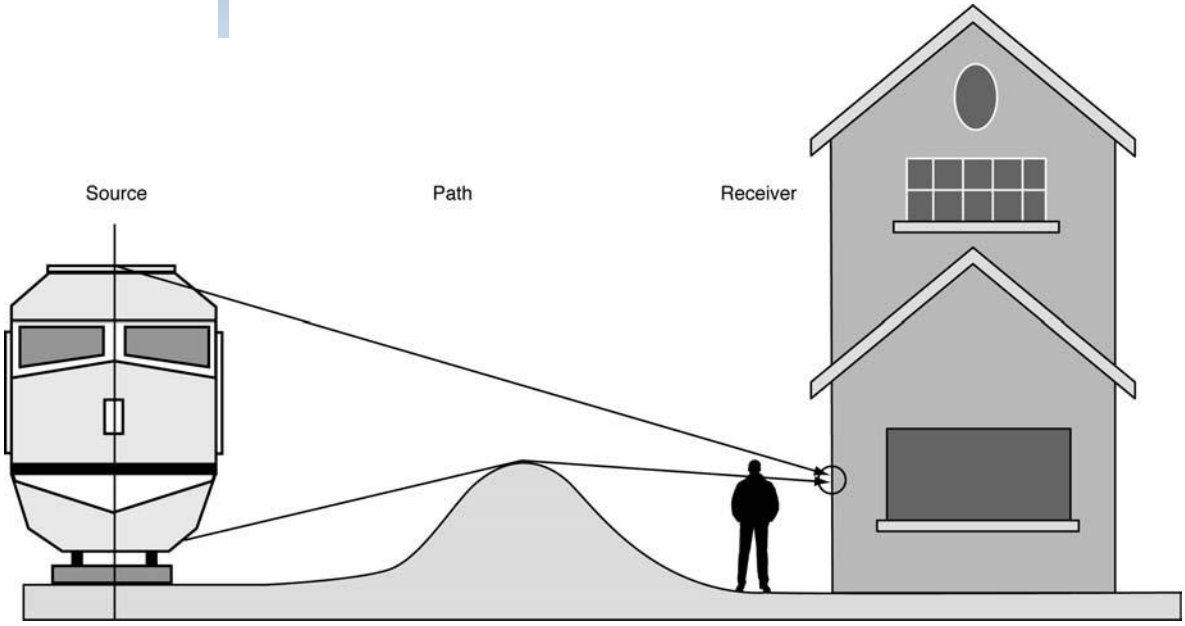


**Figure 3-1 Source-Path-Receiver Framework**

This section contains the following:

- Section 3.1 presents the noise metrics used in this manual.
- Section 3.2 provides an overview of transit noise sources, including a listing of major sources and a discussion of noise-generation mechanisms.
- Section 3.3 provides an overview of noise paths, including a discussion of the various attenuating mechanisms on the path between source and receiver.
- Section 3.4 provides an overview of receiver response to transit noise, including a discussion of the technical background for transit noise criteria and the distinction between absolute and relative noise impact.

## 3.1 Noise Metrics

This manual uses the noise metrics outlined in Table 3-1 for transit noise measurements, computations, and assessment. The terminology is consistent with common usage in the United States. All of these noise metrics are expressed in units of A-weighted decibels (dBA). A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This is the basic noise unit for transit noise analyses.

**Table 3-1 Noise Metrics**

| Metric | Abbreviation | Definition |
|---|---|---|
| A-weighted Sound Level | dBA | A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This is expressed as A-weighted decibels (dBA), the basic noise unit for transit noise analyses. |
| Sound Exposure Level | *SEL* | SEL is the cumulative noise exposure from a single noise event, normalized to one second. SEL contains the same overall sound energy as the actual varying sound energy during the event. It is the primary metric for the measurement of transit vehicle noise emissions, and is an intermediate metric in the measurement and calculation of both $L_{eq(t)}$ and $L_{dn}$. |
| Equivalent Sound Level | $L_{eq(t)}$ | The equivalent sound level $L_{eq(t)}$ describes a receiver's cumulative noise exposure from all events normalized to a specified period of time "t". $L_{eq(t)}$ represents a hypothetical, constant sound level and contains the same overall sound energy as the actual varying sound energy during the time period "t". For transit noise impact assessments, the equivalent sound level metric is A-weighted and all events are normalized over a one-hour time period, $L_{eq(1hr)}$. For transit noise assessments, this metric is appropriate for non-residential land uses and is computed for the loudest hour of project related activity during hours of noise sensitivity. |
| Day-Night Sound Level | $L_{dn}$ | $L_{dn}$ describes a receiver's cumulative noise exposure from all events over 24 hours. Events between 10 p.m. and 7 a.m. are increased by 10 dB to account for humans' greater nighttime sensitivity to noise. $L_{dn}$ is used to assess transit noise for residential land uses. |
| Maximum Sound Level | $L_{max}$ | The maximum level describes the maximum noise level reached during a single noise event. For transit noise impact assessments, it is appropriate to consider the A-weighted maximum level ($L_{max}$ ) to understand the full context of the scenario. It is not appropriate to use this metric for transit noise impact assessments. This metric is commonly used in vehicle noise specifications and commonly measured for individual vehicles. |

The noise metrics, including their application to transit noise and vibration impact assessment, are described in more detail in Appendix B.1.4. Mathematical definitions and graphic illustrations are presented to facilitate understanding and the interrelationships among metrics.

## 3.2 Sources of Transit Vehicle Noise

This section discusses major characteristics of the sources of transit noise. Transit noise can be generated by transit vehicles in motion, stationary transit

vehicles, and fixed-transit facilities. Procedures for computing nearby noise levels for major sources as a function of operating parameters such as vehicle speed are given in Sections 4.4 and 4.5.

**Transit Vehicles in Motion**

Transit vehicles most noticeably create noise when in motion. Noise from transit vehicles in motion can come from multiple sources, including the propulsion unit (i.e., the engine and engine components), the interaction of the wheels and/or tires and the running surface, and warning bells and horns.

Vehicle propulsion units generate:

- Whine from electric control systems and traction motors that propel rapid transit cars
- Diesel-engine exhaust noise from both diesel-electric locomotives and transit buses
- Air-turbulence noise generated by cooling fans
- Gear noise

Noise is also generated by the interaction of wheels and/or tires with their running surfaces. Tire noise from rubber-tired vehicles is generated at normal operating speeds. The interaction of steel wheels and rails generates:

- Rolling noise due to continuous rolling contact
- Impact noise when a wheel encounters a discontinuity in the running surface such as a rail joint, turnout or crossover (where the train or rail vehicle switches off one track and onto another)
- Impact noise from the wheel and running surface if the wheel is not completely round (wheel flat) or if the running surface is not completely flat
- Squeal generated by friction between wheels and rail on tight curves

Transit vehicles are equipped with horns and bells for use in emergency situations and as a general audible warning to track workers and trespassers within the ROW, pedestrians, and motor vehicles at highway grade crossings. Horns and bells on the moving transit vehicle combined with stationary bells at-grade crossings can generate high noise levels for nearby residents and are often sources of complaints.

For many noise sources, such as transit vehicles, the sound level is dependent on the speed of the noise source. In other cases, such as for stationary sources or horns mounted on vehicles, the sound level is not dependent on speed. Figure 3-2 illustrates sound level dependence on speed for a diesel-powered commuter rail train and an electric-powered transit train assuming all other parameters, such as weight, are equal. Plotted vertically in this figure is a notional indication of the maximum sound level during a passby. Speed dependence is strong for electric-powered transit trains because wheel/rail noise is the dominant noise source and noise from this type of source increases strongly with speed. Diesel-powered commuter rail train noise is dominated by the locomotive exhaust noise at slower speeds. As speed increases, wheel-rail

noise becomes the dominant noise source and diesel- and electric-powered trains generate similar noise levels. Similarly, speed dependence is also strong for automobiles, city buses (two-axle), and non-accelerating highway buses (three-axle), because tire/pavement noise is the dominant noise source for these vehicles. Accelerating highway bus noise is dominated by exhaust noise.

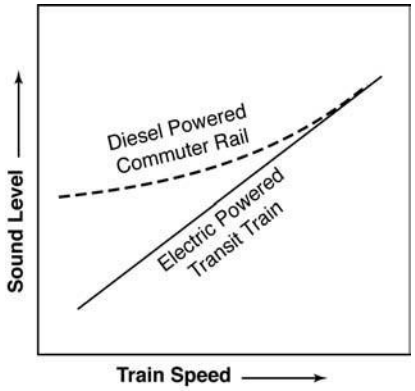


**Figure 3-2 Sound Level Dependence on Speed**

Sound levels close to the source are also dependent on vehicle acceleration, vehicle length, running surface type, and running surface condition. For high-speed rail vehicles (vehicles with an operating speed of 90–250 mph are typically beyond the scope of this manual), air turbulence can also be a source of noise. In addition, for an elevated structure, the guideway can radiate noise as it vibrates in response to the dynamic loading of the moving vehicle.

### Stationary Transit Vehicles

Noise can be generated by transit vehicles even when they are stationary. For example, auxiliary equipment such as cooling fans on motors, radiator fans, plus hydraulic, pneumatic, and air-conditioning pumps, often continue to run when vehicles are stationary. Transit buses are also often left idling in stations or storage yards.

### Fixed-transit Facilities

Noise can also be generated by sources at fixed-transit facilities. Such sources include ventilation fans in transit stations, subway tunnels, and electric power substations, as well as equipment in chiller plants, and many activities within maintenance facilities and shops.

### Common Noise Sources

Table 3-2 summarizes common sources of transit noise by vehicle and facility type.

**Table 3-2 Sources of Transit Noise**

| Vehicle or Facility* | Dominant Components | Comments |
|---|---|---|
| RRT or Light Rail Transit (LRT) on exclusive ROW | Wheel/rail interaction and guideway amplification | Depends on condition of wheels and rails |
| | Propulsion system | When accelerating and at higher speeds |
| | Brakes | When stopping |
| | Auxiliary equipment | When stopped |
| | Wheel squeal | On tight curves |
| | *In general* | Noise increases with speed and train length |
| LRT in Mixed Traffic | Wheel squeal | On tight curves |
| | Auxiliary equipment | When stopped |
| | Horns and crossing bells | At-grade crossings and stations |
| | *In general* | Traveling at lower speeds in mixed traffic produces less noise than when traveling at higher speeds in exclusive ROW |
| Commuter Rail | Diesel exhaust | On diesel-hauled trains |
| | Cooling fans | On both diesel and electric-powered trains |
| | Wheel/rail interaction | Depends on condition of wheels and rails |
| | Horns and crossing gate bells | At-grade crossings and stations |
| | *In general* | Noise is usually dominated by locomotives and horns/bells at-grade crossings |
| Low and Intermediate Capacity Transit | Propulsion systems, including speed controllers | At low speeds |
| | Ventilation systems | At low speeds |
| | Tire/guideway interaction | For rubber-tired vehicles, including monorails |
| | Wheel/rail interaction | Depends on condition of wheels and rails |
| | *In general* | Wide range of vehicles: monorail, rubber-tired, steel-wheeled, linear induction. Noise characteristics depend upon type |
| Diesel Buses | Cooling fans | While idling |
| | Engine casing | While idling |
| | Diesel exhaust | At low speeds and while accelerating |
| | Tire/roadway interaction | At moderate and high speeds |
| | *In general* | Includes city buses (generally two-axle) and commuter buses (generally three-axle) |
| Electric Buses and Trackless Trolleys | Tire/roadway interaction | At moderate speeds |
| | Electric traction motors | At moderate speeds |
| | *In general* | Much quieter than diesel buses |
| Bus Storage Yards | Buses starting up | Usually most disruptive in the early morning |
| | Buses accelerating | Usually near entrances/exits and/or locations that require buses to accelerate (tight turns) |
| | Buses idling | Warm-up areas |
| | *In general* | Site specific: often peak periods with considerable noise |
| Rail Transit Storage Yards | Wheel squeal | On tight curves |
| | Wheel impacts | On joints and switches |
| | Wheel rolling noise | On tangent track |
| | Auxiliary equipment | Throughout day and night; includes air-break release noise |
| | Coupling/uncoupling | On storage tracks |
| | Signal horns | Throughout yard site |
| | *In general* | Site specific: often early morning and peak periods with considerable noise |

| | | |
|---|---|---|
| Maintenance Facilities | Signal horns | Throughout facility |
| | Intercoms | Throughout facility |
| | Impact tools | Shop buildings |
| | Car/bus washers/driers | Wash facility |
| | Vehicle activity | Throughout facility |
| | *In general* | Site specific: considerable activity throughout day and night, some outside. |
| Stations | Automobiles | Patron arrival/departure, especially in early morning |
| | Buses idling | Bus loading zone |
| | Intercoms | Platform area |
| | Locomotive idling | At commuter rail terminal stations |
| | Auxiliary systems | At terminal stations and layover facilities |
| | Horns | At stations, if applicable |
| | *In general* | Site specific, with peak activity periods |
| Subways | Fans | Noise through vent shafts/structures |
| | Buses/trains in tunnels | Noise through vent shafts/structures |
| | *In general* | Noise is not a problem, except in the immediate vicinity of vent shafts/structures. |

* Refer to Appendix A for additional information.

## 3.3 Paths of Transit Noise from Source to Receiver

This section contains a qualitative overview of noise-path characteristics from source to receiver, including attenuation along these paths. Equations for specific noise-level attenuations along source-receiver paths are included in Sections 4.4 and 4.5.

Sound paths from source to receiver are predominantly through the air. Along these paths, sound reduces with distance due to divergence, absorption/diffusion, and shielding. These mechanisms of sound attenuation are discussed below.

**Divergence**

Sound levels naturally attenuate with distance, as shown in Figure 3-3. The plot shows attenuation at the receiver relative to the sound level 50 ft from the source. This type of attenuation is called divergence and is dependent upon source configuration (line or point source) or other source-emission characteristics. Localized sources (point sources) grouped closely together attenuate greatly with distance at a rate of approximately 6 dB per doubling of distance. Examples of point sources include highway grade-crossing signals along rail corridors, intercoms in maintenance yards and other closely grouped sources of noise. Vehicles passing along a track or roadway forming a line are called line sources. Line sources attenuate less than point sources with distance. Rate of attenuation for line sources varies depending on the noise metric. $L_{eq(1hr)}$ and $L_{dn}$ noise levels attenuate at a rate of 3 dB per doubling of distance and $L_{max}$ noise levels attenuate at a rate of 3 to 6 dBs per doubling of distance.

Figure 3-3 illustrates approximate attenuation with distance between the source and receiver for point and line sources. The line source curve for the $L_{max}$ noise

metric separates into three curves because it is dependent on the length of the line source. Equations for the curves in Figure 3-3 are included in Section 4.5.

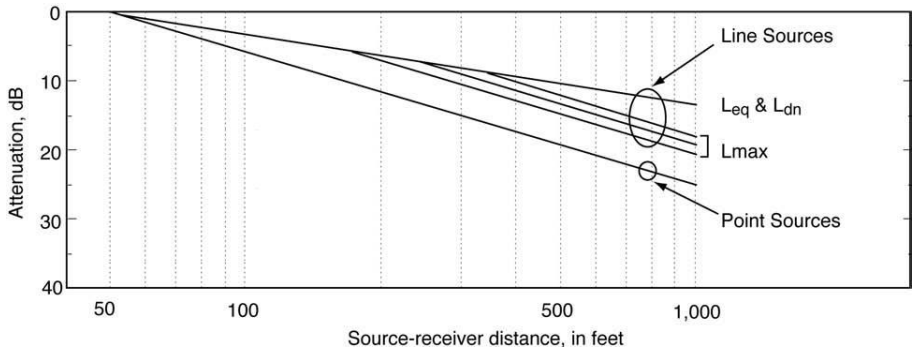


**Figure 3-3 Attenuation Due to Distance (Divergence)**

## Absorption/Diffusion

In addition to distance, sound levels can be attenuated depending on the type of ground between the source and receiver. A portion of the sound energy is absorbed by the ground and only the remaining energy travels to the source. How much energy the ground absorbs is dependent on the ground type (characterized as acoustically "hard" or "soft") and geometry. Example absorptive ground types include freshly-plowed or vegetation-covered ground. Figure 3-4 illustrates approximate attenuation due to ground type by source to receiver path distance and height. Ground attenuation can be as large as 5 dB over a path distance of several hundred ft. At very large distances, wind and temperature gradients could modify the expected ground attenuation. However, these variable atmospheric effects are not included in this manual because they generally occur beyond the range of typical transit-noise impact. Equations for the curves in this figure are included in Section 4.5.

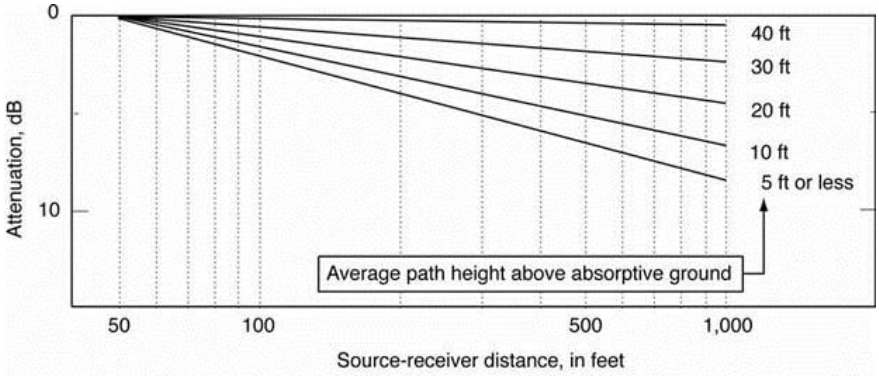


**Figure 3-4 Attenuation due to Soft Ground**

## Shielding

Sound paths are sometimes interrupted by terrain, human-constructed noise barriers, rows of buildings, or other objects. Noise barriers are one of the most effective means of mitigating noise (Section 4.5, Step 7). A noise barrier reduces sound levels at a receiver by breaking the direct line-of-sight between source and receiver with a solid wall (in contrast to vegetation which hides the source from view but does not reduce sound levels substantially over short distances). Sound energy reaches the receiver only by bending (diffracting) over the top of

the barrier, as shown in Figure 3-5. This diffraction over the barrier reduces the sound level that reaches the receiver. One important consideration in using noise barriers to mitigate noise impacts is safety. Noise barriers, if not designed and sited carefully, can reduce visibility of trains for pedestrians and motorists, leading to less safe conditions. It is important to consult with safety experts when choosing and siting a noise barrier.

Noise barriers for transportation systems are typically used to attenuate noise at the receiver, potentially reducing received sound levels by 5 to 15 dB, depending upon barrier height, length, and distance from both source and receiver. Barriers on structures close to the transportation noise source may provide less attenuation than barriers located farther from the source due to reverberation (multiple reflections) between the barrier and the body of the vehicle or noise source. This reverberation can be offset by increased barrier height and/or acoustical absorption on the source side of the barrier. Further discussion and equations on acoustical absorption and barrier attenuation is provided in Section 4.5.

Source-to-receiver sound paths may not always travel through the air, but rather through the ground or through structural components of the receiver's building. Discussion of such ground-borne and structure-borne propagation is included in Section 5.

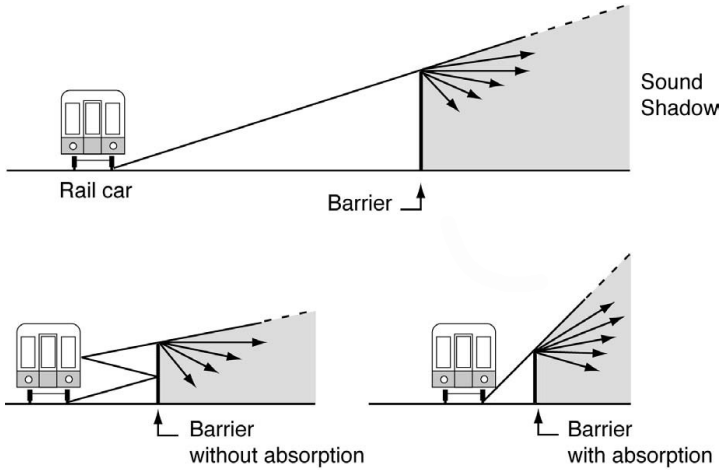


**Figure 3-5 Noise Barrier Geometry**

## 3.4 Receiver Response to Transit Noise

This section contains an overview of human receiver response to noise. It serves as background information for the noise impact criteria in Section 4.1.

Noise can interrupt ongoing activities causing community annoyance, especially in residential areas. In general, most residents become highly annoyed when noise interferes considerably with activities such as sleeping, talking, noise-sensitive work, and audio entertainment. In addition, some land uses, such as outdoor concert pavilions, are inherently incompatible with high noise levels.

Annoyance from noise has been investigated and approximate dose-response relationships have been quantified by the U.S. Environmental Protection Agency (EPA).[5] The selection of noise metrics in this manual is largely based upon this EPA work. Beginning in the 1970s, the EPA undertook a number of research and synthesis studies relating to community noise of all types. Results of these studies have been widely published, discussed, and refereed by many professionals in acoustics. Basic conclusions of these studies have been adopted by the Federal Interagency Committee on Noise (FICON),[ii] the U.S. Department of Housing and Urban Development (HUD), the American National Standards Institute, and even internationally[6][7][8][9]. Conclusions from this seminal EPA work remain scientifically relevant today.

Figure 3-6 contains a synthesis of actual case studies of community reaction to newly introduced sources of noise in a residential urban neighborhood.[10] Plotted horizontally in the figure is the increase in noise from new sources above existing noise levels expressed as Day-Night Sound Levels, $L_{dn}$, discussed in Appendix B.1.4.5. Plotted vertically is the community reaction to this newly introduced noise. As shown in the figure, community reaction varies from no reaction to vigorous action for newly introduced noises averaging from 10 dB below existing to 25 dB above existing. Note the assumptions included in the graphic are associated with the specific data points from the study. These assumptions are generally appropriate to give context to most transit projects, but community reaction may differ for conditions specific to each project.

In many community attitudinal surveys, transportation noise has been ranked among the greatest causes of community dissatisfaction. A synthesis of many such surveys on annoyance is shown in Figure 3-7.[11][12] Noise exposure levels are plotted against the percentage of people who are highly annoyed by the particular level of neighborhood noise. As shown in the figure, the percentage of high annoyance is approximately 0 percent at 45 dB, 10 percent around 60 dB, and increases quite rapidly to approximately 70 percent around 85 dB. The scatter about the synthesis line is due to community variation and wording differences in the surveys. An update of the original research containing additional railroad, transit and street traffic noise surveys generally follows the shape of the original response curve shown in Figure 3-7.[12][13]

As indicated by Figure 3-6 and Figure 3-7, introduction of certain levels of transit noise into a community may have two undesirable effects. First, it may substantially increase noise levels above existing noise levels in a community. This effect is called a relative noise impact. Evaluation of this effect compares new noise levels to the existing levels. Criteria for a relative noise impact evaluation are based upon noise increases above existing levels. Second, newly introduced transit noise may interfere with community activities independent of existing noise levels. For example, it may be too loud to converse or sleep. This effect is called absolute noise impact and is expressed as a fixed level threshold that is not to be exceeded. The fixed level threshold is determined independently of existing noise levels. Relative and absolute noise impacts are discussed in terms of transit noise criteria in Section 4.1, Step 3.

[ii] The Federal Interagency Committee on Aviation Noise (FICAN) is the current version of this group.

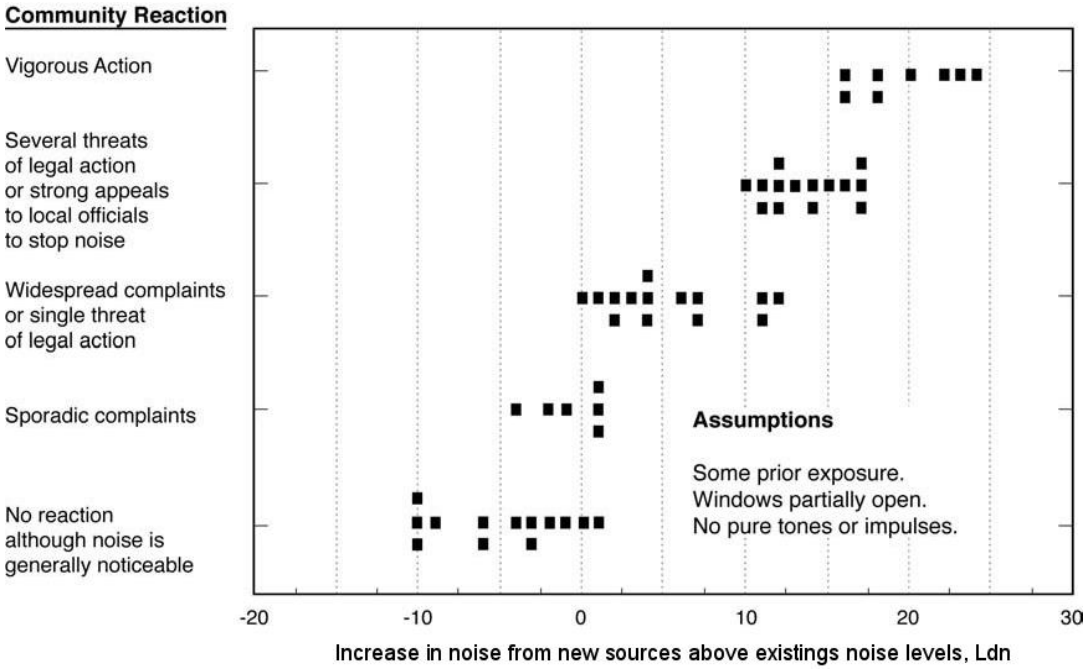


**Figure 3-6 Community Reaction to New Noise, Relative to Existing Noise in a Residential Urban Environment**

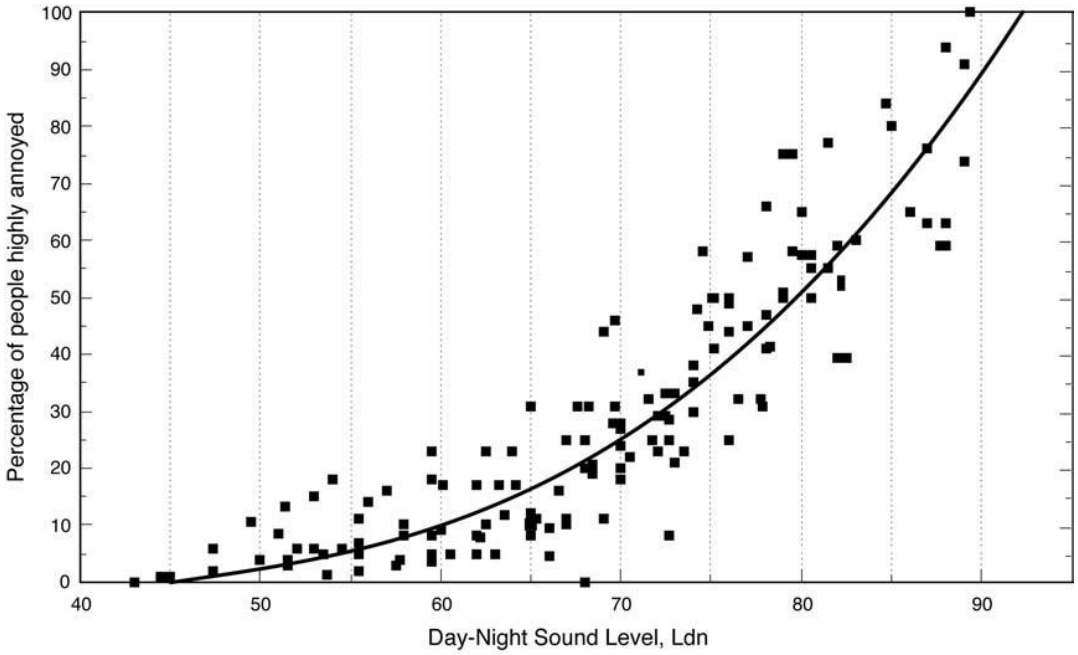


**Figure 3-7 Community Annoyance Due to Noise**

SECTION 4

# Noise Impact Analysis

The FTA noise impact analysis process is a multi-step process used to evaluate the project for potential noise impacts for FTA NEPA approvals. If impact is determined, measures necessary to mitigate adverse impacts must be considered for incorporation into the project.[4] It is recommended that project sponsors develop and formally adopt a policy for determining the need for mitigation for situations that are loosely covered by the impact criteria. Considerations for mitigation policies are included in Section 2.3. The FTA noise impact analysis steps are summarized as follows and are described in the subsequent subsections:

**4.1:** Determine noise impact criteria.
- **Step 1:** Identify the type of project/dominant noise source (transit or multimodal).
- **Step 2:** Choose land use category for FTA criteria.

**4.2:** Determine the highest appropriate level of noise analysis for the current stage of project planning or development.

**4.3:** Evaluate for the potential of impact according to the Noise Screening Procedure.
- **Step 1:** Identify project type.
- **Step 2:** Determine the screening distance.
- **Step 3:** Identify the study area.
- **Step 4:** Locate noise-sensitive land uses.

**4.4:** Evaluate impact according to the General Noise Assessment and evaluate preliminary mitigation options if impact is found.
- **Step 1:** Identify noise-sensitive receivers.
- **Step 2:** Determine the project noise source reference levels.
- **Step 3:** Estimate project noise exposure by distance.
- **Step 4:** Combine noise exposure from all sources.
- **Step 5**: Measure existing noise exposure.
- **Step 6:** Inventory noise impacts.
- **Step 7:** Determine noise mitigation needs.

**4.5:** Evaluate for impact according to the Detailed Noise Analysis and evaluate mitigation options if impact is found.
- **Step 1:** Identify noise-sensitive receivers.
- **Step 2:** Determine noise source levels for detailed analysis.
- **Step 3:** Calculate project noise exposure by distance.
- **Step 4:** Combine noise exposure from all sources.
- **Step 5:** Determine existing noise exposure.
- **Step 6:** Assess noise impact.
- **Step 7:** Determine noise mitigation measures.

In addition to analyzing for potential noise impacts, analyze the project for potential vibration impacts according to the process presented in Section 6. After both the noise and vibration analyses have been completed, assess

construction noise and vibration according to Section 7 and document findings according to Section 8.

## 4.1 Determine Noise Impact Criteria

This section describes the procedure for determining the appropriate criteria for assessing project noise impact based on the type of project and project noise source. Project noise is the new noise or change in noise introduced by the project. Noise impact criteria may vary for different segments of the project. Project segments can be portions of a project with similar characteristics.

The procedure to determine the appropriate impact criteria is described in this section and shown more simply as a flow chart in Figure 4-1. If there is uncertainty in how to determine the appropriate criteria, contact the FTA Regional office.

The selected criteria are used in the analysis procedures discussed in Sections 4.3, 4.4, and 4.5 to identify potential impacts and the level of impact.

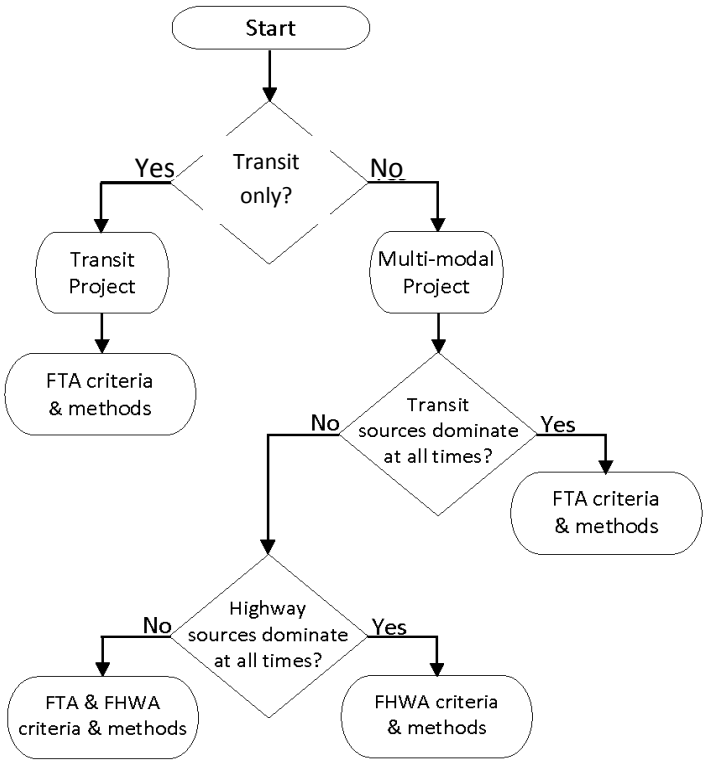


**Figure 4-1 Noise Impact Criteria Flow Chart by Project Segment**

## Step 1: Identify Project Type

*Identify the type of project as transit, multimodal (transit and highway), or other multimodal according to the dominant noise source.*

**Option A: Transit Project (Transit Noise Only) –** The transit project category includes all transit projects where the project noise is exclusively due to new transit sources, no changes are made to the highway or to existing highway noise barriers, and the existing noise levels generated by roadway sources will not change because of the project. For these transit projects, FTA is the lead agency conducting the environmental review in cooperation with the transit agency.

Typical examples of transit projects include:

- RRT, LRT, commuter rail, and AGT
- Rail projects built within an existing highway or railroad corridor that do not alter the existing noise levels generated by roadway sources
- Bus facility projects with operations on local streets and highways used to access the facility, where the project does not include roadway construction or modification that changes roadway capacity substantially
- Fixed facilities including storage and maintenance yards, passenger stations and terminals, parking facilities, and substations
- Portions of transit projects not adjacent to highway corridors

*FTA impact criteria are appropriate for transit projects, proceed to Step 2.*

**Option B: Multimodal Project (Transit and Highway Noise) –** In this manual, "multimodal" refers to projects that include changes to both transit and highway components, resulting in project noise comprised of both highway and transit noise sources.

Typical examples of multimodal projects include:

- New highway construction providing general-purpose lanes as well as dedicated bus and high occupancy vehicle (HOV) lanes
- Rail transit projects that involve changes to the highway travel lanes or existing highway noise barriers

Evaluate multimodal projects for impact according to the project noise source by project segment. FHWA's noise assessment methods are used to inform FTA's NEPA evaluation only for segments where highway noise levels change due to the transit project. These projects are not necessarily subject to FHWA's procedures at 23 CFR part 772 *(see call out box below*). For segments of the project outside the highway corridor, use FTA's criteria and methods. Use Table 4-1 to determine multimodal project noise.

Once the project noise source(s) is identified**,** determine the appropriate assessment method according to Table 4-2.

Note that a separate noise analysis may be required for FHWA approval of a multimodal project pursuant to 23 CFR part 772. For these projects, it is important to work with FHWA early in the environmental review process to determine how a noise assessment will be completed where FHWA approval is needed for the project.

The determination of whether a project is subject to FHWA procedures at 23 CFR part 772 depends upon the specific circumstances of a project. A proposed transit project that would share an existing highway ROW is not necessarily a FHWA-defined multimodal project. A transit project that meets all three of the following criteria is not considered a multimodal project subject to 23 CFR part 772:

- FTA is the lead agency in the NEPA process and FHWA's limited participation is as a cooperating agency.
- The main transportation purpose of the project, as stated in the purpose and need statement of the environmental document, is transit-related and not highway-related.
- No Federal-aid highway funds are being used to fund the project.

**Table 4-1 Multimodal Project Noise Factors**

| Factor | Description |
|---|---|
| Volume of Traffic | Major freeways and interstate highways often carry large volumes of traffic throughout the day and night such that the highway noise dominates at all times. Transit noise in this case may be unimportant by comparison, but must still be evaluated using FTA's noise criteria for a potential impact. |
| Traffic Patterns | Some highways and arterials serve primarily as commuter routes such that nighttime traffic diminishes considerably, while transit systems continue to operate well into the late hours. Here the dominant noise source at times of maximum sensitivity may be transit. |
| Type of Traffic | Some highways and arterials may serve commuters during the daytime hours, but provide access to business centers by trucks at night. In this case, the roadway noise would likely continue to dominate. |
| Alignment Configuration | Elevation of the transit mode in the median or beside a busy highway may result in transit noise contributing more noise to nearby neighborhoods than a highway that may be partially shielded by rows of buildings adjacent to the ROW. In this case, both transit and highway noise may be considered dominant. |

**Table 4-2 Multimodal Project Assessment Methods**

| Dominant Noise Source | Assessment Method |
|---|---|
| Transit, at All Times | Use FTA criteria and methods. *Proceed to Step 2.* |
| Highway, at All Times | Use FHWA criteria and methods to inform FTA's NEPA evaluation. *Contact FHWA directly for assistance using FHWA noise analysis methods and FHWA noise impact criteria.* |
| Transit and Highway at Different Times | Use both the FHWA and FTA methods to determine if one, both, or neither method determines impact due to the project noise for these segments. Note that the project noise includes both highway and transit sources associated with the project. Both methods are used because the FTA methods consider nighttime sensitivity while the FHWA methods consider the peak traffic hour. *Proceed to Step 2 for FTA criteria. Contact FHWA directly for assistance using FHWA noise analysis methods and FHWA noise impact criteria.* |

**Option C: Other Multimodal Projects –** For projects with components from other modes, contact the FTA Regional office. Additional information on high-speed rail vibration and noise can be found in the Federal Railroad Administration (FRA) "High-Speed Ground Transportation Noise and Vibration Impact Assessment" guidance manual.[14]

## Step 2: Choose Land Use Category for FTA Criteria

*Determine the appropriate noise-sensitive land use category for the project segment using Table 4-3 and the descriptions below then, proceed to Step 3. FTA criteria are presented by land use.*

**Table 4-3 Land Use Categories and Metrics for Transit Noise Impact Criteria**

| Land Use Category | Land Use Type | Noise Metric, dBA | Description of Land Use Category |
|---|---|---|---|
| 1 | High Sensitivity | Outdoor $L_{eq(1hr)}$* | Land where quiet is an essential element of its intended purpose. Example land uses include preserved land for serenity and quiet, outdoor amphitheaters and concert pavilions, and national historic landmarks with considerable outdoor use. Recording studios and concert halls are also included in this category. |
| 2 | Residential | Outdoor $L_{dn}$ | This category is applicable all residential land use and buildings where people normally sleep, such as hotels and hospitals. |
| 3 | Institutional | Outdoor $L_{eq(1hr)}$* | This category is applicable to institutional land uses with primarily daytime and evening use. Example land uses include schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities are also included in this category. |

* $L_{eq(1hr)}$ for the loudest hour of project-related activity during hours of noise sensitivity.

Noise-sensitive land use categories are described in in order of sensitivity. Most commercial or industrial uses are not considered noise-sensitive because activities within these buildings are generally compatible with higher noise levels. Business can be considered noise-sensitive if low noise levels are an important part of operations, such as sound and motion picture recording studios.

For residential land use (category 2), apply the noise criteria at the nearest façade of the occupied portion of the building, e.g., not at a garage or porch. The residential criteria should be applied at locations with nighttime sensitivity. For major noise-sensitive outdoor use at non-residential locations, apply the noise criteria at the point of noise-sensitive use nearest the noise source.

Land use categories are evaluated using noise metrics that reflect the noise-sensitive time of day:

- **Categories 1 and 3** – The noise metric, $L_{eq(1hr)}$ is used for all category 1 and 3 land uses where nighttime sensitivity is not a factor. Category 3 land uses are considered less noise-sensitive than category 1 land uses. For transit analyses, $L_{eq(1hr)}$ is computed for the noisiest hour of transit-

related activity during which human activities occur at the noise-sensitive location. See Appendix B.1.4.4 for more information on this metric.

- **Category 2** – The noise metric $L_{dn}$ is a used for all category 2 land uses where nighttime sensitivity is a factor. This noise metric includes a 10-dB penalty for nighttime noise. See Appendix B.1.4.5 for more information on this metric.

**Land Use Categories: Special Cases**

Historic sites, parks, indoor-only land use, and undeveloped land require special consideration. In addition to NEPA, noise impacts may need to be considered under other environmental laws such as Section 106[15] or Section 4(f).[16] Indoor-only use and undeveloped land should be evaluated on a case-by-case basis to determine noise sensitivity based on how each facility is used or the reason it is protected under the applicable requirement.

**Historic Sites** – Section 106 requires Federal agencies to evaluate potential effects from projects on historic properties. Per the regulations at 36 CFR part 800,[17] historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for the National Register of Historic Places (NRHP). An adverse effect determination under Section 106 is made when a project may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Under FTA environmental reviews, some structures may be evaluated as noise-sensitive resources per this noise manual and evaluated as historic properties under Section 106. However, because this manual and Section 106 regulations have different criteria for effect, identifying a severe noise impact for a structure under this manual does not necessarily mean there would be an adverse effect under Section 106. It is important to thoroughly document the characteristics of historic properties that qualify for inclusion in the NRHP for evaluation of effect under Section 106.

If a property, for example, is listed on the NRHP under criterion C because the structure possesses high artistic values, but lacks integrity of setting, feeling, or association, it is unlikely that a change in the noise environment would affect the features that qualify the property for listing or eligibility for inclusion in the NRHP.

In the assessment of effects on historic properties, consideration should be given to not just the proposed transit project, but any associated mitigation measures with the transit project. For example, if a transit project would involve noise walls or berms as mitigation, the effect of those structures on the visual setting may need to be considered in a Section 106 analysis.

**Parks** – Most parks used primarily for active recreation such as sports complexes and bike or running paths are not considered noise-sensitive.

However, some parks (even some in dense urban areas) are primarily used for passive recreation such as reading, conversation, or meditation. These places, which may be valued as havens from the noise and rapid pace of everyday city life, are treated as noise-sensitive, and are included in land use category 3. Consult the state or local agency with jurisdiction over the park on questions about how the park is used, and visit the park to observe its use, if possible.

**Indoor-Only Use** – The land use categories described in this section correspond with noise impact criteria that provide protection for both outdoor and indoor land uses. For locations where noise impact will be evaluated but there is no outdoor land use such as apartment buildings, hotels or upper levels of multi-story buildings, indoor criteria can be used. In these cases, the criterion for indoor noise levels from project sources is a $L_{dn}$ of 45 dBA.[18] This criterion is consistent with the Federal Aviation Administration (FAA). See Section 4.5 for more information on how indoor criteria apply to noise mitigation consideration.

**Undeveloped Land –** Undeveloped land may also need to be considered for noise impact assessment and mitigation if plans are under way to develop the land for noise-sensitive use. The policy for considering such land for assessment and mitigation should be determined on a project-specific basis by the project sponsor in consultation with the FTA Regional office.

## Step 3: Determine Appropriate FTA Criteria Presentation

FTA criteria for noise impact were developed specifically for transit noise sources operating on fixed-guideways or at fixed facilities in urban areas. These criteria are based on well-documented research on human response to community noise and represent a reasonable balance between community benefit and project costs. These criteria do not reflect specific community attitudinal factors. See Appendix C for additional background information on the development of FTA noise criteria.

The criteria specify a comparison of future project noise with existing noise. Note that projections of future noise exposure without the project (no-build scenario) are not included in this analysis. The criteria also consider land use which is an important factor that reflects noise sensitivity based on activity and time period of concern. The criteria are defined with the expectation that communities already exposed to high levels of noise can only tolerate a small increase. In contrast, if the existing noise levels are low, it is reasonable to allow a greater change in the community noise.

The levels of impact are described in Table 4-4. The criteria at which the levels of impact occur are presented in two ways depending on the relationship of project and existing noise sources.

*If the project noise source is a new source of transit noise in the community, such as a new project in an area currently without transit, use the criteria as presented in Option A. If the project noise adds to or changes existing transit noise in the community, use the criteria as presented in Option B.*

**Table 4-4 Levels of Impact**

| Level of Impact | Description |
|---|---|
| No Impact | Project-generated noise is not likely to cause community annoyance. Noise projections in this range are considered acceptable by FTA and mitigation is not required. |
| Moderate Impact | Project-generated noise in this range is considered to cause impact at the threshold of measurable annoyance. Moderate impacts serve as an alert to project planners for potential adverse impacts and complaints from the community. Mitigation should be considered at this level of impact based on project specifics and details concerning the affected properties. |
| Severe Impact | Project-generated noise in this range is likely to cause a high level of community annoyance. The project sponsor should first evaluate alternative locations/alignments to determine whether it is feasible to avoid severe impacts altogether. In densely populated urban areas, evaluation of alternative locations may reveal a trade-off of affected groups, particularly for surface rail alignments. Projects that are characterized as point sources rather than line sources often present greater opportunity for selecting alternative sites. This guidance manual and FTA's environmental impact regulations both encourage project sites which are compatible with surrounding development when possible. If it is not practical to avoid severe impacts by changing the location of the project, mitigation measures must be considered. |

**Option A: Project Noise Impact Criteria Presentation –** The impact criteria presentation for evaluating existing noise independently to project noise is presented in this option.

The noise levels at which impacts occur are presented in Figure 4-2 and Table 4-5. Equations for the impact criteria are presented in Appendix C. If impact is determined, measures necessary to mitigate impacts are to be considered for incorporation into the project.[3]

Figure 4-2 presents the existing noise exposure on the horizontal axis and project noise on the vertical axis. Category 1 and 2 land uses have the same criteria for project noise and are on the primary vertical axis. Category 3 land use criteria are presented on the secondary vertical axis. Note that project noise for category 1 and 3 land uses is expressed as $L_{eq(1hr)}$, whereas project noise for category 2 land use is expressed as $L_{dn}$. Also, note that project noise criteria are 5 dB higher for category 3 land uses in Figure 4-2 since these types of land use are less noise-sensitive than those in categories 1 and 2.

Note that for projects in locations with existing noise levels below 55 dBA, the project noise exposure is allowed some increase over the existing noise exposure before it is considered to cause impact. For category 1 and 2 land uses, the maximum project noise level to be considered to cause no impact is 65 dBA ($L_{eq(1hr)}$ or $L_{dn}$) regardless of the existing noise. Note that no impact at 65 dBA aligns with other Federal agencies in that a $L_{dn}$ of 65 dBA is a standard limit for an acceptable living environment among some Federal agencies.[19] [20] Project noise levels above the top curve are considered to cause severe impact. The upper limit of the severe impact range is 75 dBA for category 1 and 2 land uses. The upper limit of 75 dBA is associated with an unacceptable living environment. Project noise between the two curves is considered to have moderate impact on the community.

The criteria are also tabulated in Table 4-5. Figure 4-2 and the equations that correspond with this figure in Appendix C are the precise definition of the criteria. The values in Table 4-5 can be used for illustrative purposes and should only be used if all numbers are rounded up to the nearest decibel.

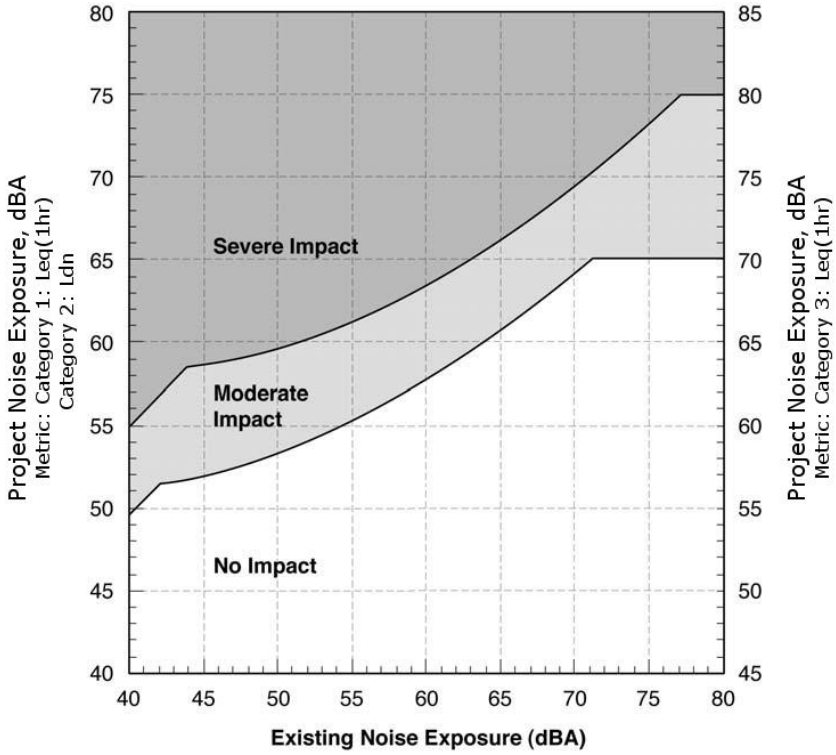


**Figure 4-2 Noise Impact Criteria for Transit Projects**

**Table 4-5 Noise Levels Defining Impact for Transit Projects**

| Existing Noise Exposure, dBA | Project Noise Impact Exposure, dBA | | | | | |
|---|---|---|---|---|---|---|
| | Category 1 ($L_{eq(1hr)}$) or 2 ($L_{dn}$) Sites | | | Category 3 Sites ($L_{eq(1hr)}$) | | |
| $L_{eq(1hr)}$ or $L_{dn}$ | No Impact | Moderate Impact | Severe Impact | No Impact | Moderate Impact | Severe Impact |
| <43 | < Ambient+10 | Ambient +10 to 15 | > Ambient+15 | < Ambient+15 | Ambient +15 to 20 | > Ambient+20 |
| 43 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 44 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 45 | <52 | 52-58 | >58 | <57 | 57-63 | >63 |
| 46 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 47 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 48 | <53 | 53-59 | >59 | <58 | 58-64 | >64 |
| 49 | <54 | 54-59 | >59 | <59 | 59-64 | >64 |
| 50 | <54 | 54-59 | >59 | <59 | 59-64 | >64 |
| 51 | <54 | 54-60 | >60 | <59 | 59-65 | >65 |
| 52 | <55 | 55-60 | >60 | <60 | 60-65 | >65 |
| 53 | <55 | 55-60 | >60 | <60 | 60-65 | >65 |
| 54 | <55 | 55-61 | >61 | <60 | 60-66 | >66 |
| 55 | <56 | 56-61 | >61 | <61 | 61-66 | >66 |
| 56 | <56 | 56-62 | >62 | <61 | 61-67 | >67 |
| 57 | <57 | 57-62 | >62 | <62 | 62-67 | >67 |
| 58 | <57 | 57-62 | >62 | <62 | 62-67 | >67 |
| 59 | <58 | 58-63 | >63 | <63 | 63-68 | >68 |
| 60 | <58 | 58-63 | >63 | <63 | 63-68 | >68 |
| 61 | <59 | 59-64 | >64 | <64 | 64-69 | >69 |
| 62 | <59 | 59-64 | >64 | <64 | 64-69 | >69 |
| 63 | <60 | 60-65 | >65 | <65 | 65-70 | >70 |
| 64 | <61 | 61-65 | >65 | <66 | 66-70 | >70 |
| 65 | <61 | 61-66 | >66 | <66 | 66-71 | >71 |
| 66 | <62 | 62-67 | >67 | <67 | 67-72 | >72 |
| 67 | <63 | 63-67 | >67 | <68 | 68-72 | >72 |
| 68 | <63 | 63-68 | >68 | <68 | 68-73 | >73 |
| 69 | <64 | 64-69 | >69 | <69 | 69-74 | >74 |
| 70 | <65 | 65-69 | >69 | <70 | 70-74 | >74 |
| 71 | <66 | 66-70 | >70 | <71 | 71-75 | >75 |
| 72 | <66 | 66-71 | >71 | <71 | 71-76 | >76 |
| 73 | <66 | 66-71 | >71 | <71 | 71-76 | >76 |
| 74 | <66 | 66-72 | >72 | <71 | 71-77 | >77 |
| 75 | <66 | 66-73 | >73 | <71 | 71-78 | >78 |
| 76 | <66 | 66-74 | >74 | <71 | 71-79 | >79 |
| 77 | <66 | 66-74 | >74 | <71 | 71-79 | >79 |
| >77 | <66 | 66-75 | >75 | <71 | 71-80 | >80 |

### Option B: Cumulative Noise Impact Criteria Presentation

*The impact criteria presentation for evaluating existing noise to project noise cumulatively is presented in this option.*

In certain cases, the cumulative form of the noise criteria shown in Figure 4-3 can be used. These cases involve projects where changes are proposed to an existing transit system, as opposed to a new project in an area previously without transit. Such changes might include operations of a new type of vehicle, modifications of track alignments within existing transit corridors, or changes in facilities that dominate existing noise levels. In these cases, the existing noise

sources change because of the project, and so it is not possible to define project noise separately from existing noise. An example would be a commuter rail corridor where the existing noise along the alignment is dominated by diesel locomotive-hauled trains, and where the project involves electrification with the resulting replacement of some of the diesel-powered locomotives with electric trains operating at increased frequency of service and higher speeds on the same tracks. In this case, the existing noise can be determined and a new future noise can be calculated, but it is not possible to describe what constitutes the "project noise." For example, if the existing noise dominated by trains was measured to be an $L_{dn}$ of 63 dBA at a particular location, and the new combination of diesel and electric trains is projected to be an $L_{dn}$ of 65 dBA, the change in the noise exposure due to the project would be 2 dB. Referring to Figure 4-3, a 2-dB increase with an existing noise exposure of 63 dBA would be rated as a moderate impact. Normally the project noise is added to the existing noise to come up with a new cumulative noise, but in this case, the existing noise was dominated by a source that changed due to the project, so it would be incorrect to add the project noise to the existing noise. Consequently, the existing noise determined by measurement is compared with a new calculated future noise, but a description of what constitutes the actual project is complex.

Another example would be a rail corridor where a track is added and grade crossings are closed, potentially resulting in a change in train location and horn operation. Here the "project noise" results from moving some trains closer to some receivers, away from others, and elimination of horns. In this case, the change in noise level is more readily determined than the noise from the actual project elements. In all cases, Figures 4-3 and 4-4 for changes in a transit system results in the same assessment of impact as Figure 4-2 for development of transit facilities in a new area.

The noise impact criteria in Figure 4-3 and Figure 4-4 are presented as an increase in cumulative noise level between the existing and project conditions. The horizontal axis represents the existing noise exposure and the vertical axis is the increase in cumulative noise level due to the transit project. Note that noise exposure is expressed as $L_{eq(1hr)}$ for category 1 and 3 land uses and $L_{dn}$ for category 2 land use. Since $L_{eq(1hr)}$ and $L_{dn}$ are measures of total acoustic energy, any new noise sources in a community will cause an increase, even if the new source level is the same or less than the existing noise level (refer to decibel addition in Appendix B). As shown in Figure 4-3, the criterion for moderate impact is a noise exposure increase of 10 dB for an existing noise exposure level of 42 dBA or less, but only a 1-dB increase when the existing noise exposure is 70 dBA.

As the existing level of ambient noise increases, the allowable level of transit noise increases, but the total amount that community noise exposure is allowed to increase is reduced. This accounts for the unexpected result that a project exposure which is less than the existing noise exposure can still cause impact. This is clearer from the examples listed in Table 4-6 which indicate the level of transit noise allowed for different existing levels of exposure. Any increase greater than shown in the table will cause moderate impact.

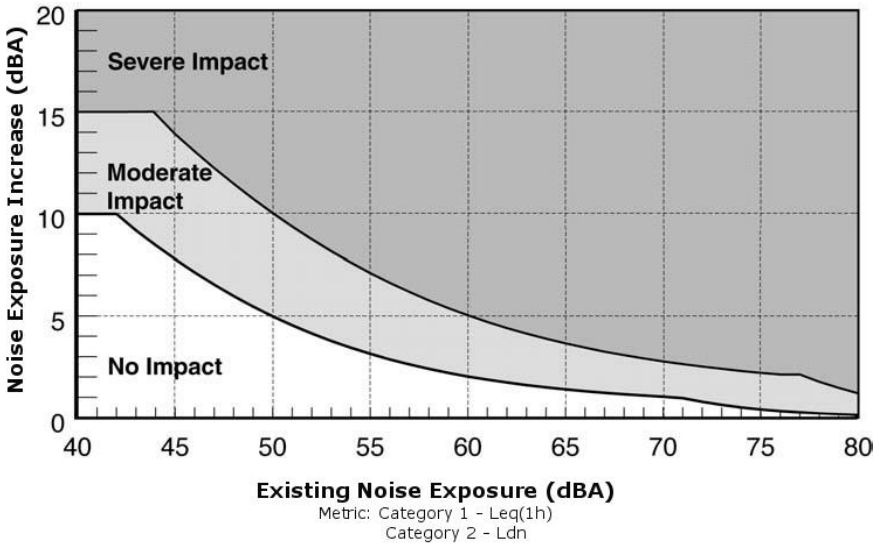


**Figure 4-3 Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 1 & 2)**

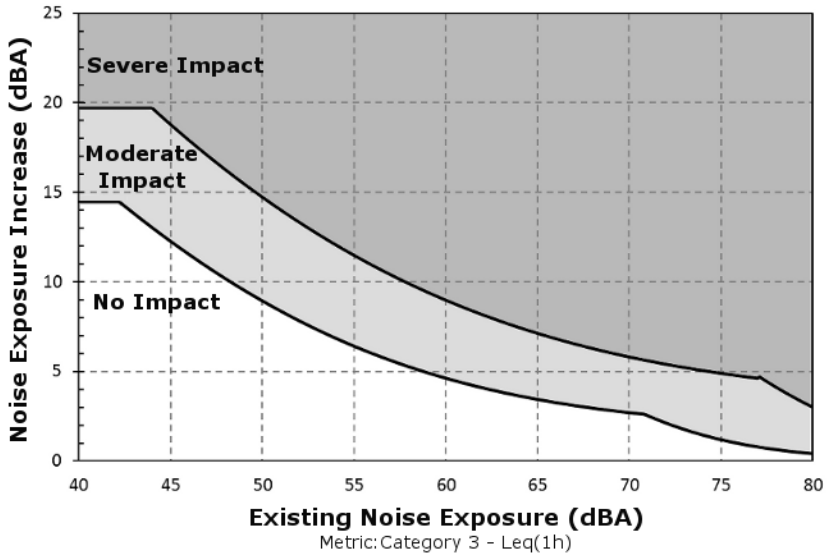


**Figure 4-4 Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 3)**

This table shows that as the existing noise exposure increases from 45 dBA to 75 dBA, the allowed project noise exposure increases from 51 dBA to 65 dBA. However, the allowed increase in the cumulative noise level decreases from 7 dB to 0 dB (rounded to the nearest whole decibel). The justification for this is that people already exposed to high levels of noise should be expected to tolerate only a small increase in the amount of noise in their community. In contrast, if the existing noise levels are quite low, it is reasonable to allow a greater change in the community noise for the equivalent difference in annoyance.

Note that Table 4-6 was developed for illustrative purposes and the official criteria are included in Figure 4-3 and Figure 4-4 and the associated equations.

**Table 4-6 Noise Impact Criteria: Effect on Cumulative Noise Exposure**

| $L_{dn}$ or $L_{eq(1hr)}$ in dBA (rounded to nearest whole decibel) | | | |
|---|---|---|---|
| **Existing Noise Exposure** | **Allowable Project Noise Exposure Before Moderate Impact** | **Allowable Combined Total Noise Exposure** | **Allowable Noise Exposure Increase Before Moderate Impact** |
| 45 | 51 | 52 | 7 |
| 50 | 53 | 55 | 5 |
| 55 | 55 | 58 | 3 |
| 60 | 57 | 62 | 2 |
| 65 | 60 | 66 | 1 |
| 70 | 64 | 71 | 1 |
| 75 | 65 | 75 | 0 |

## 4.2 Determine Noise Analysis Level

There are three levels of analysis to evaluate noise on a transit project based on the type and scale of the project, stage of project development, and environmental setting. These levels, described below, are the Noise Screening Procedure, the General Noise Assessment and the Detailed Noise Analysis.

The Noise Screening Procedure, conducted first, defines the study area of any subsequent noise impact assessment. Where there is potential for noise impact, the General Noise Assessment and Detailed Noise Analysis procedures are used to determine the extent and severity of impact. In some cases, a General Noise Assessment may be all that is needed. However, if the proposed project is near noise-sensitive land uses, and it appears at the outset that the impact would be substantial, it is prudent to conduct a Detailed Noise Analysis.

*Conduct the noise screening procedure and then determine the appropriate noise analysis option.*

**Noise Screening Procedure** – The Noise Screening Procedure is a simplified method of identifying study area receivers or locations where a project may have the potential for noise impacts from transit projects. This procedure accounts for impact criteria, the type of project, and noise-sensitive land uses. If no noise-sensitive land uses or receivers are present in the analysis area, then no further noise assessment is needed. If noise-sensitive receivers are identified, then proceed to conduct a General Assessment and/or a Detailed Assessment.

The Noise Screening Procedure steps are provided in Section 4.3.

**General Noise Assessment** – The General Noise Assessment is used to examine potentially impacted areas identified in the screening step by examining the location and estimated severity of noise impacts. This procedure considers noise source and land use information likely to be available at an early stage in the project development process. Estimates are made of project noise levels and of existing noise conditions to model the location of a noise impact contour

that defines the outer limit of an impact corridor or area. This modeling method uses transit-specific noise and adjustment data (in tabular and graphical form) for the noise computations.

For many smaller projects, this assessment may be sufficient to define impacts and determine whether noise mitigation is necessary. The procedure can be used in conjunction with established highway noise prediction procedures to compare highway, transit, and multimodal alternatives. If an assessment is needed to inform the decision on transit mode and general alignment in a corridor, the General Noise Assessment procedures should be used, and not the Detailed Noise Analysis, which requires more detailed information.

The General Noise Assessment procedure is provided in Section 4.4. FTA has also developed an Excel spreadsheet to more simply conduct the General Noise Assessment. It is on FTA's website at http://www.fta.dot.gov/12347_2233.html.

**Detailed Noise Analysis** – The Detailed Noise Analysis procedure is a comprehensive assessment method that produces the most accurate estimates of noise impacts for a proposed project. It is important to recognize that use of the Detailed Noise Analysis methods will not provide more accurate results than the General Noise Assessment unless more detailed and case-specific input data are used.

The project must be defined to the extent that location, alignment, transit mode, hourly operational schedules during day and night, speed profiles, plan and profiles of guideways, locations of access roads, and landform topography (including terrain and building features) are determined. A detailed Noise Analysis is often accomplished at the development of the final environmental impact statement (FEIS), record of decision (ROD), or combined FEIS/ROD in the NEPA process, when the preferred alternative is undergoing refinements to mitigate its adverse impacts. However, these project details may not be available until the final design phase, requiring that the detail noise analysis be conducted after the NEPA process is complete. However, it is recommended that the detailed analysis be conducted earlier for controversial projects or projects with highly noise-sensitive sites close to tracks.

A Detailed Noise Analysis may be warranted as part of the development of an environmental assessment (EA) if there are potentially severe impacts due to the proximity of noise-sensitive land uses.

In some cases, decisions on appropriate noise mitigation measures can be made based on the results of the General Noise Assessment. But if costly measures may be needed, it is generally recommended that a Detailed Noise Analysis be conducted to verify the need and design of the noise mitigation. The Detailed Noise Analysis is always appropriate under two sets of circumstances:

- For a major transit project with likely noise impacts after the preferred alternative has been selected.
- For any other transit project where potentially severe impacts are identified at an early stage.

Noise impacts may occur for relatively minor transit projects when the project is near noise-sensitive sites, particularly residences. In this case, completing a Detailed Noise Analysis is recommended. Some examples include:

- A terminal or station sited adjacent to a residential neighborhood
- A maintenance facility located near a school
- A storage yard adjacent to residences
- An electric substation located adjacent to a hospital

The Detailed Noise Analysis procedure is provided in Section 4.5.

## 4.3 Evaluate Impact: Noise Screening Procedure

*Identify the potential for impact using the Noise Screening Procedure described below.*

### Step 1: Identify Project Type

*Identify the project type using Table 4-7 and confirm the assumptions in Table 4-8 are appropriate for the project.*

The noise screening procedure is intended to be conservative to broadly capture the potential for impact with minimal effort. To make the procedure conservative, the project system must be assumed to be operating under relatively high-capacity conditions, which would produce more noise than normal operating conditions. In addition, the assumptions in Table 4-8 were made using the lowest threshold of impact (50 dBA) from the criteria curves in Figure 4-2. Clarification can be obtained from FTA on special cases that are not represented in this section.

If the assumptions in Table 4-8 are not appropriate for the project, make adjustments to the screening distances in Table 4-8 according to the methodology in Section 4.4 or the FTA spreadsheet model.

### Step 2: Determine the Screening Distance

*Determine the appropriate screening distance considering the type of project and shielding from intervening buildings.*

**2a.** Determine the appropriate screening distance column in Table 4-7.

> **Option A: Buildings in the Sound Paths –** Use the screening distances in the "Intervening Buildings" column.
>
> **Option B: Buildings Not in the Sound Paths –** Use the distances in the "Unobstructed" column.

**2b.** Adjust these distances according to the methodology in Section 4.4, or the FTA spreadsheet model, if the assumptions in Table 4-8 are not appropriate for the project. The appropriate screening distance is where the project noise reaches 50 dBA for the appropriate metric. If the assumptions in Table 4-8 are not appropriate for a commuter rail grade crossing project where horns and

warning bells are used, use the FRA horn noise model available from the FRA website to develop the screening distance distance (49 CFR § 222).[21]

## Step 3: Identify Study Area

*Apply the screening distances as follows to identify the study area. The study area is intended to be sufficiently large to encompass all potentially impacted locations.*

**Option A: Fixed Guideway Transit Sources –** Apply the screening distance from the guideway centerline.

**Option B: Highway/Transit Sources (e.g., Bus) –** Apply the screening distance from the nearest ROW line on both sides of a highway or access road.

**Option C: Small Stationary Facilities –** Apply the screening distance from the center of the noise-generating activity.

**Option D: Stationary Facility Spread Over a Large Area –** Apply the screening distance from the outer boundary of the proposed project site.

## Step 4: Locate Noise-Sensitive Land Uses

*Locate all noise-sensitive land uses within the study area using Table 4-3.*

See Section 4.1 for more information on noise-sensitive land uses. Include all categories of noise-sensitive land uses in this step.

***If no noise-sensitive land uses are identified, no further noise analysis is needed. If one or more of the noise-sensitive land uses are in the study area, proceed to Section 4.4 and complete a General Noise Assessment.***

**Table 4-7 Screening Distance for Noise Assessments**

| Project Systems | | Screening Distance, ft* | |
|---|---|---|---|
| | | Unobstructed | Intervening Buildings |
| ***Fixed-Guideway Systems*** | | | |
| Commuter Rail Mainline | | 750 | 375 |
| Commuter Rail Station | With Horn Blowing | 1,600 | 1,200 |
| | Without Horn Blowing | 250 | 200 |
| Commuter Rail Road Crossing with Horns and Bells | | 1,600 | 1,200 |
| RRT | | 700 | 350 |
| RRT Station | | 200 | 100 |
| LRT | | 350 | 175 |
| Streetcar | | 200 | 100 |
| Access Roads to Stations | | 100 | 50 |
| Low and Intermediate Capacity Transit | Steel Wheel | 125 | 50 |
| | Rubber Tire | 90 | 40 |
| | Monorail | 175 | 70 |
| Yards and Shops | | 1000 | 650 |
| Parking Facilities | | 125 | 75 |
| Access Roads to Parking | | 100 | 50 |
| Ancillary Facilities: Ventilation Shafts | | 200 | 100 |
| Ancillary Facilities: Power Substations | | 250 | 125 |
| ***Bus Systems*** | | | |
| Busway | | 500 | 250 |
| Bus Rapid Transit (BRT) on exclusive roadway | | 200 | 100 |
| Bus Facilities | Access Roads | 100 | 50 |
| | Transit Mall | 225 | 150 |
| | Transit Center | 225 | 150 |
| | Storage & Maintenance | 350 | 225 |
| | Park & Ride Lots w/Buses | 225 | 150 |
| ***Ferry Boat Terminals*** | | 300 | 150 |

*Measured from centerline of guideway for fixed-guideway sources, from the ROW on both sides of the roadway for highway/transit sources, from the center of noise-generating activity for stationary sources, or from the outer boundary of the proposed project site for fixed facilities spread out over a large area.

**Table 4-8 Assumptions for Screening Distances for Noise Assessments**

| Type of Project | | Operations | Speeds* | Metric** |
|---|---|---|---|---|
| ***Fixed-Guideway Systems*** | | | | |
| Commuter Rail Mainline | | 66 day /12 night; 1 loco, 6 cars | 55 mph | $L_{dn}$ |
| Commuter Rail Station | With Horn Blowing | 22 day / 4 night | N/A | $L_{dn}$ |
| | Without Horn Blowing | 22 day / 4 night | N/A | $L_{dn}$ |
| Commuter Rail-Highway Crossing with Horns and Bells | | 22 day / 4 night | 55 mph | $L_{dn}$ |
| RRT | | 220 day / 24 night; 6-car trains | 50 mph | $L_{dn}$ |
| RRT Station | | 220 day / 24 night | 20 mph | $L_{dn}$ |
| LRT | | 150 day / 18 night; 2 artic veh. | 35 mph | $L_{dn}$ |
| Streetcar | | 150 day / 18 night | 25 mph | $L_{dn}$ |
| Access Roads to Stations | | 1000 cars, 12 buses | 35 mph | $L_{eq(1hr)}$ |
| Low and Intermediate Capacity Transit | Steel Wheel | 220 day / 24 night | 30 mph | $L_{dn}$ |
| | Rubber Tire | 220 day / 24 night | 30 mph | $L_{dn}$ |
| | Monorail | 220 day / 24 night | 30 mph | $L_{dn}$ |
| Yards and Shops | | 20 train movements | N/A | $L_{eq(1hr)}$ |
| Parking Facilities | | 1000 cars | N/A | $L_{eq(1hr)}$ |
| Access Roads to Parking | | 1000 cars | 35 mph | $L_{eq(1hr)}$ |
| Ancillary Facilities: Ventilation Shafts | | Rapid Transit in Subway | 50 mph | $L_{dn}$ |
| Ancillary Facilities: Power Substations | | Sealed shed, air conditioned | N / A | $L_{dn}$ |
| ***Bus Systems*** | | | | |
| Busway | | 30 buses, 120 automobiles | 50 mph | $L_{eq(1hr)}$ |
| BRT on exclusive roadway | | 30 buses | 35 mph | $L_{eq(1hr)}$ |
| Bus Facilities | Access Roads | 1000 cars | 35 mph | $L_{eq(1hr)}$ |
| | Transit Mall | 20 buses | N/A | $L_{eq(1hr)}$ |
| | Transit Center | 20 buses | N/A | $L_{eq(1hr)}$ |
| | Storage & Maintenance | 30 buses | N/A | $L_{eq(1hr)}$ |
| | Park & Ride Lots w/Buses | 1000 cars, 12 buses | N/A | $L_{eq(1hr)}$ |
| ***Ferry Boat Terminals*** | | 8 boats with horns used in normal docking cycle | N/A | $L_{eq(1hr)}$ |

*N/A = not applicable

**$L_{eq(1hr)}$ = the loudest hour of project related activity during hours of noise sensitivity.

## 4.4 Evaluate Impact: General Noise Assessment

The General Noise Assessment should be completed after the Noise Screening Procedure (Section 4.3), through which noise-sensitive receivers have been identified. This can be completed either by using the General Noise Assessment Procedure described below or using the FTA General Noise Assessment Spreadsheet found on the following FTA website: http://www.fta.dot.gov/12347_2233.html.

Assumptions are used throughout the General Noise Assessment. If the listed assumptions are not appropriate for the project and good engineering judgement cannot be used by following the General Noise Assessment procedure, proceed to a Detailed Noise Analysis or consult with the FTA Regional office.

Major steps in the General Noise Assessment procedure and recommended workflow are shown in Figure 4-5 and listed below. Four examples of General Noise Assessments are given at the end of this section. Many of these concepts are explained in greater detail in the context of a Detailed Noise Analysis in Section 4.5.

**Step 1: Identify Noise-Sensitive Receivers –** Identify noise-sensitive receivers (Section 4.3) and their proximity to the project and major noise sources.

**Step 2: Determine Project Noise Source Reference Levels –** Determine the project noise sources and reference levels. Then, estimate the project noise exposure at the reference distance of 50 ft considering operational characteristics with preliminary estimations of the effect of mitigation.

**Step 3: Estimate Project Noise Exposure by Distance –** Estimate project noise exposure at distances beyond 50 ft considering propagation characteristics using a simplified procedure.

**Step 4: Combine Noise Exposure from All Sources –** Combine all sources associated with the project to predict the total project noise at the receivers.

**Step 5: Measure Existing Noise Exposure –** Measure the existing noise or estimate the existing noise exposure using a simplified procedure.

**Step 6: Inventory Impacts**

> **Option A:** Tabulate the change in noise (existing vs. estimated project noise) at each noise-sensitive receiver or cluster, identifying all moderate and severe impacts.
>
> **Option B:** Take inventory of noise-sensitive receivers that fall within the moderate and severe noise contours.

**Step 7: Determine Noise Mitigation Needs –** Evaluate the need for mitigation and repeat the General Noise Assessment with proposed mitigation.

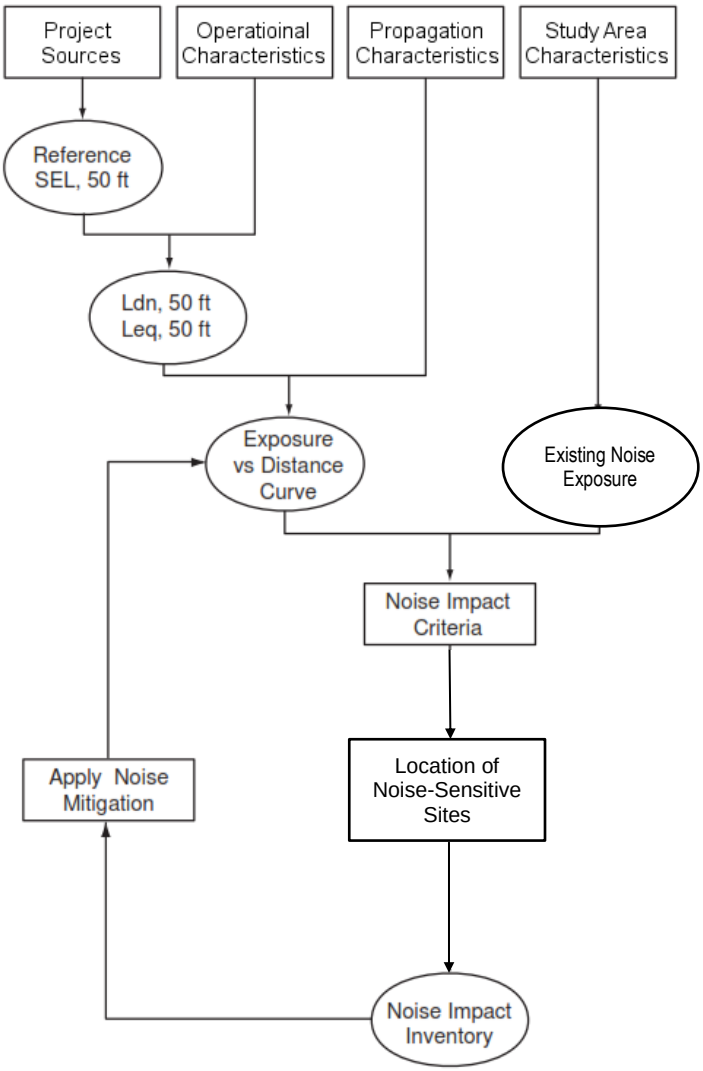


**Figure 4-5 Procedure for General Noise Assessment**

## Step 1: Identify Noise-Sensitive Receivers

*Determine the proximity of noise-sensitive land uses identified in Section 4.3 to the project and to the nearest major roadways and railroad lines.*

**1a.** When necessary, use windshield surveys or detailed land use maps to confirm the location of noise-sensitive land uses.

**1b.** For land uses more than 1,000 ft from major roadways or railroad mainlines, obtain an estimate of the population density in the immediate area, expressed in people per square mile. Distances to roadways or railroads, or population density, will be used later to estimate the existing

noise level. Coordinate with the Metropolitan Planning Organization (MPO) for population densities at an appropriate level of detail.

## Step 2: Determine Project Noise Source Reference Levels

*Determine the general source reference level for each project noise source.*

Classify all project noise sources as fixed-guideway transit, highway/transit, or stationary facility and determine the source reference levels. Note that a major fixed-guideway system will have stationary facilities associated with it and that a stationary facility may have highway/transit elements associated with it.

**Option A: Fixed-guideway Transit Sources –** For this manual, fixed-guideway transit sources include commuter rail, RRT, LRT, streetcar, AGT, monorail, and magnetically levitated vehicles (maglev). For commuter railroads and LRT systems, the crossing of streets and highways at-grade is likely, and in that case, warning devices should be included in the assessment. At an early project stage, the information available for a General Noise Assessment includes:

- Candidate transit mode
- Guideway options
- Time of operation
- Operational headways
- Design speed
- Alternative alignments

This information is not sufficient to predict noise levels at all locations along the ROW. Therefore, use conservative estimates (e.g., maximum (expected) design speeds and operations at design capacities) to estimate worst-case noise levels.

First choose the appropriate fixed-guideway transit source reference level and then predict the noise exposure at 50 ft in terms of $L_{eq(1hr)}$ and $L_{dn}$.

**A.i.** Choose the reference source noise levels 50 ft from the track for one vehicle in terms of Sound Exposure Level (SEL) using Table 4-9. See Appendix B for a detailed explanation of SEL. Note that the SEL reference speed is 50 mph, unless otherwise noted.

**Table 4-9 Reference SEL's 50 ft from Track and at 50 mph, One Vehicle**

| Source | Type | Reference Conditions | Reference SEL ($SEL_{ref}$), dBA |
|---|---|---|---|
| Commuter Rail, At-Grade | *Locomotives* | Diesel-electric, 3000 hp, throttle 5 | 92 |
| | | Electric | 90 |
| | *Diesel Multiple Unit (DMU)* | Diesel-powered, 1200 hp | 85 |
| | *Horns* | Within ¼ mile of grade crossing | 110 |
| | *Cars* | Ballast, welded rail | 82 |
| Rail Transit and Streetcars at 50 mph | | At-grade, ballast, welded rail | 82 |
| Rail Transit and Streetcars at 25 mph | | At-grade, ballast, welded rail | 76 |
| Transit whistles / warning devices | | Within 1/8 mile of grade crossing | 93 |
| AGT | *Steel Wheel* | Aerial, concrete, welded rail | 80 |
| | *Rubber Tire* | Aerial, concrete guideway | 78 |
| Monorail | | Aerial straddle beam | 82 |
| Maglev | | Aerial, open guideway | 72 |

**A.ii.** Collect the following data:

- Number of train passbys during the day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) for category 2 land uses
- Maximum number of train passbys during hours that category 1 or category 3 land uses are normally in use (typically the peak hour train volume)
- Number of vehicles per train for each time period for category 2 land uses (if this number varies during the day or night, take the average)
- Maximum number of vehicles per train during hours that category 1 or category 3 land uses are normally in use (typically the peak hour train volume)
- Train speed in mph (maximum expected)
- Guideway configuration
- Location of highway and street grade crossings, if any
- If this process is repeated to estimate the effect of proposed noise mitigation, include the noise barrier location

**A.iii.** Calculate the noise exposure at 50 ft in terms of $L_{eq(1hr)}$:

- Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-10.
- Compute $L_{eq(1hr).Combo}$ using Eq. 4-6. It may be necessary to compute the combined totals with and without warning horns. Some neighborhoods along the corridor may be exposed to horn noise, but some may not.

**A.iv.** Calculate the noise exposure at 50 ft in terms of $L_{dn}$:

- If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-10.
- It may be necessary to calculate $L_{dn}$ with and without warning horns, as in the previous step.

Note that the equations in Table 4-10 include terms to account for a difference in speed from the 50 mph reference speed and a numerical adjustment to account for the one-hour time period for this metric. For

more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

Table 4-10 presents an estimate of the noise reduction potentially provided by wayside noise barriers that can be used when assessing mitigation options in a General Noise Assessment. If impact is determined during the General Noise Assessment, repeat the procedure and include proposed mitigation according to Section 4.4, Step 7. See Section 4.5, Step 7 for a complete description of the benefits resulting from various noise mitigation measures that can be evaluated with a Detailed Noise Analysis.

**Table 4-10 Computation of Noise Exposure at 50 ft for Fixed-Guideway General Noise Assessment**

| | | |
|---|---|---|
| **Locomotives*** $L_{eq(1hr)}$ at 50 ft | $L_{eq.Loco(1hr)} = SEL_{ref} + 10\,log(N_{Loco}) + Klog(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-1** |
| **Locomotive Warning Horns**** $L_{eq(1hr)}$ at 50 ft | $L_{eq.LHorns(1hr)} = SEL_{ref} + 10\,log(V) - 35.6$ | **Eq. 4-2** |
| **Rail Vehicles†** $L_{eq(1hr)}$ at 50 ft | $L_{eq.RCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-3** |
| **Streetcars (25 mph or slower)** $L_{eq(1hr)}$ at 50 ft | $L_{eq.SCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 2\log(\frac{S}{25}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-4** |
| **Transit Warning Horns** $L_{eq(1hr)}$ at 50 ft | $L_{eq.THorns(1hr)} = SEL_{ref} - 10\,log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-5** |
| **Combined Locomotive and transit††** $L_{eq(1hr)}$ at 50 ft | $L_{eq.Combo(1hr)} = 10\log(10^{(L_{eq.Loco(1hr)}/10)} + 10^{(L_{eq.RCars(1hr)}/10)} + 10^{(L_{eq.SCars(1hr)}/10)} + 10^{(L_{eq.LHorns(1hr)}/10)} + 10^{(L_{eq.THorns(1hr)}/10)})$ | **Eq. 4-6** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$, $N_{Loco}$ = $N_d$ (loco events), and $N_{Cars}$ = $N_d$ (car events) | **Eq. 4-7** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$, $N_{Loco}$ = $N_d$ (loco events), and $N_{Cars}$ = $N_d$ (car events) | **Eq. 4-8** |
| **Day/Night** $L_{dn}$ at 50 ft | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-9** |

$N_{Loco}$ = average number of locomotives per train

K = constant
- -10 for passenger diesel
- 0 for DMUs
- +10 for electric

S = train speed, mph

$V$ = average hourly volume of train traffic, trains per hour

$N_{Cars}$ = average number of cars per train

$Adj_{track}$ = constant
- +5 for jointed track or for a crossover within 300 ft
- +4 for aerial structure with slab track (except AGT and monorail)
- +3 for embedded track on grade
- -5 if a noise barrier blocks the line of sight

$V_d$ = average hourly daytime volume of train traffic, trains per hour

$= \frac{number\ of\ trains, 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of train traffic, trains per hour

$= \frac{number\ of\ trains, 10\ p.m.\ to\ 7a.m.}{9}$

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)

$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)

$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

* Assumes a diesel locomotive power rating at approximately 3000 hp.
** Based on FRA's horn noise model (http://www.fra.dot.gov/eLib/Details/L04091).
† Includes all commuter rail cars, transit cars, streetcars above 25 mph, AGT and monorail.
† † Only include appropriate terms.

**Option B: Highway/Transit Sources –** The highway/transit type sources include most transit modes that do not require a fixed-guideway. Examples are high-occupancy vehicles, such as buses, commuter vanpools and carpools. Use the instructions below to estimate source noise levels for projects that involve these types of vehicles and are using FTA's environmental review procedures. At an early project stage, the information available for a General Noise Assessment includes:

- Vehicle type
- Transitway design options
- Time of operation
- Typical headways
- Design speed
- Alternative alignments

This information is not sufficient to predict noise levels at all locations along the ROW; therefore, use of conservative estimates (e.g., maximum (expected) design speeds and operations at design capacities) to estimate worst-case noise impact levels is recommended. The procedure is consistent with FHWA's highway noise prediction method. The reference SEL levels in Table 4-11 correspond to FHWA's source emission levels and speed coefficients for buses and automobiles.[22]

**B.i.** Using Table 4-11, choose the appropriate reference source noise levels 50 ft from the roadway in terms of SEL. Note that the SEL reference speed is 50 mph, unless otherwise noted.

**Table 4-11 Source Reference Levels at 50 ft from Roadway, 50 mph**

| Source* | Reference SEL, dBA |
|---|---|
| Automobiles and Vans | 74 |
| Buses (diesel-powered) | 82 |
| Buses (electric) | 80 |
| Buses (hybrid) | 83** |

* Assumes normal roadway surface conditions.
** For hybrid buses, determine Reference SEL on a case-by-case basis because they vary, and data are scarce.

**B.ii.** Collect the following data:

- Number of vehicle passbys during the day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) for each vehicle type in Table 4-11, if a category 2 land use is present
- Number of vehicle passbys during hours that category 1 or category 3 land uses are normally in use, each vehicle type in Table 4-11
- Speed (maximum expected)
- Transitway configuration (with or without noise barrier)

**B.iii.** Calculate the noise exposure at 50 ft in terms of $L_{eq(1hr)}$. Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-12.

**B.iv.** Calculate the noise exposure at 50 ft in terms of $L_{dn}$. If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-12.

Note that the equations in Table 4-12 include terms to account for a speed other than the 50 mph reference speed and a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

Table 4-12 presents an estimate of noise reduction potentially provided by wayside noise barriers. This is considered illustrative given that barriers are the most common noise mitigation measure. See Section 4.5, Step 7 for a complete description of the benefits resulting from noise mitigation. If impact is determined during the General Noise Assessment without mitigation, repeat the procedure and include proposed mitigation.

**Table 4-12 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Highway/Transit General Noise Assessment**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(V) + C_S log(\frac{S}{50}) - 35.6$ | **Eq. 4-10** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{Aeq(1hr)}$ where V = $V_d$ | **Eq. 4-11** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{Aeq(1hr)}$ where V = $V_n$ | **Eq. 4-12** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-13** |
| **Barrier Adjustment** | = -5 for noise barriers | |

$V$ = hourly volume of vehicles, vehicles per hour

$C_S$ = Speed constant
15 for diesel buses
28 for electric buses
21 for hybrid buses[23]
30 for automobile and van pools

S = average vehicle speed, mph

$V_d$ = average hourly daytime volume of vehicles, vehicles per hour

$= \frac{total\ number\ of\ vehicles, 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of vehicles, vehicles per hour

$= \frac{total\ number\ of\ vehicles, 10\ p.m.\ to\ 7\ a.m.}{9}$

**Option C: Stationary Sources** – Stationary sources include fixed transit system facilities. New transit facilities undergo a site review for best location that considers the noise sensitivity of surrounding land uses. Although many facilities such as bus maintenance garages are usually located in industrial and commercial areas, some facilities such as bus terminals, ferry terminals, train stations, and park-and-ride lots may be placed near residential neighborhoods where noise impact may occur. Access roads to some of these facilities may also

pass through noise-sensitive areas. Noise from access roads is treated according to the procedures described in the Highway/Transit Sources category. In a General Noise Assessment, only the prominent features of each fixed facility are considered in the noise analysis.

**C.i.** For small facilities, using Table 4-13, determine the reference source noise levels 50 ft from the center of the site in terms of SEL. The source reference levels given in the table are based on measurements for the peak hour of operation of a typical stationary source of the noted type and size.

A large facility, such as a rail yard, is spread out over considerable area with various noise sources with different noise levels depending on the layout of the facility. Specifying a single reference SEL for the facility at 50 ft from the center of the site could be misleading if all of these different noise sources are not represented. Therefore, the reference distance should be the equivalent distance of 50 ft, which is determined by estimating the noise levels from the center of the site at a distance far enough to capture all noise sources and projecting back to 50 ft from the center of the site. This approach allows for a conservative estimate of noise for all surrounding areas and the equivalent noise can be considered as concentrated at the center of the site. If the location of noise sources is known, then the distance should be taken from the point of the noisiest activity on the site (e.g., the dock in the case of ferry boat operations) instead of the center of the site.

**Table 4-13 Source Reference Levels at 50 ft from Center of Site, Stationary Sources**

| Source | Reference SEL, dBA | Reference Conditions |
|---|---|---|
| ***Rail System*** | | |
| Yards and shops | 118 | 20 train movements in peak activity hour |
| Layover tracks (commuter rail) | 109 | 1 train with diesel locomotive idling for 1 hour |
| Crossing signals | 109 | 3600 second duration |
| ***Bus System*** | | |
| Storage yard | 111 | 100 buses accessing facility in peak activity hour |
| Operating facility | 114 | 100 buses accessing facility, 30 buses serviced and cleaned in peak activity hour |
| Transit center | 101 | 20 buses in peak activity hour |
| ***Ferry Terminal*** | | |
| Ferry boat (no fog horn sounded) | 97 | 4 ferry boat landings in 1 hour |
| Ferry boat (fog horn sounded) | 100 | |
| ***Parking Garage*** | 92 | 1000-car capacity in peak activity hour |
| ***Park & Ride Lot*** | 101 | 12 buses, 1000 cars in peak activity hour |

**C.ii.** Collect the following data:

- Number of layover tracks and hours of use
- Number of buses, if different from assumed reference conditions (if this number varies during the day or night, take the average)
- Number of ferry boat landings, if different from assumed reference conditions (if this number varies during the day or night, take the average)
- Actual capacity of parking garage or lot

**C.iii.** Calculate $L_{eq(1hr)}$ at 50 ft. Calculate $L_{eq(1hr)}$ for each source using the appropriate equations in Table 4-14.

**C.iv.** Calculate $L_{dn}$ at 50 ft. If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined $L_{eq(1hr)}$ for both the daytime and nighttime periods separately, using the appropriate equations in Table 4-14.

The equations in Table 4-14 include a numerical adjustment to account for the one-hour time period for this metric. See Appendix B.1.4.4 for more information on the numerical adjustment.

Table 4-14 presents an estimate of noise reduction potentially provided by noise barriers at the property line. Only approximate locations and lengths for barrier or other noise mitigation measures are developed during a General Noise Assessment to provide a preliminary indication of the costs and benefits of mitigation. A Detailed Noise Analysis of the preferred alternative is usually warranted following the General Noise Assessment (if it predicts any impacts) to verify impacts and design the mitigation.

**Table 4-14 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Stationary Source General Noise Assessment***

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + C_N - 35.6$ | **Eq. 4-14** |
| **Daytime** $L_d$ at 50 ft | $L_d = 10\log((\frac{1}{15}) \sum_{7am-10pm} 10^{(L_{Aeq(1hr)}/10)})$ | **Eq. 4-15** |
| **Nighttime** $L_n$ at 50 ft | $L_n = 10\log((\frac{1}{9}) \sum_{10pm-7am} 10^{(L_{Aeq(1hr)}/10)})$ | **Eq. 4-16** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-17** |
| **Barrier Adjustment** | = -5 for noise barrier at property line | |
| **Volume Adjustment** | $= C_N$ | |
| | $= 10\log(\frac{N_T}{20})$ | Rail yards and shops |
| | $= 10\log(N_T)$ | Layover tracks |
| | $= 10\log(\frac{N_B}{100})$ | Bus storage yard |
| | $= 10\log(\frac{N_B}{200} + \frac{N_S}{60})$ | Bus operating facility |
| | $= 10\log(\frac{N_B}{20})$ | Bus transit center |
| | $= 10\log(\frac{N_F}{4})$ | Ferry terminal |
| | $= 10\log(\frac{N_A}{1000})$ | Parking garage |
| | $= 10\log(\frac{N_A}{2000} + \frac{N_B}{24})$ | Park & ride lot |
| | $= 10\log(\frac{E}{3600})$ | Crossing signals |
| | $N_T$ = average number of trains per hour during the day (7AM to 10PM) or night (10PM to 7AM)<br>$N_B$ = average number of buses per hour during the day or night<br>$N_F$ = average number of ferry boat landings per hour during the day or night<br>$N_S$ = average number of buses serviced and cleaned per hour during the day or night<br>$N_A$ = average number of automobiles per hour during the day or night<br>E = average hourly duration of events, sec during the day or night | |

* If any of these numbers is zero, omit that term.

## Step 3: Estimate Project Noise Exposure by Distance

*Estimate the project noise exposure for locations beyond the reference distance, such as for noise-sensitive land uses.*

In the previous step, noise exposure at the reference distance of 50 ft was calculated for the various noise sources. This step describes how to estimate the project noise exposure beyond (or, if needed, closer than) the reference distance, such as at noise-sensitive land uses locations. This procedure estimates the source's noise exposure as a function of distance. Adjustments are provided to account for shielding attenuation from rows of buildings.

**3a.** Select the appropriate distance correction curve (Fixed-Guideway & Highway or Stationary) from Figure 4-6. The Fixed-Guideway & Highway curve refers to line sources while the Stationary curve is refers to point sources. The distance correction factor ($C_{distance}$) is 0 dB at 50 ft.

**3b.** Choose a distance other than 50 ft, such as the distance to a receiver. Determine the correction factor using Figure 4-6 or calculate using the equations in Table 4-15.[iii] For distances beyond 1,000 ft, the equations in Table 4-15 can be used; however, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. More detailed calculation methods may be required to account for those effects beyond 1,000 ft.

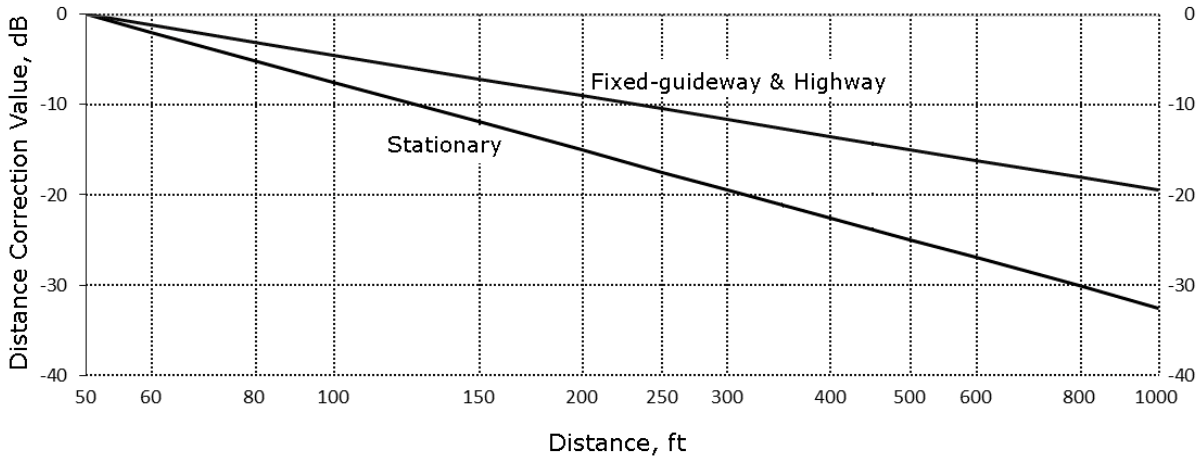


**Figure 4-6 Curves for Estimating Exposure vs. Distance in General Noise Assessment**

[iii] Note that the curves and equations assume acoustically soft ground beyond a distance of 50 ft. See Table 4-27 for more detailed calculation of ground attenuation.

**Table 4-15 Distance Correction Factor Equations for General Noise Assessment**

| Source | Equation | |
|---|---|---|
| Stationary Sources | $C_{distance} = -25\log(\frac{D}{50})$ | **Eq. 4-18** |
| Fixed-guideway and Highway | $C_{distance} = -15\log(\frac{D}{50})$ | **Eq. 4-19** |
| $D$ = distance, ft | | |

**3c.** Apply the distance correction ($C_{distance}$) to the project noise exposure at 50 ft (Section 4.4, Step 2) using the following equation:

$$L_{distance} = L_{50} + C_{distance} \quad \textbf{Eq. 4-20}$$

where:

$L_{distance}$ = $L_{dn}$ or $L_{eq(1hr)}$ at the new distance in feet
$L_{50}$ = $L_{dn}$ or $L_{eq(1hr)}$ at 50 ft

**3d.** Repeat Step 3c for each source-receiver distance from the project. A noise exposure vs. distance curve can be created, if desired, by calculating the noise exposure for all distances of interest and plotting a curve. This curve can be used to assist in determining the noise impact contour for the first row of unobstructed buildings. This plot can be used to display noise from both unmitigated and mitigated conditions to assess the potential benefits from mitigation measures.

For second row receivers and beyond, it is necessary to account for shielding attenuation from rows of intervening buildings. Without accounting for shielding, impacts may be substantially overestimated. Use the following general rules to account for the effect of shielding from intervening rows of buildings:

- Assign 4.5 dB of shielding attenuation for the first row of intervening buildings only.
- Assign 1.5 dB of shielding attenuation for each subsequent row, up to a maximum total attenuation of 10 dB.

## Step 4: Combine Noise Exposure from All Sources

*Combine all sources to predict the total project noise at the receivers using the equations in Table 4-16, once propagation adjustments have been made for the noise exposure from each source separately (fixed-guideway, highway/transit, and stationary).*

**Table 4-16 Computing Total Noise Exposure**

| | | |
|---|---|---|
| Total $L_{eq(t)}$ from all sources for the hour of interest: | $L_{eq.total(1hr)} = 10\log(\sum_{all\ sources} 10^{Leq/10})$ | **Eq. 4-21** |
| Total $L_{dn}$ from all sources | $L_{dn.total} = 10\log(\sum_{all\ sources} 10^{Ldn/10})$ | **Eq. 4-22** |

## Step 5: Estimate Existing Noise Exposure

*Measure the existing noise or estimate the existing noise exposure using a simplified procedure.*

Existing noise in the project vicinity must be quantified and compared to the project noise to determine the potential noise impact. It is generally recommended to measure existing noise, especially at locations known to be noise-sensitive, but if measurement results are not available then they must be estimated. In the Detailed Noise Analysis, the existing noise exposure is usually based on noise measurements at representative locations in the community.

It is not necessary or recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for "clusters" of sites based on measurements or estimates at representative locations in the community. Because of the sensitivity of the noise criteria to the existing noise exposure, careful characterization of pre-project ambient noise is important. Guidelines for selecting representative receiver locations and determining ambient noise are provided in Appendix D and Appendix E, respectively.

**Changes to Existing Transit**
For projects that propose changes to an existing transit system, such as a rehabilitation project, the project noise can include changes to the existing noise because of the project, and so it is not possible to define project noise separately. For these projects, refer to Section 4.1, Step 3 – Option B, on using the cumulative noise criteria.

This section describes how to estimate the existing noise in the project study area from general data available early in project planning. The procedure uses Table 4-17, where a neighborhood's existing noise exposure is based on proximity to nearby major roadways or railroads, or on population density. For areas near major airports, published aircraft noise contours can also be used to estimate the existing noise exposure. The process is as follows:

**5a.** Obtain scaled mapping and aerial photographs showing the project location and alternatives. A scale of 1 inch = 200 or 400 ft is convenient for the accuracy needed in the noise assessment. The size of the base map should be sufficient to show distances of at least 1000 ft from the center of the alignment or property center, depending on whether the project is a line source (fixed guideway/ roadway) or a stationary facility. These data are commonly available from local transit agencies and a number of publicly available online tools.

**5b.** Estimate the existing noise exposure by estimating the noise from major roads and railroad lines or by population density. First, evaluate the site's proximity to major roads and railroad lines including those that are included in the project. If these noise sources are far enough away that ambient noise is dominated by local streets and community activities, estimate the existing noise based on population density. To choose the appropriate existing noise exposure, compare noise levels from each of the three categories—Roadways, Railroads, and Population Density—and select the lowest level. In case of a

lightly used railroad (one train per day or less) select the Population Density category. Existing noise levels are presented in Table 4-17. Refer to Section 4.1, Step 3 – Option B, on using the cumulative noise criteria for projects that propose changes to an existing transit system, such as a rehabilitation project.

**Option A: Roadways –** Major roadways are separated into two categories for a general noise assessment. Roadways that cannot be described by these two categories are not considered major roadways and would use the Population Density method described below. The roadway categories are as follows:

- Interstate highway—roadways with 4 or more lanes that allow trucks
- Other roadway—parkways without trucks and city streets with the equivalent of 75 or more heavy trucks per hour or 300 or more medium trucks per hour

The estimated roadway noise levels in Table 4-17 are based on data for light to moderate traffic on typical highways and parkways using FHWA highway noise prediction procedures. Where a range of distances is given, the noise exposure estimates are given at the larger distance (note that the traffic noise at the smaller distance is underestimated). For highway noise, distances are measured from the centerline of the near lane for roadways with two lanes, while for roadways with more than two lanes the distance is measured from the geometric mean of the roadway. This distance is computed as follows:

$$D_{GM} = \sqrt{(D_N)(D_F)} \qquad \textbf{Eq. 4-23}$$

where:

$D_{GM}$ = distance to the geometric mean in feet
$D_N$ = distance to the nearest lane centerline in feet
$D_F$ = distance to the farthest lane centerline in feet

**Option B: Railroad Lines –** For railroads, the estimated noise levels are based on an average train traffic volume of 5–10 trains per day at 30–40 mph for main line railroad corridors and the noise levels are provided in terms of $L_{dn}$ only. Distances are referenced to the track centerline, or in the case of multiple tracks, to the centerline of the rail corridor. Because of the intermittent nature of train operations, train noise will affect the $L_{eq(1hr)}$ only during certain hours of the day, and these hours may vary from day to day. Therefore, to avoid underestimating noise impact when using $L_{eq(1hr)}$ , it is recommended that sites near rail lines are estimated based on nearby roadways or population density unless very specific train information is available.

**Option C: Population Density –** In areas away from major roadways, noise from local streets or in neighborhoods is estimated using a relationship determined during a research program by EPA.[24] EPA determined that ambient noise can be related to population density in locations away from transportation corridors, such as airports, major roads and railroad tracks, according to the following relation:

$$L_{dn} = 22 + 10\log(p) \qquad \textbf{Eq. 4-24}$$

where:

$L_{dn}$ = in dBA
$p$ = population density in people per square mile

In areas near major airports, published noise contours can be used to estimate the existing noise exposure. The $L_{dn}$ from such contours should be applied if greater than the estimates of existing noise from other sources at a given location.

**Table 4-17 Estimating Existing Noise Exposure for General Noise Assessment**

| Dominant Existing Noise Source | Distance from Major Noise Source, ft* | Population Density, people per sq. mi. | *Noise Exposure Estimates* | | | |
|---|---|---|---|---|---|---|
| | | | $L_{eq}$ Day | $L_{eq}$ Evening | $L_{eq}$ Night | $L_{dn}$ |
| Interstate Highway** | 10–50 | | 75 | 70 | 65 | 75 |
| | 50–100 | | 70 | 65 | 60 | 70 |
| | 100–200 | | 65 | 60 | 55 | 65 |
| | 200–400 | | 60 | 55 | 50 | 60 |
| | 400–800 | | 55 | 50 | 45 | 55 |
| | 800 and up | | 50 | 45 | 40 | 50 |
| Other Roadway† | 10–50 | | 70 | 65 | 60 | 70 |
| | 50–100 | | 65 | 60 | 55 | 65 |
| | 100–200 | | 60 | 55 | 50 | 60 |
| | 200–400 | | 55 | 50 | 45 | 55 |
| | 400 and up | | 50 | 45 | 40 | 50 |
| Railway†† | 10–30 | | -- | -- | -- | 75 |
| | 30–60 | | -- | -- | -- | 70 |
| | 60–120 | | -- | -- | -- | 65 |
| | 120–240 | | -- | -- | -- | 60 |
| | 240–500 | | -- | -- | -- | 55 |
| | 500–800 | | -- | -- | -- | 50 |
| | 800 and up | | -- | -- | -- | 45 |
| Population | | 1–100 | 35 | 30 | 25 | 35 |
| | | 100–300 | 40 | 35 | 30 | 40 |
| | | 300–1000 | 45 | 40 | 35 | 45 |
| | | 1000–3000 | 50 | 45 | 40 | 50 |
| | | 3000–10000 | 55 | 50 | 45 | 55 |
| | | 10000–30000 | 60 | 55 | 50 | 60 |
| | | 30000 and up | 65 | 60 | 55 | 65 |

* Distances do not include shielding from intervening rows of buildings. Generally, for estimating shielding attenuation in populated areas, assume 1 row of buildings every 100 ft, 4.5 dB for the first row, and 1.5 dB for every subsequent row up to a maximum of 10 dB attenuation.
** Roadways with 4 or more lanes that permit trucks, with traffic at 60 mph.
† Parkways with traffic at 55 mph, but without trucks, and city streets with the equivalent of 75 or more heavy trucks per hour and 300 or more medium trucks per hour at 30 mph.
†† Main line railroad corridors typically carrying 5-10 trains per day at speeds of 30-40 mph.

## Step 6: Inventory Noise Impacts

*Inventory the potential noise impacts either by comparing the project and existing noise at each noise-sensitive land use or by developing noise impact contours.*

Use land use information and assumptions for shielding attenuation from rows of buildings. In some cases, it may be necessary to supplement the land use information or determine the number of dwelling units within a multi-family building with a visual survey. If the objective is to compare major alignment options, it may not be necessary to identify every different type of noise-

sensitive land use. The inventory may include a subset of land uses, including residential and public institutional uses.

Option A is the preferred method as it quantifies the noise impact at each noise-sensitive land use indicating the severity of the impact. Option B may be useful for comparing and narrowing down major alignment options with numerous noise-sensitive land uses.

**Option A: Compare existing noise to project noise at each noise-sensitive land use.**

**A1.** Tabulate each individual noise-sensitive land use building and site within the identified screening distance (Section 4.3).

**A2.** Determine for each noise-sensitive land use the existing noise (Section 4.4, Step 5), the project noise (Section 4.4, Step 3) and the resulting change in noise.

**A3.** Designate each noise-sensitive land use with either a no, moderate, or severe noise impact based on the criteria in Section 4.1.

**A4.** Identify all moderate and severe impacts on a project map.

**Option B: Develop noise impact contours.**

**B1.** Determine the noise level thresholds at which the project noise would cause moderate and severe impacts using the estimated existing noise exposure from Section 4.4, Step 5 and the noise impact criteria in Figure 4-2.

**B2.** Determine the distances from the project boundary to the two impact levels using the noise exposure vs. distance curves or equations in Section 4.4, Step 3.

**B3.** Plot points on a project land use map that correspond to the distances determined in Section 4.4, Step 3. Continue this process for all areas surrounding the project. Connect the plotted points to represent the noise impact contours.

**B4.** Tabulate all noise-sensitive land use buildings and sites that lie between the impact contours and the project boundary. For residential buildings, an estimate of the number of dwelling units is satisfactory.

**B5.** Prepare summary tables showing the number of buildings (and estimated dwelling units, if available) within both impact categories.

Specific decibel level noise contours, for example, 65 dBA, can also be plotted if desired. The distances can be determined using the procedure in Section 4.4, Step 3 by substituting the desired decibel level for the impact threshold.

Locations of points will change with respect to the project boundary as the existing ambient exposure changes, the project source levels change, and as shielding effects change. It is recommended to plot points close together to

draw a smooth curve. For a General Noise Assessment, the contours may be drawn through buildings and terrain features as if they were not present. This practice is acceptable considering the level of detail associated with a project in its early stages of development. Example 4-1 and Example 4-4 describe the development of noise contours with illustrations.

## Step 7: Determine Noise Mitigation Needs

*Apply estimates of the noise reduction from proposed mitigation measures (Section 4.4, Step 2), where the assessment shows either severe or moderate impact, and repeat the tabulation of noise impacts.*

Note that noise barriers are the only form of mitigation available in a General Noise Assessment. The other mitigation measures are available for a Detailed Noise Analysis. The approximate noise barrier lengths and locations developed in a General Noise Assessment provide a preliminary basis for evaluating the costs and benefits of impact mitigation. This evaluation will provide a conservative estimate of the effect of the mitigation on the identified impacts.

In general, it is recommended to complete a Detailed Noise Analysis for final mitigation measures. However, if impact is identified through a General Noise Assessment and can be mitigated to a level of no impact using the noise reduction estimates included in the General Noise Assessment, a Detailed Noise Analysis may not be needed. Mitigation assumed in the assessment used for the NEPA evaluation must be included in the project as a commitment. Consult with the FTA Regional office to determine if a Detailed Noise Analysis is required for final mitigation measures.

The following examples illustrate how to complete general noise assessments for varying project types including commuter rail, highway/transit, BRT system, and a transit center.

## Example 4-1 General Noise Assessment – Commuter Rail

**General Noise Assessment for a Commuter Rail System in an Existing Abandoned Railroad Right-of-Way**

The following example illustrates the General Noise Assessment procedure for a new fixed-guideway project. The hypothetical project is a commuter rail system to be built within the abandoned ROW of a railroad. The example covers a segment of the corridor that passes through a densely developed area with population density of 25,000 people per square mile in mixed single- and multi-family residential land uses as shown in Figure 4-7. The example is presented in two parts: first, a segment where the rail line is grade-separated and a horn is not sounded; and second, an at-grade street-rail crossing where the horn is sounded.

**Assumptions**

- **Project Corridor**
  Existing population density is 25,000 people per square mile.
- **Commuter Rail System**
  Commuter train with one locomotive and a three-car consist on a double-track at-grade system with welded rail. Trains operate with 20-minute headways during peak hours and 1-hour headways during off-peak. Speeds are approximately 40 mph along the corridor.

**Operating Schedule**

| | Period | Headway (minutes) | | Trains per hour | | | Period Total |
|---|---|---|---|---|---|---|---|
| | | Inbound | Outbound | Inbound | Outbound | Total | |
| Daytime | 7 a.m. – 8 a.m. | 20 | 20 | 3 | 3 | 6 | 6 |
| | 8 a.m. – 4 p.m. | 60 | 60 | 1 | 1 | 2 | 16 |
| | 4 p.m. – 6 p.m. | 20 | 20 | 3 | 3 | 6 | 12 |
| | 6 p.m. – 10 p.m. | 60 | 60 | 1 | 1 | 2 | 8 |
| Nighttime | 10 p.m. – 11 p.m. | 60 | 60 | 1 | 1 | 2 | 2 |
| | 11 p.m. – 5 a.m. | -- | -- | -- | -- | -- | -- |
| | 5 a.m. – 6 a.m. | 60 | 60 | 1 | 1 | 2 | 2 |
| | 6 a.m. – 7 a.m. | 20 | 20 | 1 | 1 | 2 | 2 |

***Part 1: Grade-Separated Street Crossing***

**Determine Project Source Reference Levels at 50 ft**

Classify the noise source: Fixed-Guideway Transit
Determine noise source reference level from Table 4-9:
Locomotive: 92 dBA
Cars: 82 dBA

**Estimate Project Noise Exposure at 50 ft**

Determine average hourly daytime and nighttime volumes of train traffic.

Daytime (7 a.m. – 10 p.m.)

$$V_d = \frac{42\ trains}{15\ hours} = 2.8\ trains/hour$$

Nighttime (10 p.m. – 7 a.m.)

$$V_n = \frac{6\ trains}{9\ hours} = 0.7\ trains/hour$$

Use Eq. 4-1 and Eq. 4-3 to calculate the daytime $L_{eq(1hr)}$ at 50 ft for the locomotives and rail cars.

$$\begin{aligned} L_{d.Locos} &= SEL_{ref} + 10log(N_{Locos}) + Klog(\frac{S}{50}) + 10log(V_d) - 35.6 \\ &= 92 + 10log(1) - 10log(\frac{40}{50}) + 10log(2.8) - 35.6 \\ &= 61.8\ dBA \text{ at 50 ft} \end{aligned}$$

$$\begin{aligned} L_{d.RCars} &= SEL_{ref} + 10log(N_{Cars}) + 20log(\frac{S}{50}) + 10log(V_d) - 35.6 \\ &= 82 + 10log(3) + 20log(\frac{40}{50}) + 10log(2.8) - 35.6 \\ &= 53.7\ dBA \text{ at 50 ft} \end{aligned}$$

Calculate the total daytime $L_d$ for the locomotive and rail cars using Eq. 4-7.

$$\begin{aligned} L_{d.Combo} &= 10log(10^{L_{d.Loco}/10} + 10^{L_{d.RCars}/10}) \\ &= 10log(10^{61.8/10} + 10^{53.7/10}) \\ &= 62.4\ dBA \text{ at 50 ft} \end{aligned}$$

Calculate the nighttime $L_{eq(1hr)}$ at 50 ft for the locomotives and rail cars.

$$L_{n.Locos} = SEL_{ref} + 10\log(N_{Locos}) + K\log(\frac{S}{50}) + 10\log(V_n) - 35.6$$
$$= 92 + 10\log(1) - 10\log(\frac{40}{50}) + 10\log(0.7) - 35.6$$
$$= 55.8\ dBA \text{ at 50 ft}$$

$$L_{n.RCars} = SEL_{ref} + 10\log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\log(V_n) - 35.6$$
$$= 82 + 10\log(3) + 20\log(\frac{40}{50}) + 10\log(0.7) - 35.6$$
$$= 47.7\ dBA \text{ at 50 ft}$$

Calculate the total nighttime $L_n$ for the locomotive and rail cars using Eq. 4-8.

$$L_{n.Combo} = 10log(10^{L_{n.Locos}/10} + 10^{L_{n.RCars}/10})$$
$$= 10log(10^{55.8/10} + 10^{47.7/10})$$
$$= 56.4\ dBA \text{ at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-9.

$$L_{dn.Combo} = 10log\ (15 \times 10^{(L_{d.Combo}/10)} + 9 \times 10^{((L_{n.Combo}+10)/10)}) - 13.8$$

**Estimate Existing Noise Exposure**

Estimate existing noise at noise-sensitive sites. Since the existing alignment is on an abandoned railroad, the dominant existing noise source can be described by a generalized noise level to characterize a large area. Use Table 4-17 and population density of 25,000 people per square mile to determine the existing noise level. Unobstructed residences range from 100 to 200 ft from the rail line.

According to Table 4-17: $L_{dn}$ = 60 dBA

**Determine Noise Level and Distance for the Onset Of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 60 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{dn}$.

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 60 dBA | 58 dBA | 64 Dba |

Determine the distance from the project noise sources to the noise impact contours using the fixed-guideway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise level at 50 ft is approximately 64 dBA.

Moderate impact (58 dBA)

$$58 - 64 = -6\ dB$$

According to Figure 4-6, the distance correction is approximately -6 dB at 120 ft.

Severe Impact (64 dBA)

$$64 - 64 = 0\ dB$$

According to Figure 4-6, the distance correction is less than 0 dB at approximately 51 ft.

| Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 64 dBA | 120 ft | 51 ft |

**Develop Noise Impact Contours**

Draw contours for each affected land use, based on the above table and its distance from the rail line (Figure 4-7). Note that the impact distances listed are in terms of distance to the centerline of the Commuter Rail corridor.

**Inventory of Noise Impact**

There are six residential buildings within the contours defining moderate impact (shaded in Figure 4-7).

**Noise Mitigation**

The procedure is repeated assuming a noise barrier to be placed at the railroad ROW line. The barrier serves to reduce project noise from the commuter rail by at least 5 dB. Note that the barrier does not affect the project criteria to be used in determining impact, and the same existing noise levels (as the case without a barrier) are used to determine these thresholds.

In this example, the noise barrier decreases the distance to moderate impact from 120 to 60 ft and eliminates all residential noise impact for this segment of the project area.

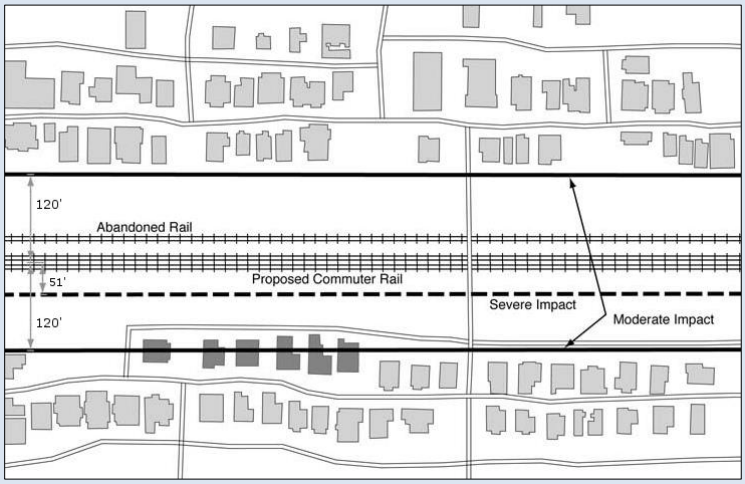


**Figure 4-7 Noise Impacts of Hypothetical Commuter Rail**

***Part 2: At-Grade Crossing with Horn Blowing***

Now consider the case of an active street crossing of the commuter railroad tracks. The General Noise Assessment method includes source reference levels for horns on moving trains and warning bells (crossing signals) at the street crossing. According to Table 4-9, the horn noise applies to track segments within ¼ mile of the grade crossing.

**Estimate Project Noise Exposure at 50 ft**

Using the train volumes from Part 1 and the information in Table 4-9 and Table 4-10, determine the day and nighttime $L_{eq(1hr)}$ from sounding the horns at 50 ft.

$$\begin{aligned} L_{d.LHorns} &= SEL_{ref} + 10\log(V_d) - 35.6 \\ &= 110 + 10\log(2.8) - 35.6 \\ &= 78.9\ dBA \end{aligned}$$

$$L_{n.LHorns} = SEL_{ref} + 10\log(V_n) - 35.6$$
$$= 110 + 10\log(0.7) - 35.6$$
$$= 72.9\ dBA$$

Calculate the $L_{dn}$ at 50 ft from train horns using Eq. 4-9 :

$$L_{dn.LHorns} = 10\log(15 \times 10^{(L_{d.LHorns}/10)} + 9 \times 10^{((L_{n.LHorns}+10)/10)})\text{-}13.8$$
$$= 81\ dBA$$

At-grade street crossings will have warning bells, typically sounding for 20 seconds for every train passby. The total daytime and nighttime durations are as follows:

$E_d$ = average daytime hourly duration
=20 seconds X 2.8 trains/hour = 56 seconds/hour

$E_n$ = average nighttime hourly duration
=20 seconds X 0.7 trains/hour = 14 seconds/hour

From Table 4-14:

$$L_{d.WBell} = SEL_{ref} + 10\log(\frac{E_d}{3600}) - 35.6$$
$$= 109 + 10\log(\frac{56}{3600}) - 35.6$$
$$= 55.3\ dBA$$

$$L_{n.WBell} = SEL_{ref} + 10\log(\frac{E_n}{3600}) - 35.6$$
$$= 109 + 10\log(\frac{14}{3600}) - 35.6$$
$$= 49.3\ dBA$$

Calculate $L_{dn}$ at 50 ft. from the warning bells using Eq. 4-17:

$$L_{dn.WBell} = 10\log(15 \times 10^{(L_{d.WBell}/10)} + 9 \times 10^{((L_{n.WBell}+10)/10)})\text{-}13.8$$
$$= 57.3\ dBA$$

Compared to horn blowing, the crossing signal warning bell noise is negligible, but still must be included in the evaluation.

**Estimate Existing Noise Exposure**

From Part 1, the existing noise level is 60 dBA.

**Determine Noise Level and Distance for the Onset Of Impact**

As in Part 1, the existing noise level (60 dBA) is used to determine the onset of moderate and severe impacts:

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 60 dBA | 58 dBA | 64 dBA |

Determine the distance from the project noise sources to the impact contours using the fixed-guideway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise at 50 ft is approximately 81 dBA. However, there are at least two intervening rows of buildings, which will provide 6 dB (4.5 dB for the first row and 1.5 dB for the second row) of shielding.

Moderate impact (58 dBA)

$$58 - (81 - 6) = -17\ dB$$

According to Figure 4-6, the distance correction is approximately -17 dB at 715 ft.

Severe Impact (64 dBA)

$$64 - (81 - 6) = -11\ dB$$

According to Figure 4-6, the distance correction is approximately -11 dB at 265 ft.

| Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 81 dBA | 715 ft | 265 ft |

**Draw Noise Impact Contours**

Contours can be drawn as in Part 1 for ¼ mile on either side of the grade crossing.

## Example 4-2 General Noise Assessment – Highway/Transit

**General Noise Assessment Example of Highway/Transit Corridor Projects**

This example illustrates a highway/transit project where the highway noise dominates and the FHWA assessment methods should be used to inform the FTA process according to the impact criteria in Section 4.1.

**Case 1: Highway Dominates**

A new LRT system is planned for the median of a major highway that carries heavy traffic both day and night. The noise levels at the first row of houses along the highway were measured during peak hour, mid-day and nighttime with hourly $L_{eq(1hr)}$ readings of 65 dBA, 63 dBA, and 60 dBA, respectively. The LRT tracks will be 125 ft from the first row of houses. The LRT operations during peak hour will be 4-car trains at 45 mph, with 5-minute headways in both directions. Nighttime service decreases to 2-car trains and 20 minute headways.

FTA is providing a share of the funding for the LRT project, but the State DOT and the FHWA are co-lead agencies because the median requires considerable preparation for the tracks, including replacing bridge piers of street crossings and moving some highway lanes.

**Assumptions**

$SEL_{ref}$ = 82 dBA
$Nd$ = 4 cars per train
$Nn$ = 2 cars per train
$S$ = 45 mph
$V_d$ = 24 trains per hour
$V_n$ = 6 trains per hour

**Estimate Project Noise Exposure at 50 ft**

Use Table 4-9 and Table 4-10 to determine the peak hour $L_{eq(1hr)}$ for the rail vehicles.

Use Eq. 4-3 to calculate the LRT peak-hour noise level.

$$L_{d.RCars}(h) = SEL_{ref} + 10\,log(N_{cars}) + 20\log(\tfrac{S}{50}) + 10\,log(V) - 35.6$$
$$= 82 + 10\,log(4) + 20\log(\tfrac{45}{50}) + 10\,log(24) - 35.6$$
$$= 65 \text{ dBA at 50 ft}$$

Use Eq. 4-3 to calculate the LRT late evening hourly noise level.

$$L_{n.RCars}(h) = SEL_{ref} + 10\,log(N_{cars}) + 20\log(\tfrac{S}{50}) + 10\,log(V) - 35.6$$
$$= 82 + 10\,log(2) + 20\log(\tfrac{45}{50}) + 10\,log(6) - 35.6$$
$$= 56 \text{ dBA at 50 ft}$$

**Estimate Project Noise Exposure at 125 ft**

Since the LRT tracks will be 125 ft from the first row of houses, use Figure 4-6 to determine the level at 125 ft.

At 125 ft, the distance correction is 5 dB.
Peak hour:

$$65 - 5 = 60\ dBA\ at\ 125\ ft$$

Night hourly:

$$56 - 5 = 51\ dBA\ at\ 125\ ft$$

In this case, the highway dominates the noise environment in the area both day and night, by 5 dB during peak hour and 9 dB at night. According to Section 4.1 and Table 4-2, use the FHWA assessment methods.

## Example 4-3 General Noise Assessment – BRT System

**General Noise Assessment for a BRT System in an Existing Railroad Right-of-Way**

This example for a simple BRT project illustrates using the FTA procedures for a new BRT corridor planned in an existing abandoned railroad ROW.

**Assumptions**

$SEL_{ref}$ = 82 for buses
$S$ = 25 mph
$V_d$ = (344 buses) / (15 hours) = 22.9 buses per hour
$V_n$ = (116 buses) / (9 hours) = 12.9 buses per hour

**Estimate Project Noise Exposure**

Use the information and equations in Table 4-12 to calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$C_S$ = 15 for buses

$$L_{d.Bus} = SEL_{ref} + 10\,log(V_d) + C_S\log(\tfrac{S}{50}) - 35.6$$
$$= 82 + 10\,log(22.9) + 15log(\tfrac{25}{50}) - 35.6$$
$$= 55 \text{ dBA at 50 ft}$$

$$L_{n.Bus} = SEL_{ref} + 10\,log(V_n) + C_S\log(\tfrac{S}{50}) - 35.6$$
$$= 82 + 10\,log(12.9) + 15log(\tfrac{25}{50}) - 35.6$$
$$= 53 \text{ dBA at 50 ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-13.

$$L_{dn.Bus} = 10\log(15 \times 10^{(L_{d.Bus}/10)} + 9 \times 10^{((L_{n.Bus}+10)/10)}) - 13.8$$
$$= 60 \text{ dBA at 50 ft}$$

**Estimate Existing Noise Exposure**

The surrounding area is residential with 2,500 people per square mile starting approximately 100 ft away from the proposed alignment. Determine the existing noise using Table 4-17.

$L_{dn}$ = 50 dBA

**Determine Noise Level and dIstance for the Onset of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 50 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{dn}$.

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 50 dBA | 54 dBA | 59 dBA |

Determine the distance to the noise impact contours using the fixed-guideway & highway curve in Figure 4-6 (or the equations in Table 4-15) and the project impact thresholds obtained above. The project noise level at 50 ft is approximately 60 dBA.

Moderate impact (54 dBA)

$$54 - 60 = -6\ dB$$

According to Figure 4-6, the distance correction is approximately -6 dB at 125 ft.

Severe Impact (59 dBA)

$$59 - 60 = -1\ dB$$

According to Figure 4-6, the distance correction is less than -1 dB at approximately 60 ft.

| Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 60 dBA | 125 ft | 60 ft |

**Inventory of Noise Impact**

Since there are residential land uses approximately 100 ft away from the proposed alignment and the onset of moderate impact is at 125 ft, there are possible moderate impacts to the residences.

**Noise Mitigation**

A barrier is proposed for mitigation between the BRT system and the residences. The analysis is repeated and results in a predicted new project level of 55 dBA and the following impact distances:

| Mitigated Project Level $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 55 dBA | 60 ft | N/A |

With a noise barrier in place between the BRT system and the residences, it is predicted that the onset of moderate impact would occur approximately 60 ft away from the BRT system. Since the residential area begins approximately 100 ft away from the BRT system, which is beyond the distance of moderate impact (60 ft), a noise barrier would provide the appropriate noise mitigation for the predicted moderate impact. The onset of severe impact is listed as N/A because with a noise barrier, the severe impact criterion is not exceeded by the project.

# Example 4-4 General Noise Assessment – Transit Center

**General Noise Assessment for a Transit Center**

The following example illustrates the procedure for performing a General Noise Assessment for a stationary source. The example represents a typical FTA-assisted project in an urban area, the siting of a busy transit center in a mixed commercial and residential area, as shown in Figure 4-8.

Assume that the Noise Screening Procedure has already been done for this project and the nearest residence has been identified approximately 140 ft from the center of the proposed transit center. Recall that if any residential or other noise-sensitive land use is identified within 150 ft of a transit center during the Noise Screening Procedure, additional analysis is required.

**Assumptions**

- **Main Street Traffic**
  Peak hour traffic of 1200 autos, 20 heavy trucks, 300 medium trucks.

- **Population Density**
  12 houses per block, single family homes, 3 people per family.
  - Block area 78,750 square ft.
  - Population density = 9,750 people/square mile.

- **Bus Traffic**

| Period | Hours | Buses per Hour |
|---|---|---|
| Peak, Morning | 7 a.m.–9 a.m. | 30 |
| Peak, Afternoon | 4 p.m.–6 p.m. | 30 |
| Mid-day | 9 a.m.–4 p.m. | 15 |
| Evening | 6 p.m.–10 p.m. | 12 |
| Early Morning (Night) | 6 a.m.–7 a.m. | 15 |
| Late Night | 10 p.m.–1 a.m. | 4 |

**Estimate Project Noise Exposure at 50 ft**

Determine the hourly volume of buses during day and night.

Daytime (7 a.m. – 10 p.m.)

$$V_d = \frac{273\ buses}{15\ hours} = 18.2\ buses/hour$$

Nighttime (10 p.m. – 7 a.m.)

$$V_n = \frac{27\ buses}{9\ hours} = 3\ buses/hour$$

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft for the bus transit center using the reference levels in Table 4-13 and the equations in Table 4-14.

$$\begin{aligned} L_{d.BTCenter} &= SEL_{ref} + C_N - 35.6 \\ &= 101 + 10\log(\frac{18.2}{20}) - 35.6 \\ &= 65\ dBA \text{ at 50 ft} \end{aligned}$$

$$L_{n.BTCenter} = SEL_{ref} + C_N - 35.6$$

$$= 101 + 10\log(\frac{3}{20}) - 35.6$$
$$= 57\ dBA \text{ at } 50 \text{ ft}$$

Calculate $L_{dn}$ at 50 ft for the project using Eq. 4-17.

$$L_{dn.BTCenter} = 10\log(15 \times 10^{(L_{d.BTCenter}/10)} + 9 \times 10^{((L_{n.BTCenter}+10)/10)})\text{-}13.8$$
$$= 66\ dBA \text{ at } 50 \text{ ft}$$

**Estimate Existing Noise Exposure**

Estimate existing noise at noise-sensitive sites from the dominant noise source, and either major roadways or local streets (population density).

**Roadway Noise Estimate –** The traffic on Main Street qualifies this street for the Other Roadway category in Table 4-17. According to the map, the nearest residence is 275 ft from the edge of Main Street. The table shows existing $L_{dn}$ = 55 dBA at this distance for representative busy city street traffic.
**Population Density Noise Estimate –** Noise from local streets is estimated from the population density of 9,750 people/square mile. Table 4-17 confirms that the $L_{dn}$ is approximately 55 dBA.

In this example, the existing noise level by both the roadway and population density estimates are the same, but that is not always the case. If the levels are different, use the lower noise level. The existing noise level associated with the residential neighborhood in this example is $L_{dn}$ = 55 dBA.

**Determine Noise Level and Distance for the Onset of Impact**

Determine the noise level for the onset of moderate and severe impact using Figure 4-2 and the existing noise level of 55 dBA. Note that this project is land use category 2 and the appropriate metric is $L_{dn}$.

| Existing Noise $L_{dn}$ | Onset of Moderate Impact $L_{dn}$ | Onset of Severe Impact $L_{dn}$ |
|---|---|---|
| 55 dBA | 56 dBA | 62 dBA |

Determine the distances from the center of the property to the noise impact contours using the stationary curve in Figure 4-6. The project noise level at 50 ft is 66 dBA.

Moderate impact (56 dBA)

$$56 - 66 = -10\ dB$$

According to Figure 4-6, the distance correction is approximately -10 dB at 125 ft.

Severe impact (62 dBA)

$$62 - 66 = -4\ dB$$

According to Figure 4-6, the distance correction is -4 dB at approximately 70 ft.

| Project Noise $L_{dn}$ | Onset of Moderate Impact Distance | Onset of Severe Impact Distance |
|---|---|---|
| 66 dBA | 125 ft | 70 ft |

**Draw Noise Impact Contours**

Draw lines at 70 ft and 125 ft from the center of the property of the proposed transit center. These lines represent the noise impact contours. (Note that in Figure 4-8 the severe impact contour is not drawn for clarity. The contour is just within the dashed line representing the moderate impact contour after mitigation).

**Inventory of Noise Impact**

Within, or touching, the contour defining moderate impact are three residential buildings (shaded in Figure 4-8). No residences are within the severe impact contour.

**Noise Mitigation**

The process is repeated with a hypothetical noise barrier at the property line on the residential side of the transit center. This would consist of a wall approximately 15 ft high partially enclosing the transit center, sufficient to screen the residences but not the commercial block facing Main Street. According to Table 4-14, the approximate noise barrier effect is -5 dB. Repeating the procedure above, the noise barrier will reduce the moderate impact contour to 80 ft and the severe impact contour to 45 ft (note that at 50 ft the distance correction is 0), which in this example eliminates all potential impacts on the residences.

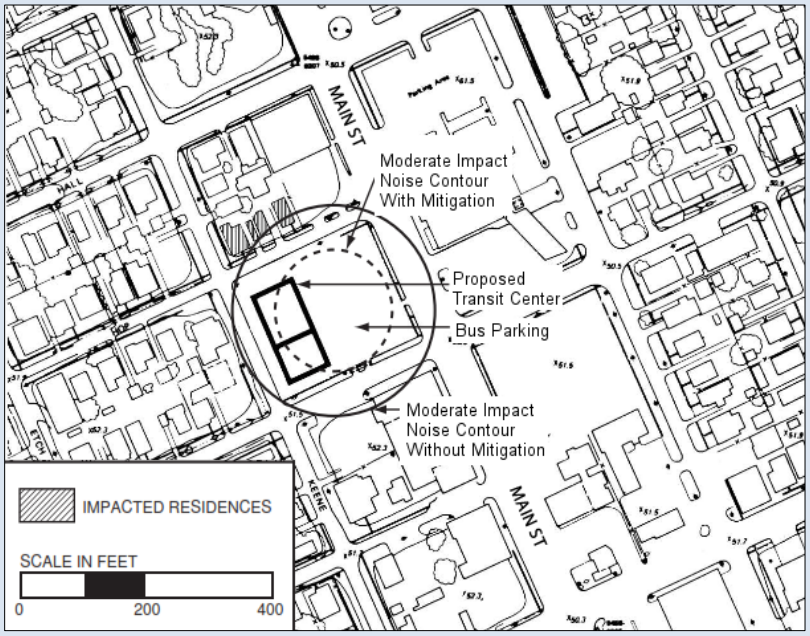


**Figure 4-8 Example of Project for General Noise Assessment: Siting of Transit Center in Mixed Commercial/Residential Area**

## 4.5 Evaluate Impact: Detailed Noise Analysis

**Evaluate for impact using the Detailed Noise Analysis procedure in this section, if appropriate.** For guidelines on when the Detailed Noise Analysis is appropriate, review Section 4.2.

The steps in the Detailed Noise Analysis (Figure 4-9) parallel the steps in the General Noise Assessment, though the Detailed Noise Analysis employs equations for computations rather than graphs or tables. Each step in the Detailed Noise Analysis is more refined in the prediction of project noise and subsequent evaluation of mitigation measures. Noise projections from the project must be determined for each receiver.

- **Step 1: Identify Noise-Sensitive Receivers**
  Identify the noise-sensitive receivers of interest in the impact analysis study, including clustering noise-sensitive areas. This identification is usually based

on the Screening Procedure and General Noise Assessment previously conducted.

- **Step 2: Determine Project Noise Source Reference Levels**
  Determine the project noise sources and reference levels. Then, estimate the project noise exposure at the reference distance of 50 ft, considering operational characteristics. When appropriate, measurements may be used to determine noise source reference levels.

- **Step 3: Determine Propagation Characteristics**
  Estimate project noise exposure as a function of distance, accounting for shielding and propagation along the path.

- **Step 4: Combine Noise Exposure from All Sources**
  Combine all sources to predict the total project noise at receivers.

- **Step 5: Determine Existing Noise Exposure**
  Determine the existing noise exposure. Measurements are used to determine the existing noise exposure. When measurements are unavailable, a simplified procedure to estimate existing noise exposure may be used with a clear justification to and approval by the FTA Regional office.

- **Step 6: Assess Noise Impact**
  Assess the noise impact at each receiver of interest using separate procedures for transit only and multimodal transportation projects.

- **Step 7: Determine Noise Mitigation Measures**
  Evaluate the need for mitigation and repeat the Detailed Noise Analysis with proposed mitigation.

When situations arise that are not explicitly covered in the Detailed Noise Analysis, professional judgment, in consultation with the FTA Regional office, may be used to extend these methods to cover these unique cases, when appropriate. Appendix G provides information on developing and using non-standard modeling procedures.

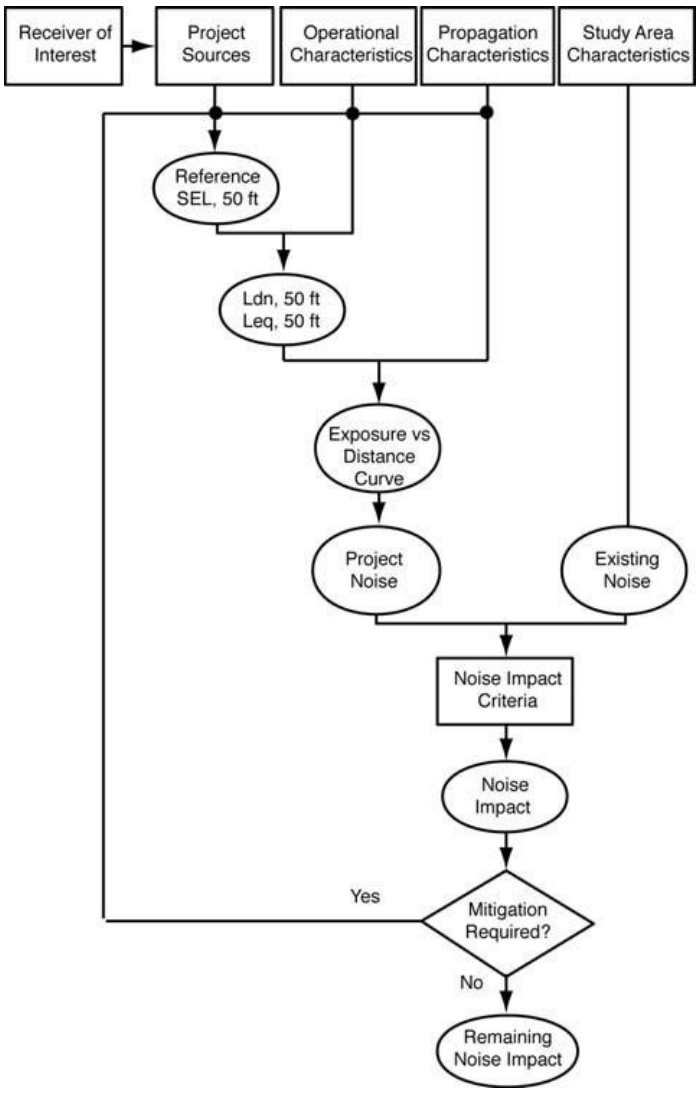


**Figure 4-9 Procedure for Detailed Noise Analysis**

## Step 1: Identify Noise-Sensitive Receivers

*Select the noise-sensitive receivers of interest, the number of which will depend upon the land use in the vicinity of the proposed project and the extent of the study area defined by the Noise Screening Procedure in Section 4.3 and the results of the General Noise Assessment in Section 4.4.*

The steps in identifying the noise-sensitive receivers of interest, both the number of receivers needed and their locations, shown in Figure 4-10, include:

**1a.** Identify all noise-sensitive land uses.
**1b.** Select individual receivers of interest.
**1c.** Cluster residential neighborhoods and other large noise-sensitive areas.

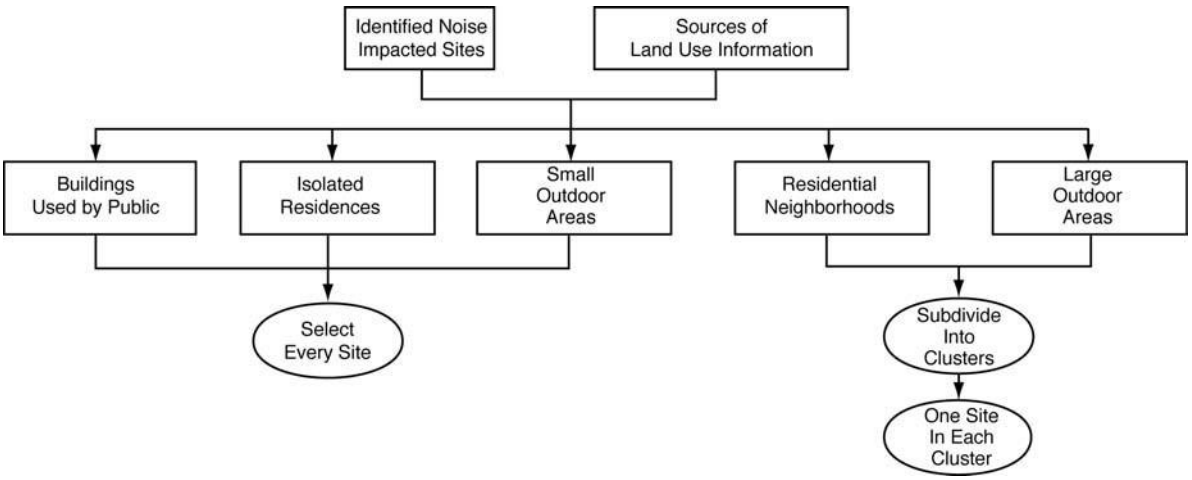


**Figure 4-10 Guide to Selecting Noise-Sensitive Receivers of Interest**

**1a.** Identify all noise-sensitive land uses where impact is identified by the General Noise Assessment in Section 4.4. If a General Noise Assessment has not been done, include all noise-sensitive sites according to the Noise Screening Procedure in Section 4.3. In areas where ambient noise is low, include land uses that are farther from the proposed project than for areas with higher ambient levels.

Recommended materials and methods that can assist in locating noise-sensitive land uses near the proposed project include:

- **Land use maps** prepared by regional or local planning agencies or by the project staff. Area-wide maps often do not have sufficient detail to be of much use. But they can provide broad guidance and may suggest residential pockets hidden within otherwise commercial zones. Of more use are project-specific maps that provide building-by-building detail on the land near the proposed project.

- **Road and town maps** can supplement other maps, are generally more up-to-date, and may be of larger scale.

- **Aerial photographs,** when current, especially those of 400-ft scale or better, are valuable in locating all potential noise-sensitive land uses close to the proposed project. In addition, they can be useful in determining the distances between receivers and the project.

- **Windshield survey,** in which the corridor is driven and land uses are annotated on base maps, may be used for definitive identification of noise-sensitive sites. The windshield survey, supplemented by footwork where needed, is especially useful in identifying newly-constructed sites and in confirming land uses very close to the proposed project. In addition, maps and aerial photos typically reveal only horizontal distances, not vertical distances. Houses on a hill overlooking the project may need a barrier of unacceptable height for its attenuation to be effective, and the greater vertical distance between source and receiver may eliminate the impact entirely. The windshield survey would reveal where vertical contour maps

or other means may be needed so that vertical distances can be determined.

- **Geographic Information Systems (GIS)** provides electronic mapping needed for identifying noise-sensitive land uses. GIS data may include land parcels, building structures, aerial photography, and project-specific information. These data may be obtained during the project study or from local or regional agencies that store and maintain GIS data. Using electronic GIS data has advantages over paper mapping with respect to automating the process of identifying noise-sensitive land uses and accurately being able to determine their distances to the project alignment

Table 4-18 contains three types of *land uses of interest* and provides guidelines as to when receivers should be analyzed individually and when they can be clustered.

**Table 4-18 Land Uses of Interest**

| Land Uses | Specific Use | Selecting Receivers |
|---|---|---|
| Residences | Isolated single family residences<br><br>Neighborhoods (single and multi-family residences, apartment buildings, duplexes, etc.) | Select each isolated residence as a receiver of interest.<br>For residential areas, cluster by proximity to project sources, proximity to ambient-noise sources, and location along project line. Choose one receiver of interest (closest to the project noise source and at an intermediate distance from the predominant sources of existing noise) in each cluster (i.e., Balance the distance between the receiver and the new noise source and the receiver and the existing noise source). Multiple clusters in one location may be needed to fully characterize the area. |
| Indoor noise-sensitive sites | Places of worship<br>Schools Hospitals/nursing homes Libraries<br>Public meeting halls<br>Concert halls/auditoriums/theaters<br>Recording/broadcast studios<br>Museums and certain historic buildings<br>Hotels and motels<br>Other public buildings with noise- sensitive indoor use | Select noise-sensitive buildings as separate receivers of interest. |
| Outdoor noise-sensitive areas | Certain parks<br>Historic sites used for interpretation<br>Amphitheaters<br>Passive recreation areas<br>Cemeteries<br>Other outdoor noise-sensitive areas | For relatively small noise-sensitive areas, select noise-sensitive sites as separate receivers of interest.<br>For relatively large areas (e.g. a cemetery, etc.), cluster by proximity to project noise sources, proximity to ambient-noise sources, and location along project line. Choose one receiver of interest (closest to the project noise source and at an intermediate distance from the predominant sources of existing noise) in each cluster. |

**1b.** Select the following types of noise-sensitive receivers within the noise study area, per Table 4-18, to be evaluated as individual receivers:

- Every major noise-sensitive public building
- Every isolated residence
- Every relatively small outdoor noise-sensitive area

Use judgment to avoid analyzing noise where such analysis is obviously not needed. Areas that are considered particularly noise-sensitive by the community, but do not meet the criteria in Table 4-3, should be considered on a case-by-case basis as discussed in Section 4.1.

**1c.** Residential neighborhoods and relatively large outdoor noise-sensitive areas can often be clustered, simplifying the analysis that is required without compromising the accuracy of the analysis. Subdivide all such neighborhoods/areas into clusters of approximately uniform noise, each containing a collection of noise-sensitive sites. Strive to obtain uniformity of both project noise and ambient noise using the following guidelines:

- In general, project noise reduces (drops off) with distance from the project. For this reason, project noise uniformity requires nearly equal distances between the project noise source and all sites within the cluster. Clusters are typically shaped as long narrow strips parallel to the transit corridor and/or circling project point sources such as maintenance facilities. It is suggested to cluster sites where the project noise varies over a range of 5 dB or less.

- Note that noise drops off approximately 3 dB per doubling of distance for line sources and approximately 6 dB per doubling of distance for point sources over open terrain. This reduction in noise will occur over a shorter distance in areas containing obstacles blocking the path of sound propagation, such as rows of buildings.

- Ambient noise usually drops off from non-project sources in the same manner as noise from project sources. For this reason, clustering for uniform ambient noise will usually result in long narrow strips parallel to major roadways or circling major point sources of ambient noise, such as manufacturing facilities. It is suggested to cluster sites where the ambient noise varies over a range of 5 dB or less. Ambient noise levels may be difficult to judge without measurements. In areas without predominant sources of noise, like highways, ambient noise can be considered to vary with population density, which is often uniform along the corridor. In situations where ambient noise tends to be uniform, the clusters can encompass relatively large areas.

After defining clusters, select one representative receiver in each cluster. It is recommended to choose the receiver closest to the project noise source and at an intermediate distance from the predominant sources of existing noise. See Appendix D for additional guidance and examples on clustering receivers, as well as an example.

Assess each identified cluster representative and individual noise-sensitive receiver of interest using the Detailed Noise Analysis as presented in the following steps.

## Step 2: Determine Project Noise Source Reference Levels

*Identify the major project noise sources near the noise-sensitive receivers of interest, group them by source type, and determine reference levels to compute project noise at 50 ft, as shown in Figure 4-11.*

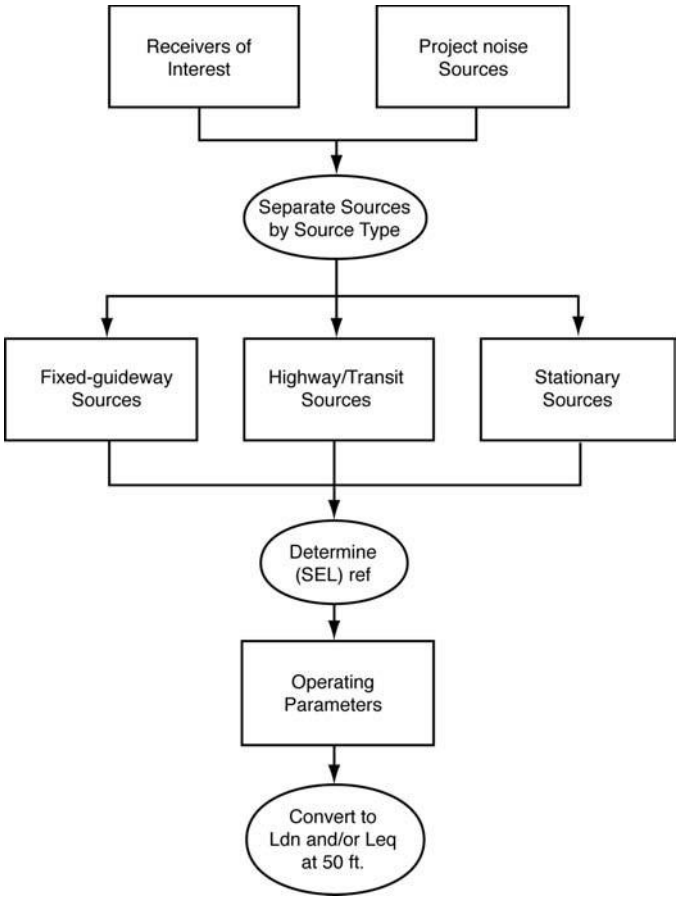


**Figure 4-11 Flow Diagram for Determining Project Noise at 50 ft**

**2a.** Identify the major project noise sources near receivers of interest according to Table 4-19. The right-hand column of the table indicates if each source is considered as a major contributor to the overall noise impact. Note that some noise sources can create high noise levels but are not indicated as major contributors. Although such sources are loud, they rarely stay in a neighborhood for more than a day or two; therefore, the overall noise exposure is relatively minor. Computations are required for all major noise sources in this table.

**Table 4-19 Sources of Transit Noise**

| Project Type | Source Type | Actual Source | Major? |
|---|---|---|---|
| Commuter Rail<br>Light Rail Streetcars<br>RRT | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Horns and whistles | Yes |
| | | Crossing signals | Yes |
| | | Crossovers/switches | Yes |
| | | Squeal on tight curves | Yes |
| | | Track-maintenance equipment | No |
| | Stationary | Substations | Yes |
| | | Chiller plants | No |
| Busways<br>Bus Transit Malls | Highway/Transit | Bus passbys | Yes |
| | | Buses parking | No |
| | Stationary | Buses idling | Yes |
| AGT | Fixed-Guideway | Vehicle passbys | Yes |
| Monorail | Miscellaneous | Line equipment | No |
| Terminals<br>Stations<br>Transit Centers | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Crossovers/switches | Yes |
| | | Squeal on tight curves | Yes |
| | Highway/Transit | Bus passbys | Yes |
| | | Buses parking | No |
| | | Automobile passbys | No |
| | Stationary | Locomotives idling | Yes |
| | | Buses idling | Yes |
| | | Ferry boats landing, idling, and departing at dock | Yes |
| | | HVAC equipment | No |
| | | Cooling towers | No |
| | | P/A systems | No |
| Park-and-Ride Lots | Highway/Transit | Bus passbys | Yes |
| | | Buses idling | Yes |
| | | Automobile passbys | No |
| | Stationary | P/A systems | No |
| Traffic Diversion Projects | Highway/Transit | Highway vehicle passbys | Yes |
| Storage Facilities<br>Maintenance Facilities | Fixed-Guideway | Locomotive and rail car passbys | Yes |
| | | Locomotives idling | Yes |
| | | Squeal on tight curves | Yes |
| | | Horns, warning signals, coupling/ uncoupling, auxiliary equipment, crossovers/ switches, brake squeal, and air release | Yes |
| | Highway/Transit | Bus passbys | Yes |
| | Stationary | Buses idling | Yes |
| | | Yard/shop activities | No |
| | | Car washes | No |
| | | HVAC Equipment | No |
| | | P/A Systems | No |

**2b.** Separate the major noise sources by source type: fixed-guideway transit, highway/transit or stationary facility. Note that a major fixed-guideway system will usually have stationary facilities associated with it, and that a stationary facility may have highway/transit elements associated with it. Then use the instructions in the following source type options below to:

**2c.** Determine the source reference levels for the all project noise sources. Each source reference level pertains to reference operating conditions for stationary sources or one vehicle passby under reference operating conditions.

These reference levels should incorporate source-noise mitigation only if such mitigation will be considered for incorporation into the system specifications. The source levels used in this manual are typical of systems designed according to current engineering practice, but they do not include special noise control features that could be incorporated in the specifications at extra cost. If special features that result in noise reductions are included in any of the predictions, the Federal environmental documents must include a commitment by the project sponsor to adopt such treatments before the project is approved for construction. For example, if the specifications include vehicle noise limits that may not be exceeded, these limits should be used to determine the reference level, and this level should be used in the analysis rather than the standard, tabulated reference level.

**2d.** Convert the source reference level to noise exposure in terms of $L_{eq(1hr)}$ or $L_{dn}$ under project operating conditions using the appropriate equations depending upon the type of source. The noise exposure is determined at the reference distance of 50 ft.

**Option A. Fixed-guideway Sources –** Compute project noise at 50 ft for fixed-guideway sources as identified in the second column of Table 4-19.

### A.i. Reference SEL Levels

Determine the reference SEL at 50 ft for each major fixed-guideway noise source, either by measurement according to Appendix F or by referencing Table 4-20. The table provides guidance on which method is preferred for each source type. The "NO" designation implies that the source levels given in the table are appropriate to use in the analysis, and the "YES" designation implies that measurements are preferred over the data given in the table. In general, measurements are preferred for source types that vary considerably from project to project, including any emerging technology sources. The data in the table are adequate for source types that do not vary considerably from project to project.

For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of these measurements to the reference conditions of Table 4-20. For projects where source-noise specifications have been defined (e.g., noise limits are usually included in the specifications for purchase of new transit vehicles), these specifications may be used instead of measurements after conversion to reference conditions using the equations in Appendix F. This is only appropriate when there is a firm commitment to adopt the noise specifications in the vehicle

procurement documents during the engineering phase and to adhere to the specifications throughout the procurement, delivery, and testing of the vehicles.

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

**Table 4-20 Source Reference SELs at 50 ft: Fixed-Guideway Sources at 50 mph**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements? * |
|---|---|---|---|
| Rail cars | 82 | 80 | No |
| Streetcars** | 76 | 74 | No |
| Locomotives – diesel | 92 | 88 | No |
| Locomotives – electric | 90 | 86 | No |
| Diesel multiple unit (DMU) | 85 | 81 | Yes |
| Agt – steel wheel | 80 | 78 | Yes |
| Agt – rubber tire | 78 | 75 | Yes |
| Monorail | 82 | 80 | Yes |
| Maglev | 72 | 70 | Yes |
| Transit car horns (emergency) | 93 | 90 | No |
| Transit car whistles | 81 | 78 | No |
| Locomotive horns | | | |
| At-grade crossing | 113 | 110 | No |
| From crossing to 1/8 mile | † | 110 | |
| From 1/8 mile to 1/4 mile | 110 | 110 | |

* "No" implies that the source levels given in the table are appropriate to use in the analysis and "Yes" implies that measurements are preferred over the data given in the table.
** The reference speed for streetcars is 25 mph. For streetcar speeds above 25 mph, use the "Rail Cars" reference level and 50 mph for the reference speed.
† Use the following equation for locomotive horns from crossing to 1/8 mile:

$$SEL_{Ref} = 113 - 3 \times (\frac{D_P}{660})$$

where:
$D_P$= distance from grade crossing parallel to tracks

**A.ii. Estimate Noise Exposure at 50 ft** – Use the reference SELs in Table 4-20, operating conditions, and the equations in Table 4-21 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Trains with different numbers of cars or operating conditions produce different noise exposure levels and should be converted from SEL to $L_{dn}$ separately. Use the following guidelines to determine if sources should be converted separately. These differences in operating conditions will produce an approximate 2-decibel change in noise exposure:
    - 40 percent change in number of locomotives or cars per train.
    - 40 percent change in number of trains per hour.
    - 40 percent change in number of trains per day, or per night (for computation of $L_{dn}$).
    - 15 percent change in train speed.
    - Change of one notch in diesel locomotive throttle setting (e.g., from notch 5 to notch 6).

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project-related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for locomotives, rail cars, and warning horns.
   - Number of rail cars in the train (if this number varies during the day, take the average for the daytime and nighttime periods separately for category 2 land uses, and use the maximum number during the period of interest for category 1 or 3 land uses).
   - Number of locomotives in the train, if any.
   - Train speed, in miles per hour (maximum expected).
   - Average throttle setting of the train's locomotive(s) for diesel-powered locomotives and DMU's only.[iv] If this input is not available, assume a throttle setting of 8 for locations where the vehicle would accelerate and 5 for all other locations.[25]
   - For residential receivers of interest:
     - Average hourly train volume during daytime hours (the total number of train passbys between 7 a.m. and 10 p.m., divided by 15 hours);
     - Average hourly train volume during nighttime hours (the total number of train passbys between 10 p.m. and 7 a.m., divided by 9 hours);
   - For non-residential receivers of interest, number of events that occur during each hour of interest in trains per hour; and
   - Track type (continuously welded or jointed) and profile (at-grade or elevated).

4. **Calculate $L_{eq(1hr)}$ at 50 ft**
   - Calculate $L_{eq(1hr)}$ using the appropriate equations in Table 4-21 for each hour of interest.
   - Compute the combined $L_{eq(1hr)}$. It may be necessary to compute the combined totals with and without the warning horns; some neighborhoods along the corridor may be exposed to the horn noise and some may not.

5. **Calculate $L_{dn}$ at 50 ft**
   - If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the combined day $L_{eq(1hr)}$ and the combined night $L_{eq(1hr)}$.
   - It may be necessary to calculate $L_{dn}$ with and without the warning horns, as above.

[iv] Omit this term if not applicable from the equation in Table 4-21 for other vehicle types.

Note that the equations in Table 4-21 include terms to account for a difference in speed from the reference speed of 50 mph and a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

**Table 4-21 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Fixed-Guideway Sources**

| | | |
|---|---|---|
| **Locomotives*** $L_{eq(1hr)}$ at 50 ft | $L_{eq.Loco(1hr)} = SEL_{ref} + 10\,log(N_{Loco}) + C_T + Klog(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-25** |
| **Locomotive Warning Horns**** $L_{eq(1hr)}$ at 50 ft | $L_{eq.LHorns(1hr)} = SEL_{ref} + 10\,log(V) - 35.6$ | **Eq. 4-26** |
| **Rail Vehicles†** $L_{eq(1hr)}$ at 50 ft | $L_{eq.RCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 20\log(\frac{S}{50}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-27** |
| **Streetcar (25 mph or slower)** $L_{eq(1hr)}$ at 50 ft | $L_{eq.SCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 2\log(\frac{S}{25}) + 10\,log(V) - 35.6 + Adj_{track}$ | **Eq. 4-28** |
| **Transit Warning Horns**** $L_{eq(1hr)}$ at 50 ft | $L_{eq.THorns(1hr)} = SEL_{ref} - 10\,log(\frac{S}{50}) + 10\,log(V) - 35.6$ | **Eq. 4-29** |
| **Combined Locomotive and transit††** $L_{eq(1hr)}$ at 50 ft | $L_{eq.Combo(1hr)} = 10\log(10^{(L_{eq.Loco(1hr)}/10)} + 10^{(L_{eq.RCars(1hr)}/10)} + 10^{(L_{eq.SCars(1hr)}/10)} + 10^{(L_{eq.LHorns(1hr)}/10)} + 10^{(L_{eq.THorns(1hr)}/10)})$ | **Eq. 4-30** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$, $N_{Loco}$ = $N_d$ (loco events), and $N_{Cars}$ = $N_d$ (car events) | **Eq. 4-31** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$, and $N_{Loco}$ = $N_d$ (loco events), and $N_{Cars}$ = $N_d$ (car events) | **Eq. 4-32** |
| **Day/Night** $L_{dn}$ at 50 ft | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-33** |

$N_{Loco}$ = average number of locomotives per train

$C_T$ = $0\ for\ T < 6$
$2(T-5)\ for\ T \geq 6$
where
T = average throttle setting for diesel-powered locomotives and DMUs only

K = -10 for passenger diesel
0 for DMUs[Ŧ]
+10 for electric

$N_{Cars}$ = average number of cars per train

$V$ = average hourly volume of train traffic, trains per hour

S = train speed, mph

$Adj_{track}$ = constant
+5 for jointed track or for a crossover within 300 ft
+4 for aerial structure with slab track (except AGT and monorail)
+3 for embedded track on grade

$V_d$ = average hourly daytime volume of train traffic, trains per hour
$= \frac{number\ of\ trains, 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)
$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of train traffic, trains per hour
$= \frac{number\ of\ trains, 10\ p.m.\ to\ 7a.m.}{9}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)
$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

* Assumes a diesel locomotive power rating at approximately 3000 hp ** Based on FRA's horn noise model (www.fra.dot.gov/Elib/Document/2681
† Includes all commuter rail cars, transit cars, streetcars above 25 mph, AGT and monorail. †† Only include appropriate terms.
[Ŧ] Because of the wide range of vehicle types that qualify as a DMU, measurements are preferred for the reference level and speed coefficient. If no measurements are conducted, use the reference level in Table 4-20 and a speed coefficient of 0.

## Example 4-5 Detailed Noise Analysis – Fixed Guideway Noise Sources

**Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Fixed-Guideway Source**

A commuter train with 1 diesel locomotive and 6 cars will pass close to a residential area at a grade crossing. The track is jointed.

**Assumptions**

$SEL_{ref}$ = 92 for diesel locomotives
= 82 for rail cars
= 113 for locomotive warning horns at-grade crossing
$N_{Cars}$ = 6
$N_{Loco}$ = 1
$S$ = 43 mph
$T$ = 8
$V_d$ = $40\ trains/15\ hours = 2.667\ trains\ per\ hour$
$V_n$ = $2\ trains/9\ hours = 0.222\ trains\ per\ hour$

Use the equations in Table 4-21 to determine the daytime $L_{eq(1hr)}$ for each source and the combined daytime $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Locs(1hr)} = SEL_{ref} + 10\,log(N_{Loco}) + C_T + Klog(\frac{S}{50}) + 10\,log(V_d) - 35.6$$
$$= 92 + 10\,log(1) + 6 + (-10)log(\frac{43}{50}) + 10\,log(2.667) - 35.6$$
$$= 67.3\ dBA \text{ at 50 ft}$$

$$L_{d.RCars(1hr)} = SEL_{ref} + 10\,log(N_{Cars}) + 20log\left(\frac{S}{50}\right) + 10\,log(V_d) - 35.6 + Adj_{track}$$
$$= 82 + 10\,log(6) + 20log\left(\frac{43}{50}\right) + 10\,log(2.667) - 35.6 + 5$$
$$= 62.1\ dBA \text{ at 50 ft}$$

$$L_{d.LHorn(1hr)} = SEL_{ref} + 10\,log(V_d) - 35.6$$
$$= 113 + 10\,log(2.667) - 35.6$$
$$= 81.7\ dBA \text{ at 50 ft}$$

$L_{d.Combo(1hr)}$ With horn:
$$= 10log\left[10^{(L_{d.Locos(1hr)}/10)} + 10^{(L_{d.RCars(1hr)}/10)} + 10^{(L_{d.LHorn(1hr)}/10)}\right]$$
$$= 81.9\ dBA \text{ in neighborhoods where the horn is sounded}$$

Without horn:
$$= 10log\left[10^{(L_{d.Locos(1hr)}/10)} + 10^{(L_{d.RCars(1hr)}/10)}\right]$$
$$= 68.4\ dBA \text{ in neighborhoods where the horn is not sounded}$$

Use the same equations as above to determine the nighttime $L_{eq(1hr)}$ at 50 ft. Use $V_n$ instead of $V_d$.

$L_{n.Locos(1hr)}$ = 56.5 for locomotives
$L_{n.RCars(1hr)}$ = 51.3 for cars
$L_{n.LHorn(1hr)}$ = 70.9 for horns
$L_{n.Combo(1hr)}$ = 71.1 in neighborhoods where the horn is sounded
= 57.6 in neighborhoods where the horn is not sounded

Calculate the $L_{dn}$ with and without horns.

$$L_{dn.Combo} = 10log\left[15 \times 10^{(L_{d.Combo}/10)} + 9 \times 10^{((L_{n.Combo}+10)/10)}\right] - 13.8$$

With horn: = 81.6 at 50 ft in neighborhoods where horns are sounded
Without horn: = 68.1 at 50 ft in neighborhoods where horns are not sounded

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

**Option B. Highway/Transit Sources** – Compute project noise at 50 ft for highway/transit noise sources as identified in the second column of Table 4-19. Use the instructions below to estimate source noise levels for projects following FTA's procedures that involve highway vehicles.

This method is based on the original FHWA highway noise prediction model, with updated noise emission levels.[26] The vehicle equations are applicable to speeds typical of freely-flowing traffic on city streets and access roads.

**B.i. Reference SEL Levels** – Determine the reference SEL at 50 ft for each major highway/transit source, either by measurement according to Appendix F or by using Table 4-22.[v] The table provides guidance on which method is preferred for each source type. "NO" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table. For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of measurement data to the reference conditions in Table 4-20.

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

**Table 4-22 Source Reference SELs at 50 ft: Highway/Transit Sources at 50 mph**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements?* |
|---|---|---|---|
| Automobiles | 74 | 70 | No |
| Buses (diesel) | 82 | 79 | No |
| Buses (electric trolleybus) | 80 | 77 | No |
| Buses (hybrid)** | 83 | 80 | Yes |

* "No" implies that the source levels given in the table are appropriate to use in the analysis and "Yes" implies that measurements are preferred over the data given in the table.
** Hybrid bus with full-time diesel engine and electric drive motors.

[v] Idling buses are considered stationary sources.

**B.ii. Noise Exposure at 50 ft** – Use the reference SELs in Table 4-22, operating conditions, and the equations in Table 4-23 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Noise emission from most transit buses is not dependent upon whether the buses are accelerating or cruising. However, accelerating suburban buses are substantially louder than cruising suburban buses. For this reason, suburban buses require separate calculation along roadway stretches where they are accelerating. Separate calculation is also needed for all highway/transit vehicles at different speeds, since speed affects noise emissions. Use the following guidelines to determine if sources should be calculated separately. These differences in operating conditions will produce an approximate 2-decibel change in noise exposure:
    - 40 percent change in number of vehicles per hour;
    - 40 percent change in number of vehicles per day, or per night (for computation of $L_{dn}$); or
    - 15 percent change in vehicle speed.

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
    - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
    - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
    - Source reference SELs for the vehicle types of concern
    - Average running speed in miles per hour
    - For residential receivers of interest:
        - Average hourly vehicle volume during daytime hours (total number of vehicle passbys between 7 a.m. and 10 p.m., divided by 15).
        - Average hourly vehicle volume during nighttime hours (total number of vehicle passbys between 10 p.m. and 7 a.m., divided by 9).
    - For non-residential receivers of interest, number of events that occur during each hour of interest, in vehicles per hour

4. **Calculate $L_{eq(1hr)}$ at 50 ft – Calculate $L_{eq(1hr)}$ using the appropriate** equations in Table 4-23 for each hour of interest.

5. **Calculate $L_{dn}$ at 50 ft –** If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the day $L_{eq(1hr)}$ and night $L_{eq(1hr)}$.

Note that the equations in Table 4-23 include terms to account for a difference in speed from the reference speed of 50 mph and a numerical adjustment to

account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

**Table 4-23 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Highway/Transit Sources**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(V) + C_{emissions} - 10\log(\frac{S}{50}) - 35.6$ | **Eq. 4-34** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where V = $V_d$ | **Eq. 4-35** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where V = $V_n$ | **Eq. 4-36** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-37** |
| **Adjustments** | = -3 for automobiles, open-graded asphalt<br>= +3 for automobiles, grooved pavement | |

$V$ = average hourly volume of vehicles, vehicles per hour

$C_{emissions}$ = $25\log(\frac{S}{50})$ for buses
$31\log(\frac{S}{50})$ for hybrid buses [23]
1.6 for accelerating 3-axle commuter buses
$40\log(\frac{S}{50})$ for automobiles

S = average vehicle speed, mph (distance divided by time, excluding stop time at red lights)

$V_d$ = average hourly daytime volume of vehicles of this type, vehicles per hour
$= \frac{total\ vehicle\ volume, 7\ a.m.\ to\ 10\ p.m.}{15}$

$V_n$ = average hourly nighttime volume of vehicles, vehicles per hour
$= \frac{total\ vehicle\ volume, 10\ p.m.\ to\ 7\ a.m.}{9}$

## Example 4-6 Detailed Noise Analysis – Highway Transit Noise Sources

**Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Highway/Transit Source**

A bus route with city buses will pass close to a school that is in session from 8 a.m. to 4 p.m. on weekdays. Within this time period, the hour of greatest activity for this bus route is 8 a.m. to 9 a.m.

**Assumptions**

$SEL_{ref}$ = 82 dBA
$S$ = 40 mph
$V$ = 30 buses per hour

Use the equations in Table 4-23 to determine the hourly $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Bus} = SEL_{ref} + 10\,log(V) + C_{emissions} - 10\log(\frac{S}{50}) - 35.6$$
$$= 82 + 10\,log(30) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 59.7\ dBA \text{ at 50 ft}$$

This same bus also passes close to a residential area with the following operating conditions:

$$V_d = 200\ buses/15\ hours = 13.33\ buses\ per\ hour$$
$$V_n = 20\ buses/9\ hours = 2.22\ buses\ per\ hour$$

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Bus} = 82 + 10\,log(13.33) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 56.2\ dBA \text{ at } 50 \text{ ft}$$

$$L_{n.Bus} = 82 + 10\,log(2.22) + 6 + 25 \times log(\frac{40}{50}) - 10\log(\frac{40}{50}) - 35.6$$
$$= 48.4\ dBA \text{ at } 50 \text{ ft}$$

Calculate $L_{dn}$ at 50 ft.

$$L_{dn.Bus} = 10log(15 \times 10^{(L_{d.Bus}/10)} + 9 \times 10^{((L_{n.Bus}+10)/10)}) - 13.8$$
$$= 57.2\ dBA \text{ at } 50 \text{ ft}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

**Option C. Stationary Sources** – Compute project noise at 50 ft for stationary sources as identified in the second column of Table 4-19.

**C.i. Determine Reference SEL Levels** – Determine the reference SEL at 50 ft for each major stationary source, either by measurement according to Appendix F or by using Table 4-24. The table provides guidance on which method is preferred for each source type. "NO" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table. In general, measurements are preferred for source types that vary considerably from project to project. For example, curve squeal is highly variable depending on weather conditions, curve radius, and train speed. The data in the table are adequate for source types that do not vary considerably from project to project (crossing signals, for example). For sources where measurements are preferred, refer to Appendix F for guidance on measurement procedures and methods for conversion of these measurements to the reference conditions of Table 4-24.

Layover facilities and transit centers can be the sources of low-frequency noise from idling diesel engines. Sounds with considerable low-frequency components can cause greater annoyance than would be expected based on their A-weighted levels. Low-frequency sounds often cause windows and walls to vibrate resulting in secondary effects in buildings such as rattling of dishes in cupboards and wall-mounted pictures. The reference levels in Table 4-24 are adjusted to take increased annoyance into account. For a Detailed Noise Analysis at locations where such idling takes place for an extended period, use the method described in ANSI Standard S12.9-Part 4, Annex D.[27]

Approximate $L_{max}$ values are provided in the table for general user information. As discussed in Appendix B.1.4.2, $L_{max}$ is not used directly in the evaluation of noise impact.

**Table 4-24 Source Reference SELs at 50 ft: Stationary Sources**

| Source | Reference SEL, dBA | Approximate $L_{max}$, dBA | Prefer Measurements?* |
|---|---|---|---|
| Auxiliary Equipment | 101 | 65 | Yes |
| Locomotive Idling | 109 | 73 | No |
| Rail Transit Idling | 106 | 70 | No |
| Buses Idling | 111 | 75 | No |
| Ferry Boat Landing**, Idling, and Departing | 91 | 78 | No |
| Ferry Boat Fog Horn | 90 | 84 | No |
| Track Curve Squeal | 136 | 100 | Yes |
| Car Washes | 111 | 75 | Yes |
| Crossing Signals | 109 | 73 | No |
| Substations | 99 | 63 | No |

*"No" implies that the source levels given in the table are appropriate to use in the analysis, and "YES" implies that measurements are preferred over the data given in the table.

**Ferry boat landings are included in the stationary source category because the noise from the landing remains in one area even though the boats move in and out.

**C.ii. Estimate Noise Exposure at 50 ft** – Use the reference SELs in Table 4-24, operating conditions, and the equations in Table 4-25 to predict the noise exposure at 50 ft expressed in terms of $L_{eq(1hr)}$ and $L_{dn}$. Follow the steps below:

1. **Identify operating conditions** – Identify actual source durations and numbers of events. Sources with different operating conditions should be converted from SEL to $L_{dn}$ separately. Use the following guidelines to determine if sources should be converted separately. These differences in operating conditions will produce an approximate 2-dB change in noise exposure:
   - 40 percent change in event duration (e.g., from 30 to 42 minutes), or
   - 40 percent change in number of events per hour (e.g., from 10 to 14 events per hour).

2. **Establish relevant time periods** – For each of these source types and conditions, determine the relevant time periods for all receivers that may be affected by this source.
   - For residential receivers, the time periods of interest for computation of $L_{dn}$ are: daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).
   - If the source will affect non-residential receivers, the time period of interest is the loudest hour of project related activity during hours of noise sensitivity. Several different hours may be of interest for non-residential receivers depending on the hours the facility is used.

3. **Collect input data**
   - Source reference SELs for each relevant source
   - Average duration of one event, in seconds
   - For residential receivers of interest:
     - Average number of events per hour that occur during the daytime (the total number of events between 7 a.m. and 10 p.m., divided by 15).

    - Average number of events per hour that occur during the nighttime (the total number of events between 10 p.m. and 7 a.m., divided by 9).
  - For non-residential receivers of interest, number of events that occur during each hour of interest in events per hour

4. **Calculate $L_{eq(1hr)}$ at 50 ft** – Calculate $L_{eq(1hr)}$ using the appropriate equations in Table 4-25 for each hour of interest.

5. **Calculate $L_{dn}$ at 50 ft** – If the project noise will affect any residential receivers, calculate the $L_{dn}$ using the day $L_{eq(1hr)}$ and night $L_{eq(1hr)}$.

Note that the equations in Table 4-25 include a numerical adjustment to account for the one-hour time period for this metric. For more information on the numerical adjustment to represent the time period of interest, see Appendix B.1.4.4.

**Table 4-25 Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft: Stationary Sources**

| | | |
|---|---|---|
| **$L_{eq(1hr)}$ at 50 ft** | $L_{eq(1hr)} = SEL_{ref} + 10\,log(N) + 10\log(\frac{E}{3600}) - 35.6$ | **Eq. 4-38** |
| **Daytime** $L_d$ at 50 ft | $L_d = L_{eq(1hr)}$ where N = $N_d$ | **Eq. 4-39** |
| **Nighttime** $L_n$ at 50 ft | $L_n = L_{eq(1hr)}$ where N = $N_n$ | **Eq. 4-40** |
| **$L_{dn}$ at 50 ft** | $L_{dn} = 10\log(15 \times 10^{(L_d/10)} + 9 \times 10^{((L_n+10)/10)}) - 13.8$ | **Eq. 4-41** |

$N$ = number of events of this type that occur during one-hour

E* = duration of one event, sec

$N_d$ = average hourly number of events that occur during daytime (7 a.m. to 10 p.m.)

$= \frac{number\ of\ events\ between\ 7\ a.m.\ to\ 10\ p.m.}{15}$

$N_n$ = average hourly number of events that occur during nighttime (10 p.m. to 7 a.m.)

$= \frac{number\ of\ events\ between\ 10\ p.m.\ to\ 7\ a.m.}{9}$

*Omit the term containing E for ferry boat, and fog horn noise sources.

## Example 4-7 Detailed Noise Analysis – Stationary Noise Sources

**Computation of $L_{eq(1hr)}$ and $L_{dn}$ at 50 ft for Stationary Sources**

A signal crossing lies close to a school that is in session from 8 a.m. to 4 p.m. on weekdays. Within this time period, the hour of greatest activity for the signal crossing is 8 a.m. to 9 a.m.

**Assumptions**

$SEL_{ref}$ = 109 dBA
$E$ = 25 seconds (counting both cycles of the signal)
$N$ = 22

Use the equations in Table 4-25 to determine the hourly $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Cross} = SEL_{ref} + 10log(N) + 10log\left(\frac{E}{3600}\right) - 35.6$$
$$= 109 + 10log(22) + 10log(\frac{25}{3600}) - 35.6$$
$$= 65.2\ dBA \text{ at 50 ft}$$

This same signal crossing lies close to a residential area with the following operating conditions:

$N_d$ = $200\ /15\ hours = 13.3\ events\ per\ hour$
$N_n$ =$12\ /9\ hours = 1.33\ events\ per\ hour$

Calculate the daytime and nighttime $L_{eq(1hr)}$ at 50 ft.

$$L_{d.Cross} = 109 + 10log(13.3) + 10log(\frac{25}{3600}) - 35.6$$
$$= 63.1\ dBA \text{ at 50 ft}$$
$$L_{n.Cross} = 109 + 10log(1.33) + 10log(\frac{25}{3600}) - 35.6$$
$$= 53.1\ dBA \text{ at 50 ft}$$

Calculate $L_{dn}$ at 50 ft.

$$L_{dn} = 10log(15 \times 10^{(L_{d.Cross}/10)} + 9 \times 10^{((L_{n.Cross}+10)/10)}) - 13.8$$
$$= 63.1\ dBA \text{ at 50 ft}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

## Step 3: Determine Propagation Characteristics

*Determine the combined propagation characteristics between each source and receiver of interest.*

**3a.** Calculate project noise exposure as a function of distance. *Calculate the project noise exposure at distances other than 50 ft, such as at receiver locations, as a function of distance accounting for shielding and ground effects along the path*. See Example 4-8 below.

1. Determine the topography of the ground within the transit corridor using the figures in Table 4-26 as a guide. It is not necessary to represent the transit corridor with an extreme number of changes in topography. Often, several typical sections will suffice throughout the transit corridor.

2. Use the equations in Table 4-26 to determine ground factor (G) based on the effective path height (Heff) for each identified terrain feature. Standard source heights are included at the bottom of the table. Assume receiver heights of 5 ft for both outdoor receivers and first-floor receivers. Note that larger ground factors correspond to larger amounts of ground attenuation with increasing distance from the source. For acoustically "hard" (e.g., non-absorptive) ground conditions, G should be taken to be zero.

3. Determine the distance correction factor using the ground factor and another distance, such as the distance to a receiver, and the equations in Table 4-27.

4. Apply the distance correction ($C_{distance}$) to the project noise exposure at 50 ft (Section 4.5, Step 2) using the following equation:

$$L_{distance} = L_{50ft} + C_{distance} \quad \textbf{Eq. 4-42}$$

where:

$L_{distance}$ = $L_{dn}$ or $L_{Aeq(1hr)}$ at the new distance, ft

$L_{50ft}$ = $L_{dn}$ or $L_{Aeq(1hr)}$ at 50 ft

5. Plot noise exposure as a function of distance if desired.

**Table 4-26 Ground Factor G, for Ground Attenuation**

**Ground Factor**

**Soft Ground:**

$$G = \begin{cases} 0.66, & H_{eff} \le 5 \\ 0.75\left(1 - \frac{H_{eff}}{42}\right), & 5 < H_{eff} < 42 \\ 0, & H_{eff} \ge 42 \end{cases}$$ **Eq. 4-43**

$H_{eff}$ = sum of average path heights on either side of the barrier, see below.

**Hard Ground:** $G = 0$

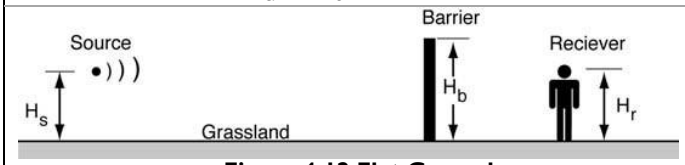


**Figure 4-12 Flat Ground**

$$H_{eff} = \frac{H_s + 2H_b + H_r}{2}$$ **Eq. 4-44**

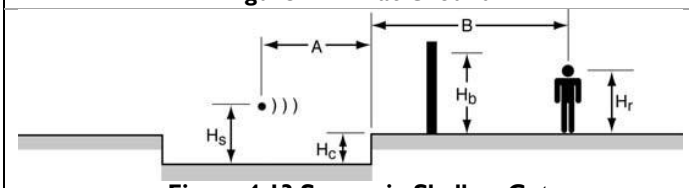


**Figure 4-13 Source in Shallow Cut**

$$H_{eff} = \frac{H_s + 2H_b + H_c + H_r}{2} \quad for\ B \le \frac{A}{2}$$

Use **Eq. 4-44** $\quad for\ B > \frac{A}{2}$

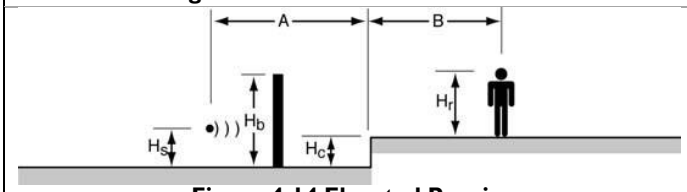


**Figure 4-14 Elevated Receiver**

$$H_{eff} = \frac{H_s + H_c + H_r}{2} \quad for\ H_b \le H_c$$

$$H_{eff} = \frac{H_s + 2H_b - H_c + H_r}{2} \quad for\ H_b > H_c$$

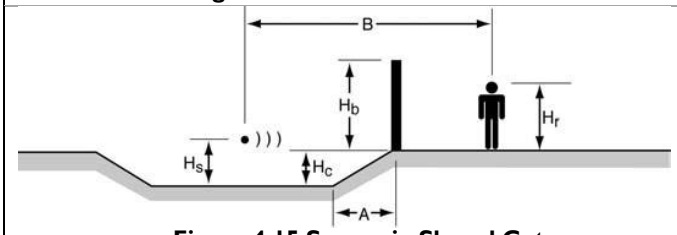


**Figure 4-15 Source in Sloped Cut**

Use **Eq. 4-44** $\quad for\ A \le \frac{B}{2}$

$$H_{eff} = \frac{H_s + 2H_b + H_c + H_r}{2} \quad for\ A > \frac{B}{2}$$

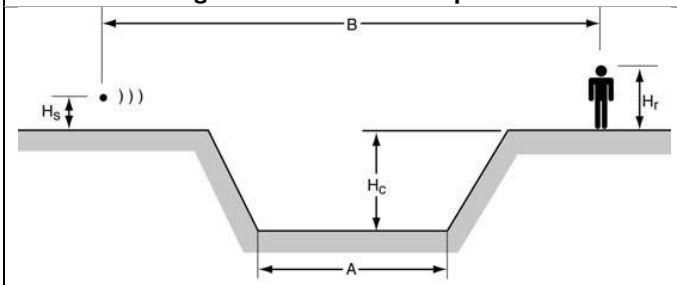


**Figure 4-16 Source and Receiver Separated by Trench**

$$H_{eff} = \frac{H_s + H_r}{2} \quad for\ A \le \frac{B}{2}$$

$$H_{eff} = \frac{H_s + 2H_c + H_r}{2} \quad for\ A > \frac{B}{2}$$

$H_s$ = 8 ft for trains with diesel-electric locomotives
= 2 ft for trains without diesel-electric locomotives
= 0 ft for automobiles
= 3 ft for 2-axle city buses
= 8 ft for 3-axle commuter buses

Note: Equations for $H_{eff}$ remain valid when $H_b = 0$

**Table 4-27 Distance Correction Factor Equations for Detailed Noise Analysis**

| Source | Equation* | |
|---|---|---|
| Stationary Sources | $C_{distance} = -20\log(\frac{D}{50}) - 10Glog(\frac{D}{50})$ | **Eq. 4-45** |
| Fixed-guideway rail car passbys | $C_{distance} = -10\log(\frac{D}{50}) - 10Glog(\frac{D}{42})$ | **Eq. 4-46** |
| Fixed-guideway locomotive and rubber-tired vehicle passbys, highway vehicle passbys and horns | $C_{distance} = -10\log(\frac{D}{50}) - 10Glog(\frac{D}{29})$ | **Eq. 4-47** |
| $D$ = distance, ft<br>$G$ = ground factor, see Table 4-26 | | |

*These equations assume the distance between the source and receiver is approximately 300 ft or less. At longer distances, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. Therefore, more detailed calculation methods may be required to account for those effects.

## Example 4-8: Detailed Noise Analysis – Exposure vs. Distance Curve

**Exposure vs. Distance Curve for Fixed-Guideway Source**

Plot an exposure vs. distance curve for a diesel-electric commuter train that does not sound the horn in this area.

**Assumptions**

The terrain is flat grassland without a noise barrier.

$L_{eq.Loco}$ $(8-9am)$ = 72 dBA at 50 ft
$L_{dn.Loco}$ = 68 dBA at 50 ft
$H_r$ = 5 ft
$H_b$ = 0 ft (for a "no noise barrier" case)
$H_s$ = 8 ft (for a diesel-electric commuter train)

Calculate $H_{eff}$ using the equations in Table 4-26.

$$H_{eff} = \frac{H_s + 2H_b + H_r}{2}$$
$$= \frac{8+0+5}{2}$$
$$= 6.5 \text{ ft}$$

Determine the ground factor using Eq. 4-43.

$$G = 0.75(1 - \frac{H_{eff}}{42})$$
$$= 0.63$$

Use Eq. 4-45 to determine noise vs. exposure equations for $L_{d.loco}$ and $L_{dn.loco}$.

$$L_{eq.Loco} = 72 - 10\log(\frac{D}{50}) - 6.3\log(\frac{D}{42})$$

$$L_{dn.Loco} = 68 - 10\log(\frac{D}{50}) - 6.3\log(\frac{D}{42})$$

Plot the two equations (see example in Figure 4-17). From these curves, the noise levels due to this train operation can be determined for a receiver of interest at any distance without shielding.

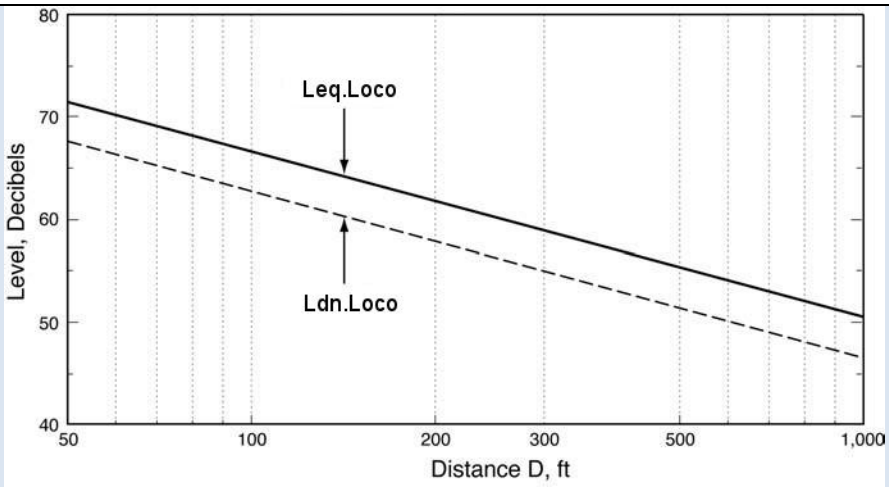


**Figure 4-17 Example Exposure vs. Distance Curves**

**3b.** Calculate the attenuation due to shielding for each distance of interest from Step 3a, using the following equation and Tables 4-26 through 4-30 and as illustrated in Example 4-9. If the conditions described in the tables are not met, the attenuation due to shielding is considered zero. Shielding can be due to intervening noise barriers, terrain features, rows of buildings, and dense tree zones.

$$A_{shielding} = \max\{IL_{barrier} \; or \; A_{buildings} \; or \; A_{trees}\} \qquad \textbf{Eq. 4-48}$$

where:

$IL_{barrier}$ = barrier insertion loss, see Table 4-28

$A_{buildings}$ = attenuation due to buildings, see Table 4-29

$A_{trees}$ = attenuation due to trees, see Table 4-30

**Table 4-28 Barrier Insertion Loss**

| **Barrier Insertion Loss** | $IL_{barrier} = \max\{0 \text{ or } (A_{barrier} - 10(G_{NB} - G_B)\log(\frac{D}{50}))\}$ **Eq. 4-49** | |
|---|---|---|
| $A_{barrier}$ | $= \min\{12 \; or \; [5.3\log(P) + 6.7]\}$ | For non-absorptive transit barriers within 5 ft of the rail |
| | $= \min\{15 \; or \; (5.3\log(P) + 9.7)\}$ | For absorptive transit barriers within 5 ft of the rail |
| | $= \min\{15 \text{or} (20\log(\frac{2.51\sqrt{P}}{\tanh(4.46\sqrt{P})}) + 5)\}$ | For all other barriers, and for protrusion of terrain above the line of sight |
| P | = path length difference, ft (see figure 4-18)* | |
| $D$ | = closest distance between the receiver and the source, ft | |
| $G_{NB}$ | = ground factor G computed without barrier (see Table 4-26) | |
| $G_B$ | = ground factor G computed with barrier (see Table 4-26) | |

* If the source height (exhaust outlet) for diesel-electric locomotives is not available, assume 15 ft.

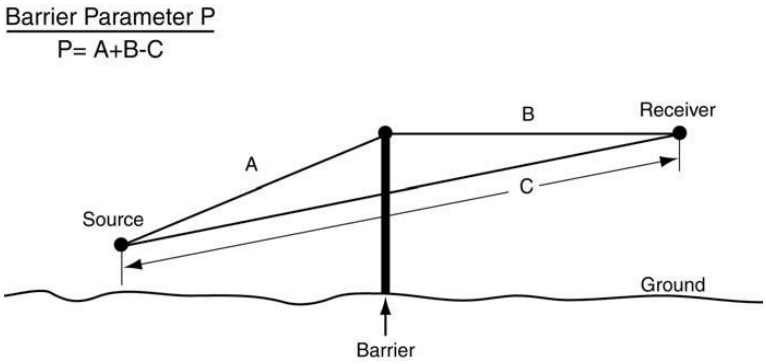


**Figure 4-18 Noise Barrier Parameter "P"**

**Table 4-29 Attenuation due to Buildings**

| Condition | Equation | |
|---|---|---|
| Gaps in the row of buildings constitute less than 35% of the length of the row | $A_{buildings} = \min\{10 \; or \; [1.5\,(R-1)+5]\}$ | **Eq. 4-50** |
| Gaps in the row of buildings constitute 35 to 65% of the length of the row | $A_{buildings} = \min\{10 \; or \; [1.5\,(R-1)+3]\}$ | **Eq. 4-51** |
| Gaps in the row of buildings constitute more than 65% of the length of the row | $A_{buildings} = 0$ | |
| $R$ = number of rows of houses that intervene between the source and receiver | | |

**Table 4-30 Attenuation due to Trees**

| Condition | Equation | |
|---|---|---|
| At least 100 ft of trees intervene between the source and receiver with no clear line-of-sight between source and receiver, and the trees extend 15 ft or more above the line-of-sight | $A_{trees} = \min\left\{10 \; or \; \frac{W}{20}\right\} \; where \; W \geq 100ft$<br>$= 0 \; where \; W < 100ft$ | **Eq. 4-52** |
| W = width of tree zone along the line-of-site between the source and receiver in feet | | |

## Example 4-9: Detailed Noise Analysis – Shielding

**Computation of Shielding**

The following features are between the rail corridor and a receiver of interest. Calculate the attenuation due to shielding.

1. A 15-foot high noise barrier is 40 ft from the closest track and 130 ft from the receiver
2. A dense tree zone 100 ft thick that extends 15 ft above the line-of-sight

**Assumptions**

$H_s$ = 8 ft
$H_r$ = 5 ft

Barrier dimensions

A = 40.61 ft
B = 130.38 ft
C = 170.03 ft

**Barrier**

Calculate $H_{eff}$ with and without the barrier using the equations in Table 4-26.

$$H_{eff.NoBarrier} = \frac{H_s + 2H_b + H_r}{2}$$

$$= \frac{8 + 0 + 5}{2}$$
$$= 6.5 \text{ ft}$$

$$H_{eff.Barrier} = \frac{H_s + 2H_b + H_r}{2}$$
$$= \frac{8 + 15 + 5}{2}$$
$$= 21.5 \text{ ft}$$

Determine the ground factor with and without the barrier using Eq. 4-43.

$$G_{NoBarrier} = 0.75\left(1 - \frac{H_{eff}}{42}\right)$$
$$= 0.63$$

$$G_{Barrier} = 0.75\left(1 - \frac{H_{eff}}{42}\right)$$
$$= 0.37$$

Calculate the barrier insertion loss using Table 4-28 and Figure 4-18.

$$P = A + B - C$$
$$= 0.96 \text{ ft}$$

$$A_{barrier} = \min\{15 \text{or} (20 \log(\frac{2.51\sqrt{P}}{\tanh(4.46\sqrt{P})}) + 5)\}$$
$$= 12.8 \text{ dB}$$
$$= \min\{15 \; or \; 12.8\}$$
$$= 12.8 \text{ dB}$$

$$IL_{barrier} = \max\{0 \text{ or } (A_{barrier} - 10(G_{NoBarrier} - G_{Barrier}) \log(\frac{D}{50}))\}$$
$$= 12.8 - 10(0.63 - 0.37) \log(\frac{170}{50})$$
$$= 11.4 \text{ dB}$$

**Trees**

Determine the attenuation due to trees using Table 4-30.

$$A_{trees} = \min\{10 \; or \; \frac{W}{20}\}$$
$$= 5 \text{ dB}$$

**Total Shielding**

The total shielding is the maximum of the barrier and tree zone shielding, 11.4 dB.

$$A_{shielding} = \max\{IL_{barrier} \; or \; A_{buildings} \; or \; A_{trees}\}$$
$$= \max\{11.4 \; or \; 0 \; or \; 5\}$$
$$= 11.4 \text{ dB}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

**3c.** Combine the two propagation characteristics.
Combine the results from Steps 3a and 3b to determine the noise at the receiver considering the propagation characteristics of distance and shielding by applying the distance correction and attenuation due to shielding to the project noise exposure level at 50 ft.

The equations in Table 4-31 combine the equations in Steps 3a and 3b.

**Table 4-31 Calculate $L_{dn}$ or $L_{eq(1hr)}$**

| Source | Equation* | |
|---|---|---|
| Stationary Sources | $L_{DistShield} = L - 20\log(\frac{D}{50}) - 10Glog(\frac{D}{50}) - A_{shielding}$ | **Eq. 4-53** |
| Fixed-guideway rail car passbys | $L_{DistShield} = L - 10\log(\frac{D}{50}) - 10Glog(\frac{D}{42}) - A_{shielding}$ | **Eq. 4-54** |
| Fixed-guideway locomotive and rubber-tired vehicle passbys, highway vehicle passbys and horns | $L_{DistShield} = L - 10\log(\frac{D}{50}) - 10Glog(\frac{D}{29}) - A_{shielding}$ | **Eq. 4-55** |
| $L$ = $L_{dn}$ *or* $L_{eq}$<br>$D$ = distance, ft<br>$G$ = ground factor, see Section 4.5, Step 3a<br>$A_{shielding}$ = attenuation due to shielding, see Section 4.5, Step 3b. | | |

*These equations assume the distance between the source and receiver is approximately 300 ft or less. At longer distances, ground effects have an upper limit and atmospheric conditions may affect propagation characteristics. Therefore, more detailed calculation methods may be required to account for those effects.[28, 29]

## Step 4: Combine Noise Exposure from All Sources

*Combine all sources to predict the total project noise at the receivers using the equations in Table 4-32 after propagation adjustments have been made for the noise exposure from each source separately.*

**Table 4-32 Computing Total Noise Exposure**

| | | |
|---|---|---|
| Total $L_{eq(1hr)}$ from all sources for the hour of interest: | $L_{eq.total(1hr)} = 10\log(\sum_{all\ sources} 10^{L_{Aeq(1hr)}/10})$ | **Eq. 4-56** |
| Total $L_{dn}$ from all sources | $L_{dn.total} = 10\log(\sum_{all\ sources} 10^{L_{dn}/10})$ | **Eq. 4-57** |

## Example 4-10 Detailed Noise Analysis – Combine Sources

**Computation of Total Exposure from Combined Sources**

Combine the noise exposure from the commuter train and light rail system to estimate the total noise exposure at the receiver.

**Assumptions**
A commuter train operation produces the following levels at a receiver of interest:

$L_{eq.Commuter}$ = 72 dBA
$L_{dn.Commuter}$ = 68 dBA

A light rail system produces the following levels at the same receiver:

$L_{eq.LightRail}$ = 69 dBA

$L_{dn.LightRail}$ = 70 dBA

No other project sources affect this receiver.

Calculate the total noise exposure at the receiver using the equations in Table 4-32.

$$L_{eq.total} = 10\log(10^{(72/10)} + 10^{(69/10)})$$
$$= 73.8 \text{ dBA}$$
$$L_{dn.total} = 10\log(10^{(68/10)} + 10^{(70/10)})$$
$$= 72.1 \text{ dBA}$$

Note: Computation results should always be rounded to the nearest decibel at the end of the computation. In all examples of this section, however, the first decimal place is retained for readers to precisely match their own computations against the example computations.

## Step 5: Determine Existing Noise Exposure

*Choose the appropriate method for characterizing noise and then determine the existing noise at each identified noise-sensitive receiver.* The existing noise is needed to determine the noise impact according to the criteria described in Section 4.1, Step 2. Recall that impact is assessed based on a comparison of the existing ambient noise exposure and the additional noise exposure that will be caused by the project. The existing noise exposure must be estimated for all receivers of interest identified in Section 4.5, Step 1.

For a Detailed Noise Analysis, it is recommended to measure existing noise at each receiver of interest identified in Section 4.5, Step 1, for the most precise assessment of existing noise and conclusions concerning noise impact. However, measurements are expensive, often thwarted by weather, and take considerable time in the field. If taking measurements at each identified receiver is not possible, other less precise methods are available. Different methods may be used at different receivers along the project. However, it is important to recognize the correlation between the precision of measurements and the confidence in the impact assessment. Especially in a Detailed Noise Analysis, avoid using less precise methods of measuring existing noise just for the sake of convenience or expediency. The use of less precise methods must be clearly justified.

**Option A. Noise Exposure Measurements** – Full one-hour measurements are the most appropriate way to determine ambient noise exposure for non-residential receivers with the level of precision expected in a Detailed Noise Analysis**.** For residential receivers, full 24-hour measurements are more appropriate. These full-duration measurements are preferred over other methods of characterizing existing noise where time and study funds allow.

Follow the procedures below for these full-duration ambient noise exposure measurements:

**Ai. Non-residential land uses** – Measure a full hour $L_{eq(1hr)}$ at the receiver of interest on at least two non-successive weekdays (generally between noon on Monday and noon on Friday). Select the hour of the day when the maximum project activity is expected to occur.

**A.ii. Residential land uses** – Measure a full 24-hour $L_{dn}$ at the receiver of interest for a single weekday (generally between noon on Monday and noon on Friday).

**A.iii. Microphone position** – The location of the microphone at the receiver depends upon the proposed location of the transit noise source, so use good technical judgment in positioning the measurement microphone. If, for example, a new rail line will be in front of the house, do not locate the microphone in the backyard behind the house where the line of sight between the noise source and receiver is obstructed. Figure 4-19 illustrates recommended measurement positions for various locations of the project, with respect to the house and the existing source of ambient noise.

**A.iv. Measurement guidelines** – Undertake all measurements in accordance with good engineering practice following guidelines given in ASTM and ANSI standards.[30][31]

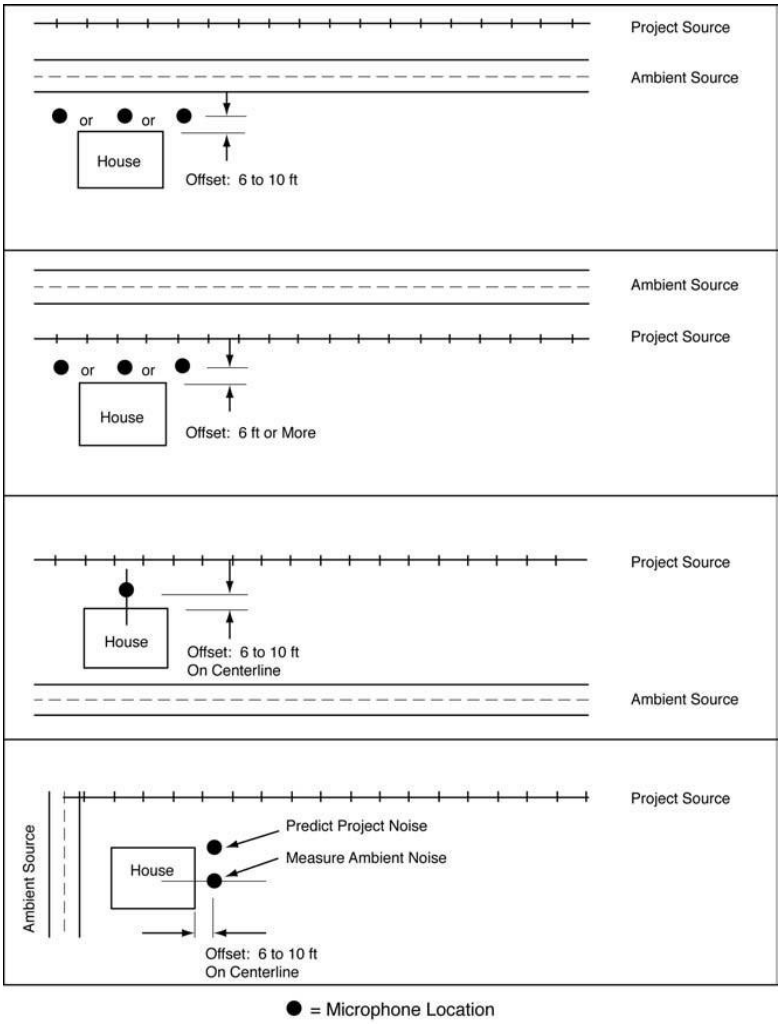


**Figure 4-19 Recommended Microphone Locations for Existing Noise Measurements**

**Option B. Noise Exposure Computations from Partial Measurements** – Often, measurements can be made at some of the receivers of interest and used to estimate noise exposure at nearby receivers. In other situations, several $L_{eq(1hr)}$ measurements can be taken at a receiver and then the $L_{dn}$ computed from these. Both options require experience and knowledge of acoustics to select representative measurement sites. If using this method to compute an Ldn, a minimum time period of one hour should be used for each measurement period. It is unacceptable to extrapolate a one hour measurement from a shorter measurement period.

Measurements at one receiver can be used to represent the noise environment at other sites, but only when proximity to major noise sources is similar among the sites. Residential neighborhoods with otherwise similar homes may have greatly varying noise environments. For example, one area of the neighborhood may be located where the ambient noise is clearly due to highway traffic. A second area toward the interior of the neighborhood may have highway noise as a factor, but also include other noise sources from the community. A third area located deep into the residential area could have local street traffic and other community activities dominate the ambient noise. In this example, three or more measurement sites would be required to represent the varying ambient noise conditions in a single neighborhood.

Typical situations where representative measurement sites can be used to estimate noise levels at other sites occur when both share the following characteristics:

- Proximity to the same major transportation noise sources, such as highways, rail lines and aircraft flight patterns
- Proximity to the same major stationary noise sources, such as power plants, industrial facilities, rail yards and airports
- Similar type and density of housing, such as single-family homes on quarter-acre lots and multi-family housing in apartment complexes

Acoustical professionals are often adept at such computations from partial data and are encouraged to use their experience and judgment in fully utilizing the measurements in their computations. This does necessitate a conservative estimate (underestimate) of existing noise to account for reduced precision from partial data as compared to full noise measurements.

Those without a background in acoustics are encouraged to use the procedures in Appendix E to compute existing noise from partial measurements. These methods include a factor to conservatively estimate (underestimate) existing noise to account for reduced precision from partial data as compared to full noise measurements.

**Option C. Estimating Existing Noise Exposure** – The least precise way to determine noise exposure is to estimate it from a table. This method is often used for the General Noise Assessment, but it is not recommended for a Detailed Noise Analysis. It can be used, however, in the absence of better data for locations where roadways or railroads are the predominant ambient noise source. Table 4-17 presents these existing levels. The levels in Table 4-17 are

conservative and underestimate existing noise to account for reduced precision compared to full noise measurements. If a simplified procedure to estimate existing noise exposure is chosen it must be clearly justified and receive approval by the FTA Regional office.

While measurements are considered the most precise method, there is one situation where it may be more accurate to estimate rather than measure the existing noise exposure, which is in areas near major airports where aircraft noise is dominant. Because airport noise is highly variable based on weather conditions and corresponding runway usage, it is preferable in such cases to base the existing noise exposure on published aircraft noise contours in terms of Annual Average $L_{dn}$.

## Step 6: Assess Noise Impact

Assess noise impact at each receiver of interest identified in Section 4.5, Step 1 using the noise impact criteria in Section 4.1 and the procedures in this step. Choose the appropriate noise impact assessment procedure for a transit project or multimodal project.

**Option A. Transit Projects** – For transit projects, noise impact is assessed at each receiver of interest using the criteria for transit projects described in Section 4.1. The noise impact assessment procedure is as follows:

**A.i.** Tabulate existing ambient noise exposure (rounded to the nearest whole decibel) at all receivers identified Section 4.5, Step 1. In cases where large residential buildings are exposed to noise on one side only, the receivers on that side are included in the analysis.

**A.ii.** Tabulate project noise exposure at these receivers from Section 4.5, Step 4.

**A.iii.** Determine the level of noise impact (no impact, moderate impact, or severe impact) according to Section 4.1.

**A.iv.** Document the results in noise-assessment inventory tables. Include the following information:

- Receiver identification and location
- Land use description
- Number of noise-sensitive sites represented (number of dwelling units in residences or acres of outdoor noise-sensitive land)
- Closest distance to the project
- Existing noise exposure
- Project noise exposure
- Level of noise impact (no impact, moderate impact, or severe impact)
- A sum of the total number of receivers and numbers of dwelling units predicted to experience moderate impact or severe impact

**A.v.** Illustrate the areas of moderate impact and severe impact. Two methods of displaying impact are labeling and contouring.

- In a Detailed Noise Analysis, the most accurate indication of impact is to label each impacted building or cluster identified in the inventory table.
- A less precise illustration of impacted areas is a plot of project noise contours on the maps or aerial photographs, along with shaded impact areas. Use the procedures in Section 4.4, Step 6 and the levels from Section 4.5, Step 2 to develop these contours.

Note that it is difficult to position noise contours in urban areas due to shielding, terrain features, and other propagation anomalies. If noise contours are used, they should be considered illustrative rather than definitive. If desired to conform to the practices of another agency, the contouring may perhaps include several contour lines of constant project noise, such as $L_{dn}$ 65, $L_{dn}$ 70, and $L_{dn}$ 75 dBA.

**A.vi.** Including information on the magnitude of the impacts is an essential part of the assessment. The magnitude of noise impact is defined by the two threshold curves delineating onset of moderate impact and severe impact.

**Option B. Multimodal Projects** – For multimodal projects, project noise comprised of both highway and transit noise sources that are assessed according to the FTA noise impact criteria (see Table 4-2), use the procedure in Option A above. For multimodal projects that require FHWA's noise assessment methods to inform FTA's evaluation (see Section 4.1, Step 1 - Option B), follow the FHWA guidance.[32] In general, the appropriate calculation method is to use the current version of FHWA's Traffic Noise Model (TNM).[22] TNM is a state-of-the-art computer program used for predicting noise impacts near highways.

TNM allows for a detailed assessment at each receiver of interest by separately calculating the noise contribution of each roadway segment. For each roadway segment, the noise from each vehicle type is computed from reference noise levels, adjusted for:

- Vehicle volume
- Vehicle speed
- Grade
- Roadway segment length
- Source-to-receiver distance

Further adjustments needed to accurately model the sound propagation from source to receiver include:

- Shielding provided by rows of buildings,
- Effects of different ground types,
- Source and receiver elevations, and
- Effect of any intervening noise barriers.

TNM sums the noise contributions of each vehicle type for a given roadway segment at the receiver. TNM then repeats this process for all roadway segments, summing their contributions to generate the predicted noise level at each receiver.

## Step 7: Determine Noise Mitigation Measures

Evaluate alternative mitigation measures where the Detailed Noise Analysis shows either severe or moderate impact, and it is not feasible to change the alignment or location of the project to avoid impact. Project noise that is found to cause no impact does not generally require any mitigation.

Mitigation of noise impact from transit projects may involve treatments at the three fundamental components of the noise problem: at the noise source, along the source-to-receiver propagation path, or at the receiver. Generally, the transit property has authority to treat the source and some elements of the propagation path, but may have little or no authority to modify anything at the receiver. After mitigation options have been determined, repeat the project noise computations including the adopted mitigation and reassess the remaining noise impact.

Approximate costs for noise control measures are documented in a report from the Transit Cooperative Research Program (TCRP)[33] and are also presented in this section. These costs reflect the noise mitigation costs available in 1997 (unless otherwise noted), which are the most recent data available as of this publication, and should only be used as representative estimates when considering noise mitigation options. Current noise mitigation costs should be researched before decisions on noise mitigation options are finalized, and then they should be documented according to Section 8.

**7a. Evaluate Source Treatments** – The most effective noise mitigation treatments are applied at the noise source. This is the preferred approach to mitigation when possible. Common source treatments and their estimated acoustical effectiveness are included in Table 4-33 and described below. It is important to note that the values below are estimates and should be applied with good engineering judgement. It also important to note that these mitigation measures should not be applied as a reduction in the reference SEL values for a vehicle that already incorporates that measure as a feature, such as vehicle skirts. Measurements to determine the reference SEL source level are required in those instances.

**Table 4-33 Transit Noise Mitigation Measures – Source Treatments**

| Mitigation Measure | | Effectiveness |
|---|---|---|
| Stringent Vehicle & Equipment Noise Specifications | | Varied |
| Operational Restrictions† | | Varied |
| Resilient or Damped Wheels* | For rolling noise on tangent track: | 2 dB |
| | For wheel squeal on curved track: | 10-20 dB |
| Vehicle Skirts* | | 6-10 dB |
| Undercar Absorption* | | 5 dB |
| Quiet Fan Design and Fan Placement* | | Varied |
| Preventative Maintenance on Rail Systems* | | Varied |
| Resurfacing Roads** | | 10 dB |
| Guideway Support for Buses** | | 10 dB |
| Turn Radii Greater than 1000 ft* | | Avoids Squeal |
| Rail Lubrication on Sharp Curves* | | Reduces Squeal |
| Movable-Point Frogs (reduce rail gaps at crossovers)* | | Reduces Impact Noise |
| Engine Compartment Treatments | | 6-10 dB |
| Quiet Zones* | | Reduces occurrence of horn noise |

†FTA does not normally accept operational restrictions as a noise mitigation measure – see below.
* Applies to rail projects only.
** Applies to bus projects only.

- **Stringent Vehicle and Equipment Noise Specifications**
  - **Vehicles** – Among the most effective noise mitigation treatments is noise control during the specification and design of the transit vehicle. Such source treatments apply to all transit modes. By developing and enforcing stringent but achievable noise specifications, the transit property takes a major step in controlling noise everywhere on the system. It is important to ensure that the noise levels quoted in the specifications are achievable with the application of best available technology during the development of the vehicle and reasonable considering the noise reduction benefits and costs.

    Effective enforcement includes penalties for non-compliance with the specifications. The noise mitigation achieved by source treatment is dependent on the quality of installation and maintenance. Vehicles failing to meet the noise specification could result in complaints from the public and require additional noise mitigation measures applied along the path or at receivers.

  - **Stationary sources** – Stringent but achievable noise specifications for stationary sources are also an effective approach for mitigating noise impacts. Typical equipment includes fixed plant equipment such as transformers and mechanical equipment, as well as grade-crossing signals. For example, it may be possible to reduce noise impact from grade-crossing signals in some areas by specifying equipment that sets the level of the warning signal lower in locations where ambient noise is lower to minimize the signal noise in the direction of noise-sensitive receivers.

- **Operational Restrictions** – Changes in operations that can mitigate noise include the lowering of speed, the reduction of nighttime (10 p.m. to 7 a.m.) operations, and reduction of warning horns and signals.

  - **Speed reduction** – Because noise from most transit vehicles is dependent on speed, a reduction of speed results in lower noise levels. The effect can be considerable. For example, the speed dependency of steel-wheel/steel-rail systems for $L_{eq(1hr)}$ and $L_{dn}$ (Table 4-21) results in a 6-dB reduction when reducing the speed to half of the original speed.

    Although there are tangible benefits from speed reductions during the most noise-sensitive time periods, FTA does not ordinarily accept speed reduction as a noise mitigation measure for two important reasons: speed reduction is unenforceable and negated if vehicle operators do not adhere to established policies, and it is contrary to the purpose of the transit investment by FTA, which is to move as many people as possible as efficiently and safely as possible.

  - **Reduction of nighttime operations** – Complete elimination of nighttime operations has a strong effect on reducing the $L_{dn}$, because nighttime noise is increased by 10 dB when calculating $L_{dn}$. But restrictions on operations are usually not feasible because of service demands. FTA generally does not pursue restrictions on operations as a

noise reduction measure. However, if early morning idling can be curtailed to the minimum necessary, however, this can have a measurable effect on $L_{dn}$.

While there are tangible benefits from limits on operations during the most noise-sensitive time periods, FTA does not recommend limits on operations as a way to reduce noise impacts because it is contrary to the purpose of the transit investment by FTA which is to move as many people as possible as efficiently and safely as possible.

- **Reduction of warning horns and signals** – Minimizing or eliminating horns and other warning signals at gate crossings can reduce noise impact for light rail and commuter rail systems. Although these mitigation options are limited by safety considerations, they can be effective in the right circumstances. For examples, see quiet zones below and wayside horns in Step 7b.

- **Wheel Treatments (Rail)** – A major source of noise from steel-wheel and steel-rail systems is the wheel/rail interaction that can produce three distinctive sounds: roar, impact, and squeal (as discussed in Section 3.2). Roar is the rolling noise caused by small-scale roughness on the wheel tread and rail running surface. Impacts are caused by discontinuities in the running surface of the rail or by a flat spot on the wheels. Squeal occurs when a steel-wheel tread or its flange rubs across the rail, resulting in resonant vibrations in the wheel that creates a screeching sound. Various wheel designs and other mitigation measures exist to reduce the noise from each of these three mechanisms.

  - **Resilient wheels** – Resilient wheels are effective in eliminating wheel squeal on tight turns with reductions of 10 to 20 dB in the high-frequency range where squeal noise occurs. Rolling noise is also slightly reduced with resilient wheels and typically achieves a 2-dB reduction on tangent track. The costs for resilient wheels are approximately $2000 to $3000 per wheel, as compared to about $400 to $700 for standard steel wheels.[vi]

  - **Damped wheels** – Damped wheels, like resilient wheels, are effective in eliminating wheel squeal on tight turns with reductions of 5 to 15 dB in the high-frequency range where squeal occurs. Rolling noise is also slightly reduced by approximately 2 dB on tangent track. This treatment involves attaching vibration absorbers to standard steel wheels. The costs for damped wheels add approximately $500 to $1000 to the normal $700 for each steel wheel.

[vi] Assumes 8 wheels per vehicle.

- **Vehicle Treatments** – Vehicle noise mitigation measures are applied to the various mechanical systems associated with propulsion, ventilation, and passenger comfort. Propulsion systems of transit vehicles include diesel engines, electric motors, and diesel-electric combinations. Noise from the propulsion system depends on the type of unit and how much noise mitigation is built into the design. Mufflers on diesel engines are generally required to meet noise specifications; however, mufflers are generally practical only on buses, not on locomotives. Control of noise from engine casings may require shielding the engine by body panels without louvers, dictating other means of cooling, and ventilation.

  Ventilation requirements for vehicle systems are related to the noise generated by a vehicle. Fan noise often remains a major noise source after other mitigation measures have been instituted because of the need to have direct access to cooling air. This applies to heat exchangers for electric traction motors, diesel engines, and air-conditioning systems. The mitigation options for these systems include:

  - **Quiet fan design and placement** – Fan noise can be reduced by installation of quiet, efficient fans. Forced-air cooling on electric traction motors can be quieter than self-cooled motors at operating speeds. Placement of fans on the vehicle can make a considerable difference in the noise radiated to the wayside or to patrons on the station platforms.

  - **Vehicle skirts and undercar absorption** – The vehicle body design can provide shielding and absorption of the noise generated by the vehicle components. Acoustical absorption under the car has been demonstrated to provide up to 5 dB of mitigation for wheel/rail noise and propulsion-system noise on rapid transit trains. Similarly, vehicle skirts over the wheels can provide more than 5 dB of mitigation. By carrying their own noise barriers, vehicles with these features can provide cost-effective noise reduction. The cost for vehicle skirts will add approximately $5000 to $10000 per vehicle. Undercar absorption will add approximately $3500 per vehicle, assuming that 50% of the underside of the floor is treated.

- **Preventative Maintenance (Rail)** – Preventative maintenance is the best strategy to minimize rail and wheel deterioration. While these are not mitigation measures in the traditional sense and should not be included as mitigation in an environmental document, they can help to keep both noise and vibration levels at a "like-new" level or reduce both noise and vibration in systems with deferred maintenance. This can be accompanied by considerable life cost benefits for the transit system.

  - **Spin-slide control systems** – Similar to anti-locking brake systems (ABS) on automobiles, spin-slide control systems reduce the incidence of wheel flats, a major contributor of impact noise. Trains with smooth wheel treads can be up to 20 dB quieter than those with wheel flats. To be effective, the anti-locking feature should be in operation during all braking phases, including emergency braking. Wheel flats are more likely

to occur during emergency braking than during dynamic braking. The cost of slip-slide control may be incorporated in the new vehicle costs, but may be between $5,000 and $10,000 per vehicle with a maintenance cost of $200 per year.

- **Wheel truing** – Maintenance of wheels by truing eliminates wheel flats from the treads and restores the wheel profile. As discussed above, wheel flats are a major source of impact noise. As a guideline, it is recommended that wheel sets match within approximately ±0.01 inch and all wheels on the same truck should match within ±0.02 inches to minimize damage and wear to wheels and rails.(34) A wheel truing machine costs approximately $1 million, including associated maintenance materials and labor costs. The TCRP report estimates a system with 700 vehicles would incur a yearly cost of $300,000 to $400,000 for a wheel truing program.

  It is recommended to install wheel-flat detector systems to identify vehicles that are most in need of wheel truing. These systems are becoming more common on railroads and intercity passenger systems, but are relatively rare on transit systems.

- **Rail grinding** – The smoothness of the running surface is critical in the mitigation of noise from a moving vehicle. Mill scale grinding before commencement of pre-revenue service train operations is critical. Experience shows that grinding new rails after approximately 3 months of train operations and scheduling routine grinding at approximate intervals of 2 years in the problem areas would minimize noise problems related to corrugation in most cases. Grinding with small machines when the corrugation depth is still small is a reasonable approach. As a guideline, it is recommended to spot-grind at locations where corrugation occurs before corrugation grows to 0.02 inches (32).

  Periodic rail grinding can result in a net savings per year on wheel and rail wear. Most transit systems contract out rail grinding, although some of the larger systems make the investment of approximately $1 million for the equipment and do their own grinding. Contractors typically charge a fixed amount per day for the equipment on site, plus an amount per pass-mile (one pass of the grinding machine for one mile). Typical rail grinding cost would be approximately $7,000 to $10,000 per pass-mile.

- **Wheel and rail profile matching** – It is important to consider the wheel and rail profile compatibility when truing wheels and grinding rails. If the profiles do not match, the benefits of this kind of preventative maintenance will not be achieved.

  It is equally important to consider initial wheel and rail profile compatibility. Work with track designers and vehicle suppliers early in the design process to ensure wheel and rail profile compatibility. Profiles should be defined during the design phase and should be in

place when system opens.[32] The cost of wheel and rail profile matching may be incorporated in the new vehicle and new rail costs.

Profile grinding of the rail head in combination with a wheel truing program may be the most practical approach to controlling and reducing noise and vibration where such practices are not normally conducted.

- **Maintenance program** – Clearly defined maintenance specifications should be developed during design phase of the project. The specifications should define rail and wheel profiles, include detailed guidance for pre-revenue mill scale grinding, address issues related to healthy rail-wheel interface, and include a mechanism for periodic monitoring of wheel and rail condition and verification for compliance.[32] A diligent maintenance program can often resolve or reduce rail noise issues before they occur. Vehicle reconditioning programs should also be developed particularly for components such as suspension system, brakes, wheels, and slip-slide detectors.

- **Guideway Support (Bus)** – The smoothness of the running surface is critical in the mitigation of noise from a moving vehicle.
  - **Resurfacing roads** – Roughness on the guideway can be eliminated by resurfacing roads, thereby reducing noise levels by up to 10 dB.

  - **Bridge expansion joint angles and design** – Bridge expansion joints are also a source of noise for rubber-tire vehicles. This source of noise can be reduced by placing expansion joints on an angle or by specifying the serrated type rather than joints with right-angle edges.

- **Turn Radii and Rail Lubrication** – For steel-wheel/steel-rail systems with non-steerable trucks and sharp turns, squeal can typically be eliminated by designing all turn radii to be greater than 1000 ft, or 100 times the truck wheelbase, whichever is less. If this is not possible, squeal can be mitigated by installation of lubricators (though the potential environmental impacts of lubricant application should be factored into this decision).Rail lubricators cost approximately $10,000 - $40,000 per curve.

- **Movable-point and Spring-rail Frogs** – Frogs with spring-loaded mechanisms and frogs with movable points can reduce impact noise near crossovers. According to the TCRP report, a spring frog costs approximately $12,000, twice the cost of a standard frog. A movable point frog involves elaborate signal and control circuitry resulting in higher costs of approximately $200,000.

- **Use of Locomotive Horns at-grade Crossings and Quiet Zones** – In cases where commuter rail operations share tracks or ROW with freight or intercity passenger trains that are part of the general railroad system, the safety rules of the FRA, including the Train Horn Rule, apply.[35] The Train Horn Rule requires that locomotive horns be sounded at public highway grade crossings, although some exceptions are allowed in carefully defined circumstances. Locomotive horns are often a major contributor in

projections of adverse noise impact, in the community from proposed commuter rail projects. Since noise barriers are not feasible at highway-rail grade crossings, the establishment of quiet zones could be considered.

Quiet zones can be established in which supplemental safety measures (SSMs) are used in place of the locomotive horn to provide an equivalent level of safety at-grade crossings.[vii] By adopting an approved SSM at each public grade crossing, a quiet zone of at least a half-mile long can be established. These measures are in addition to the standard safety devices required at most public grade crossings (e.g., stop signs, reflectorized crossbucks, flashing lights with gates that do not completely block travel over the tracks). Below are four SSMs that have been predetermined by the FRA to fully compensate for the lack of a locomotive horn:

- **Temporary closure of a public highway-rail grade crossing** – This measure requires closure of the grade crossing for one period each 24 hours, and the closure must occur at the same time each day.
- **Four-quadrant gate system** – This measure involves the installation of at least one gate for each direction of traffic to fully block vehicles from entering the crossing.
- **Gates with medians or channelization devices** – This measure keeps traffic in the proper travel lanes as it approaches the crossing. This denies the driver the option of circumventing the gates by traveling in the opposing lane.
- **One-way street with gates** – This measure consists of one-way streets with gates installed, so that all approaching travel lanes are completely blocked.

In addition to the pre-approved SSMs, the FRA rule also identifies a range of other measures that may be used in establishing a quiet zone. These could include modified SSMs or non-engineering types of measures, such as increased monitoring by law enforcement for grade crossing violations or instituting public education and awareness programs that emphasize the risks associated with grade crossings and applicable requirements. These alternative safety measures (ASMs) require approval by FRA based on a demonstration that public safety would not be compromised by eliminating horn usage.

The lead agency for designating a quiet zone is the local public authority responsible for traffic control and law enforcement on the roads crossing the tracks. To satisfy the FRA regulatory requirements, the public transit agency must work closely with this agency while also coordinating with any freight or passenger railroad operator sharing the ROW. The final environmental document should discuss the main considerations in adopting the quiet zone including: the engineering feasibility, receptiveness of the local public authority, consultation with the railroad, preliminary cost estimates, and evidence of the planning and interagency coordination that has occurred to date. If a quiet zone will be relied on as a mitigation measure, the final environmental document should provide reasonable

[vii] For more information on quiet zones, visit: https://www.fra.dot.gov/Page/P0889.

assurance that any remaining issues can and will be resolved. For more information on documentation requirements see Section 8.

The cost of establishing a quiet zone varies considerably, depending on the number of intersections that must be treated and the specific SSMs, ASMs, or combination of measures that are used. The FRA gives a cost estimate of $15,000 per crossing for installing two 100-foot-long, non-traversable medians that prevent motorists from driving around closed gates. A typical installation of a four-quadrant gate system is in the range of $175,000–$300,000 per crossing.[36] Who pays for the installation of modifications can become a major consideration in a decision to pursue a quiet zone designation, especially in cases where noise from preexisting railroad operations is controversial in the community. In many cases where a quiet zone would mitigate a severe impact caused by the proposed transit project, the costs are covered by the project sponsor and FTA in the same proportion as the overall cost-sharing for the project.

**7b. Evaluate Path Treatments** – When noise mitigation treatments cannot be applied at the noise source or additional mitigation is required after treating the source, the next preferred placement of noise mitigation is along the noise propagation path between the source and receiver. Common path treatments and their estimated acoustical effectiveness are included in Table 4-34 and described below.

**Table 4-34 Transit Noise Mitigation Measures – Path Treatments**

| Mitigation Measure | Effectiveness |
|---|---|
| Noise barriers close to vehicles | 6-15 dB |
| Noise barriers at row line | 3-15 dB[37] |
| Alteration of horizontal & vertical alignments | Varied |
| Wayside horns | Varied |
| Acquisition of buffer zones | Varied |
| Ballast on at-grade guideway* | 3 dB |
| Ballast on aerial guideway* | 5 dB |
| Resilient track support on aerial guideway | Varied |
| Vegetation and trees | Varied, see Table 4-30 |

* Applies to rail projects only.

- **Noise Barriers** – Noise barriers are effective in mitigating noise when they break the line-of-sight between source and receiver. The mechanism of sound shielding is described in Section 3.3. The necessary height of a barrier depends on the source height and the distance from the source to the barrier, see Table 4-28 and Figure 4-18.
  - **Noise barriers close to vehicles** – Barriers located very close to a rapid transit train, for example, may only need to be approximately 3 to 4 ft above the top of rail to be effective. Standard barriers close to vehicles can provide noise reductions of 6 to 10 dB.
  - **Noise barriers at ROW line –** Barriers on the ROW line or for trains on the far track, the height must be increased to provide equivalent effectiveness to barriers located close to the vehicles. Otherwise, the effectiveness can drop to 3 dB or less, even if the barrier breaks the line-of-sight.

All barrier effectiveness can be increased by as much as 5 dB by applying sound-absorbing material to the inner surface of the barrier. The length of the barrier wall is also important to its effectiveness. The barrier must be long enough to block noise from a moving train along most of its visible path. This is necessary so that train noise from beyond the ends of the barrier will not severely compromise noise-barrier performance at noise-sensitive locations. The barrier length can be refined in the engineering phase, closely examining the predicted sound level exceedances at specific receivers, site geometries, and the contribution of barrier flanking noise, then adjusting the length as appropriate.

Noise barriers can be made of any outdoor weather-resistant solid material that meets the minimum sound transmission loss required by the project. Materials that are commonly used for noise barriers include 16-gauge steel, 1-inch thick plywood, and any reasonable thickness of concrete. Typically, a surface density of 4 pounds per square foot is required. Areas with strong winds may require more stringent structural requirements. It is critical to seal any gaps between barrier panels and between the barrier and the ground or elevated guideway deck for maximum performance.

Costs for noise barriers (based on highway installations) range from $20 to $25 per square foot of installed noise barrier at-grade with additional cost for design and inspection.[38] Installation on aerial structures could be twice the amount of installation at-grade, especially if the structure has to be strengthened to accommodate the added weight and wind load.

As described in Section 3.3, noise barriers, if not designed and sited carefully, can reduce visibility of trains for pedestrians and motorists, which causes safety concerns. It is important to consult with safety experts in choosing and siting a noise barrier.

- **Alteration of Horizontal and Vertical Alignments** – Transit alignment in a cut as part of grade separation can accomplish the same result as installation of a noise barrier at-grade or on aerial structure. The walls of the cut serve the same function as barrier walls in breaking the line-of-sight between source and receiver.

- **Wayside Horns** – The sounding of a locomotive horn as the train approaches an at-grade intersection produces a very wide noise footprint in the community. Using wayside horns at these intersections instead of the locomotive horn can substantially reduce the noise footprint without compromising safety at the grade crossing.

  A wayside horn does not need to be as loud as a locomotive horn, and the warning sound is focused only on the area where it is needed. These are pole-mounted horns used in conjunction with flashing lights and gates at the intersection, with a separate horn oriented toward each direction of oncoming vehicle traffic. Noise levels in nearby residential and business areas can be reduced substantially with wayside horns, depending on the location with respect to the grade crossing.

A plan to use wayside horns in place of the locomotive horn at public grade crossings must be coordinated with several public and private entities, notably the local agency having responsibility for traffic control and law enforcement on the road crossings, the state agency responsible for railroad safety, any railroads that share the ROW, and FRA. Public notification must also be given. Preliminary cost information from testing programs indicates a wayside horn system at a railroad/highway grade crossing costs approximately $50,000.

- **Buffer Zones** – Because noise levels attenuate with distance, one noise mitigation option is to increase the distance between noise sources and the closest noise-sensitive receivers. This can be accomplished by locating alignments away from noise-sensitive sites. Acquisition of land or purchasing easements for noise buffer zones is an option that may be considered if appropriate for the project.

- **Ground Absorption – Ballast on Guideways** – Propagation of noise over ground is affected by whether the ground surface is absorptive or reflective. Noise from vehicles on the surface is strongly affected by the character of the ground in the immediate vicinity of the vehicle. Roads and streets for buses are hard and reflective, but the ground at the side of a road has a substantial effect on the propagation of noise to greater distance. Guideways for rail systems can be either reflective or absorptive, depending on whether they are concrete or ballast. Ballast on a guideway can reduce train noise 3 dB at-grade and up to 5 dB on an aerial structure.

- **Vegetation and Trees** – In almost all cases, vegetation and trees are ineffective at providing noise mitigation. Vegetation and Trees can provide some mitigation if at least 100 ft of trees intervene between the source and receiver, if no clear line-of-sight exists between the source and receiver, and if the trees extend 15 ft or more above the line-of-sight as described in Section 4.5, Step 3b. This is generally not a recommended form of mitigation to pursue.

**7c. Evaluate Receiver Treatments –** Consider treatments to the receivers when noise mitigation treatments cannot be applied at the source or along the propagation path, or if combinations of treatments are required. Common receiver treatments and their estimated acoustical effectiveness are included in Table 4-35 and are described in this section.

**Table 4-35 Transit Noise Mitigation Measures – Receiver Treatments**

| Mitigation Measure | Effectiveness |
|---|---|
| Acquisition of Property Rights for Construction of Noise Barriers | 5-10 dB |
| Building Noise Insulation | 5-20 dB |

- **Noise Barriers** – In certain cases, it may be possible to acquire limited property rights for the construction of noise barriers at the receiver. As discussed above, barriers need to break the line-of-sight between the noise source and the receiver to be effective and are most effective when they are

closest to either the source or the receiver. See Section 3.3 for more information on noise barriers.

- **Building Insulation** – In cases where noise barriers are not feasible—such as multi-story buildings, buildings very close to the ROW, or grade crossings—the only practical noise mitigation measure may be to provide sound insulation for the buildings. In these cases, the need for mitigation at locations where impact has been identified will depend on the use (outdoor vs. indoor), any existing outdoor to indoor reduction in noise levels, and the feasibility of constructing effective noise barriers for second stories and above.

  Depending on the quality of the original building façade, especially windows and doors, sound insulation treatments can improve the noise reductions from transit noise by 5 to 20 dB. To be considered cost-effective, a treatment should provide a minimum reduction of 5 dB in the interior of the building and meet the $L_{dn}$ 45 dBA interior criterion. For more information, see Section 4.1.

  In many cases, especially in locations with high ambient noise levels, the existing sound insulation of a building may already meet the 45 dBA $L_{dn}$ interior noise criterion. It is recommended that sound insulation testing be conducted to determine if the existing sound insulation is sufficient or what additional measures would be required to meet the interior criterion. Effective treatments include:
  - Caulking and sealing gaps in the building façade; and
  - Installation of new doors and windows that are specially designed to meet acoustical transmission-loss requirements:
    - Exterior doors facing the noise source should be replaced with well-gasketed, solid-core wood doors and well-gasketed storm doors.
    - Acoustical windows are typically made of multiple layers of glass with air spaces between to provide noise reduction. Acoustical performance ratings are published in terms of Sound Transmission Class (STC) for these windows. It is recommended to use a minimum STC rating of 39 on any window exposed to the noise source.

  These treatments are beneficial for heat insulation as well as for sound insulation, but acoustical windows are typically non-operable and central ventilation or air conditioning is needed. Residents' preferences should be considered.

  If needed, additional building sound insulation can be provided by sealing vents and ventilation openings and relocating them to a side of the building away from the noise source. In cases where the noise sources is low-frequency noise from diesel locomotives, it may be necessary to increase the mass of the building façade for wood-frame houses by adding a layer of sheathing to the exterior walls.

Examples of residential sound insulation for rail or highway projects are limited. However, much practical experience with sound insulation of buildings has been gained through grants for noise mitigation to local airport authorities by FAA.

SECTION 5

# Transit Vibration

This section presents the basic concepts of transit ground-borne vibration, also referred throughout this manual as simple "vibration," and low-frequency groundborne-noise that sometimes results from vibration. The steps for the screening and assessing of potential vibration impacts of transit projects for FTA NEPA approval are described in the following sections.

The Source-Path-Receiver framework for ground-borne vibration for a rail system illustrated in Figure 5-1 is central to all environmental vibration studies. The train wheels rolling on the rails create vibration energy that is transmitted through the track support system into the transit structure. The vibration of the transit structure excites the adjacent ground, creating vibration waves that propagate through the ground and into nearby buildings creating ground-borne vibration effects that potentially interfere with activities. The vibrating building components may radiate sound, which this manual refers to as ground-borne noise. Airborne noise from transit sources is covered in Sections 2.3–4.5 of this manual. Ground-borne noise refers to the noise generated by ground-borne vibration.

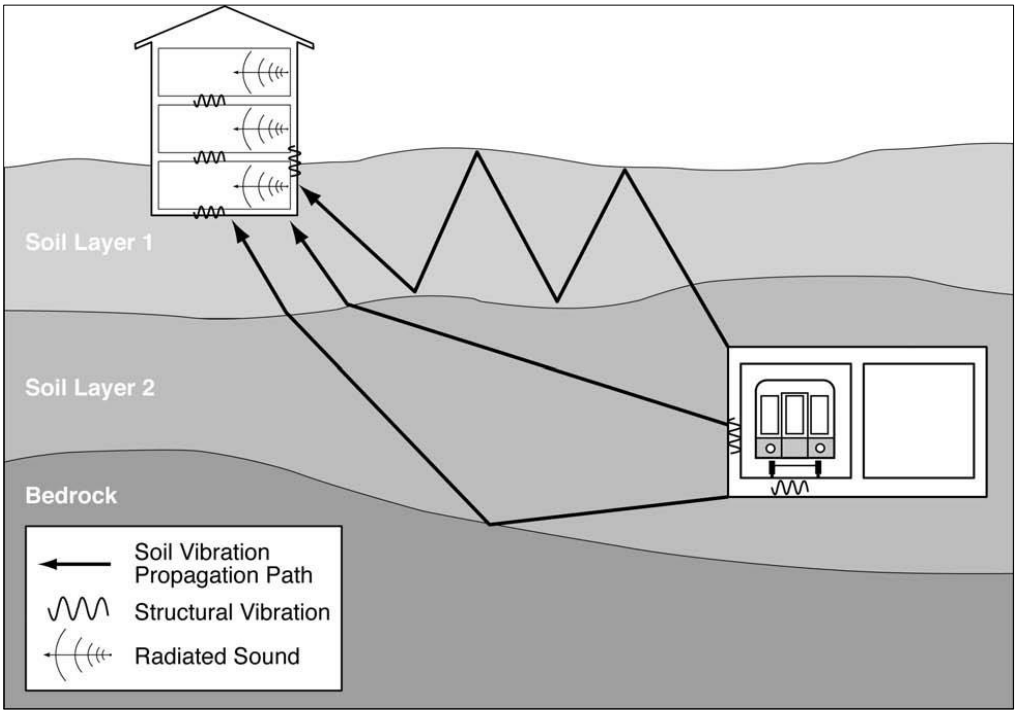


**Figure 5-1 Propagation of Ground-Borne Vibration into Buildings**

This section contains the following:

- Section 5.1 The ground-borne vibration and noise metrics used in this manual
- Section 5.2 An overview of transit vibration sources

- Section 5.3 An overview of transit vibration paths
- Section 5.4 An overview of receiver factors of transit vibration and a discussion of the technical background for ground-borne noise criteria

## 5.1 Ground-Borne Vibration and Noise Metrics

Vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration. Because the motion is oscillatory, there is no net movement of the vibration element and the average of any of the motion metrics is zero. Displacement is the most intuitive metric. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement and acceleration is the rate of change of the speed.

Although displacement is easier to understand than velocity or acceleration, it is rarely used for describing ground-borne vibration. Most transducers used for measuring ground-borne vibration use either velocity or acceleration. Furthermore, the response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.

This manual uses the metrics outlined in Table 5-1 for transit ground-borne vibration and noise measurements, computations, and assessment. These metrics are consistent with common usage in the United States.

**Table 5-1 Ground-borne Vibration and Noise Metrics**

| Metric | Abbreviation | Definition |
|---|---|---|
| Vibration Decibels | VdB | The vibration velocity level in decibel scale. |
| Peak Particle Velocity | PPV | The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States. |
| Root Mean Square | rms | The square root of the arithmetic average of the squared amplitude of the signal. |
| A-weighted Sound Level | dBA | A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This unit is used to characterize ground-borne noise. |

The metrics in the table above are illustrated in Figure 5-2. The components in the figure include:

- **Raw signal** – This curve shows the instantaneous vibration velocity, which fluctuates positively and negatively about the zero point.

- **Peak particle velocity (PPV)** – PPV is the maximum instantaneous positive or negative peak of the vibration signal. PPV is often used in monitoring of construction vibration (such as blasting) since it is related to the stresses that are experienced by buildings and is not used to evaluate human response.

- **Root mean square (rms) velocity** – Because the net average of a vibration signal is zero, the rms amplitude is used to describe smoothed vibration amplitude. The rms of a signal is the square root of the

average of the squared amplitude of the signal. The average is typically calculated over a one-second period. The rms amplitude is always less than the PPV[viii] and is always positive. The rms amplitude is used to convey the magnitude of the vibration signal felt by the human body, in inches/second.

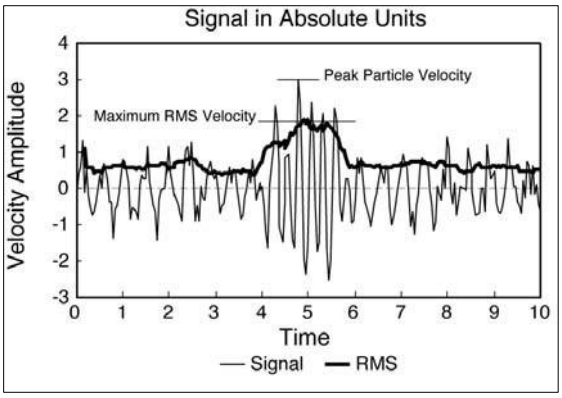


**Figure 5-2 Vibration Signal in Absolute Units**

The PPV and rms velocity are described in inches per second in the United States and meters per second internationally (with several different reference values). Although it is not universally accepted, vibration is commonly expressed in decibel notation. The decibel scale compresses the range of numbers required to describe vibration.

The graph in Figure 5-3 shows the rms curve from Figure 5-2 expressed in decibels.

Vibration velocity level in decibels is defined as:

$$L_v = 20 \log\left(\frac{v}{v_{ref}}\right) \qquad \textbf{Eq. 5-1}$$

where:

$L_v$ = velocity level, VdB
$v$ = rms velocity amplitude
$v_{ref}$ = 1 x $10^{-6}$in/sec in the USA
= 1 x $10^{-8}$m/sec internationally*

*Because of the variations in the reference quantities, it is important to be clear about what reference quantity is being used when specifying velocity levels. All vibration levels in this manual are referenced to 1x$10^{-6}$ inches/second.

[viii] The ratio of PPV to maximum rms amplitude is defined as the crest factor for the signal. The crest factor is typically greater than 1.41, although a crest factor of 8 or more is not unusual for impulsive signals. For ground-borne vibration from trains, the crest factor is usually 4 to 5.

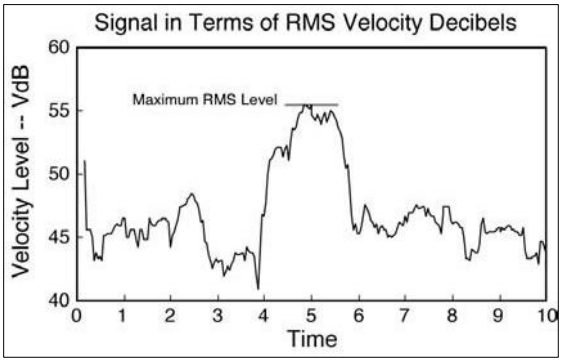


**Figure 5-3 Vibration Signal in RMS Velocity Decibels**

Ground-borne noise occurs when vibration radiates through a building interior and creates a low-frequency sound, often described as a rumble, as a train passes by. The annoyance potential of ground-borne noise is typically characterized with the A-weighted sound level. Although the A-weighted sound level is typically used to characterize community noise, characterizing low-frequency noise using A-weighting can be challenging because the non-linearity of human hearing causes sounds dominated by low-frequency components to seem louder than broadband sounds (sounds consisting of many frequency components, with no dominant frequencies) that have the same A-weighted level. The result is that ground-borne noise with a level of 40 dBA sounds louder than 40 dBA broadband noise. Because ground-borne noise sounds louder than broadband noise at the same noise level, the limits for ground-borne noise are lower (i.e., stricter) than would be the case for broadband noise.

## 5.2 Sources of Transit Ground-borne Vibration and Noise

Ground-borne vibration can be a concern for nearby neighbors of a transit system route or maintenance facility. However, in contrast to airborne noise, ground-borne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. This section discusses common sources of ground-borne vibration and noise.

Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of vibration waves that propagate through the ground and create perceptible ground-borne vibration in nearby buildings include construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is fairly smooth, the vibration from rubber-tired traffic is rarely perceptible. Building damage due to vibration is also rare for typical transportation projects; but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings.

Figure 5-4 illustrates common vibration sources and the human and structural response to ground-borne vibration ranging from approximately 50 VdB (below

perceptibility) to 100 VdB (the threshold of potential damage). The background vibration velocity level in residential areas is usually 50 VdB or lower,[ix] and the threshold of perception for humans is approximately 65 VdB. A vibration level of 85 VdB in a residence can result in strong annoyance.

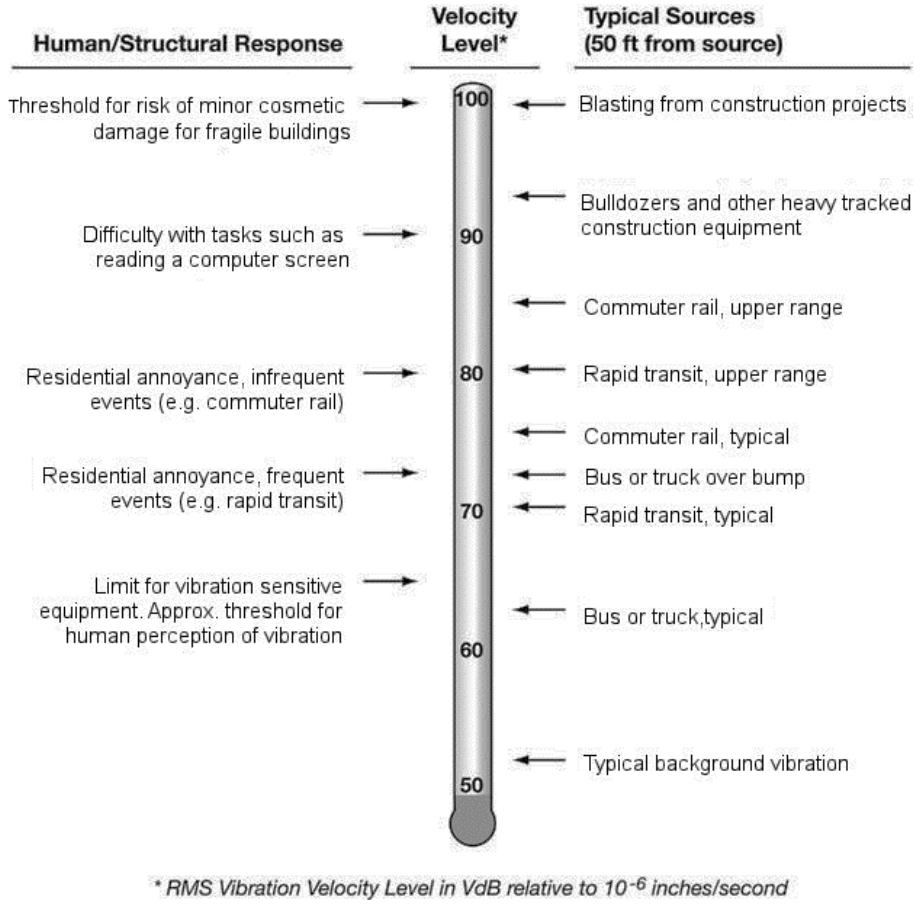


**Figure 5-4 Typical Levels of Ground-Borne Vibration**

Rapid transit or light rail systems typically generate vibration levels of 70 VdB or more near their tracks, while buses and trucks rarely create vibration that exceeds 70 VdB unless there are bumps due to frequent potholes in the road. Heavy locomotives on diesel commuter rail systems create vibration levels approximately 5 to 10 dB higher than rail transit vehicles.

Vibration from trains is strongly dependent on factors such as how smooth the wheels and rails are, as well as the resonance frequencies of the vehicle suspension system and the track support system. These systems, like all mechanical systems, have resonances that result in increased vibration response at certain frequencies, called natural frequencies. Unusually rough road or track, steel-wheel flats, geologic conditions that promote efficient propagation of vibration, or vehicles with very stiff suspension systems could increase typical

[ix] Background vibration is typically well below the threshold of human perception and is of concern only when the vibration affects very sensitive manufacturing or research equipment. Electron microscopes and high-resolution lithography equipment are examples of equipment that is highly sensitive to vibration.

vibration levels by approximately 10 VdB. Common factors that contribute to ground-borne vibration and noise at the source are presented in Table 5-2. These factors are discussed in more detail throughout this Section.

**Table 5-2 Factors that Influence Levels of Ground-Borne Vibration and Noise at the Source**

| Category | Factors | Influence |
|---|---|---|
| Operations and Vehicles | Speed | Higher speeds result in higher vibration levels. Doubling speed results in a vibration level increase of approximately 4 to 6 dB. |
| | Vehicle Suspension | Stiff suspension in the vertical direction can increase the effective vibration forces. On transit cars, the primary suspension has the largest effect on vibration levels. |
| | Wheel Condition and Type | Wheel flats and general wheel roughness are major sources of vibration from steel wheel/steel rail systems. Resilient wheels on rail transit systems can provide some vibration reduction over solid steel wheels, but are usually too stiff to provide substantial reduction. For more information, see Section 6.4, Step 2. |
| Guideway | Track/Roadway Surface | Rough track or rough roads are often sources of excessive vibration. Maintaining a smooth surface will reduce vibration levels. |
| | Track Support System | On rail systems, the track support system is one of the major components in determining the levels of vibration. The highest vibration levels are created by track that is rigidly attached to a concrete trackbed (e.g., track on wood half-ties embedded in the concrete). The vibration levels are much lower when special vibration control track systems such as resilient fasteners, ballast mats, and floating slabs are used. |
| | Transit Structure | Heavier transit structures typically result in the lower vibration levels. The vibration levels from a lightweight bored tunnel will usually be higher than from a poured concrete box subway. |
| | Transit System Elevation | A rail system guideway will be either underground (subway), at-grade, or elevated, with substantial differences in the vibration characteristics at each elevation.<br>▪ Underground: vibration is typically the most important environmental factor of interest.<br>▪ At-grade: airborne noise is typically the dominant factor, although vibration and noise can be a problem, particularly at interior locations well isolated from exterior noise.<br>▪ Elevated: it is rare for vibration to be an issue with elevated railways except when guideway supports are located within 50 ft of buildings. |

Brief discussions of ground-borne vibration and noise sources for different modes of transit are provided below.

### At-Grade Heavy Rail and Light Rail

Ground-borne vibration and noise from urban heavy rail and LRT is common when there is less than 50 ft between the track and building foundations. Local geology and structural details of the building determine if the source of complaints is due to perceptible vibration or audible ground-borne noise. Complaints about ground-borne vibration from surface track are more common than ground-borne noise complaints. A substantial percentage of complaints about both ground-borne vibration and noise correlate with proximity of special track work, rough or corrugated track, or wheel flats. Light rail systems tend to generate fewer complaints than heavy rail due to lower operating speeds.

### Commuter and Intercity Passenger Trains

There is the potential for vibration-related issues when new commuter or intercity rail passenger service (including electric multiple units (EMUs) and diesel multiple units (DMUs)) powered by either diesel or electric locomotives is introduced in an urban or suburban area. Commuter and intercity passenger trains have similar characteristics, but commuter trains typically operate on a more frequent schedule. These passenger trains often share track with freight trains, which have different vibration characteristics as discussed below.

### Freight Trains

Local and long-distance freight trains are similar in that they both are diesel-powered and have the same types of cars. They differ in their overall length, number and size of locomotives, and number of heavily loaded cars. However, because locomotive suspensions are similar, the maximum vibration levels of local and long-distance freights are similar. Locomotives and rail cars with wheel flats are the sources of the highest vibration levels.

If the transit project does not in any way change the freight service, tracks, etc., then vibration from the freight line would be part of the existing conditions and need to be considered in terms of cumulative impacts (see Section 6.2, Step 3 on how to consider cumulative impacts). If the project results in changes to the freight path, operations, frequency, etc. (e.g., relocating freight tracks within the ROW to make room for the transit tracks) then those potential impacts and mitigation should be evaluated as part of the proposed project. However, note that vibration mitigation is very difficult to implement on tracks where freight trains with heavy axle loads operate.

### High-Speed Passenger Trains

Passenger trains travelling at high speeds, 90 to 250 miles per hour, have the potential for creating high levels of ground-borne vibration. Ground-borne vibration should be anticipated as one of the major environmental impacts of any trains travelling at high speeds located in an urban or suburban area.[x] For projects that are specifically high-speed transportation refer to the FRA "High-Speed Ground Transportation Noise and Vibration Impact Assessment" guidance manual.[39]

### AGT Systems

AGT systems include a wide range of transportation vehicles that provide local circulation in downtown areas, airports, and theme parks. Because AGT systems normally operate at low speeds, have lightweight vehicles, run on elevated structures, and rarely operate in vibration-sensitive areas, ground-borne vibration problems are very rare.

### Subway and At-grade Track

While ground-borne vibration produced from trains operating subway and at-grade track have very different characteristics, they have comparable overall vibration velocity levels. Complaints about ground-borne vibration are often more common near subways than near at-grade track. This is not because

[x] Amtrak trains (branded Acela at the time of publication) on the Northeast Corridor between Boston and Washington, DC, which attain moderate to high speeds in some sections with improved track, fit into this category.

subways create higher vibration levels than at-grade systems, rather because subways are usually located in more densely developed areas in closer proximity to building foundations, and the airborne noise is usually a more serious problem for at-grade systems than the ground-borne vibration. Another difference between subway and at-grade track is that the ground-borne vibration from subways tends to be higher frequency than the vibration from at-grade track, which makes the ground-borne noise more noticeable.

**Streetcars**

Complaints about ground-borne vibration from street cars are uncommon given that streetcars typically operate at very low speeds (less than 25 mph).

**Buses**

Because the rubber tires and suspension systems of buses provide vibration isolation, it is unusual for buses to cause ground-borne vibration or noise problems. For most issues with bus-related vibration, such as rattling of windows, the cause is almost always airborne noise and directly related to running surface conditions such as potholes, bumps, expansion joints, or other discontinuities in the road surface (usually resolved by smoothing the discontinuities).

Buses operating inside buildings will likely cause vibration concerns for other building inhabitants. An example of this situation is a bus transfer station in the same building as commercial office space. Sudden loading of a building slab by a heavy moving vehicle or by vehicles running over lane divider bumps can cause intrusive building vibration.

## 5.3 Paths of Transit Ground-Borne Vibration and Noise

Vibration travels from the source through the transit structure and excites the adjacent ground, creating vibration waves that propagate through soil layers and rock strata to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the building structure. The vibration of the building structure and room surfaces can radiate a low-frequency rumble called ground-borne noise (Figure 5-1).

Soil and subsurface conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils. Shallow rock may concentrate the vibration energy close to the surface, resulting in ground-borne vibration problems at large distances from the track. Factors such as soil layers and depth to water table can have substantial effects on the propagation of ground-borne vibration. These factors are summarized in Table 5-3.

**Table 5-3 Factors that Influence Levels of Ground-borne Vibration and Noise along Path**

| Geology Factors | Influence |
|---|---|
| Soil type | Vibration levels are generally higher in stiff clay-type soil than in loose sandy soil. |
| Rock layers | Vibration levels are usually high near at-grade track when the depth to bedrock is 30 ft or less. Subways founded in rock will result in lower vibration amplitudes close to the subway. Vibration levels do not attenuate as rapidly in rock as in soil. |
| Soil layering | Soil layering can have a substantial effect on the vibration levels since each stratum can have considerably different dynamic characteristics. |
| Depth to water table | The presence of the water table may have a substantial effect on vibration, but a definite relationship has not been established. |

## 5.4 Receiver Factors that Influence Ground-Borne Vibration and Noise

Ground-borne vibration is a concern almost exclusively inside buildings. Train vibration may be perceptible to people who are outdoors, but it is very rare for outdoor vibration to cause complaints.

The vibration levels inside a building are dependent on the vibration energy that reaches the building foundation, coupling of the building foundation to the soil, and propagation of the vibration through the building. In general, the heavier a building is, the lower the response will be to the incident vibration energy. Common factors that contribute to ground-borne vibration and noise at the receiver are presented in Table 5-4.

**Table 5-4 Factors that Influence Levels of Ground-Borne Vibration and Noise at the Receiver**

| Receiver Building Factors | Influence |
|---|---|
| Foundation type | The heavier the building foundation, the greater the coupling loss as the vibration propagates from the ground into the building. |
| Building construction | Each building has different characteristics relative to structure-borne vibration, but, in general, the heavier the building, the lower the levels of vibration. The maximum vibration amplitudes of the floors and walls of a building will often occur at the resonance frequencies of the components of the building. |
| Acoustical absorption | The more acoustically absorptive materials in the receiver room, the lower the ground-borne noise level. Note that because ground-borne noise usually is a low-frequency phenomenon, it is affected by low-frequency absorption (e.g., below 250 Hz). |

## 5.5 Human Response to Transit Ground-borne Vibration and Noise

This section contains an overview of human receiver response to ground-borne vibration and noise. It serves as background information for the vibration impact criteria in Section 6.2.

The effects of ground-borne vibration can include perceptible movement of floors in buildings, rattling of windows, shaking of items on shelves or hanging on walls, and low-frequency noise (ground-borne noise). Building damage is not a

factor for typical transportation projects, but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings. Although the perceptibility threshold is approximately 65 VdB, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB (Figure 5-4). A vibration level that causes annoyance is well below the damage risk threshold for typical buildings (100 VdB).

Ground-borne vibration is almost never a problem outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of a building, the motion does not provoke the same adverse human reaction. Ground-borne noise that accompanies the building vibration is usually perceptible only inside buildings and typically is only an issue at locations with subway or tunnel operations where there is no airborne noise path or for buildings with substantial sound insulation such as a recording studio.

One of the challenges in developing suitable criteria for ground-borne vibration is that there has been relatively little research into human response to vibration and, specifically, human annoyance with building vibration. The American National Standards Institute (ANSI) developed criteria for evaluation of human exposure to vibration in buildings in 1983,[40] and the International Organization for Standardization (ISO) adopted similar criteria in 1989[41] and revised them in 2003.[42] The 2003 version of ISO 2631-2 acknowledges that "human response to vibration in buildings is very complex." It further indicates that the degree of annoyance cannot always be explained by the magnitude of the vibration alone. In some cases, complaints are associated with measured vibration that is lower than the perception threshold. Other phenomena such as ground-borne noise, rattling, visual effects such as movement of hanging objects, and time of day (e.g., late at night) all play some role in the response of individuals. To understand and evaluate human response, which is often measured by complaints, all of these related effects need to be considered.

Figure 5-5 illustrates the relationship between the vibration velocity level measured in 22 homes and the general response of the occupants to the vibration from measurements performed for several transit systems along with subjective ratings by researchers and residents. These data are published in the "State-of-the-Art Review of Ground-borne Noise and Vibration."[43] The figure also includes a curve representing the percent of people annoyed by vibration from high-speed trains from a Japanese study for comparison.[44]

Both the occupants and the people who performed the measurements agreed that floor vibration in the Distinctly Perceptible range is unacceptable for a residence. The data indicates that residential vibration exceeding 75 VdB is unacceptable for a repetitive vibration source such as rapid transit trains that pass every 5 to 15 minutes. The results from the Japanese study confirm the conclusion that at a vibration velocity level of 75 to 80 VdB, many people will find the vibration annoying. A Transportation Research Board (TRB) study of human response to vibration from 2009 also supports this finding and indicates that incidence of complaints fall rapidly with a level decreasing below 72 VdB.[42][45]

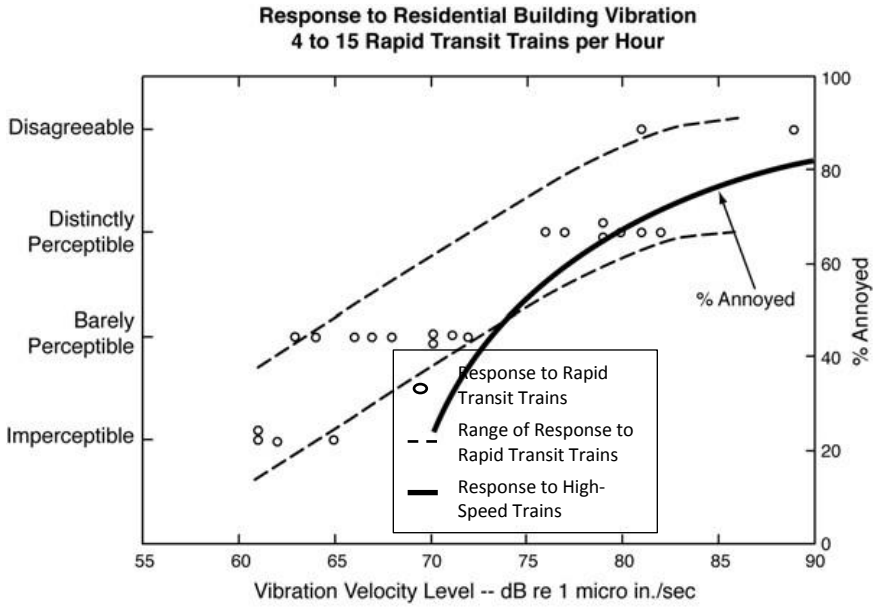


**Figure 5-5 Response to Transit-Induced Residential Vibration**

Table 5-5 presents the human response to different levels of ground-borne vibration and noise on which the criteria presented in Section 6.2 are based. The vibration level (VdB) is presented with the corresponding frequency assuming that the vibration spectrum peaks at 30 Hz or 60 Hz.[xi] The ground-borne noise levels (dBA) are estimated for the specified vibration velocity with a peak vibration spectrum of 30 Hz (Low Freq) and 60 Hz (Mid Freq). Note that the human response differs for vibration velocity level based on frequency. For example, the noise caused by vibrating structural components may cause annoyance even though the vibration cannot be felt. Alternatively, a low-frequency vibration can cause annoyance while the ground-borne noise level it generates does not.

[xi] The A-weighted level of ground-borne noise can be estimated by applying A-weighting to the vibration velocity spectrum and by subtracting an additional 5 dB for a room with average acoustical absorption. Since the A-weighting at 31.5 Hz is -39.4 dB, if the vibration spectrum peaks at 30 Hz, the A-weighted sound level will be approximately 40 dB lower than the velocity level. If the vibration spectrum peaks at 60 Hz, the A-weighted sound level will be approximately 25 dB lower than the velocity level.

**Table 5-5 Human Response to Different Levels of Ground-Borne Vibration and Noise**

| Vibration Velocity Level | Noise Level | | Human Response |
|---|---|---|---|
| | Low Freq* | Mid Freq** | |
| 65 VdB | 25 dBA | 40 dBA | Approximate threshold of perception for many humans. Low-frequency sound: usually inaudible. Mid-frequency sound: excessive for quiet sleeping areas. |
| 75 VdB | 35 dBA | 50 dBA | Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise: tolerable for sleeping areas. Mid-frequency noise: excessive in most quiet occupied areas. |
| 85 VdB | 45 dBA | 60 dBA | Vibration tolerable only if there are an infrequent number of events per day. Low-frequency noise: excessive for sleeping areas. Mid-frequency noise: excessive even for infrequent events for some activities. |

*Approximate noise level when vibration spectrum peak is near 30 Hz.
**Approximate noise level when vibration spectrum peak is near 60 Hz.

SECTION 6

# Vibration Impact Analysis

The FTA vibration impact analysis process is a multi-step process used to evaluate a project for potential vibration impacts. If impact is determined, measures necessary to mitigate adverse impacts are to be considered for incorporation into the project.[3]

The FTA vibration impact analysis steps are summarized as follows and are described in the following sections:

**6.1** Determine vibration analysis level.

**6.2** Determine vibration impact criteria.
- **Option A:** General Vibration Assessment Criteria
- **Option B:** Vibration Impact Criteria for a Detailed Vibration Analysis

**6.3** Evaluate Impact: Vibration Screening Procedure
- **Step 1:** Classify project vehicles.
- **Step 2:** Determine project type.
- **Step 3:** Determine screening distance.
- **Step 4:** Identify vibration-sensitive land uses.

**6.4** Evaluate Impact: General Vibration Assessment.
- **Step 1:** Select base curve for ground surface vibration level.
- **Step 2:** Apply adjustments.
- **Step 3:** Inventory vibration impact.

**6.5** Evaluate Impact: Detailed Vibration Analysis
- **Step 1:** Characterize Existing Vibration
- **Step 2:** Estimate Vibration Impact
- **Step 3:** Assess Vibration Impacts
- **Step 4:** Determine Vibration Mitigation Measures

A similar process for the noise impact analysis is presented in Section 4. After the noise and vibration analyses have been completed, assess construction noise and vibration according to Section 7 and document findings according to Section 8.

## 6.1 Determine Vibration Analysis Level

There are three levels of analysis to assess the potential ground-borne vibration and noise impacts resulting from a public transportation project. The appropriate level of analysis varies by project based on the type and scale of the project, the stage of project development, and its environmental setting. These three levels are: the Vibration Screening Procedure, the General Vibration Assessment, and the Detailed Vibration Analysis. These levels of vibration analysis mirror the levels of noise analysis discussed in Section 4.2.

The Vibration Screening Procedure, performed first, defines the study area of any subsequent vibration impact assessment. Where there is potential for

impact, the General Vibration Assessment and Detailed Vibration Analysis procedures are used to determine the extent and severity of impact. In some cases, a General Vibration Assessment may be all that is needed. However, if the proposed project is near noise-sensitive land uses and it appears at the outset that the impact would be substantial, it is prudent to conduct a Detailed Vibration Analysis.

The methods for analyzing transit vibration are consistent with those described in recognized handbooks and international standards.[46][47]

*Conduct the vibration screening procedure and then determine the appropriate vibration analysis option:*

**Vibration Screening Procedure** – The Vibration Screening Procedure is a simplified method of identifying the potential for vibration impact from transit projects. The Vibration Screening Procedure is applicable to all types of transit projects and does not require any specific knowledge about the vibration characteristics of the system or the geology of the area. This procedure uses simplified assumptions and considers the type of project and the presence or absence of vibration-sensitive land uses within a screening distance that has been developed to identify most potential vibration impacts. If no vibration-sensitive land uses are present within the defined screening distance, then no further vibration assessment is necessary.

The Vibration Screening Procedure steps are provided in Section 6.3, Step 1.

**General Vibration Assessment** – The General Vibration Assessment is used to examine potential impacts to vibration-sensitive land use areas identified in the screening step more closely. It uses generalized information likely to be available at an early stage in the project development process and during the development of most environmental documents.

Vibration levels at receivers are determined by estimating the overall vibration velocity level and A-weighted ground-borne noise levels as a function of distance from the track and applying adjustments to account for factors such as track support systems, vehicle speed, type of building, and track and wheel conditions.

A General Vibration Assessment is sufficient for the environmental review of many projects, including projects that compare transit modal alternatives or relocate a crossover or turnout. The General Vibration Assessment may also be sufficient if it results in a commitment to mitigation that eliminates the vibration impacts, such as a change in transit mode or alignment. However, if impact is identified through the General Vibration Assessment procedures and not mitigated, a Detailed Vibration Analysis of the selected alternative must be completed. Most vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done.

The General Vibration Assessment procedure is provided in Section 6.3, Step 2.

**Detailed Vibration Analysis** – The Detailed Vibration Analysis procedure is a comprehensive assessment method that produces the most accurate estimates

of vibration impact for a proposed project and is often accomplished during the engineering phase of a project when there are sufficient data identifying potential adverse vibration impacts from the project. However, a Detailed Vibration Analysis may be warranted earlier in the environmental review process if there are potentially severe impacts due to the proximity of vibration-sensitive land uses. This type of assessment requires professionals with experience in performing and interpreting vibration propagation tests.

A Detailed Vibration Analysis may not be necessary for all segments of a project. Generalized prediction curves from the General Vibration Assessment procedures may be sufficient for most of the alignment, and the Detailed Vibration Analysis procedure may only need to be applied to particularly sensitive receivers (Section 6.3). Note that a Detailed Vibration Analysis is typically required when designing special track-support systems such as floating slabs or ballast mats. These and other costly vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done in the engineering phase of the project.

The Detailed Vibration Analysis procedure is presented in Section 6.3, Step 3.

## 6.2 Determine Vibration Impact Criteria

Use the FTA criteria presented in this section when conducting a General Vibration Assessment or a Detailed Vibration Assessment. Like noise, the sensitivity to vibration varies by land use type, and the criteria represent these sensitivities. These criteria are based on national and international standards,[38][39][48] as well as experience on human response to building vibration. See Section 5.5 for additional background information on the development of FTA vibration criteria. The criteria for environmental impact from ground-borne vibration and noise are based on the maximum root-mean-square (rms) vibration velocity levels for repeated events of the same source.

Determine the appropriate criteria based on the level of analysis (Section 6.1). The impact criteria for the General Vibration Assessment are presented in Option A, and the impact criteria for the Detailed Vibration Analysis are presented in Option B.

### Option A: General Vibration Assessment Criteria

Determine the land use according to Step 1 and the frequency of events according to Step 2. The impact criteria for the General Vibration Analysis are presented in Step 3.

#### Step 1: Land Use Categories

*Determine the appropriate land use category for the receiver of vibration impacts of the project or project segment.* Sensitive land use categories for vibration assessment are presented in Table 6-1 in order of sensitivity. Consider indoor use of the buildings when determining land use categories for ground-borne vibration and noise, since impact is experienced indoors.

**Table 6-1 Land Use Categories for General Vibration Assessment Impact Criteria**

| Land Use Category | Land Use Type | Description of Land Use Category |
|---|---|---|
| - | Special Buildings | This category includes special-use facilities that are very sensitive to vibration and noise that are not included in the categories below and require special consideration. However, if the building will rarely be occupied when the source of the vibration (e.g., the train) is operating, there is no need to evaluate for impact. Examples of these facilities include concert halls, TV and recording studios, and theaters. |
| 1 | High Sensitivity | This category includes buildings where vibration levels, including those below the threshold of human annoyance, would interfere with operations within the building. Examples include buildings where vibration-sensitive research and manufacturing* is conducted, hospitals with vibration-sensitive equipment, and universities conducting physical research operations. The building's degree of sensitivity to vibration is dependent on the specific equipment that will be affected by the vibration. Equipment moderately sensitive to vibration, such as high resolution lithographic equipment, optical microscopes, and electron microscopes with vibration isolation systems are included in this category.** For equipment that is more sensitive, a Detailed Vibration Analysis must be conducted. |
| 2 | Residential | This category includes all residential land use and buildings where people normally sleep, such as hotels and hospitals. Transit-generated ground-borne vibration and noise from subways or surface running trains are considered to have a similar effect on receivers.*** |
| 3 | Institutional | This category includes institutions and offices that have vibration-sensitive equipment and have the potential for activity interference such as schools, churches, doctors' offices. Commercial or industrial locations including office buildings are not included in this category unless there is vibration-sensitive activity or equipment within the building. As with noise, the use of the building determines the vibration sensitivity. |

* Manufacturing of computer chips is an example of a vibration-sensitive process.
** Standard optical microscopes can be impacted at vibration levels below the threshold of human annoyance.
*** Even in noisy urban areas, the bedrooms will often be in quiet buildings with effective noise insulation. However, ground-borne vibration and noise are experienced indoors, and building occupants have practically no means to reduce their exposure. Therefore, occupants in noisy urban areas are just as likely to be exposed to ground-borne vibration and noise as those in quiet suburban areas.

- **Ground-borne Vibration** – Locations with equipment that is highly-sensitive to vibration should be included in category 1 or assessed using the Detailed Vibration Analysis procedures (Section 6.3, Step 3) and criteria (Section 6.2, Option B) or specific criteria of the equipment manufacturer.

  Most computer installations or telephone switching equipment is not considered sensitive to vibration. Although the owners of this type of equipment often are concerned with the potential for ground-borne vibration interrupting smooth operation of their equipment, it is rare for computer or other electronic equipment to be particularly sensitive to vibration. This type of equipment is typically designed to operate in common building environments where the equipment may experience occasional disturbances and continuous background vibration caused by other equipment.

- **Ground-borne Noise** – Ground-borne noise is typically only assessed at locations with subway or tunnel operations where there is no airborne noise path, or for buildings with substantial sound insulation such as a recording studio. For typical buildings with at-grade or elevated transit operations, the interior airborne noise levels are often higher than the

ground-borne noise levels. For interior rooms or other special cases, ground-borne noise may need to be assessed.

## Step 2: Identify Event Frequency

*Determine the appropriate frequency of events for the project or project segment.*

Community response to vibration correlates with the frequency of events and, intuitively, more frequent events of low vibration levels may evoke the same response as fewer high vibration level events. This effect is accounted for in the ground-borne vibration and noise impact criteria by characterizing projects by frequency of events. Event frequency definitions are presented in Table 6-2.

**Table 6-2 Event Frequency Definitions**

| Category | Definition | Typical Project Types |
|---|---|---|
| Frequent Events | More than 70 events per day | Most rapid transit |
| Occasional Events | 30–70 events per day | Most commuter trunk lines |
| Infrequent Events | Fewer than 30 events per day | Most commuter rail branch lines |

## Step 3: Apply Impact Criteria by Land Use and Event Frequency

Select the appropriate impact criteria for ground-borne vibration and noise based on the previously identified land use categories and frequency of events. It is also important to consider the time of vibration sensitivity. If the building is not typically occupied when the vibration source (e.g., train) is operating, it is not necessary to consider impact.

The criteria in this section are appropriate for assessing human annoyance or interference with vibration-sensitive equipment for common projects. While not typical, existing conditions, freight train operations, and building damage may require consideration.

- **Existing Conditions** – The criteria in this section do not consider existing conditions. In most cases, the existing environment does not include a substantial number of perceptible ground-borne vibration or noise events. However, existing conditions must be evaluated in some cases, such as for projects located in an existing rail corridor. For criteria considering existing conditions, see Step 3b.

- **Freight Train Operations** – The criteria are primarily based on experience with passenger train operations. Passenger train operations (rapid transit, commuter rail, and intercity passenger railroad) create vibration events that last approximately 10 seconds or less while a typical line-haul freight train event lasts approximately two minutes. This manual is oriented to transit projects. However, situations will occur when freight train operations must be evaluated, such as when freight train tracks are relocated for a transit project within a railroad ROW. Guidelines on applying these criteria to freight train operations are presented in Step 3c.

- **Building Damage** – It is extremely rare for vibration from train operations to cause substantial or even minor cosmetic building damage. However, damage to fragile historic buildings located near the ROW may be of concern. Even in these cases, damage is unlikely except when the track is located very close to the structure. Damage thresholds that apply to these structures are discussed in Section 7.2, Step 4 on Construction Vibration Impacts.

**3a. Choose the impact criteria by land use category and event frequency.** The criteria for ground-borne vibration and noise land use categories 1-3 are presented in Table 6-3. The criteria are presented in terms of acceptable indoor ground-borne vibration and noise levels. Impact will occur if these levels are exceeded. Criteria for ground-borne vibration are expressed in terms of rms velocity levels in VdB, and criteria for ground-borne noise are expressed in terms of A-weighted sound pressure levels in dBA.

**Table 6-3 Indoor Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for General Vibration Assessment**

| Land Use Category | GBV Impact Levels (VdB re 1 micro-inch /sec) | | | GBN Impact Levels (dBA re 20 micro Pascals) | | |
|---|---|---|---|---|---|---|
| | Frequent Events | Occasional Events | Infrequent Events | Frequent Events | Occasional Events | Infrequent Events |
| **Category 1**: Buildings where vibration would interfere with interior operations. | 65 VdB* | 65 VdB* | 65 VdB* | N/A** | N/A** | N/A** |
| **Category 2**: Residences and buildings where people normally sleep. | 72 VdB | 75 VdB | 80 VdB | 35 dBA | 38 dBA | 43 dBA |
| **Category 3**: Institutional land uses with primarily daytime use. | 75 VdB | 78 VdB | 83 VdB | 40 dBA | 43 dBA | 48 dBA |

* This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed.
** Vibration-sensitive equipment is generally not sensitive to ground-borne noise; however, the manufacturer's specifications should be reviewed for acoustic and vibration sensitivity.

The criteria for ground-borne vibration and noise for special land uses are presented in Table 6-4. The criteria are presented in terms of acceptable indoor ground-borne vibration and noise levels. Impact will occur if these levels are exceeded. As for the other land uses, the criteria for ground-borne vibration are expressed in terms of rms velocity levels in VdB, and criteria for ground-borne noise are expressed in terms of sound pressure levels in dBA.

**Table 6-4 Indoor Ground-Borne Vibration and Noise Impact Criteria for Special Buildings**

| Type of Building or Room | Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch/sec) | | Ground-Borne Noise Impact Levels (dBA re 20 micro-Pascals) | |
|---|---|---|---|---|
| | Frequent Events | Occasional or Infrequent Events | Frequent Events | Occasional or Infrequent Events |
| Concert halls | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| TV studios | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| Recording studios | 65 VdB | 65 VdB | 25 dBA | 25 dBA |
| Auditoriums | 72 VdB | 80 VdB | 30 dBA | 38 dBA |
| Theaters | 72 VdB | 80 VdB | 35 dBA | 43 dBA |

**3b. Consider the presence of existing vibration conditions.**
When the project will cause vibration more than 5 dB above the existing vibration, the existing source can be ignored, and the standard vibration criteria in Step 3a are appropriate. When the project will cause vibration less than 5 dB above the existing vibration level, use the instructions presented in this section to determine the appropriate impact criteria for the project. For information on characterizing existing vibration conditions, see Section 6.2, Step 3.

Use Table 6-5 and Figure 6-1 to determine the appropriate impact criteria. Sources of existing vibration are typically longer in duration than the events introduced into the environment due to the project. The frequency of use in the rail corridor is also a factor in characterizing the existing conditions. Both factors are considered in the process of determining appropriate impact criteria in Table 6-5 and Figure 6-1.
Examples of projects considering the existing vibration conditions in Table 6-5 and Figure 6-1 include:

- An automated people mover system planned for a corridor with an existing rapid transit service with 220 trains per day that did not have a significant increase in events from the existing 220 trains per day and that is not 3 dB above the existing vibration level would cause no additional impact.
- Where a new commuter rail line shares a heavily-used corridor with a rapid transit system, the project vibration exceeds the existing vibration level, there is not a significant increase in the number of events, and the project vibration exceeds the existing vibration level by 3 dB or more, the projected vibration levels must be evaluated using the standard impact criteria to determine impact.
- If a new transit project will use an existing railroad ROW and the location of existing railroad tracks are shifted, existing vibration can be substantial. The track relocation and reconstruction can result in lower vibration levels that would benefit the receivers and not introduce any adverse impact. However, if the track relocation causes higher vibration levels at vibration-sensitive receivers, then the projected vibration levels must be evaluated using the standard impact criteria to determine impact.

**Table 6-5 Impact Criteria Considering Existing Conditions**

| Category | Number of Operations (At present – without project) | Criteria |
|---|---|---|
| Heavily Used | More than 12 trains per day | Use the standard vibration criteria in Section 6.2, Step 3a for the following scenarios:<br>▪ The existing vibration does not exceed the standard vibration criteria.<br>▪ The existing vibration exceeds the standard vibration criteria and there is a significant increase in events.*<br>▪ The existing vibration exceeds the standard vibration criteria, and the project vibration is 3 dB or more above the existing vibration.<br>The project has no impact if the existing vibration exceeds the standard vibration criteria, the number of events does not increase significantly, and the project vibration does not exceed the existing vibration by 3 dB or more. |
| Moderately Used | 5 – 12 trains per day | Use the standard vibration criteria in Section 6.2 Step 3a for the following scenarios:<br>▪ The existing vibration does not exceed the standard vibration criteria.<br>▪ The existing vibration exceeds the standard vibration criteria, and the project vibration is not 5 dB or more below the existing vibration.<br>The project has no impact if the existing vibration exceeds the standard vibration criteria and the project vibration is at least 5 dB below the existing vibration. |
| Infrequently Used | Fewer than 5 trains per day | The standard vibration criteria in Section 6.2, Step 3a apply. |

* Approximately doubling the number of events is required for a significant increase.

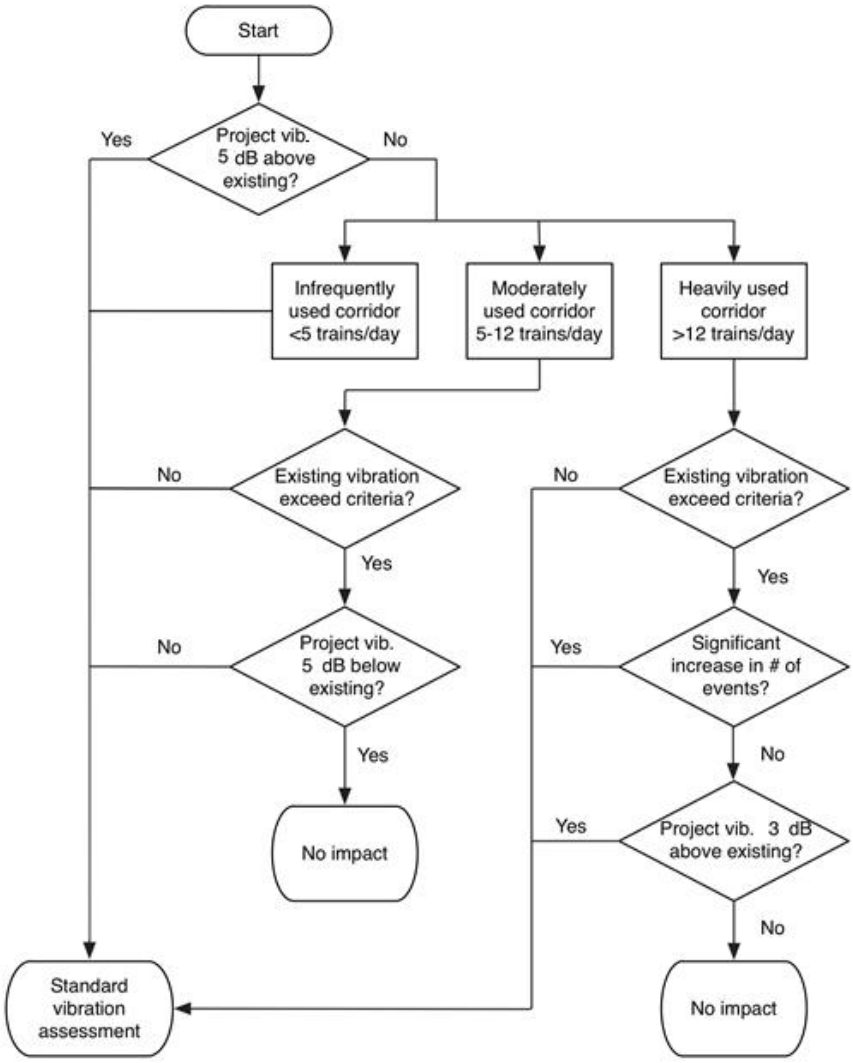


**Figure 6-1 Existing Vibration[xii] Criteria Flow Chart**

### 3c. Apply criteria to freight trains if part of the project.

Use the criteria presented in Step 3a to assess the vibration from freight trains in shared ROW scenarios because no specific impact criteria exist for freight railroads. It is important to consider that freight operations occur over substantially greater distances than passenger train operations and have different weight and axle loads.

When assessing vibration from freight train operations, consider the locomotive and rail car vibration separately. Since locomotive vibration lasts for a very short time, it can be characterized by the infrequent events category in Table 6-2. Rail car vibration from a typical line-haul freight train usually lasts for several minutes and can be characterized by the frequent events category in Table 6-2. Note

[xii] Vibration is abbreviated as "vib." in this flowchart.

that locomotives often create vibration levels that are 3 to 8 dB higher than those created by rail cars.

Use good engineering judgment to confirm the approach is reasonable for each project. For example, some spur rail lines carry very little rail traffic (sometimes only one train per week) or have short trains, in which case it may not be necessary to evaluate for impact. If there is uncertainty in how to determine the appropriate criteria, contact the FTA Regional office.

Decisions to relocate freight tracks closer to vibration-sensitive sites should be made with the understanding that increased vibration due to freight rail may not be possible to mitigate. Freight rail vibration may not always be successfully mitigated by the same methods as rail transit systems.

## Option B: Vibration Impact Criteria for a Detailed Vibration Analysis

Determine the appropriate impact criteria for ground-borne vibration and ground-borne noise for a Detailed Vibration Analysis.

## Step 1: Ground-Borne Vibration

*Choose the appropriate criteria based on Figure 6-2 and Table 6-6.*

Ground-borne vibration criteria presented in this section are more detailed than in the General Vibration Assessment. The criteria are based on international standards for the effects of vibration on people related to annoyance and interference with activities in buildings[39] as well as industry standards for vibration-sensitive equipment.[46] The criteria in this section are used to assess the potential for interference or annoyance from building response and to determine performance of vibration reduction methods. Note that for highly-sensitive equipment, specific vibration criteria provided by the manufacturer supersede the criteria in this section.

The criteria are presented by category in Figure 6-2 and are defined by international and industry standards.[39][46] These criteria define limits for acceptable maximum rms vibration velocity level with a one-second averaging time at the floor of the receiving building in terms of a one-third octave band frequency spectrum. Band levels that exceed a particular criterion curve indicate impact; and therefore, mitigation options should be evaluated considering the specific frequency range in which the treatment is most effective. Interpretations of the criteria are presented in Table 6-6.

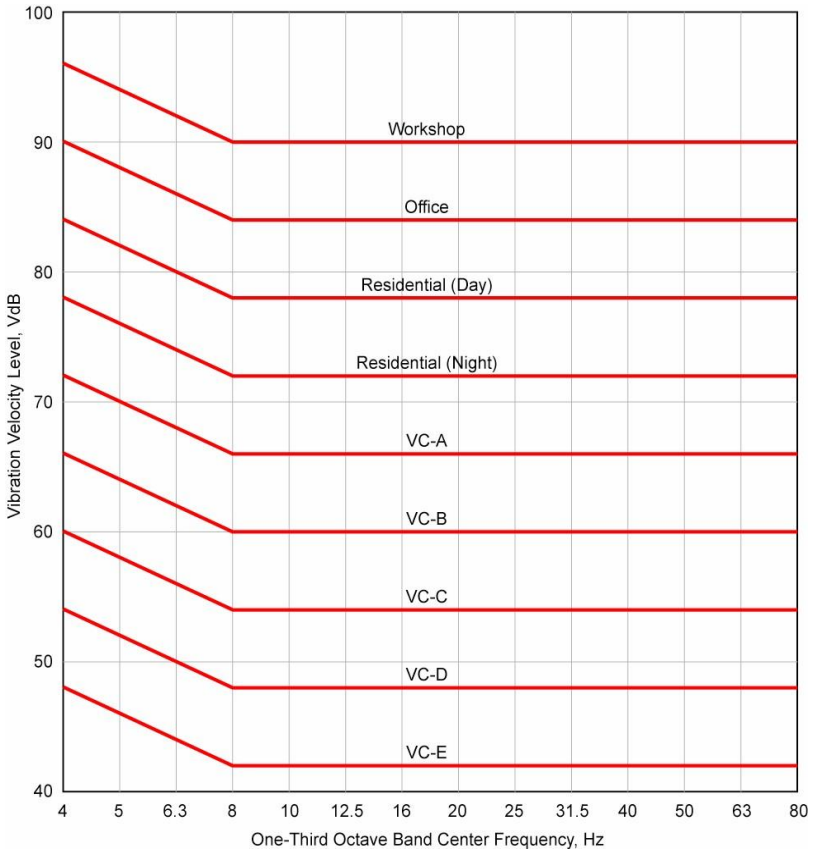


**Figure 6-2 Criteria for Detailed Vibration Analysis**

**Table 6-6 Interpretation of Vibration Criteria for Detailed Vibration Analysis**

| Criterion Curve | Max Lv,* VdB | Description of Use |
|---|---|---|
| Workshop (ISO) | 90 | Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration. |
| Office (ISO) | 84 | Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration. |
| Residential Day (ISO) | 78 | Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20X). |
| Residential Night, Operating Rooms (ISO) | 72 | Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power optical microscopes (100X) and other equipment of low sensitivity. |
| VC-A | 66 | Adequate for medium- to high-power optical microscopes (400X), microbalances, optical balances, and similar specialized equipment. |
| VC-B | 60 | Adequate for high-power optical microscopes (1000X) and inspection and lithography equipment to 3-micron line widths. |
| VC-C | 54 | Appropriate for most lithography and inspection equipment to 1-micron detail size. |
| VC-D | 48 | Suitable in most instances for the most demanding equipment, including electron microscopes operating to the limits of their capabilities. |
| VC-E | 42 | The most demanding criterion for extremely vibration-sensitive equipment. |

* As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hz.

In addition to the uses described in Table 6-6, the detailed vibration criteria can be applied to the three land use categories presented in Table 6-3.

- For residential land uses (category 2), use the residential night criterion curve in Table 6-6.
- For institutional uses (category 3), use the residential day criterion curve in Table 6-6.
- For category 1, the specific use of the building should be matched to the appropriate criterion curve in Table 6-6.
- For special buildings, such as those found in Table 6-4, either the criteria in Table 6-4 or specific criteria presented by the building operator should be used.

These criteria use a frequency spectrum because vibration-related problems generally occur due to resonances of the structural components of a building or vibration-sensitive equipment. Resonant response is frequency-dependent. A Detailed Vibration Analysis can provide an assessment that identifies potential problems resulting from resonances.

The detailed vibration criteria are based on generic cases when people are standing or equipment is mounted on the floor in a conventional manner. Consequently, the criteria are less stringent at very low frequencies below 8 Hz. Where special vibration isolation has been provided in the form of pneumatic isolators, the resonant frequency of the isolation system is very low. Consequently, in this special case, the curves may be extended flat at lower frequencies.

### Step 2: Ground-borne Noise

Ground-borne noise impacts are assessed based on criteria for human annoyance and activity interference. The Detailed Vibration Analysis procedure provides vibration spectra inside a building. To evaluate ground-borne noise, convert these vibration spectra to sound pressure level spectra in the occupied spaces using the method described in Section 6.5 and compare to the criteria as follows:

- For residential buildings, use the criteria presented in Table 6-3.
- For special buildings listed in Table 6-4, A-weighted noise may not be sufficient to assess activity interference for a Detailed Vibration Analysis. Each special building may have a unique specification for acceptable noise levels and criteria must be determined on a case-by-case basis. For example, a recording studio may have stringent requirements for allowable noise in each frequency band.

## 6.3 Evaluate Impact: Vibration Screening Procedure

*Determine the potential for impact using the Vibration Screening Procedure by identifying any vibration-sensitive land uses (Table 6-1) within the appropriate screening distance.*

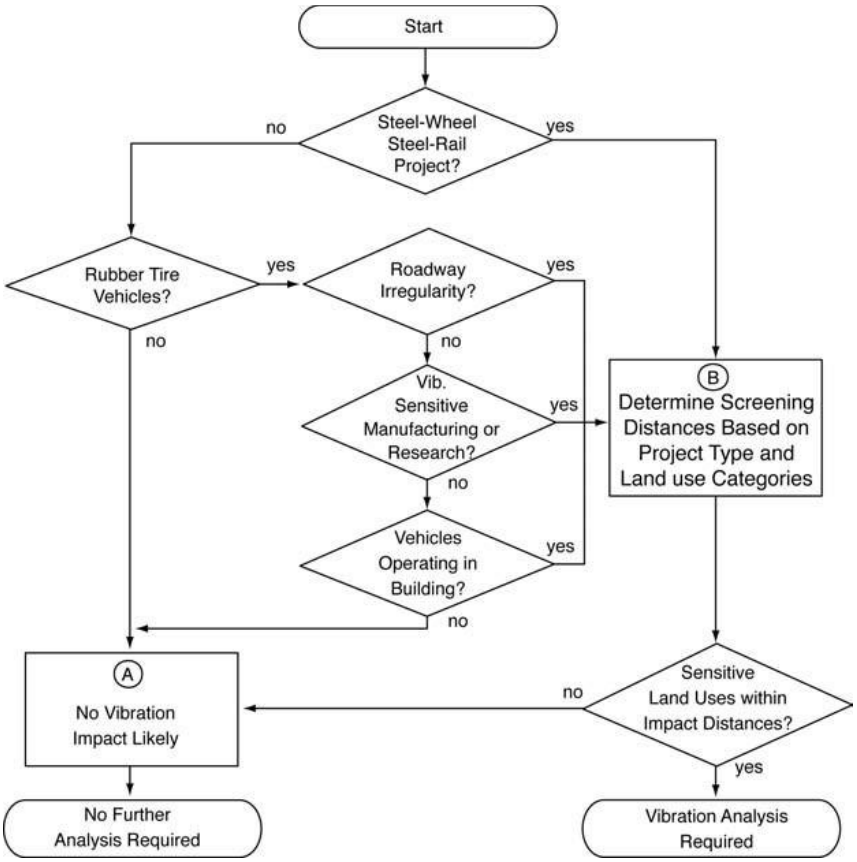


**Figure 6-3 Flow Chart of Vibration Screening Process**

## Step 1: Classify Project Vehicles

*Determine the project type and the next step based on the guidelines below.*

**Option A: No Vehicles** – Transit projects that do not involve vehicles do not have potential for vibration impact and do not require further analysis (Box A in Figure 6-3).

Many smaller FTA-funded projects, such as bus terminals, park-and-ride lots, and station rehabilitation are in this category, and do not require further analysis of ground-borne vibration impact. However, if track systems are modified (e.g., tracks moved or switches modified), *proceed to Step 2*.

**Option B: Steel-wheeled/Steel-rail Vehicles** – Transit projects with steel-wheeled/steel-rail vehicles have potential for vibration impact (Box B in Figure 6-3); *proceed to Step 2*. These rail systems include urban rapid transit, LRT, commuter rail, and steel-wheel intermediate capacity transit (ICT) systems.

**Option C: Rubber-tire Vehicles** – For projects that involve rubber-tire vehicles and do not meet the following conditions, vibration impact is unlikely, and no further analysis is needed. *Proceed to Step 2* for projects that involve rubber-tire vehicles and meet the following conditions (Box A in Figure 6.3):

- **Roadway irregularity** – Expansion joints, speed bumps, or other design features that result in unevenness in the road surface can result in perceptible ground-borne vibration at distances up to 75 ft away.

- **Operation close to vibration-sensitive buildings** – Buses, trucks, or other heavy vehicles operating close to a vibration-sensitive building (within approximately 100 ft from the property line) may impact vibration-sensitive activities, such as research that uses electron microscopes or manufacturing of computer chips.

- **Vehicles operating within buildings** – Special considerations are often required for shared use facilities where vehicles operate inside or directly underneath buildings such bus stations located inside an office building complex.

## Step 2: Determine Project Type

*Determine the project type according to Table 6-7.*

**Table 6-7 Project Types for Vibration Screening Procedure**

| Project Type Number | Project Type | Description |
|---|---|---|
| 1 | Conventional Commuter Railroad | Both locomotives and passenger vehicles create vibration. For commuter trains, the highest vibration levels are typically created by the locomotives. Electric commuter rail vehicles create levels of ground-borne vibration that are comparable to electric rapid transit vehicles. |
| 2 | RRT | Ground-borne vibration impact from rapid transit trains is one of the major environmental issues for new systems. Ground-borne vibration is usually a major concern for subway operations. It is less common for at-grade and elevated rapid transit lines to create intrusive ground-borne vibration and noise since air-borne noise typically dominates. |
| 3 | LRT and Streetcars | The ground-borne vibration characteristics of light rail systems are very similar to those of rapid transit systems. Because the speeds of light rail systems are usually lower, typical vibration levels are usually lower. Steel-wheel/steel-rail AGT is included in either this category or the ICT category depending on the level of service and train speeds. |
| 4 | Intermediate Capacity Transit | Because of the low operating speeds of most ICT systems, vibration problems are not common. However, steel-wheel ICT systems that operate close to* vibration-sensitive buildings have the potential of causing intrusive vibration. With a stiff suspension system, an ICT system could create intrusive vibration. |
| 5 | Bus and Rubber-Tire Transit Projects | This category encompasses most projects that do not include steel-wheel trains of some type. Examples include diesel buses, electric trolley buses, and rubber-tired people movers. Most projects that do not include steel-wheel trains do not cause vibration impacts.** |

*See the screening distances for category 1 land uses in Table 6-8.

** Most complaints about vibration caused by buses and trucks are related to rattling of windows or items hung on the walls. These vibrations are usually the result of airborne noise and not ground-borne vibration. In the case where ground-borne vibration is the source of the complaint, the vibration can usually be attributed to irregularities in the road.

## Step 3: Determine Screening Distance

*Determine the appropriate screening distances based on land use and project type according to Table 6-8.*

The distances are based on the criteria presented in Section 6.3, the procedures in Section 6.4 assuming normal vibration propagation, and include a 5-dB factor of safety. Even so, areas with very efficient vibration propagation can have substantially higher vibration levels.

Because of the 5-decibel safety factor, the screening distances will identify most of the potentially impacted areas, even for areas with efficient propagation. However, when there is evidence of efficient propagation, such as previous complaints about existing transit facilities or a history of problems with construction vibration, increase the distances in Table 6-8 by a factor of 1.5.

**Table 6-8 Screening Distances for Vibration Assessments**

| Type of Project | Critical Distance for Land Use Categories* Distance from ROW or Property Line, ft | | |
|---|---|---|---|
| | Land Use Cat. 1 | Land Use Cat. 2 | Land Use Cat. 3 |
| Conventional Commuter Railroad | 600 | 200 | 120 |
| RRT | 600 | 200 | 120 |
| LRT and Streetcars | 450 | 150 | 100 |
| ICT | 200 | 100 | 50 |
| Bus Projects (if not previously screened out) | 100 | 50 | -- |

*For the Vibration Screening Procedure, evaluate special buildings as follows: Category 1 - concert halls and TV studios, Category 2 - theaters and auditoriums

### Step 4: Identify Vibration-Sensitive Land Uses

Identify all vibration-sensitive land uses (Table 6-1) within the chosen screening distance. If no vibration-sensitive land uses are identified, no further vibration analysis is needed. If one or more of the vibration-sensitive land uses are in the screening distance, complete a General Vibration Assessment (Section 6.4) or a Detailed Vibration Analysis (Section 6.5).

## 6.4 Evaluate Impact: General Vibration Assessment

*Evaluate for impact using the General Vibration Assessment procedure if the Vibration Screening Procedure (Section 6.3) identified vibration-sensitive receivers within the screening distance of the transit vibration source.*

For guidelines on when the General Vibration Assessment is appropriate, review Section 6.1.

The basic approach for the General Vibration Assessment is to define a curve or set of curves that predicts the overall ground-borne vibration as a function of distance from the source, then apply adjustments to these curves to account for factors such as vehicle speed, geologic conditions, building type, and receiver location within the building. When the vehicle type is not covered by the curves included in this section, it will be necessary to define an appropriate curve either by extrapolating from existing information or performing measurements at an existing facility.

### Step 1: Select Base Curve for Ground Surface Vibration Level

*Select a standard vibration curve to represent general vibration characteristics for the source.*

The curves presented in Figure 6-4 are based on measurements of ground-borne vibration at representative North American transit systems and can be used to represent vibration characteristics for standard transportation systems in the General Vibration Assessment.

These curves assume typical ground-borne vibration levels, equipment in good condition, and speeds of 50 mph for the rail systems and 30 mph for buses. Adjustments to account for differences in speed and geologic conditions are included in Step 2.

Select a base curve from Figure 6-4 according to the guidelines in Table 6-9. Equations for the curves in Figure 6-4 are included in Table 6-10. Additional considerations for selecting a base curve for systems not included in Table 6-9 are presented below by transit mode.

**Table 6-9 Ground Surface Vibration Level Base Curve Descriptions**

| Curve | Description |
|---|---|
| Locomotive-Powered Passenger or Freight Curve | Appropriate for vehicles powered by diesel or electric locomotives including intercity passenger trains and commuter rail trains. |
| Rapid Transit or Light Rail Vehicles Curve | Appropriate for both heavy and light-rail vehicles on at-grade and subway track. |
| Rubber-Tired Vehicles Curve | Appropriate for rubber-tire vehicles. These types of vehicles rarely create ground-borne vibration problems unless there is a discontinuity or bump in the road that causes the vibration. This curve represents the vibration level for a typical bus operating on smooth roadway. |

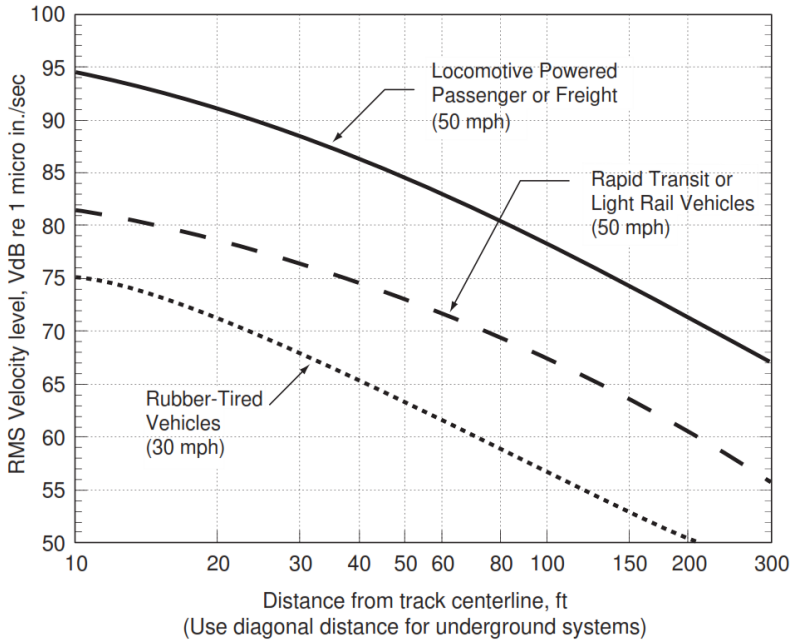


**Figure 6-4 Generalized Ground Surface Vibration Curves**

**Table 6-10 Generalized Ground Surface Vibration Equations**

| Curve | Equation | |
|---|---|---|
| Locomotive Powered Passenger or Freight Curve | $L_v = 92.28 + 14.81\log(D) - 14.17\log(D)^2 + 1.65\log(D)^3$ | **Eq. 6-1** |
| Rapid Transit or Light Rail Vehicles Curve | $L_v = 85.88 - 1.06\log(D) - 2.32\log(D)^2 - 0.87\log(D)^3$ | **Eq. 6-2** |
| Rubber-Tired Vehicles Curve | $L_v = 66.08 + 34.28\log(D) - 30.25\log(D)^2 + 5.40\log(D)^3$ | **Eq. 6-3** |
| $L_v$ = velocity level, VdB<br>$D$ = distance, ft | | |

Considerations for selecting a base curve for different transit modes include:

- **Intercity passenger trains** – Although intercity passenger trains can be an important source of environmental vibration, it is rare that they are considered for FTA-funded projects unless a new transit mode uses an existing rail alignment. When a new transit line uses an existing rail alignment, changes in the intercity passenger traffic can result in either positive or negative impacts. Use the locomotive-powered passenger or freight curve for intercity passenger trains unless there are specific data available on the ground-borne vibration created by the new train operations.

- **Locomotive-powered commuter rail** – Use the locomotive-powered passenger or freight curve for all commuter rail system powered by either diesel or electric locomotives.

- **Electric multiple unit (EMU)** – Use the rapid transit or light rail vehicles curve for self-powered electric commuter rail trains.

- **Diesel multiple unit (DMU)** – Self-powered DMUs create vibration levels somewhere between rapid transit vehicles and locomotive-powered passenger trains. A vibration curve for DMUs can be estimated by lowering the locomotive-powered passenger or freight curve by 5 dB.

- **Subway heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for subway heavy rail and subway light rail. Although vibrations from subway and at-grade tracks have very different characteristics, the overall vibration velocity levels are comparable. When applied to subways, the rapid transit or light rail vehicles curve assumes a relatively lightweight bored concrete tunnel in soil. The vibration levels will be lower for heavier subway structures such as cut-and-cover box structures and stations.

- **At-grade heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for at-grade heavy rail or light rail. Heavy rail and LRT vehicles have similar suspension systems and axle loads and create similar levels of ground-borne vibration.

- **Elevated guideways or aerial structures** – Vibration from operations on an elevated structure is typically not an issue unless the guideway is supported by a building or located very close to buildings. Apply the appropriate adjustment for the aerial structures (Section 6.4, Step 2).

- **Streetcars** – Use the rapid transit or light rail vehicles curve for street cars.

- **ICT** – Use the rapid transit or light rail vehicles curve for ICT systems with steel wheels and the rubber-tired vehicles curve for ICT systems with rubber tires.

- **Other vehicle types** – For less common modes such as magnetically-levitated vehicles (maglev), monorail, or AGT, use good engineering judgment to choose a standard curve to best fit the mode or if a new curve needs to be developed, as a function of distance from the track. Examples include:
  - Vibration from a rubber-tire monorail operating on aerial guideway can be approximated using the rubber-tired vehicles curve with the appropriate adjustment for the aerial structure (Section 6.4, Step 2).
  - Most of the data available on the noise and vibration characteristics of maglev vehicles comes from high-speed systems intended for inter-city service. Even though there is no direct contact between the vehicle and the guideway, the dynamic loads on the guideway can generate ground-borne vibration. Measurements on a German high-speed maglev resulted in ground-borne vibrations at 75 mph which is comparable to the base curve for rubber-tired vehicles at 30 mph.[49]

## Step 2: Apply Adjustments

*Apply project-specific adjustments to the standard vibration curve.*

Once the base curve has been selected, use the adjustments in the following instructions to develop project-specific vibration projections at each receiver. All adjustments are given as single numbers to add to, or subtract from, the base level.

Adjustments are separated by source, path, and receiver and include speed, wheel and rail type and condition, type of track support system, type of building foundation, and number of floors above the basement level. Calculate the appropriate adjustments to the base level. An example of the General Vibration Assessment is provided at the end of this Section.

It should be recognized that many of these adjustments are strongly dependent on the frequency spectrum of the vibration source and the frequency dependence of the vibration propagation. The adjustments in this section are suitable for generalized evaluation of the vibration impact and vibration

mitigation measures because they are based on typical vibration spectra. However, these adjustments are not adequate for detailed evaluations of impact of vibration-sensitive buildings or for detailed specification of mitigation measures.

**2a.** Apply source adjustments to the base curve using Table 6-11 and the descriptions below to account for the project-specific source characteristics.

**Table 6-11 Source Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Source Factor | Adjustment to Propagation Curve | | Comment |
|---|---|---|---|
| Speed | Vehicle Speed | Reference Speed: 50 mph / 30 mph | Vibration level is approximately proportional to 20log(speed/speed$_{ref}$), see Eq. 6-4. |
| | 60 mph | +1.6 dB / +6.0 dB | |
| | 50 mph | 0.0 dB / +4.4 dB | |
| | 40 mph | -1.9 dB / +2.5 dB | |
| | 30 mph | -4.4 dB / 0.0 dB | |
| | 20 mph | -8.0 dB / -3.5 dB | |
| **Vehicle Parameters (not additive, apply greatest value only)** | | | |
| Vehicle with stiff primary suspension | +8 dB | | Transit vehicles with stiff primary suspensions have been shown to create high vibration levels. Include this adjustment when the primary suspension has a vertical resonance frequency greater than 15 Hz. |
| Resilient Wheels | 0 dB | | Resilient wheels do not generally affect ground-borne vibration except at frequencies greater than about 80 Hz. |
| Worn Wheels or Wheels with Flats | +10 dB | | Wheel flats or wheels that are unevenly worn can cause high vibration levels. |
| **Track Conditions (not additive, apply greatest value only)** | | | |
| Worn or Corrugated Track | +10 dB | | Corrugated track is a common problem. Mill scale* on new rail can cause higher vibration levels until the rail has been in use for some time. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment. |
| Special Trackwork within 200 ft | +10 dB (within 100 ft)<br>+5 dB (between 100 and 200 ft) | | Wheel impacts at special trackwork will greatly increase vibration levels. The increase will be less at greater distances from the track. Do not include an adjustment for special trackwork more than 200 ft away. |
| Jointed Track | +5 dB | | Jointed track can cause higher vibration levels than welded track. |
| Uneven Road Surfaces | +5 dB | | Rough roads or expansion joints are sources of increased vibration for rubber-tire transit. |
| **Track Treatments (not additive, apply greatest value only)** | | | |
| Floating Slab Trackbed | -15 dB | | The reduction achieved with a floating slab trackbed is strongly dependent on the frequency characteristics of the vibration. |
| Ballast Mats | -10 dB | | Actual reduction is strongly dependent on frequency of vibration. |
| High-Resilience Fasteners | -5 dB | | Slab track with track fasteners that are very compliant in the vertical direction can reduce vibration at frequencies greater than 40 Hz. |

*Mill scale on a new rail is a slightly corrugated condition caused by certain steel mill techniques.

In addition to the comments in Table 6-11, use the following guidelines to select the appropriate adjustment factors. Some adjustments in the same category are not cumulative (additive) and only the greatest applicable adjustment should be applied. The adjustments that are not additive are noted in Table 6-11 and in the descriptions below. Note that some adjustments are not additive across multiple categories and are noted in the comments of Table 6-11. For example, the adjustment for a vehicle with stiff primary suspension is 8 dB, and the adjustment for wheel flats is 10 dB. If the vehicle has a stiff primary suspension and has wheel flats, the projected vibration levels should be increased by 10 dB, not 18 dB.

In addition, some vibration control measures are targeted for specific frequency ranges. The shape of the actual vibration spectra should be considered so that an appropriate vibration control measure may be selected.

- **Speed** – The levels of ground-borne vibration and noise vary, approximately, as 20 times the logarithm of speed. This means that doubling train speed will increase the vibration levels approximately 6 dB, and halving train speed will reduce the levels by 6 dB. The adjustments in Table 6-11 have been tabulated for reference vehicle speeds of 30 mph for rubber-tired vehicles and 50 mph for steel-wheel vehicles. Use the following relationship to calculate the adjustments for other speeds.

  $$Adj_{speed}\ (dB) = 20\log(\frac{speed}{speed_{ref}}) \qquad \textbf{Eq. 6-4}$$

  Variation with speed has been observed to be as low as $15\log(\frac{speed}{speed_{ref}})$, but unless specific speed data for vibration for a vehicle has been obtained, use Eq. 6-4.

- **Vehicle Parameters** – The most important factors for the vehicles are the suspension system, wheel condition, and wheel type. Most new heavy rail and light rail vehicles have relatively soft primary suspensions. However, a stiff primary suspension (vertical resonance frequency greater than 15 Hz) can result in higher levels of ground-borne vibration than soft primary suspensions. Vehicles, for which the primary suspension consists of rubber or neoprene around the axle bearing, usually have a very stiff primary suspension with a vertical resonance frequency greater than 40 Hz or more.

  Deteriorated wheel condition is another factor that increases vibration levels. It can be assumed that a new system has vehicles with wheels in good condition. When older vehicles are used on new track, it is important to consider the condition of the wheels, and it may be appropriate to include an adjustment for the wheel condition.

  Resilient wheels will reduce vibration levels at frequencies greater than the effective resonance frequency of the wheel. When this resonance

frequency is relatively high, greater than 80 Hz, resilient wheels may only have a marginal effect on ground-borne vibration.

The adjustments in this category are not additive; apply the greatest applicable value only.

- **Track Conditions** – This category includes the type of rail (welded, jointed, or special trackwork), the track support system, and the condition of the rail. The base curves assume welded rail in good condition. Jointed rail causes higher vibration levels than welded rail and the increase depends on the condition of the joints.

  Wheel impacts at special trackwork, such as frogs at crossovers, create much higher vibration forces than typical track conditions. Because of the higher vibration levels at special trackwork, crossovers are the principal areas of vibration impact on new systems. Methods of mitigating the vibration impact include modifying the track support system, installing low-impact frogs, or relocating the crossover. Special track support systems such as ballast mats, high-resilience track fasteners, resiliently supported ties, and floating slabs have all been shown to be effective in reducing vibration levels.

  The condition of the running surface of the rails can strongly affect vibration levels. Factors such as corrugations, general wear, or mill scale on new track can cause vibration levels 5 to 15 dB higher than normal. Mill scale will typically wear away after some time in service, but the track must be ground to remove corrugations or to reduce the roughness from wear.

  Roadway surfaces in the rubber-tired vehicle base curve are assumed to be smooth. Rough washboard surfaces, bumps, or uneven expansion joints are the types of running surface defects that cause increased vibration levels over the smooth road condition.

  The adjustments in this category are not additive; apply the greatest applicable value only. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment.

**2b.** Apply path adjustments to the base curve using Table 6-12 and the descriptions below to account for the project-specific path characteristics.

**Table 6-12 Path Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Path Factor | Adjustment to Propagation Curve | | Comment |
|---|---|---|---|
| Resiliently Supported Ties (Low-Vibration Track, LVT) | -10 dB | | Resiliently supported tie systems have been found to provide very effective control of low-frequency vibration. |
| **Track Structure (not additive, apply greatest value only)** | | | |
| Type of Transit Structure | Relative to at-grade tie & ballast: | | In general, the heavier the structure, the lower the vibration levels. Putting the track in cut may reduce the vibration levels slightly. Rock-based subways generate higher-frequency vibration. |
| | Elevated structure | -10 dB | |
| | Open cut | 0 dB | |
| | Relative to bored subway tunnel in soil: | | |
| | Station | -5 dB | |
| | Cut and cover | -3 dB | |
| | Rock-based | -15 dB | |
| **Ground-borne Propagation Effects** | | | |
| Geologic conditions that promote efficient vibration propagation | Efficient propagation in soil | +10 dB | Refer to the text for guidance on identifying areas where efficient propagation is possible. |
| | Propagation in rock layer | Dist. / Adjust. | The positive adjustment accounts for the lower attenuation of vibration in rock compared to soil. It is generally more difficult to excite vibrations in rock than in soil at the source. |
| | | 50 ft / +2 dB | |
| | | 100 ft / +4 dB | |
| | | 150 ft / +6 dB | |
| | | 200 ft / +9 dB | |
| Coupling to building foundation | Wood-Frame Houses | -5 dB | In general, the heavier the building construction, the greater the coupling loss. |
| | 1-2 Story Masonry | -7 dB | |
| | 3-4 Story Masonry | -10 dB | |
| | Large Masonry on Piles | -10 dB | |
| | Large Masonry on Spread Footings | -13 dB | |
| | Foundation in Rock | 0 dB | |

In addition to the comments in Table 6-12, use the following guidelines to select the appropriate adjustment factors.

- **Track Structure** – The weight and size of a transit structure affects the vibration radiated by that structure. In general, vibration levels are lower for heavier transit structures. Therefore, the vibration levels from a cut-and-cover concrete double-box subway can be assumed to be lower than the vibration from a lightweight concrete-lined bored tunnel.

  The vibration from elevated structures is lower than from at-grade track because of the mass and damping of the structure and the extra distance that the vibration must travel before it reaches the receiver. Elevated structures in AGT applications are sometimes designed to bear on building elements. This is a special case and may require detailed design considerations.

  The adjustments in this category are not additive; apply the greatest applicable value only.

- **Ground-Borne Propagation Effects – Geologic Conditions** – Although it is known that geologic conditions have a considerable effect on the vibration levels, it is rarely possible to develop more than a general understanding of the vibration propagation characteristics for a General Vibration Assessment. One of the challenges with identifying the cause of efficient propagation is the difficulty in determining whether higher than normal vibration levels are due to geologic conditions or due to special source conditions (e.g., rail corrugations or wheel flats).

  Some geologic conditions are repeatedly associated with efficient propagation. Shallow bedrock, less than 30 ft below the surface, is likely to have efficient propagation. Soil type and stiffness are also important factors in determining propagation characteristics. In particular, stiff, clayey soils, consolidated sand, gravel, and glacial till can be associated with efficient vibration propagation. Investigation of soil boring records can be used to estimate depth to bedrock and the presence of problem soil conditions.

  A conservative approach would be to use the 10-dB adjustment for efficient propagation for areas where efficient propagation is likely. However, this adjustment can greatly overstate the potential for vibration impact where efficient propagation is not present and should be applied using good judgment. Review available geological data and any complaint history from existing transit lines and major construction sites near the transit corridor to identify areas where efficient propagation is possible. If there is reason to suspect efficient propagation conditions, conduct a Detailed Vibration Analysis during the engineering phase and include vibration propagation tests at the areas with potential for efficient propagation.

- **Track Structure and Geologic Conditions – Examples**
  - **Subway**
    For a subway, determine if the subway will be founded in bedrock. Bedrock is considered to be hard rock. It is usually appropriate to consider soft siltstone and sandstone to be more like soil than hard rock. Whether a subway is founded in soil or rock can make a 15-dB difference in the vibration levels.

    When a subway structure is founded in rock, include the following Track Structure and Ground-borne Propagation Effects adjustments from Table 6-12:
    - Type of Transit Structure adjustment: Rock-based – 15 dB
    - Geologic Conditions adjustment: Propagation in rock layer for the appropriate distance.

    This adjustment increases with distance because vibration attenuates more slowly in rock than in the soil used as a basis for the reference curve.

- **At-grade** – When considering at-grade vibration sources, determine if the vibration propagation characteristics are typical or efficient. Efficient

vibration propagation results in vibration levels approximately 10 dB higher than typical levels. This more than doubles the potential impact zone for ground-borne vibration.

- **Ground-Borne Propagation Effects – Coupling to Building Foundation** – Since annoyance from ground-borne vibration and noise is an indoor phenomenon, the effects of the building structure on the vibration must be considered. Wood-frame buildings, such as typical residential structures, are more easily excited by ground vibration than heavier buildings. In contrast, large masonry buildings with spread footings have a low response to ground vibration.

  When a building foundation is directly on the rock layer, there is no coupling loss due to the weight and stiffness of the building. Use the standard coupling factors based on building type if there is at least a 10-foot layer of soil between the building foundation and the rock layer.

**2c.** Apply receiver adjustments to the base curve using Table 6-13 and the descriptions below to account for the project-specific receiver characteristics. The data in Table 6-13 is applicable when the building structural features are known.

For more generic cases that do not have detailed information on individual buildings, use a conservative approach and apply the following adjustments to predict indoor vibration based on the outdoor vibration, instead of using the adjustments in Table 6-13:[43][50]

- Light-weight, wood-frame construction 1st floor: +3 dB
- Light-weight, wood-frame construction 2nd and 3rd floors: +6 dB
- Large buildings: 0 dB
- Small masonry buildings: +3 dB

**Table 6-13 Receiver Adjustment Factors for Generalized Predictions of GB Vibration and Noise**

| Receiver Factor | Adjustment to Propagation Curve | | Comment |
|---|---|---|---|
| Floor-to-floor attenuation | 1 to 5 floors above grade | -2 dB/floor | This factor accounts for dispersion and attenuation of the vibration energy as it propagates through a building starting with the first suspended floor.* |
| | 5 to 10 floors above grade | -1 dB/floor | |
| Amplification due to resonances of floors, walls, and ceilings | +6 dB | | The actual amplification will vary greatly depending on the type of construction. The amplification is lower near the wall/floor and wall/ceiling intersections. |

* Floor-to-floor attenuation adjustments for the first floor assume a basement.

In addition to the comments in Table 6-13, use the following guidelines to select the appropriate adjustment factors. Note that receiver adjustments are additive.

- Vibration generally reduces in level as it propagates through a building. As indicated in Table 6-13, a 1- to 2-decibel attenuation per floor is typically appropriate.
- Resonances of the building structure, particularly the floors, will cause some amplification of the vibration. Consequently, for a wood-frame structure, the building-related adjustments nearly cancel out. Example: All adjustments for the first floor assuming a basement are: -5 dB for the coupling loss; -2 dB for the propagation from the basement to the first floor; and +6 dB for the floor amplification. The total adjustment in this case is -1 dB.

**2d.** Apply adjustments to the final adjusted curve using Table 6-14 and the descriptions below to convert ground-borne vibration levels to ground-borne noise levels.

**Table 6-14 Conversion to Ground-borne Noise**

| Conversion to Ground-borne Noise | | | |
|---|---|---|---|
| Noise Level in dBA | Peak frequency of ground vibration: | | Use these adjustments to estimate the A-weighted sound level given the average vibration velocity level of the room surfaces. See text for guidelines for selecting low-, mid-, or high-frequency characteristics. Use the high-frequency adjustment for subway tunnels in rock or if the dominant frequencies of the vibration spectrum are known to be 60 Hz or greater. |
| | Low frequency (<30 Hz) | -50 dB | |
| | Mid Frequency (peak 30 to 60 Hz) | -35 dB | |
| | High frequency (>60 Hz) | -20 dB | |

Estimate the levels of radiated noise using the average vibration amplitude of the room surfaces (floors, walls, and ceiling), and the total acoustical absorption in the room.

The un-weighted sound pressure level is approximately 5 dB[37][43] less than the vibration velocity level when the velocity level is referenced to $1 \times 10^{-6}$ inches/sec; but for a better estimate, it is necessary to consider general frequency ranges. Since ground-borne noise is A-weighted, the adjustments vary by frequency range, as described below. See Appendix B.1.4.1 for more information on A-weighting.

To select the appropriate adjustment, classify the frequency characteristics according to the guidelines below.

- **Low Frequency (<30 Hz)** – Low-frequency vibration characteristics can be assumed for the following conditions:
  - Subways surrounded by cohesionless sandy soil
  - Vibration isolation track support systems
  - Most surface track

- **Mid Frequency (peak 30 to 60 Hz)** – The mid-frequency vibration characteristic can be assumed for the following conditions:
  - Subways, unless other information indicates that one of the other assumptions is appropriate,
  - Surface track when the soil is very stiff with high clay content

- **High Frequency (>60 Hz)** – High-frequency characteristics can be assumed for the following conditions:
  - Subways with the transit structure founded in rock
  - Subways, when there is very stiff, clayey soil

## Step 3: Inventory of Vibration Impact

*Take inventory of vibration-sensitive land uses with impact and determine if a Detailed Vibration Analysis is required.*

Compare the projected vibration levels, including all appropriate adjustments in Section 6.4, Step 2, to the criteria to determine if impact from ground-borne vibration or noise is likely. Note that for any transit mode, variation in vibration levels under apparently similar conditions is not uncommon. In the General Vibration Assessment, it is preferable to make a conservative assessment of the impact and include buildings that may ultimately not be subject to impact.

The standard curves in Section 6.4, Step 1, represent the upper range of vibration levels from well-maintained systems. Although actual levels fluctuate widely, it is rare that ground-borne vibration will exceed these curves by more than 1 or 2 dB unless there are extenuating circumstances such as wheel- or running-surface defects. However, because actual levels of ground-borne vibration will sometimes differ substantially from the projections, use the following guidelines to interpret vibration impact:

- **Projected vibration is below the impact threshold** – Vibration impact is unlikely, and the environmental document should state this.

- **Projected ground-borne vibration is 0 to 5 dB greater than the impact threshold** – There is a strong chance that actual ground-borne vibration levels will be below the impact threshold. The environmental document should report impact at these locations as exceeding the applicable threshold, present possible mitigation measures and costs, and commit to conducting more detailed studies to refine the vibration impact analysis during the engineering phase. During the Detailed Vibration Analysis, determine appropriate mitigation, if necessary. A site-specific Detailed Vibration Analysis may show that vibration impacts will not occur and control measures are not needed.

- **Projected ground-borne vibration is 5 dB or greater than the impact threshold** – Vibration impact is probable and Detailed Vibration Analysis must be conducted during the engineering phase to determine appropriate vibration control measures. The environmental document should report impact at these locations as exceeding the applicable threshold, present possible mitigation measures and costs, and commit to conducting more detailed studies to refine the vibration impact analysis during the engineering phase. During the Detailed Vibration Analysis, determine appropriate mitigation, if necessary. A site-specific, Detailed Vibration Analysis may show that very costly vibration mitigation must be incorporated into the project to eliminate the impacts.

FTA recommends the reporting of a vibration level as a single value and not as a range, as ranges tend to confuse the interpretation of impact.

Express the results of the General Vibration Assessment in terms of an inventory with the following components:

- Include all vibration-sensitive land uses as identified in the Vibration Screening Procedure.
- Organize the inventory according to the categories described in Table 6-8.
- Include information on potentially feasible mitigation measures to reduce vibration to acceptable levels based on the generalized reduction estimates provided in this section. To be considered feasible, the measure or combination of measures must provide at least a 5-dB reduction of the vibration levels and be reasonable in terms of cost.

These potential mitigation measures are considered preliminary. Final vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done; see Section 6.5 for more information. Vibration control is frequency-dependent; therefore, specific recommendations of vibration control measures can only be made after evaluating the frequency characteristics of the vibration.

## Example 6-1 General Vibration Assessment – LRT

**General Vibration Assessment for an LRT project**

The hypothetical project is a LRT system that operates at 40 mph on at-grade, ballast and tie track with welded rail. The first floor of houses is at 125 ft from the LRT tracks and there is efficient propagation through the soil. The houses are constructed with wood frames. The houses will be exposed to 260 train passbys per day. Calculate the ground-borne vibration and assess for impact.

**Select Base Curve for Ground Surface Vibration**

Determine the appropriate base curve and the RMS velocity level ($L_v$).

According to Table 6-9, the Rapid Transit or Light Rail Vehicles curve is appropriate.

$L_v = 65\ VdB$ at 125 ft for this curve at 50 mph

**Apply Adjustments**

Apply the appropriate source adjustments using Table 6-11.

$$Source\ Speed\ Adjustment = 20\log\left(\frac{40}{50}\right) = -1.9\ dB$$
$$L_v = 65 - 1.9 = 63.1\ VdB$$

Apply the appropriate path adjustments using Table 6-12.

$$Efficient\ propagation = +10\ dB$$
$$Coupling\ to\ building\ foundation\ (wood\ frame) = -5\ dB$$
$$L_v = 63.1 + 10 - 5 = 68.1\ VdB$$

Apply the appropriate receiver adjustments using Table 6-13.

$$Amplification\ due\ to\ resonance\ of\ floor = +6\ dB$$
$$First\ floor\ attenuation = -2\ dB$$
$$L_v = 68.1 + 6 - 2 = 72.1\ VdB$$

**Assess for Impact**
Because there are more than 70 events per day, this project is in the Frequent Events category (Table 6-2). For category 2 land uses (residences) with frequent events, the impact criteria is 72 VdB (Table 6-3). Therefore, according to the General Vibration Assessment, there is potential for impact and a Detailed Vibration Analysis should be completed.

## 6.5 Evaluate Impact: Detailed Vibration Analysis

*Evaluate for impact using the Detailed Vibration Analysis procedure, if appropriate (Section 6.1).*

The goal of the Detailed Vibration Analysis is to use all available tools to develop accurate projections of potential ground-borne vibration impact and when necessary, to design mitigation measures. A Detailed Vibration Analysis requires developing estimates of the frequency components of the vibration signal, usually in terms of 1/3-octave-band spectra. The analytical techniques for solving vibration problems are complex, and the technology continually advances. Therefore, the approach presented in this section focuses on the key steps for these analyses. The key elements of the Detailed Vibration Analysis procedure and recommended steps are described below.

The methods in this section generally assume a steel-wheel/rail system. The procedures could be adapted to bus systems. However, this is rarely necessary because vibration impact is very infrequent with rubber-tired transit.

In general, when situations arise that are not explicitly covered in the Detailed Vibration Analysis, professional judgment may be used to extend these methods to cover these unique cases, when appropriate. Appendix G provides information on developing and using non-standard modeling procedures.

### Step 1: Characterize Existing Vibration Conditions

*Conduct measurements to survey and document the existing vibration conditions.*

In contrast to noise impact analysis, the existing ambient vibration is not required to assess vibration impact in most cases; but, it is important to

document general background vibration in the project corridor. Because the existing environmental vibration is usually below human perception, a limited vibration survey is sufficient even for a Detailed Vibration Analysis.

It is particularly valuable to survey vibration conditions at sensitive locations for the following reasons:

- To obtain valuable information on the true sensitivity of the activity to external vibration and obtain a reference condition under which vibration is not problematic.
- To document that existing vibration levels are above or below the normal threshold of human perception for the existing condition.
- To document levels of vibration created by existing rail lines. If vibration from an existing rail line is higher than the proposed train, there may not be impact even if the standard impact criteria are exceeded.
- To use existing vibration sources to characterize propagation. Existing vibration sources such as freight trains, industrial processes, quarrying operations, or normal traffic can be used to characterize vibration propagation. Carefully designed and performed measurements may eliminate the need for more complex propagation tests. See Appendix G for information on using non-standard modeling procedures.
- To identify the potential for efficient vibration propagation. If a measurement site has existing vibration approaching the range of human perception (e.g., the maximum vibration velocity levels are greater than about 65 VdB), then this site should be carefully evaluated for the possibility of efficient vibration propagation.

Conduct measurements to characterize existing vibration conditions. The goal of most ambient vibration measurements is to characterize the rms vertical vibration velocity level at the ground surface. In almost all cases, it is sufficient to measure only vertical vibration and ignore the transverse components of the vibration. Although transverse components[51] can transmit vibration energy into a building, the vertical component typically dominates.

**1a. Choose Measurement Locations** – Conduct outdoor and/or indoor measurements to characterize existing vibration conditions, as appropriate, for the project. Although ground-borne vibration is almost exclusively a problem inside buildings, it is generally recommended to perform measurements outdoors because equipment inside the building may cause more vibration than exterior sources. Additionally, the building structure and the resonances of the building can have strong effects on the vibration that are difficult to predict. It can also be important to measure and document those indoor sources of vibration. These indoor sources may cause vibration greater than that due to external sources like street traffic or aircraft overflights. When measuring (indoor) floor vibration, take measurements near the center of a floor span where the vibration amplitudes are the highest.

### 1b. Measurement Considerations

- **Site selection** – Selecting sites for an ambient vibration survey requires good judgment. Sites selected to characterize a transit corridor should be distributed along the entire project where potential for impacts have been identified and should be representative of the types of vibration environments found in the corridor. This would commonly include:
  - Measurements in quiet, residential areas removed from major traffic arterials to characterize low-ambient vibration areas;
  - Measurements along major traffic arterials and highways or freeways to characterize high-ambient vibration areas;
  - Measurements in any area with vibration-sensitive activities; and
  - Measurements at any major existing source of vibration such as railroad lines.

- **Transducer placement** – Place the transducers near the building setback line. For ambient measurements along railroad lines, it is recommended to include:
  - Multiple sites at several distances from the rail line at each site, and
  - 4 to 10 train passbys for each test.

  Because of the irregular schedule for freight trains and the low number of operations each day, it is often impractical to perform tests at more than two or three sites along the rail line or to measure more than two or three passbys at each site.

  Rail type and condition strongly affect the vibration levels. Consequently, it is important to inspect the track to locate any switches, bad rail joints, corrugations, or other factors that could be responsible for higher than normal vibration levels. Locations with these kinds of irregularities should be represented in addition to locations with rail in better condition.

- **Transducer mounting methods** – The way a transducer is mounted can affect the measured levels of ground-borne vibration.
  - Straightforward methods of mounting transducers on the ground surface or on pavement are adequate for vertical vibration measurements for the frequencies of concern for ground-borne vibration (less than about 200 Hz).
  - Quick-drying epoxy, clay, or beeswax can be used to mount transducers to smooth paved surfaces or metal stakes driven into the ground.
  - Rough concrete or rock surfaces require special mountings. One approach is to use a liberal base of epoxy to attach small aluminum blocks to the surface, and then mount the transducers on the aluminum blocks.
  - When in doubt, review the specific transducer documentation and discuss additional mounting guidance with the transducer manufacturer.

**1c. Existing Vibration Characterization** – The appropriate methods of characterizing ambient vibration are dependent on the type of information required for the analysis. Consider the following when characterizing the existing vibration:

- **Ambient vibration** – Ambient vibration is usually characterized with a continuous 10- to 30-minute measurement of vibration. The rms velocity level of the vibration velocity level over the measurement period provides an indication of the average vibration energy. The rms velocity level over the measurement period is typically equivalent to a long averaging time rms level.

- **Specific events** – Characterize specific events such as train passbys by the rms level over the time that the train passes by. If the locomotives produce vibration levels more than 5 dB higher than the passenger or freight cars, obtain a separate rms level for the locomotives. The locomotives can usually be characterized by the $L_{max}$ during the train passby. The rms averaging time or time constant should be 1 second when determining $L_{max}$. In some cases, it may be adequate to characterize the train passby using $L_{max}$, which is simpler to obtain than the rms averaged over the entire train passby.

- **Spectral analysis** – Perform a spectral analysis of vibration propagation data. For example, if vibration transmission of the ground is suspected of having particular frequency characteristics, use 1/3-octave band charts to describe vibration behavior. Narrowband spectra also can be valuable, particularly for identifying discrete frequency components and designing specific mitigation measures.

  Note that it is preferred to characterize existing vibration in terms of the rms velocity level instead of the peak PPV, which is commonly used to monitor construction vibration. As discussed in Section 5.1, rms velocity is considered more appropriate than PPV for describing human response to building vibration.

## Step 2: Estimate Vibration Impact

*Estimate ground-borne vibration and noise at sites where significant impact is probable and assess for impact.*

Predicting ground-borne vibration associated with a transportation project continues to be a developing field. Because ground-borne vibration is a complex phenomenon that is difficult to model and predict accurately, most projection procedures that have been used for transit projects rely on empirical data.

The procedure described in this section is based on site-specific tests of vibration propagation. This procedure was developed under a FTA-funded research contract[52] and is recommended for detailed evaluations of ground-borne vibration. Other approaches to a prediction procedure, such as finite element methods, can be used. See Appendix G for information on using non-standard modeling procedures.

**Overview of Prediction Procedure** – This procedure was developed to allow the use of data collected in one location to accurately predict vibration levels in another site where the geologic conditions may be completely different. The procedure is based on transfer mobility. Transfer mobility is the complex velocity response produced by a point force as a function of frequency. It represents the relationship between a vibration source that excites the ground and the resulting vibration of the ground surface. It is a function of both frequency and distance from the source. The analyses in this manual focus on transfer mobility magnitude, which is the magnitude for the velocity relative to the force without reference to phase. The transfer mobility level is the level in decibels relative to 1E-6 in/lb-s.

The transfer mobility measured at an existing transit system is used to normalize ground-borne vibration data and remove the effects of geology. The normalized vibration is referred to as the force density. Force density is the force per root distance along the track in $lb/ft^{1/2}$. The force density can be combined with transfer mobility measurements at vibration-sensitive sites along a new project to develop projections of future ground-borne vibration.

The transfer mobility between two points completely defines the composite vibration propagation characteristics between the two points. In most practical cases, receivers are close enough to the train tracks that the vibration cannot be considered as originating from a single point. Therefore, the vibration source must be modeled as a line-source. Consequently, the point transfer mobility must be modified to account for a line-source. The subsequent line-source transfer mobility is given in units of decibels relative to 1e-6 in/s/lb/sqrt(ft).

The prediction procedure considers ground-borne vibration to be divided into several basic components described below and shown in Figure 6-5.

- **Excitation Force (Force Density)** – The vibration energy is created by oscillatory and impulsive forces. Steel wheels rolling on smooth steel rails create random oscillatory forces. When a wheel encounters a discontinuity such as a rail joint, an impulsive force is created. The force excites the transit structure, such as the subway tunnel or the ballast for at-grade track.

  In the prediction method, the combination of the actual force generated at the wheel/rail interface and the vibration of the transit structure are usually combined into an equivalent force density level. The force density level is the level in decibels of the force density relative to 1 $lb/ft^{1/2}$ and describes the force that excites the soil/rock surrounding the transit structure.

- **Vibration Propagation (Transfer Mobility)** – The vibration of the transit structure causes vibration waves in the soil that propagate away from the transit structure. The vibration energy can propagate through the soil or rock in a variety of wave forms. All ground vibration includes shear and compression waves. Rayleigh waves [49] are also created and propagate along the ground surface. These Rayleigh waves can be a

major carrier of vibration energy. The mathematical modeling of vibration is complicated when there are soil strata with different elastic properties, which is common. As indicated in Figure 6-5, the propagation through the soil/rock is modeled using the transfer mobility, which is usually determined experimentally.

The combination of the force density level and the transfer mobility is used to predict the ground- surface vibration. This is the major difference from the General Vibration Assessment, which generalizes estimates of the ground-borne vibration.

- **Building Vibration** – When the ground vibration excites a building foundation, it sets the building into vibratory motion and vibration waves propagate throughout the building structure. The interaction between the ground and the foundation causes some reduction in vibration levels. The amount of reduction is dependent on the mass and stiffness of the foundation. The more massive the foundation, the lower the response to ground vibration. As the vibration waves propagate through the building, they can create vibration that can be felt and cause windows and household items to rattle.

- **Audible Noise** – In addition to vibration that can be felt, the vibration of room surfaces radiates low-frequency sound that may be audible. The sound level is affected by the amount of acoustical absorption in the receiver room.

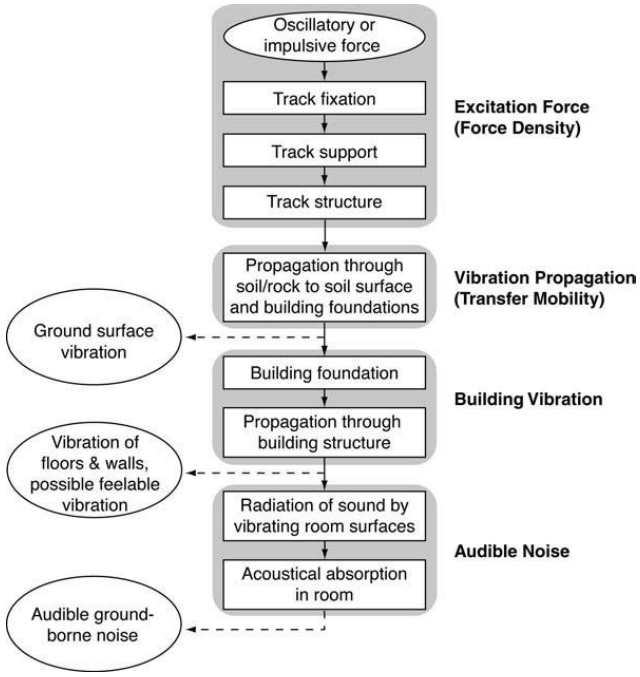


**Figure 6-5 Ground-Borne Vibration and Noise Model**

A fundamental assumption of the prediction approach outlined in this section is that the force density, transfer mobility, and the building coupling to the ground are all independent factors. The following equations are the basis for the

prediction procedure, where all of the quantities are one-third octave band spectral levels in decibels with consistent reference values:

$$L_v = FDL + LSTM + C_{build} \quad \textbf{Eq. 6-5}$$

$$L_A = L_v + K_{rad} + K_{A-wt} \quad \textbf{Eq. 6-6}$$

where:

$L_v$ = rms vibration velocity level in VdB
$FDL$ = force density level in dB for a line vibration source such as a train
$LSTM$ = line-source transfer mobility level in dB from the tracks to the sensitive site
$C_{build}$ = adjustments to account for ground-building foundation interaction and attenuation of vibration amplitudes as vibration propagates through buildings
$L_A$ = A-weighted sound level
$K_{rad}$ = adjustment to account for conversion from vibration to sound pressure level including accounting for the amount of acoustical absorption inside the room. A value of -5 dB can be used for $K_{rad}$ for typical residential rooms when the decibel reference value for $L_v$ is 1 micro in/sec [37][50]
$K_{A-wt}$ = A-weighting adjustment at the 1/3-octave band center frequency

All of the quantities given above are functions of frequency, and the standard approach is to develop projections on a 1/3-octave band basis using the average values for each 1/3-octave band. The end results of the analysis are the 1/3-octave band spectra of the ground-borne vibration and the ground-borne noise.

The spectra are then compared to the vibration criteria for the Detailed Vibration Analysis. The A-weighted ground-borne noise level can be calculated from the vibration spectrum and compared to the criteria. This more detailed approach differs from the General Vibration Assessment, where the overall vibration velocity level and A-weighted sound level are predicted without any consideration of the particular frequency characteristics of the propagation path.

The key steps in obtaining quantities for Eq. 6-5 and Eq. 6-6 are presented in the following steps and include:

**Step 2a.** Estimate force density
**Step 2b.** Measure the point-source transfer mobility
**Step 2c.** Estimate line-source transfer mobility
**Step 2d.** Project ground-borne vibration and ground-borne noise

**2a. Estimate Force Density** – The estimate of force density can be based on previous measurements or a special test program can be designed to measure the force density at an existing facility.

If no suitable measurements are available, conduct testing at a transit facility with equipment similar to the planned vehicles. Adjustments for factors such as train speed, track support system, and vehicle suspension may be needed to match the force density to the conditions at a specific site. Review the report

"State-of- the-Art Review: Prediction and Control of Ground-Borne Noise and Vibration from Rail Transit Trains" [41] for examples of appropriate adjustments.

Force density is not a quantity that can be measured directly; it must be inferred from measurements of transfer mobility and train vibration at the same site. To derive force density, the best results are achieved by deriving line-source transfer mobility from a line of impacts. The standard approach is to average the force density from measurements at three or more positions at one site. If feasible, it is recommended to take measurements at more than one site and at multiple speeds.

If no suitable measurements are available, see Steps 2b and 2c for guidelines on obtaining line-source transfer mobility.

The force density for each 1/3-octave band is as follows:

$$FDL = L_v - LSTM \qquad \textbf{Eq. 6-7}$$

where:

$FDL$ = force density level in dB
$L_v$ = measured train ground-borne vibration level in VdB
$LSTM$ = line-source transfer mobility level in dB

Figure 6-6 shows example trackbed force densities in decibels relative to 1 lb/(ft)$^{1/2}$. These force densities were developed from measurements of vibration from heavy and LRT vehicles and represent an incoherent line of vibration force equal to the length of transit trains. This figure provides a comparison of the vibration forces from heavy commuter trains and LRT vehicles with different types of primary suspensions, illustrating the range of vibration forces commonly experienced in a transit system. A force density of a vehicle includes the characteristics of its track support system at the measurement site. Adjustments must be applied to the force density to account for differences between the facility where the force density was measured and the new system being analyzed.

Figure 6-7 shows typical force densities for rail transit vehicles at 40 mph on ballast and tie tracks, which are approximately within the tolerances shown in Figure 6-6. The force densities should be applied very carefully for other track types and speeds. The embedded tracks, although considerably stiffer than ballast and tie tracks, are expected to show similar force density levels.[53] The curves in Figure 6-7 should also be applied with caution for newer generations of light rail vehicles as well as vehicles that utilize direct fixation tracks. The preferred approach for vibration predictions would be to perform force density measurements at a system with vehicles and operations that are similar to those of the future project.

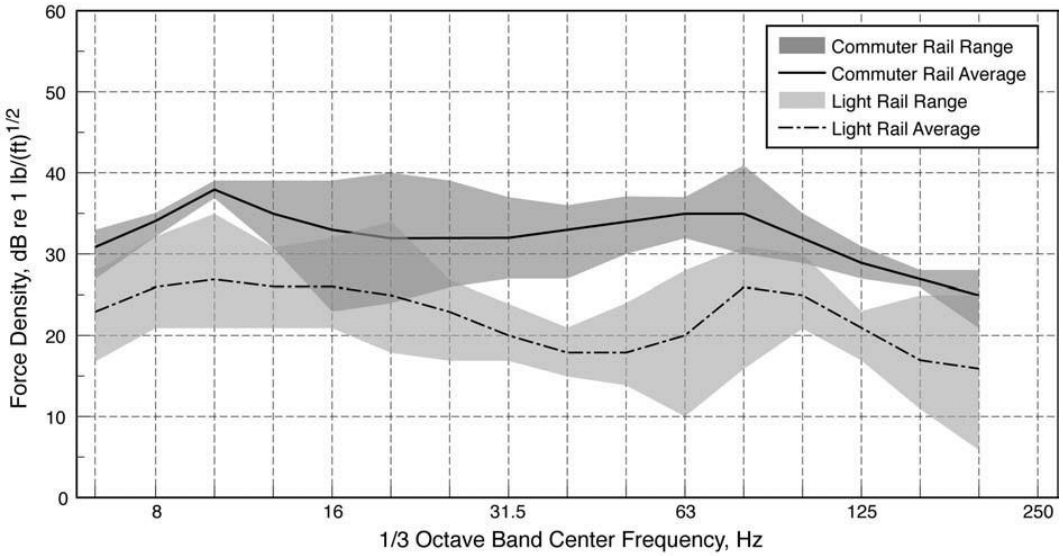


**Figure 6-6 Typical Force Densities for Rail Transit Vehicles, 40 mph**

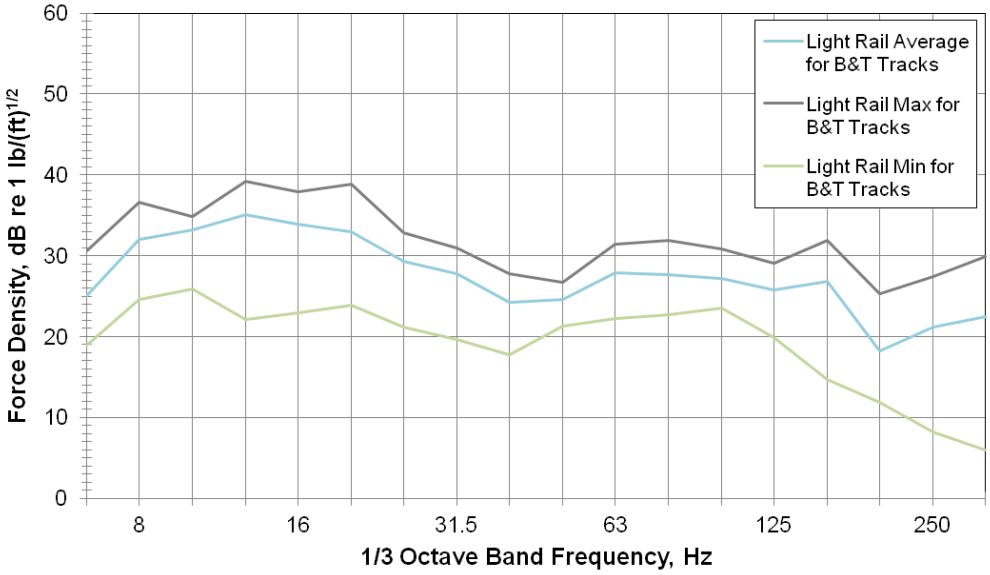


**Figure 6-7 Typical Force Densities for LRT Vehicles, 40 mph**

**2b. Measure Point-Source Transfer Mobility** – Using the appropriate instrumentation, measure point-source transfer mobility for sources with short lengths, such as buses or single car vehicles or columns supporting elevated structures. For longer vehicles, see Section 2c for a discussion of measuring line-source transfer mobilities.

The test procedure to measure point-source transfer mobility consists of impacting the ground by dropping a heavy weight and measuring the force into the ground and the response at several distances from the impact. Other excitation sources may include swept sine, sine-dwell, random vibration, and maximum length sequence. The goal of the test is to create vibration pulses that

travel from the source to the receiver using the same path that will be taken by the transit system vibration.

Figure 6-8 illustrates the field procedure for measuring both at-grade and subway testing of transfer mobility. A weight is dropped from a height of 3 to 4 ft onto a force transducer. The responses of the force and vibration transducers are recorded on a multichannel recorder for later analysis in the laboratory. An alternative approach is to set up the analysis equipment in the field and capture the signals directly. This complicates the field testing, but eliminates the laboratory analysis of recorded data.

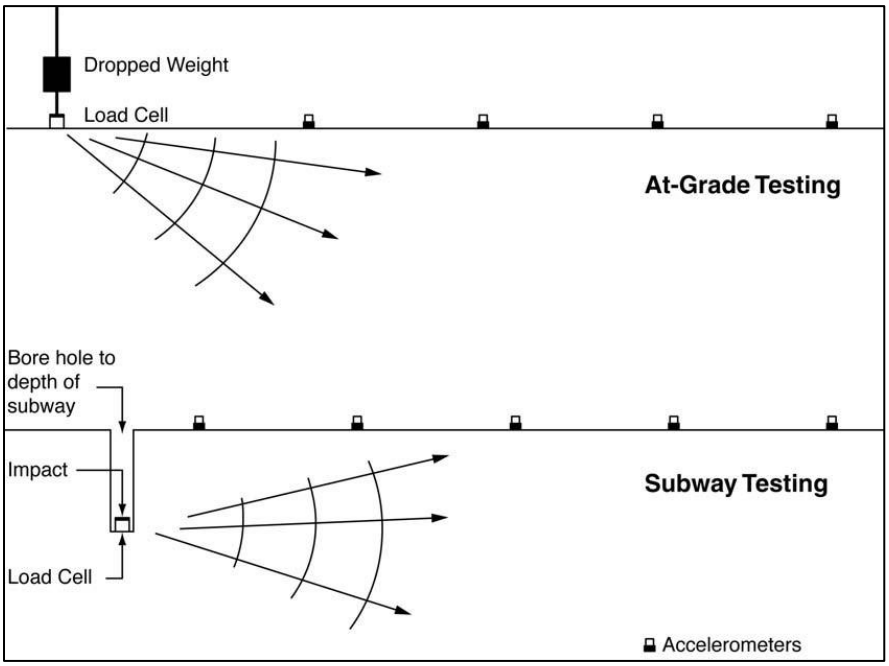


**Figure 6-8 Test Configuration for Measuring Transfer Mobility**

When the procedure is applied to subways, the force must be located at the approximate depth of the subway. This is done by drilling a bore hole and locating the force transducer at the bottom of the hole. The tests are usually performed while the bore holes are drilled to allow for the use of the soil-sampling equipment on the drill rig for the transfer mobility testing. The force transducer is attached to the bottom of the drill string and lowered to the bottom of the hole. A standard soil sampling hammer is used to excite the ground; typically, a 140-pound weight is dropped 18 inches onto a collar that is attached to the drill string. The force transducer must be capable of operating under water if the water table is near the surface or a slurry drilling process is used.

Standard signal-processing techniques are used to determine the transfer function (frequency response function) between the exciting force and the resultant ground-borne vibration. Numerical regression methods are used to combine a number of two-point transfer functions into a smooth point-source transfer mobility level that represents the average vibration propagation characteristics of a site as a function of both distance from the source and

frequency. The transfer mobility level is usually expressed in terms of a group of 1/3-octave band transfer mobility levels. Figure 6-9 is an example of point-source transfer mobility levels from a series of tests at the Transportation Technology Center in Pueblo, Colorado.[50][54][55][56][57]

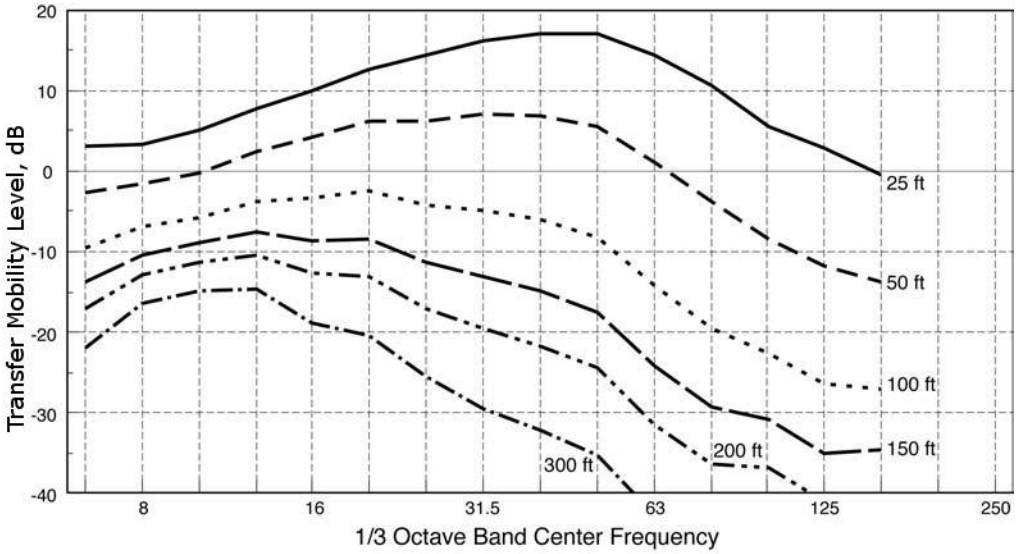


**Figure 6-9 Example of Point-Source Transfer Mobility**

## Instrumentation

Performing a transfer mobility test requires specialized equipment, which is generally available from commercial sources. Typical instrumentation for field-testing and laboratory analysis of transfer mobility is shown in Figure 6-10.

A load cell can be used as the force transducer. The force transducer should be capable of impact loads of 5,000 to 50,000 pounds depending on the hammer used for the impact. For borehole testing, the load cell must be hermetically sealed and capable of being used at the bottom of a 30- to 100-foot-deep hole partially filled with water.

Either accelerometers or geophones can be used as the vibration transducers. Geophones should be carefully mounted so that they are vertical. The requirement is that the transducers with the associated amplifiers be capable of accurately measuring levels of 0.0001 in/sec at 40 Hz and have a flat frequency response from 6 Hz to 400 Hz. Data should be acquired with a digital acquisition system with a flat frequency response over the range of 6 to 400 Hz.

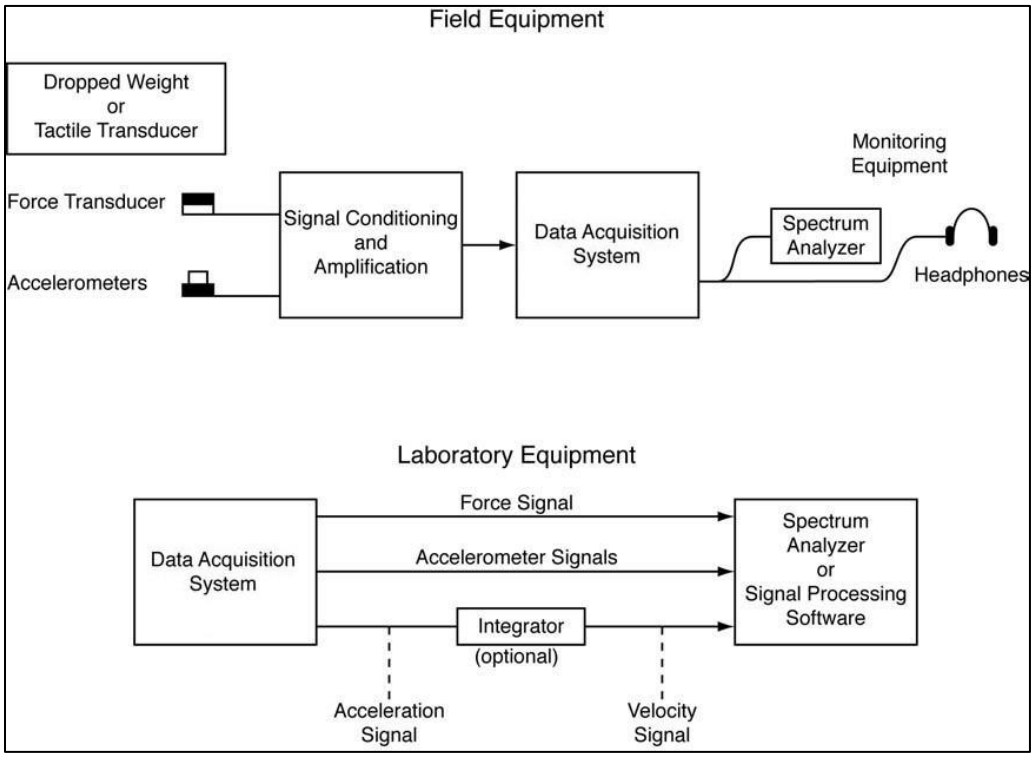


**Figure 6-10 Equipment Required for Field Testing and Laboratory Analysis**

A narrowband spectrum analyzer or signal-processing software can be used to calculate the transfer function and coherence between the force and vibration data. The analyzer must be capable of capturing impulses from at least two channels to calculate the frequency spectrum of the transfer function between the force and vibration channels. All transfer functions should include the average of at least 20 impulses. Time averaging of the impulses will provide substantial signal enhancement, which is usually required to accurately characterize the transfer function. Signal enhancement is particularly important when the vibration transducer is more than 100 ft from the impact.

Alternative methods of determining transfer mobility may be used, provided that these techniques have been demonstrated to provide the same results as the conventional weight-drop method over the frequency range of 6 Hz to 400 Hz. See Appendix G for information on developing and using non-standard procedures. These methods may include using other impulse-response measurement systems involving the use of shakers or electro-mechanical actuators, stimuli such as sweeps or maximum length sequences (MLS), and various signal processing techniques. A forthcoming ANSI Standard will describe in detail the procedures, methodologies, and reporting requirements for performing ground-borne vibration propagation measurements.

The transfer function can be calculated with either a spectrum analyzer or signal-processing software. Note that transfer functions should include the average of at least 20 impulses. Specialized multi-channel spectrum analyzers have built-in capabilities for computing transfer functions and are computationally efficient. However, signal-processing software can offer more

flexibility in analyzing data signals and allows the use of different digital signal processing methods. Typical measurement programs involve acquisition of data in the field and later processing of the information in a laboratory. However, recent advances in instrumentation and signal-processing software allow data to be collected and analyzed while in the field.

**2c. Estimate Line-Source Transfer Mobility** – Estimate line-source transfer mobility for long sources such as multi-car trains. Line-source transfer mobilities are used to normalize measured vibration velocity levels from train passbys and to obtain force density. Two different approaches can be used to develop estimates of line-source transfer mobility. The first consists of using lines of transducers and the second consists of a line of impact positions.

**Option A: Lines of Transducers** – Develop line-source transfer mobility curves from tests using one or more lines of transducers as shown in Figure 6-11 and described below.

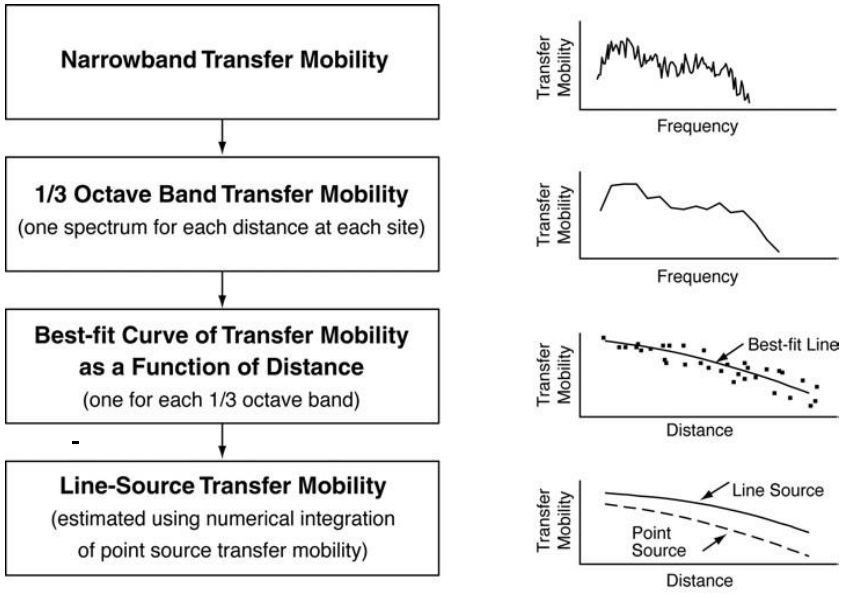


**Figure 6-11 Analysis of Transfer Mobility**

**Ai.** Obtain the narrowband transfer function between source and receiver at each measurement position. There should be a minimum of four distances in any test line. Because of the possibility of local variations in propagation characteristics, two or more lines should be used to characterize a site if possible. A total of 10 to 20 transducer positions are often used to characterize a site.

**Aii.** Calculate the equivalent 1/3-octave band transfer functions, generally between 6 and 400 Hz. This reduces each spectrum to 15 numbers. As shown in Figure 6-11, the 1/3-octave band spectrum is much smoother than the narrowband spectrum.

**Aiii.** Calculate a best-fit curve of transfer mobility as a function of distance for each 1/3-octave band. When analyzing a specific site, the best-fit curve will be

based on 10 to 20 points. Up to several hundred points could be used to determine average best-fit curves for a number of sites.

**Aiv.** Apply the best-fit curve to the vibration sources. The 1/3-octave band best-fit curves can be directly applied to point vibration sources. Buses can usually be considered point-sources, as can columns supporting elevated structures. However, for a line vibration source such as a train, numerical integration must be used to calculate the equivalent line-source transfer mobility. The numerical integration procedures are detailed in the TRB publication: "A Prediction Procedure for Rail Transportation Ground-Borne Noise and Vibration."(50)

**Option B: Line of Impulses** – This second procedure for estimating line-source transfer mobility is best for detailed assessment of specific vibration paths or specific buildings and is a more direct approach.

**Bi.** Measure multiple point-source transfer mobilities according to the procedures in Step 2b above. The vibration transducers are placed at specific points of interest and a line of impacts is used. For example, a 150-foot train might be represented by a line of 11 impact positions along the track centerline at 15-foot intervals (Figure 6-12).

**Bii.** Sum the point-source results using Simpson's rule[xiii] for numerical integration to calculate the line-source transfer mobility.

Figure 6-13 shows an example of line-source transfer mobilities that were derived from the point-source transfer mobilities shown in Figure 6-9.

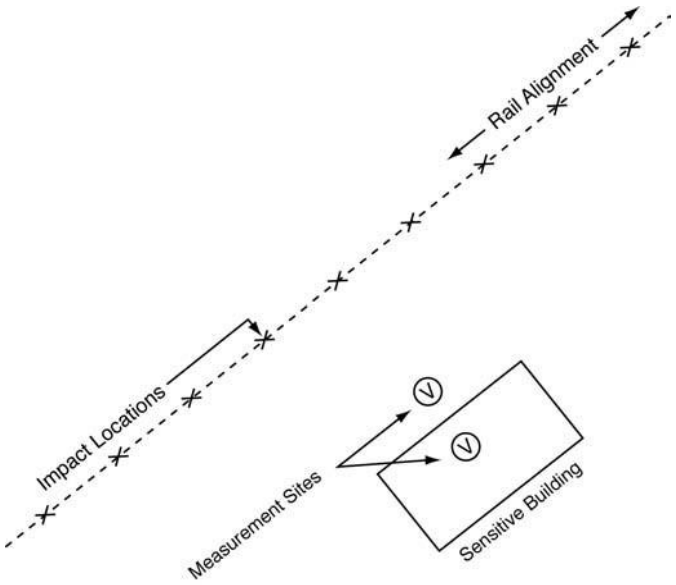


**Figure 6-12 Schematic of Transfer Mobility Measurements Using a Line of Impacts**

[xiii] Simpson's rule is a method for approximating integrals.

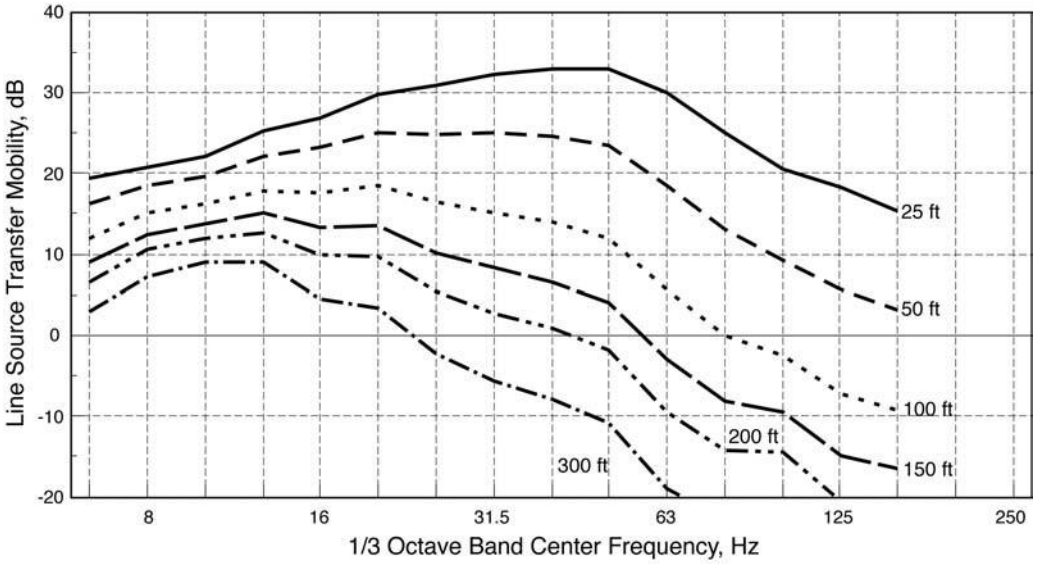


**Figure 6-13 Example of Line-source Transfer Mobility**

**2d. Project Ground-Borne Vibration and Noise** – Combine force density and line-source transfer mobility to project ground-borne vibration. Then, apply adjustment factors to estimate the building response to the ground-borne vibration and to estimate the A-weighted sound level inside buildings.

The propagation of vibration from the building foundation to the receiver room is very complex and dependent on the specific design of the building. Detailed evaluation of the vibration propagation would require extensive use of numerical procedures such as the finite element method. Such a detailed evaluation is generally not practical for individual buildings considered in this manual. If the detailed features of the individual buildings are available, the recommended procedure is to estimate the propagation of vibration through a building and the radiation of sound by vibrating building surfaces using simple empirical or theoretical models. The recommended procedures are outlined in the Handbook of Urban Rail Noise and Vibration Control.[44] The approach consists of adding the following adjustments to the 1/3-octave band spectrum of the projected ground-borne vibration:

- **Building response or coupling loss** – This adjustment represents the change in the incident ground-borne vibration due to the presence of the building foundation. The adjustments described in the handbook [44] are shown in Figure 6-14. Note that the correction is zero when estimating basement floor vibration or vibration of at-grade slabs. Measured values may be used in place of these generic adjustments.

- **Transmission through the building** – The vibration amplitude typically decreases as the vibration energy propagates from the foundation through the remainder of the building. The general assumption is that vibration attenuates by 1 to 2 dB for each floor.

- **Floor resonances** – Vibration amplitudes will be amplified because of resonances of the floor/ceiling systems. For a typical wood-frame

residential structure, the fundamental resonance is usually in the 15 to 20 Hz range. Reinforced-concrete slab floors in modern buildings will have fundamental resonance frequencies in the 20 to 30 Hz range. An amplification resulting in a gain of approximately 6 dB should be used in the frequency range of the fundamental resonance.

- **Floor vibration and ground-borne noise** – The projected floor vibration is used to estimate the levels of ground-borne noise. The primary factors affecting noise level are the average vibration level of the room surfaces and the amount of acoustical absorption within the room. The radiation adjustment is -5 dB for typical rooms, [37] [50] which gives:

$$L_A \approx L_V + K_{A-wt} - 5 \qquad \textbf{Eq. 6-8}$$

where:

$L_A$ = A-weighted sound level in a 1/3-octave band
$L_v$ = rms vibration velocity level in that band
$K_{A-wt}$ = A-weighting adjustment at the 1/3-octave band center frequency

The A-weighted levels in the 1/3-octave bands are combined to produce the overall A-weighted sound level.

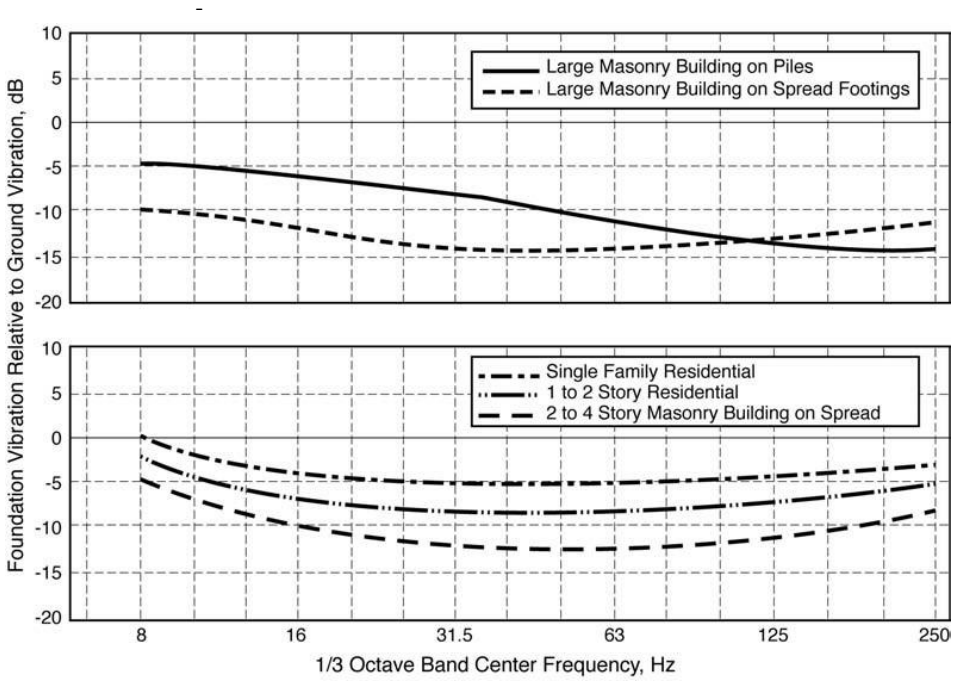


**Figure 6-14 Foundation Response for Various Types of Buildings**

Where detailed information on the structural features of individual buildings are unavailable and there are no site-specific data on outdoor to indoor propagation characteristics, the preferred approach is to apply a combined factor for the foundation response and the gain from floor resonances. Empirical data based on the TCRP D-12 Project from 34 measurement sites across 5 cities in North

America and other studies suggest that the average change in vibration from outdoor to indoor was 0 dB across all 1/3-octave bands with a standard deviation of approximately 5 to 6 dB in the 31.5 to 63 Hz frequency.[43][48] Therefore, the recommended approach for predicting indoor vibration based on outdoor data is to use an adjustment of +3 to +6 dB for light-weight, wood-frame construction and use an adjustment of 0 dB for heavier buildings.

However, for buildings with high-vibration sensitivity or where there is concern regarding interference with vibration-sensitive equipment, it is advisable to measure the outdoor-indoor response of the building, using the process described in Section 2b or 2c, to determine the actual response of the foundation and building to vibration.

## Step 3: Assess Vibration Impact

*Take inventory of vibration-sensitive land uses with impact.*

Assess vibration impact at each receiver of interest using the impact criteria in Section 6.3. Note that ground-borne vibration and noise levels that exceeded criteria in the General Vibration Assessment may not cause impact according to the more detailed procedures of the Detailed Vibration Analysis; in which case, mitigation is not required. But if projected levels still exceed the criteria, evaluate vibration mitigation measures using the spectra provided by the Detailed Vibration Analysis.

## Step 4: Determine Vibration Mitigation Measures

*Select practical vibration control measures that will be effective at the dominant vibration frequencies and compatible with the given transit structure and track support system.*

The purpose of vibration mitigation is to minimize the adverse effects that the project ground-borne vibration and ground-borne noise will have on sensitive land uses. Because ground-borne vibration is not as common a problem as environmental noise, the mitigation approaches have not been as well defined. In some cases it may be necessary to develop innovative approaches to control the impact. See Appendix G for information on using non-standard methods.

Standard vibration control measures for rail transit systems are discussed in this step. Note that vibration control measures for rail transit systems are not always effective for freight trains.[xiv] Bus systems rarely cause vibration impact, but if impact occurs, roadway roughness or unevenness caused by bumps, pot holes, expansion joints, or driveway transitions are usually the causes. Smoothing the roadway surface is typically the recommended course of action.[xv]

[xiv] The heavy axle loads associated with freight rail are outside the range of applicable design parameters for vibration reduction on lighter rail transit systems. Plans to relocate existing railroad tracks closer to vibration-sensitive sites in order to accommodate a new rail transit line in the ROW must be carefully considered because it may not be possible to mitigate the increased vibration impact from freight trains.

[xv] In cases where a rubber-tired system runs inside a building, such as an airport people mover, vibration control may involve additional measures. Loading and unloading of guideway support beams may generate dynamic forces that transmit into the building structure. Special guideway support systems may be required, similar to the discussion below regarding floating slabs.

Vibration reduction measures incur additional costs to a system. Some of the same treatments for noise mitigation can be considered for vibration mitigation. Costs for noise control measures are documented in a report from the Transit Cooperative Research Program (TCRP).[31] Where applicable to vibration reduction, costs for noise abatement methods from that report are given in the following sections. These costs reflect the noise mitigation costs as of 1997 (unless otherwise noted), and should only be used as representative estimates when considering noise mitigation options. Current noise mitigation costs should be researched before decisions on noise mitigation options are finalized, and then they should be documented according to Section 8.

Mitigation of vibration impacts may involve treatments at the source, along the source-to-receiver propagation path, or at the receiver.

**1a. Evaluate Source Treatments** – The most effective vibration mitigation treatments are applied at the vibration source. This is the preferred approach to mitigation when possible. Possible source treatments include:

- **Preventative Maintenance** – Effective maintenance programs are essential for controlling ground-borne vibration. Key vibration points are discussed below; see Section 4.5, Step 7 for more detailed information on the benefits of effective maintenance programs on controlling transit noise and vibration. While these are not mitigation measures in the traditional sense, and should not be included as mitigation in an environmental document, they can help to keep both noise and vibration levels at a "like-new" level or reduce both in systems with deferred maintenance.

  - **Rail grinding** is a particularly important practice for vibration mitigation for rail that develops corrugations. The TCRP report notes that periodic rail grinding results in a net savings per year on wheel and rail wear. Most transit systems contract out rail grinding, although some of the larger systems make the investment and do their own grinding. As mentioned in Section 4.5, Step 7, the typical rail grinding cost would be $1000 to $7000 per grinding pass mile, with an additional investment of approximately $1 million for the equipment for a larger transit system to do its own grinding.

  - **Dramatic vibration reduction** results can be achieved by removing wheel flats through **wheel truing**. As mentioned in Section 4.5, Step 7, a wheel truing machine costs approximately $1 million, including associated maintenance, materials, and labor costs. The TCRP report figures a system with 700 vehicles would incur a yearly cost of $300,000 to $400,000 for a wheel truing program.

  - **Profile grinding of the rail head** in combination with a wheel truing program may be the most practical approach to controlling and reducing vibration and noise where such practices are not normally conducted. Profiles should be defined during the design phase and should be in place when system opens.[32] The cost of

wheel and rail profile matching may be incorporated in the new vehicle and new rail costs.

Rough wheels or rails can increase vibration levels by as much as 20 dB in extreme cases, negating the effects of even the most effective vibration control measures. Yet, it is rare that vibration control measures (such as those discussed below) will provide more than 15 to 20 dB attenuation. When there are ground-borne vibration impacts with existing transit equipment, the best vibration control measure often is to implement new or improved maintenance procedures. Grinding rough or corrugated rail and wheel truing to eliminate wheel flats and restore the wheel contour may provide considerable vibration reduction. Regular maintenance may replace the need to modify the existing track system, such as through adding floating slabs.

- **Planning and Design of Special Trackwork** – A large percentage of the vibration impact from a new transit facility is often caused by wheel impacts at special trackwork for turnouts and crossovers. When feasible, the most effective vibration control measure is to relocate the special trackwork to a less vibration-sensitive area. This may require adjusting the location by several hundred feet provided it will not have an adverse impact on the operation plan for the system. Careful review of crossover and turnout locations during the project development phase is an important step to minimizing potential for vibration impact.

  Another approach is to use special devices (frogs) at turnouts and crossovers that incorporate mechanisms to close the gaps between running rails. Frogs with spring-loaded mechanisms and frogs with movable points can substantially reduce vibration levels near crossovers. According to the TCRP report, a spring frog costs about $12,000, twice the cost of a standard frog. A movable point frog involves elaborate signal and control circuitry resulting in higher costs at approximately $200,000.

- **Vehicle Specifications** – The ideal rail vehicle with respect to minimizing ground-borne vibration should have the following characteristics:
  - Low, unsprung weight
  - Soft primary suspension
  - A minimum of metal-to-metal contact between moving parts of the truck
  - Smooth wheels that are perfectly round

  A limit for the vertical resonance frequency of the primary suspension should be included in the specifications for any new vehicle. A vertical resonance frequency of 12 Hz or less is sufficient to control the levels of ground-borne vibration, although some have recommended the vertical resonance frequency be less than 8 Hz.

- **Special Track Support Systems** – When the vibration assessment indicates that vibration levels will be excessive, the track support system is typically modified to reduce the vibration levels.

  Floating slabs, resiliently supported ties, high-resilience fasteners, and ballast mats can be used to reduce the levels of ground-borne vibration. To be effective, all of these measures must be optimized for the frequency spectrum of the vibration. Most of these relatively standard procedures have been successfully used on several subway projects.

  Applications on at-grade and elevated track are less common. This is because vibration impact is less common for at-grade and elevated track. Note that the cost of these types of vibration control measures is a higher percentage of the overall construction costs for at-grade and elevated track, and exposure to the elements can require substantial design modifications.

  Each major vibration control measure for track support is discussed below. Costs for these treatments are not covered by the TCRP report, but are given as estimates based on transit agency experience.

  - **Resilient fasteners** – Resilient fasteners are used to fasten the rail to concrete track slabs. Standard resilient fasteners are very stiff in the vertical direction, usually in the range of 200,000 lb/in, and do provide some vibration reduction compared to the rigid fastening systems used on older systems (e.g., wood half-ties embedded in concrete).

    Special fasteners with vertical stiffness in the range of 30,000 lb/in may reduce vibration by as much as 5 to 10 dB at frequencies above 30 to 40 Hz. These premium fasteners vary in cost and can be priced competitively when purchased in large quantities.

  - **Ballast mats** – A ballast mat consists of a rubber or other type of elastomer pad that is placed under the ballast. In general, the mat must be placed on a concrete pad to be effective. They will not be as effective if placed directly on the soil or the sub-ballast. Consequently, most ballast mat applications are in subway or elevated structures.

    Ballast mats can provide 8 to 12 dB attenuation at frequencies above 25 to 30 Hz.[58] Ballast mats are often a good retrofit measure for existing tie-and-ballast track where there is vibration impact. Installed ballast mats cost approximately $180 per track-foot.

  - **Undertie pads** – Undertie pads (resiliently supported concrete ties) consist of a rubber pad mounted on the bottom of a concrete tie directly on the ballast. The pads provide vibration isolation at frequencies above 25 Hz and are easy to

install or retrofit. Installed undertie pads cost approximately $260 per track-foot.

- **Resiliently supported ties** – The resiliently supported tie system consists of concrete ties supported by rubber pads resting on top of a slab track or subway invert. The rails are fastened directly to the concrete ties using standard rail clips. Resiliently supported ties provide vibration reduction in between 15 to 40 Hz, which is particularly appropriate for transit systems with vibration impact in the 20 to 30 Hz range. A resiliently supported tie system costs approximately $400 per track-foot.

- **Floating slabs** – Floating slabs can be very effective at controlling ground-borne vibration and noise and consist of a concrete slab supported on resilient elements such as rubber or a similar elastomer. Floating slabs are effective at frequencies greater than their single-degree-of-freedom vertical resonance frequency.

  Floating slabs are among the most expensive vibration control treatments. A typical double-tie floating slab system costs approximately 4 times the cost of ballast and tie per track foot. Examples of floating slabs include:
  - Floating slabs used in Washington, DC; Atlanta, GA; and Boston, MA, were all designed to have a vertical resonance in the 14 to 17 Hz range.
  - A special system referred to as the double-tie system was first used in Toronto. It consists of 5-foot-long slabs with four or more rubber pads under each slab. This system was designed with a resonance frequency in the 12 to 16 Hz rang3.
  - Another special floating slab was used in San Francisco's Bay Area Rapid Transit (BART) system. It uses a discontinuous precast concrete double-tie system with a resonance frequency in the 5 to 10 Hz frequency range.

- **Tire-derived aggregate (TDA)** – TDA (shredded tires) consists of a layer of tire shreds wrapped in geotech fabric placed underneath the ballast on hard packed ground. This is a new, low-cost option that can provide reduction in vibration levels at frequencies above 25 Hz. This mitigation measure has proven to be effective for the Denver Regional Transportation District (RTD) light rail system as well as the Santa Clara Valley Transportation Authority (VTA) light rail system,[59] but the effective life of TDA has not been determined. Installed TDA costs approximately $260 per track-foot.

- **Other treatments** – Changing any feature of the track support system can change the levels of ground-borne vibration. Approaches

such as using heavier rail, thicker ballast, or heavier ties can be expected to reduce the vibration levels. There also is some indication that vibration levels are lower with wood ties compared to concrete ties. But there is little confirmation that any of these approaches will make a substantial change in the vibration levels.

- **Operational Changes** – The most effective operational change is to reduce the vehicle speed. Reducing the train speed by a factor of two will reduce vibration levels approximately 6 dB. Other operational changes include:
  - Use of equipment that generates the lowest vibration levels during the nighttime hours when people are most sensitive to vibration and noise.
  - Adjusting nighttime schedules to minimize movements in the most sensitive hours.

While there are tangible mitigation benefits from speed reductions and limits on operations during the most sensitive time periods, FTA does not generally accept speed reduction as a vibration mitigation measure for two important reasons: (1) speed reduction is unenforceable and negated if vehicle operators do not adhere to established policies, and (2) it is contrary to the purpose of the transit investment by FTA, which is to move as many people as possible as efficiently and safely as possible. FTA does not recommend limits on operations as a way to reduce vibration impacts.

**1b. Evaluate Path Treatments** – When vibration mitigation treatments cannot be applied at the vibration source or additional mitigation is required after treating the source, the next preferred placement of vibration mitigation is along the vibration propagation path between the source and receiver. Possible path treatments include:

- **Trenches** – Use of trenches to control ground-borne vibration is analogous to controlling airborne noise with noise barriers. This approach has not received much attention in the United States, but trenches could be a practical method for controlling transit vibration from at-grade track. A rule-of-thumb given by Richert and Hall[60] is that if the trench is located close to the source, the trench bottom must be at least 0.6 times the Rayleigh wavelength below the vibration source. For most soils, Rayleigh waves travel at around 600 ft/sec, which means that the wavelength at 30 Hz is 20 ft, requiring that a trench be approximately 15 ft deep to be effective at 30 Hz.

  A trench can be effective as a vibration barrier if it is either open or solid. The Toronto Transit Commission tested a trench filled with Styrofoam to keep it open and reported successful performance over a period of at least one year. Solid barriers can be constructed with sheet piling or concrete poured into a trench.

- **Buffer Zones** – Expanding the rail ROW can be the most economical method of reducing the vibration impact by simply increasing the distance between the source and receiver. A similar approach is to

negotiate a vibration easement from the affected property owners (e.g., a row of single-family homes adjacent to a proposed commuter rail line). There may be legal limitations, however, on the ability of funding agencies to acquire land strictly for the purpose of mitigating vibration (or noise) impact.

**1c. Evaluate Receiver Treatments** – When vibration mitigation treatments cannot be applied at the source or along the propagation path, or if combinations of treatments are required, treatments to the receivers can be considered as described below.

- **Building Modifications** – In some circumstances, it is practical to modify the affected building to reduce the vibration level. Vibration isolation of buildings consists of supporting the building foundation on elastomer pads, similar to bridge bearing pads. Vibration isolation of buildings is seldom an option for existing buildings and is typically only possible for new construction. Vibration impacts on sensitive laboratory instruments, such as electron microscopes, may be controlled with vibration isolation tables.

  This approach is particularly important for shared-use facilities such as an office space above a transit station or terminal. When vibration-sensitive equipment such as electron microscopes will be affected by transit vibration, specific modifications to the building structure may be the most cost-effective method of controlling the impact aside from modification of equipment mounting systems. For example, the floor upon which the vibration-sensitive equipment is located could be stiffened and isolated from the remainder of the building to reduce the vibration. Alternatively, the equipment mounting systems could be modified or the equipment could be relocated to a different building at far less cost.

SECTION 7

# Noise and Vibration during Construction

Construction noise and vibration often generates complaints from the community, even when construction is for a limited timeframe. Public concerns about construction noise and vibration increase considerably with lengthy periods of heavy construction on major projects as well as prevalence of nighttime construction (often scheduled to avoid disrupting workday road and rail traffic). Noise and vibration complaints typically arise from interference with people's activities, especially when the adjacent community has no clear understanding of the extent or duration of the construction. Misunderstandings can arise when the community thinks a contractor is being insensitive, and the contractor believes it is performing the work in compliance with local ordinances. This situation underscores the need for early identification and assessment of potential problem areas.

This section outlines the procedures for assessing noise and vibration impacts during construction. The type of assessment (qualitative or quantitative) and the level of analysis are determined based on the scale of the project and surrounding land uses. In cases where a full quantitative assessment is not warranted, a qualitative assessment of the construction noise and vibration environment can lead to greater understanding and tolerance in the community. For major projects with extended periods of construction at specific locations, a quantitative assessment can aid contractors in making bids by allowing changes in construction approach and including mitigation costs before the construction plans are finalized.

Generally, local noise ordinances are not very useful for evaluating construction noise impact. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land uses. While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.

Procedures for assessing construction noise are presented in Section 7.1. Procedures for assessing construction vibration are presented in Section 7.2.

## 7.1 Construction Noise Assessment

Noise impacts from construction may vary greatly depending on the duration and complexity of the project. The key elements of the Construction Noise Assessment procedure and recommended workflow are as follows.

**Step 1:** Determine Level of Construction Noise Assessment

**Step 2:** Use a Qualitative Construction Noise Assessment to Estimate Construction Noise

**Step 3:** Use a Quantitative Construction Noise Assessment to Estimate Construction Noise

**Step 4:** Assess Construction Noise Impact

**Step 5:** Determine Construction Noise Mitigation Measures

If there is uncertainty in how to determine the appropriate level of assessment, contact the FTA Regional office.

## Step 1: Determine Level of Construction Noise Assessment

*Determine the appropriate level of assessment based on the scale and type of the project and depending on the stage of environmental review.*

Consider the following factors:

- Scale of the project
- Proximity of noise-sensitive sites to the construction zones
- Number of noise-sensitive receivers in the project area
- Duration of construction activities near noise-sensitive receivers
- Schedule, including the construction days, hours, and time periods
- Method (e.g., cut-and-cover vs. bored tunneling)
- Concern about construction noise expressed in comments by the general public (e.g., through scoping or public meetings)

**1a. Determine if an assessment is required** – Construction Noise Assessments are not required for many small projects including:

- Installation of safety features like grade-crossing signals;
- Track improvements within the ROW; or
- Erecting small buildings and facilities which are similar in scale to the surrounding development.

For small projects like these, include descriptions in the environmental document of the length of construction, the loudest equipment to be used, the expected truck access routes, the avoidance of nighttime activity, and any other relevant planned construction method.

### 1b. Determine whether a qualitative or quantitative assessment is required

- **Qualitative Construction Noise Assessment** – Qualitative Construction Noise Assessments may be required for projects with less than a month of construction time in a noise-sensitive area. See Step 2 for more information on Qualitative Construction Noise Assessments.

- **Quantitative Construction Noise Assessments** – Quantitative Construction Noise Assessments may be required for projects with a month or more of construction in noise-sensitive areas or if particularly noisy equipment will be involved. See Step 3 for more information on Quantitative Construction Noise Assessments.

## Step 2: Use a Qualitative Construction Noise Assessment to Estimate Construction Noise

*Use a qualitative construction noise assessment to estimate construction noise for appropriate projects per Section 7.1, Step 1b.*

Provide qualitative descriptions in the environmental document of the following elements:

- Duration of construction (both overall and at specific locations)
- Equipment expected to be used (e.g., noisiest equipment)
- Schedule with limits on times of operation (e.g., daytime use only)
- Monitoring of noise
- Forum for communicating with the public
- Commitments to limit noise levels to certain levels, including any local ordinances that apply
- Consideration of application of noise control treatments used successfully in other projects

Effective community outreach and relations are important for these projects. Disseminate information to the public early regarding the kinds of construction equipment, expected noise levels, and durations to forewarn potentially affected neighbors about the temporary inconvenience. Including a general description of the variation of noise levels during a typical construction day may also be helpful.

Note that the construction criteria in Step 4 do not apply to qualitative assessments.

## Step 3: Use a Quantitative Construction Noise Assessment to Estimate Construction Noise

*Use a quantitative construction noise assessment to estimate construction noise for appropriate projects per Section 7.1, Step 1b.*

For Quantitative Construction Noise Assessments, follow the recommended procedure in this step and include a description of the planned construction methods and any basic measures that have been identified to reduce the potential impact, such as prohibiting the noisiest construction activities during the nighttime, in the environmental document. It may be prudent, however, to defer final decisions on noise control measures until the project and construction plans are defined in greater detail during the engineering phase.

- **Noise Source Levels from Typical Construction Equipment and Operations** – The noise levels generated by construction

equipment vary greatly on factors such as the type of equipment, the equipment model, the operation being performed, and the condition of the equipment. Typically, the dominant source of noise from most construction equipment is the engine, often a diesel engine, which usually does not have sufficient muffling. In other cases, such as impact pile-driving or pavement-breaking, noise generated by the process dominates. Construction equipment can be considered to operate in the following two modes for Construction Noise Assessments:

- **Stationary** – Stationary equipment operates in one location for one or more days at a time, with either a fixed power operation (pumps, generators, compressors) or a variable noise operation (pile drivers, pavement breakers).
- **Mobile** – Mobile equipment moves around the construction site with power applied in cyclic fashion (bulldozers, loaders), or to and from the site (trucks). Movement around the site is considered in the construction noise prediction procedure.

Variation in power imposes additional complexity in characterizing the noise source level from mobile equipment. Describe the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the $L_{eq(t)}$ of the operation.

Typical noise levels from representative equipment are included in Table 7-1. The levels are based on an EPA Report,[61] measured data from railroad construction equipment taken during the 1976 Northeast Corridor Improvement Project, the FHWA Roadway Construction Noise Model, and other measured data.

For equipment that is not represented in Table 7-1, measure the noise levels according to the standard procedures for measuring the exterior noise levels for the certification of mobile and stationary construction equipment by the Society of Automotive Engineers.[62][63]

**Table 7-1 Construction Equipment Noise Emission Levels**

| Equipment | Typical Noise Level 50 ft from Source, dBA |
|---|---|
| Air Compressor | 80 |
| Backhoe | 80 |
| Ballast Equalizer | 82 |
| Ballast Tamper | 83 |
| Compactor | 82 |
| Concrete Mixer | 85 |
| Concrete Pump | 82 |
| Concrete Vibrator | 76 |
| Crane, Derrick | 88 |
| Crane, Mobile | 83 |
| Dozer | 85 |
| Generator | 82 |
| Grader | 85 |
| Impact Wrench | 85 |
| Jack Hammer | 88 |
| Loader | 80 |
| Paver | 85 |
| Pile-driver (Impact) | 101 |
| Pile-driver (Sonic) | 95 |
| Pneumatic Tool | 85 |
| Pump | 77 |
| Rail Saw | 90 |
| Rock Drill | 95 |
| Roller | 85 |
| Saw | 76 |
| Scarifier | 83 |
| Scraper | 85 |
| Shovel | 82 |
| Spike Driver | 77 |
| Tie Cutter | 84 |
| Tie Handler | 80 |
| Tie Inserter | 85 |
| Truck | 84 |

**3a.** Use the metric $L_{eq(t)}$ to assess construction noise. This unit is appropriate because $L_{eq(t)}$ can be used to describe:

- Noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period
- Noise level during an entire phase
- Average noise over all phases of the construction

**3b.** Use Eq. 7-1 to predict construction noise impact for major transit projects, considering the noise generated by the equipment and noise propagation due to distance. Calculate $L_{eq.equip}$ for all equipment individually, then use decibel addition to sum the $L_{Aeq.equip}$ for all equipment operating during the same time period. See Appendix B.1.1 for information on decibel addition.

$$L_{eq.equip} = L_{emission} + 10\log(Adj_{Usage}) - 20\log(\frac{D}{50}) - 10G\log(\frac{D}{50}) \quad \textbf{Eq. 7-1}$$

where:

$L_{eq,equip}$ = $L_{eq(t)}$ at a receiver from the operation of a single piece of equipment over a specified time period, dBA

$L_{emission}$ = noise emission level of the particular piece of equipment at the reference distance of 50 ft, dBA

$Adj_{Usage}$ = usage factor to account for the fraction of time that the equipment is in use over the specified time period

$D$ = distance from the receiver to the piece of equipment, ft

$G$ = a constant that accounts for topography and ground effects

Determine the quantities for Eq. 7-1 based on the level of assessment as described below.

- A general assessment of construction noise is warranted for projects in an early assessment stage when the equipment roster and schedule are undefined and only a rough estimate of construction noise levels is practical.
- A detailed analysis of construction noise is warranted when many noise-sensitive sites are adjacent to a construction project or where contractors are faced with stringent local ordinances or heightened public concerns expressed in early outreach efforts.

Complete the appropriate assessment for each phase of construction. Major construction projects are accomplished in several different phases. Each phase has a specific equipment mix, depending on the work to be accomplished during that phase. As a result of the equipment mix, each phase has its own noise characteristics; some phases have higher continuous noise levels than others, and some have higher impact noise levels than others.

**Option A: General Assessment** – Determine the quantities for Eq. 7-1 based on the following assumptions for a General Assessment of each phase of construction.

- **Noise emission level ($L_{emission}$)** – Determine the emission level at 50 ft according to noise from typical construction equipment described above and Table 7-1.

- **Usage factor ($Adj_{Usage}$)** – Assume a usage factor of 1. This assumes a time period of one-hour with full power operation. Most construction equipment operates continuously for periods of one-hour or more during the construction period.

  Therefore, 10log($Adj_{usage}$) = 0 and can be omitted from the equation.

- **Distance (D)** – Assume that all equipment operates at the center of the project, or centerline for guideway or highway construction project.

- **Ground effect (G)** – G = 0 assuming free-field conditions and ignoring ground effects. If ground effects are of specific importance to the assessment, consider using the Detailed Analysis procedure.

Only determine the $L_{eq.equip}$ for the two noisiest pieces of equipment expected to be used in each phase of construction. Then, sum the levels for each phase of construction using decibel addition.

**Option B: Detailed Analysis –** Determine the quantities for Eq. 7-1 based on the following assumptions for a Detailed Analysis of each phase of construction. Alternatively, for detailed, long-term, and complex construction projects or projects near a particularly sensitive site, the FHWA's Windows-based screening tool, "Roadway Construction Noise Model (RCNM)," can be used for the prediction of construction noise.(64)

- **Noise emission level ($L_{emission}$)** – Measure or certify the noise emission level for each piece of equipment.

- **Usage factor ($Adj_{Usage}$)** – Long-term construction project noise impact is based on a 30-day average $L_{dn}$, the times of day of construction activity (nighttime noise is penalized by 10 dB in residential areas), and the percentage of time the equipment is used during a period of time that will affect $Adj_{Usage}$.

  For example, an 8-hour $L_{eq(t)}$ is determined by making $Adj_{Usage}$ the percentage of time each individual piece of equipment operates under full power in that period. Similarly, the 30-day average $L_{dn}$ is determined from the $Adj_{Usage}$ expressed by the percentage of time the equipment is used during the daytime hours (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.), separately, over a 30-day period. To account for increased sensitivity to nighttime noise, the nighttime noise levels are adjusted by 10 dB in the $L_{dn}$ computation (see Appendix B.1.4.5).

- **Distance (D)** – Determine the location of each piece of equipment during operation and the distance to each receiver.

- **Ground effect (G)** – Use Table 4-26 in Section 4.5, Step 3 to calculate G to account for the site topography, natural and man-made barriers, and ground effects.

  Compute the 8-hour $L_{eq(t)}$ ( $L_{eq.equip(8hr)}$) and the 30-day average $L_{dn}$ ($L_{dn.equip(30day)}$) for all equipment expected to be used in each phase of construction separately. Then, sum the levels for each phase of construction using Eq. 4-56 and Eq. 4-57 in Table 4-32.

## Step 4: Assess Construction Noise Impact

*Compare the predicted noise levels from the Quantitative Construction Noise Assessment with impact criteria to assess impact from construction noise for each phase of construction.*

No standardized criteria have been developed for assessing construction noise impact. Consequently, criteria must be developed on a project-specific basis unless local ordinances apply. As stated earlier in this section, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.

The construction impact guidelines are presented based on the level of quantitative assessment.

**Option A: General Assessment** – Compare the combined $L_{eq.equip(1hr)}$ for the two noisiest pieces of equipment for each phase of construction determined in Section 7.1, Step 3 to the criteria below. Then, identify locations where the level exceeds the criteria.

**Table 7-2 General Assessment Construction Noise Criteria**

| Land Use | $L_{eq.equip(1hr)}$, dBA | |
|---|---|---|
| | Day | Night |
| Residential | 90 | 80 |
| Commercial | 100 | 100 |
| Industrial | 100 | 100 |

**Option B: Detailed Analysis** – Compare the combined $L_{eq.equip(1hr)}$ and the combined $L_{dn.equip(30day)}$ for all equipment for each phase of construction determined in Section 7.1, Step 3 to the criteria below. Then, identify locations where the level exceeds the criteria.

**Table 7-3 Detailed Analysis Construction Noise Criteria**

| Land Use | $L_{eq.equip(8hr)}$, dBA | | $L_{dn.equip(30day)}$, dBA |
|---|---|---|---|
| | Day | Night | 30-day Average |
| Residential | 80 | 70 | 75 |
| Commercial | 85 | 85 | 80* |
| Industrial | 90 | 90 | 85* |

*Use a 24-hour $L_{eq(24hr)}$ instead of $L_{dn.equip(30day)}$.

## Step 5: Determine Construction Noise Mitigation Measures

*Evaluate the need for mitigation and select appropriate mitigation measures.*

Where potential impacts have been identified according to Section 7.1, Step 4, evaluate appropriate control measures. Include descriptions of how each affected location will be treated with one or more mitigation measures in the environmental document.

**5a.** Determine the appropriate approach for construction noise control. Categories of approaches include:

- **Design considerations and project layout**
  - Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.
  - Re-route truck traffic away from residential streets. Select streets with the fewest homes if no alternatives are available.
  - Site equipment on the construction lot as far away from noise-sensitive sites as possible.
  - Construct walled enclosures around especially noisy activities or clusters of noisy equipment. For example, shields can be used around pavement breakers, and loaded vinyl curtains can be draped under elevated structures.

- **Sequence of operations**
  - Combine noisy operations to occur in the same time period. The total noise level produced will not be substantially greater than the level produced if the operations were performed separately.
  - Avoid nighttime activities. Sensitivity to noise increases during the nighttime hours in residential neighborhoods.

- **Alternative construction methods**
  - Avoid impact pile-driving where possible in noise-sensitive areas. Drilled piles or the use of a sonic/vibratory pile driver or push pile driver are quieter alternatives where the geological conditions permit their use.
  - Use specially-quieted equipment, such as quieted and enclosed air compressors and properly-working mufflers on all engines.
  - Select quieter demolition methods. For example, sawing bridge decks into sections that can be loaded onto trucks results in lower cumulative noise levels than impact demolition by pavement breakers.

Include descriptions of how each impacted location will be treated with one or more mitigation measures in the environmental impact assessment when possible.

**5b.** Describe and commit to a mitigation plan that will be developed later when the information is available to make final decisions (not often available during the project development phase) on all specific mitigation measures. This may be the case for large, complex projects. The objective of the plan should be to minimize construction noise using all reasonable (e.g., cost vs. benefit) and feasible (e.g., possible to construct) means available.

Components of a mitigation plan may include some or all of the following provisions, which should also be specified in construction contracts:

- **Equipment noise emission limits** – Equipment noise limits are absolute noise limits applied to generic classes of equipment at a reference distance (typically 50 ft). The limits should be set no higher than what is reasonably achievable for well-maintained equipment with effective mufflers. Lower limits that require source noise control may be appropriate for certain equipment when needed to minimize community noise impact, if reasonable and feasible. Provisions could also be included to require equipment noise certification testing prior to use on-site.

- **Lot-line construction noise limits** – Lot-line construction noise limits are noise limits that apply at the lot-line of specific noise-sensitive properties. The limits are typically specified in terms of both noise exposure (usually $L_{eq(t)}$ over a 20-30-minute period) and maximum noise level. They should be based on local noise ordinances if applicable, as well as pre-construction baseline noise levels (usually 3 to 5 dB above the baseline).

- **Operational and/or equipment restrictions** – It may be necessary to prohibit or restrict certain construction equipment and activities near residential areas during nighttime hours. This is particularly true for activities that generate tonal, impulsive, or repetitive sounds, such as back-up alarms, hoe ram demolition, and pile-driving.

- **Noise abatement requirements** – In some cases, specifications may be provided for particular noise control treatments based on the results of the design analysis and/or prior commitments made to the public by civic authorities. An example would be the requirement for a temporary noise barrier to shield a particular community area from noisy construction activities.

- **Noise monitoring plan requirements** – Plans can be developed for pre-project noise monitoring to establish baseline noise levels at sensitive locations, as well as for periodic equipment and lot-line noise monitoring during the construction period. The plan should outline the measurement and reporting methods that will be used to demonstrate compliance with the project noise limits.

- **Noise control plan requirements** – For major construction projects, preparation and submission of noise control plans on a periodic basis (e.g., every six months) are generally required. These plans should predict the construction noise at noise-sensitive receiver locations based on the proposed construction equipment and methods. If the analysis predicts that the specified noise limits will be exceeded, the plan should specify the mitigation measures that will be applied and should demonstrate the expected noise reductions these measures will achieve. The objective of this proactive approach is to minimize the

likelihood of community noise complaints by ensuring that any necessary mitigation measures are included in the construction plans.

- **Compliance enforcement program** – If construction noise is an issue in the community, it is important that a program be implemented to monitor contractor compliance with the noise control specifications and mitigation plan. It is recommended that this function be performed by a construction management team on behalf of the public agency.

- **Public information and complaint response procedures** – To maintain positive community relations, it is recommended to keep the public informed about the construction plans and efforts to minimize noise, and procedures should be established for prompt response and corrective action to noise complaints during construction.

Most of these provisions are appropriate for large-scale projects, where construction activity will continue for many months, if not years. The linked references contain more information on construction noise for major transportation projects.[60][65]

## 7.2 Construction Vibration Assessment

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings founded on the soil near the construction site respond to these vibrations with varying results, ranging from no perceptible effects at the lowest levels, low rumbling sounds and perceptible vibrations at moderate levels, and slight damage at the highest levels.

While ground vibrations from construction activities do not often reach the levels that can damage structures, fragile buildings must receive special consideration. The construction vibration criteria include consideration of the building condition.

The key elements of the Construction Vibration Assessment procedures and recommended workflow are as follows:

**Step 1:** Determine level of construction vibration assessment

**Step 2:** Use a qualitative construction vibration assessment

**Step 3:** Use a quantitative construction vibration assessment

**Step 4:** Assess construction vibration impact

**Step 5:** Determine construction vibration mitigation measures

## Step 1: Determine Level of Construction Vibration Assessment

*Determine the appropriate level of assessment based on the scale and type of the project and the stage of environmental review.*

**1a. Determine if an assessment is required.**
Construction Vibration Assessments are not required for many small projects including:

- Installation of safety features like grade-crossing signals
- Track improvements within the ROW
- Erecting small buildings and facilities, which are similar in scale to the surrounding development

**1b. Determine whether a qualitative or quantitative assessment is required.**

- **Qualitative Construction Vibration Assessment** – A qualitative construction vibration assessment is appropriate for projects where prolonged annoyance or damage from construction vibration is not expected. For example, equipment that generates little or no ground vibration—such as air compressors, light trucks, and hydraulic loaders—only require qualitative descriptions. See Section 7.2, Step 2 for more information on qualitative construction vibration assessments.

- **Quantitative Construction Vibration Assessment** – A quantitative construction vibration analysis is appropriate for projects where construction vibration may result in building damage or prolonged annoyance. For example, activities such as blasting, pile-driving, vibratory compaction, demolition, and drilling or excavation near sensitive structures require a quantitative analysis. See Section 7.2, Step 3 for more information on quantitative construction vibration assessments.

If there is uncertainty in how to determine the appropriate level of assessment, contact the FTA Regional office.

## Step 2: Use a Qualitative Construction Vibration Assessment

*Use a qualitative construction vibration assessment to estimate vibration for appropriate projects per Section 7.2, Step 1b.*

Provide qualitative descriptions in the environmental document of the following elements:

- Duration of construction (both overall and at specific locations)
- Equipment expected to be used
- Description of how ground-borne vibration will be maintained at an acceptable level

Note that the criteria in Section 7.2, Step 4 do not apply to qualitative assessments.

## Step 3: Use a Quantitative Construction Vibration Assessment

*Use a quantitative construction vibration assessment to estimate vibration for appropriate projects per Section 7.2, Step 1b.*

For quantitative construction vibration assessments, follow the recommended procedure in this step. Vibration source levels from typical construction equipment and operations are provided below, and procedures on how to estimate construction vibration for damage and annoyance are provided in Steps 3a and 3b, respectively.

- **Vibration Source Levels from Construction Equipment** – Table 7-4 presents average source levels in terms of velocity for various types of construction equipment measured under a wide variety of construction activities. The approximate rms vibration velocity levels were calculated from the PPV limits using a crest factor of 4, representing a PPV-rms difference of 12 dB. Note that although the table gives one level for each piece of equipment, there is considerable variation in reported ground vibration levels from construction activities. The data in Table 7-4 provide a reasonable estimate for a wide range of soil conditions.[66][67][68][69]

**Table 7-4 Vibration Source Levels for Construction Equipment**

| Equipment | | PPV at 25 ft, in/sec | Approximate Lv* at 25 ft |
|---|---|---|---|
| Pile Driver (impact) | upper range | 1.518 | 112 |
| | typical | 0.644 | 104 |
| Pile Driver (sonic) | upper range | 0.734 | 105 |
| | typical | 0.17 | 93 |
| Clam shovel drop (slurry wall) | | 0.202 | 94 |
| Hydromill (slurry wall) | in soil | 0.008 | 66 |
| | in rock | 0.017 | 75 |
| Vibratory Roller | | 0.21 | 94 |
| Hoe Ram | | 0.089 | 87 |
| Large bulldozer | | 0.089 | 87 |
| Caisson drilling | | 0.089 | 87 |
| Loaded trucks | | 0.076 | 86 |
| Jackhammer | | 0.035 | 79 |
| Small bulldozer | | 0.003 | 58 |

* RMS velocity in decibels, VdB re 1 micro-in/sec

### 3a. Damage Assessment

Assess for building damage for each piece of equipment individually. Construction vibration is generally assessed in terms of peak particle velocity (PPV), as described in Section 5.1.

- Determine the vibration source level ($PPV_{ref}$) for each piece of equipment at a reference distance of 25 ft as described above and in Table 7-4.
- Use Eq. 7-2 to apply the propagation adjustment to the source reference level to account for the distance from the equipment to the receiver. Note that the equation is based on point sources with normal propagation conditions.

$$PPV_{equip} = PPV_{ref} \times (\frac{25}{D})^{1.5} \quad \textbf{Eq. 7-2}$$

where:

$PPV_{equip}$ = the peak particle velocity of the equipment adjusted for distance, in/sec
$PPV_{ref}$ = the source reference vibration level at 25 ft, in/sec
$D$ = distance from the equipment to the receiver, ft

**3b. Annoyance Assessment**

Assess for annoyance for each piece of equipment individually. Ground-borne vibration related to human annoyance is related to rms velocity levels, expressed in VdB as described in Section 5.1.

Estimate the vibration level ($L_v$) using Eq. 7-3.

$$L_{v.distance} = L_{vref} - 30log(\frac{D}{25}) \quad \textbf{Eq. 7-3}$$

where:

$L_{v.distance}$ = the rms velocity level adjusted for distance, VdB
$L_{vref}$ = the source reference vibration level at 25 ft, VdB
$D$ = distance from the equipment to the receiver, ft

## Step 4: Assess Construction Vibration Impact

*Compare the predicted vibration levels from the Quantitative Construction Vibration Assessment with impact criteria to assess impact from construction vibration.*

Assess potential damage effects from construction vibration for each piece of equipment individually. Note that equipment operating at the same time could increase vibration levels substantially, but predicting any increase could be difficult. The criteria presented in this section should be used during the environmental impact assessment phase to identify problem locations that must be addressed during the engineering phase.

Compare the PPV and approximate $L_v$ for each piece of equipment determined in Section 7.2, Step 3 to the vibration damage criteria in Table 7-5, which is presented by building/structural category, to assess impact.[70][71] The approximate rms vibration velocity levels were calculated from the PPV limits using a crest factor of 4.

**Table 7-5 Construction Vibration Damage Criteria**

| Building/ Structural Category | PPV, in/sec | Approximate $L_v$* |
|---|---|---|
| I. Reinforced-concrete, steel or timber (no plaster) | 0.5 | 102 |
| II. Engineered concrete and masonry (no plaster) | 0.3 | 98 |
| III. Non-engineered timber and masonry buildings | 0.2 | 94 |
| IV. Buildings extremely susceptible to vibration damage | 0.12 | 90 |

*RMS velocity in decibels, VdB re 1 micro-in/sec

Compare the $L_v$ determined in Section 7.2, Step 3 to the criteria for the General Vibration Assessment in Section 6.2 to assess annoyance or interference with vibration-sensitive activities due to construction vibration.

## Step 5: Determine Construction Vibration Mitigation Measures

*Evaluate the need for mitigation and select appropriate mitigation measures where potential human impacts or building damage from construction vibration have been identified according to Section 7.2, Step 4.*

**5a.** Determine the appropriate approach for construction vibration mitigation considering equipment location and processes.

- **Design considerations and project layout**
  - Route heavily-loaded trucks away from residential streets. Select streets with the fewest homes if no alternatives are available.
  - Operate earth-moving equipment on the construction lot as far away from vibration-sensitive sites as possible.

- **Sequence of operations**
  - Phase demolition, earth-moving, and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration level produced could be substantially less when each vibration source operates separately.
  - Avoid nighttime activities. Sensitivity to vibration increases during the nighttime hours in residential neighborhoods.

- **Alternative construction methods**
  - Carefully consider the use of impact pile-driving versus drilled piles or the use of a sonic/vibratory pile driver or push pile driver where those processes might create lower vibration levels if geological conditions permit their use.
    - Pile-driving is one of the greatest sources of vibration associated with equipment used during construction of a project. The source levels in Table 7-4 indicate that sonic pile drivers may provide substantial reduction of vibration levels compared to impact pile drivers. But, there are some additional vibration effects of sonic pile drivers that may limit their use in sensitive locations.
    - A sonic pile driver operates by continuously shaking the pile at a fixed frequency, literally vibrating it into the ground. Continuous operation at a fixed frequency may, however, be more

noticeable to nearby residents, even at lower vibration levels. Furthermore, the steady-state excitation of the ground may induce a growth in the resonant response of building components. Resonant response may be unacceptable in cases of fragile buildings or vibration-sensitive manufacturing processes. Impact pile drivers, however, produce a high vibration level for a short time (0.2 seconds) with sufficient time between impacts to allow any resonant response to decay.

- Select demolition methods involving little to no impact, where possible. For example, sawing bridge decks into sections that can be loaded onto trucks results in lower vibration levels than impact demolition by pavement breakers. Milling generates lower vibration levels than excavation using clam shell or chisel drops.
- Avoid vibratory rollers and packers near sensitive areas.

**5b.** Describe and commit to a mitigation plan that will be developed and implemented during the engineering and construction phase when the information available during the project development phase will not be sufficient to define specific construction vibration mitigation measures. The objective of the plan should be to minimize construction vibration damage using all reasonable and feasible means available. The plan should include the following components:

- A procedure for establishing threshold and limiting vibration values for potentially affected structures, based on an assessment of each structure's ability to withstand the loads and displacements due to construction vibrations
- A commitment to develop a vibration monitoring plan during the engineering phase and to implement a compliance monitoring program during construction

SECTION 8

# Documentation of Noise and Vibration Assessment

The level of required documentation is determined according to the project class of action. Section 2.1 covers the appropriate class of action (EIS, EA, or CE) for different projects. If there is uncertainty in the appropriate level of documentation, contact the FTA Regional office.

The noise and vibration analysis must be articulated to the public in a clear, comprehensive manner for all levels of documentation. The technical data and information necessary to withstand scrutiny in the environmental review process must be documented in a way that remains intelligible to the public. Justification for all assumptions used in the analysis, such as selection of representative measurement sites and all baseline conditions, must be presented for review.

A separate technical report or memorandum is often prepared as a supplement to the environmental document. A technical report is appropriate in cases when including the data from the assessment would create an unreasonably long environmental document. The details of the analysis are important for establishing the basis for the assessment. Therefore, all details in the technical report should be contained in a well-organized format for easy access to the information.

For large-scale projects, the environmental document should contain a summary of the essential analysis information to provide subject matter context and the analysis findings. For these projects, separate technical reports are usually prepared as supplements to the EIS or EA and referred to in the environmental document. For smaller projects, or projects with minimal noise or vibration impact, all of the technical information may be presented in the environmental document itself or in a technical memorandum. Other projects might have no potential for noise or vibration impacts. For those projects, that environmental documentation should explain that no noise or vibration impacts are expected.

This section provides guidance on presenting the necessary noise and vibration information in the environmental document (Section 8.1) and the associated technical report (Section 8.2).

## 8.1 Environmental Document

In the environmental document, provide a summary of the comprehensive noise and vibration information from the technical report and emphasize the salient points of the analysis in a format and style that the public can understand. Smaller projects may have all of the technical information contained within the environmental document, so take special care in summarizing the technical details to convey the information adequately.

## Step 1: Choose the Information to Include

*Choose the appropriate noise and vibration analysis information to include based on the level of environmental review and the associated documentation.*

**1a. Provide full disclosure of noise and vibration impacts** in the environmental document, including identification of locations where impacts cannot be mitigated below the severe impact level. In general, an EIS describes significant impacts and plans to mitigate the impacts. For EAs, completion of the environmental review with a finding of no significant impact (FONSI) may depend on mitigation being considered for incorporation in the proposed project. The way mitigation is presented in the environmental document depends on the type of impact (noise or vibration) and the stage of project development and environmental review. Projects that meet the criteria of a CE may also require the completion of a noise and/or vibration analysis, and the results of such an analysis should be documented in a noise memo or the CE documentation.

**1b. Document noise impacts** – Typically, airborne noise impacts can be accurately predicted during the environmental review. For projects that focus on a single alternative, noise impacts can be accurately identified in the draft environmental document. If mitigation is anticipated, then mitigation options should be explored in the EA or draft EIS; firm decisions on mitigation can be deferred to the final document. But for all projects, decisions on noise mitigation should be made before the final document is approved.

**1c. Document vibration impacts** – Predicting vibration impacts accurately is more complex because ground-borne vibration may be strongly influenced by subsurface conditions. The geotechnical studies that reveal these conditions are normally undertaken during the engineering phase, after the environmental review process is complete. Therefore, the final environmental document will usually not be able to state with certainty whether mitigation is needed for ground-borne vibration and noise.

If the engineering phase is conducted at the same time as the final environmental document, report the results of the Detailed Vibration Analysis in the final environmental document. If the engineering phase is conducted after the final environmental document, report the results of the General Vibration Assessment in the final environmental document. If impact is determined, include a commitment in the final document to conduct a Detailed Vibration Analysis during the engineering phase to complete the impact assessment. Also, include a discussion on various control measures that could be used and the likelihood that the criteria could be met through the use of one or more of the measures. It may be possible to state a commitment in the final environmental document to adhere to the impact criteria for the Detailed Vibration Analysis, while deferring the selection of specific vibration control measures until the completion of detailed studies in the engineering phase. When work is conducted after FTA signs its final decision document (i.e., ROD, combined FEIS/ROD, or FONSI), additional documentation, such as a reevaluation of the previous decision, may be necessary. FTA recommends contacting the FTA Regional office directly in these situations.

**1d. Describe mitigation measures in the decision document** – After the decision document is approved, incorporate the mitigation measures by reference in the actual grant agreements signed by FTA and the project sponsor. The mitigation measures then become contractual conditions that must be adhered to by the project sponsor.

It is typically appropriate to include the following noise and vibration information in the environmental document, as described in Section 8.1:

- The existing conditions (affected environment)
- The direct impacts from operation (environmental consequences)
- The construction impacts (environmental consequences)

## Step 2: Organize information in the Environmental Document

*Include information in the following sections of the environmental document separating out the noise and vibration information.*

**2a. Existing Conditions (Affected Environment)** – Describe the existing conditions (conditions without the project) in terms of the existing noise and vibration conditions in this section of the document. The primary function of this section is to establish the focus and baseline conditions for the discussion of environmental impacts. Include the following basic information and separate the noise and vibration sections.

- **Description of noise/vibration metrics, effects and typical levels** – Include a targeted summary of relevant information from Section 3 of this manual. This will serve as background for the discussions of noise/vibration levels and characteristics that will follow in later sections. Provide illustrative material to convey typical levels to the public.

- **Inventory of noise/vibration-sensitive sites** – Describe the approach for identifying noise- and vibration-sensitive sites as well as the identified sites and site descriptions. Use sufficient detail to demonstrate completeness. Document these results on a map.

- **Noise/vibration measurements** – Document the basis for selecting measurement sites, including tables of sites coordinated with maps showing locations of sites. Summarize the measurement approach and include the justification for the measurement procedures used.

  Present measurement data in well-organized tables and figures with a summary and interpretation of measured data. Measurements are often included in the table of measurement sites described in the previous paragraph. In some cases, measurements may be supplemented or replaced by collected data relevant to the noise and vibration characteristics of the area. For example, soil information for estimating ground-borne vibration propagation characteristics may be available from other projects in the area.

A summary and interpretation of how the collected data define the project setting is fundamental to this section.

**2b. Direct Impacts** – Include the following in the discussion on direct impacts due to project operation:

- **Overview of approach** – Provide a targeted summary of relevant information on the assessment procedure for determining noise/vibration impacts as a framework for the following sections.

- **Estimated noise/vibration levels** – Provide a general description of prediction models used to estimate project noise/vibration levels. Describe any distinguishing features unique to the project, such as source levels associated with various technologies.

  Describe the results of the predictions in general terms first, followed by a detailed accounting of predicted noise levels. Supplement this information with tables and illustrate by contours, cross-sections, or shaded mapping. If contours are included in a technical report, it is not necessary to repeat them in this section.

- **Criteria for noise/vibration impact** – Describe the impact criteria for the project in detail and reference the appropriate section in this manual. Include tables listing the criteria levels or the figures included in this manual.

- **Noise/vibration impact assessment** – Present the impact assessment in its own section or combined with the section above.

  Describe the locations, as identified in the screening procedure, where noise/vibration impact is expected to occur without implementation of mitigation measures, based on the screening results, predicted future levels, existing levels, and application of the impact criteria.

  Include inventory tables of impacted noise- and vibration-sensitive sites to quantify the impacts for all noise/vibration-sensitive sites included in the Affected Environment (Existing Conditions) as described in the Existing Conditions section above.

- **Noise/vibration mitigation measures** – Perhaps the greatest difference between the technical report and the environmental document is with mitigation. The technical report discusses mitigation options and recommendations, while the environmental document provides the vehicle for reaching decisions on appropriate mitigation measures.

  Begin this section with a summary of the noise/vibration mitigation measures considered for the impacted locations. Describe the specific measures selected for implementation in detail. Also, include any

applicable, specific noise or vibration policies the project sponsor may have in place.

In cases where it is not possible to commit to a specific mitigation measure in the final environmental document, it may be possible to commit to a certain noise/vibration level. For example, the environmental document could include a commitment to meet or exceed the impact criteria specified in Sections 4.1 and 6.2.

- **Unavoidable adverse environmental effects** – If it is projected that adverse noise/vibration impacts will result after all reasonable abatement measures have been incorporated, identify these impacts in this section.

**2c. Construction Impacts** – Discuss construction impacts in the environmental document's section on construction impacts, if present. If, because of the scale of the project, the environmental document does not have a separate construction impacts section, then the construction impacts should be discussed with the rest of the resource impacts.

When a special section on construction noise/vibration impacts is included in the document, it should be organized according to the comprehensive outline on long-term impacts described above. For projects with relatively minor effects, include a brief summary of impact.

## 8.2 Technical Report on Noise and Vibration

The technical report is intended to present complete technical data and descriptions in a manner that can be understood by the general public, but is more technical than the information found in the environmental document. All necessary background information should be present in the technical report, including tables, maps, charts, drawings, and references that may be too detailed for the environmental document, but which are important in helping to draw conclusions about the project's noise and vibration impacts and mitigation options.

Include the following major subject headings and key information described below. If both noise and vibration have been assessed, include separate sections for noise and vibration with subsections for key information as described below. Additional details on documentation requirements for the technical report of non-standard procedures and methodologies are included in Appendix G.

- **Overview** – Include a brief description of the project and an overview of the noise/vibration concerns to highlight initial considerations in framing the scope of the study.

- **Inventory of Noise/Vibration-Sensitive Sites** – Describe the approach for identifying noise- and vibration-sensitive sites as well as the identified sites and site descriptions. Use sufficient detail to demonstrate completeness. Document results on a map.

- **Measurements of Existing Noise/Vibration Conditions**
  - Document the basis for selecting measurement sites, including tables of sites coordinated with maps showing locations of sites. Summarize the measurement approach with justification for the measurement procedures used.
  - If the measurement data are used to estimate existing conditions at other locations, include the rationale and the method of estimation. Describe measurement procedures in detail.
  - Include tables of measurement instruments documenting manufacturer, type, serial number, and date of most recent calibration by authorized testing laboratory. Document measurement periods, including the time of day and length of time at each site to demonstrate adequate representation of ambient conditions.
  - Present measurement data in well-organized tables and figures with a summary and interpretation of measured data.

- **Additional Measurements Related to the Project** – Include detailed description of measurements and results for projects that require specialized measurements at noise- and vibration-sensitive sites. Examples include:
  - Outdoor-to-indoor noise level reduction of homes
  - Transmission of vibration into concert halls and recording studios
  - Special source-level characterization

- **Predictions of Noise/Vibration from the Project**
  - Describe the prediction model used to estimate future project conditions and specific data used as input to the models. Reference the appropriate section in this manual. Document any change or extension to the models recommended in this manual, so that the validity of the adjustments can be confirmed. See Appendix G for more information.
  - Describe in detail the modeled scenarios and why the scenarios were chosen.
  - Tabulate computed levels and illustrate by contours, cross-sections, or shaded mapping. Illustrate noise/vibration impacts with base maps at a scale with enough detail to provide reference for the location.

- **Noise/Vibration Criteria**
  - Describe the impact criteria for the project in detail and reference the appropriate section in this manual. Include tables specifying the criteria levels or the figures included in this manual.
  - If construction noise and/or vibration assessments were conducted, include the construction criteria in a separate section with the construction assessment details. See below for more information.

- **Noise/Vibration Impact Assessment**
  - Describe the impact assessment according to the appropriate noise and/or vibration impact assessment sections in this manual.
  - If an alternatives analysis was conducted, present a resulting impact inventory for each alternative mode or alignment in a format that allows comparison among alternatives.
  - Tabulate the inventory according to the different types of affected noise- and vibration-sensitive sites. Present the results of the assessment both before and after mitigation.

- **Noise/Vibration Mitigation**
  - Begin this section with a summary of all treatments considered, including those not carried to final consideration.
  - Consider final candidate mitigation treatments separately and provide a description of the features of the treatment, including costs, expected benefit in reducing impacts, locations where the benefit would be realized, and a discussion of the practicality of alternative treatments.
  - Include enough noise and vibration impact information to allow the project sponsor and FTA to reach decisions on mitigation prior to issuance of an environmental decision document.

- **Construction Noise/Vibration Impacts**
  - Describe criteria adopted for construction noise or vibration if construction noise and/or vibration assessments were conducted.
  - Describe the method used for predicting construction noise or vibration and include inputs to the models such as equipment roster by construction phase, equipment source levels, assumed usage factors, and other assumed site characteristics.
  - Present predicted levels for noise- and vibration-sensitive sites and identify short-term impacts.
  - In cases where construction impacts are identified, discuss feasible abatement methods using enough detail to allow construction contract documents to include mitigation measures.

- **References** – Provide references for all criteria, approaches, and data used in the analyses, as well as other reports related to the project that may be relied on for information, e.g., geotechnical reports.

# Appendix A: Glossary of Terms

Terminology used through the manual is defined in this appendix.[49][72]

| | |
|---|---|
| A-weighting | A standardized filter used to alter the sensitivity of a sound level meter with respect to frequency so that the instrument is less sensitive at low and high frequencies where the human ear is less sensitive. Abbreviated as dBA. |
| Absolute Noise Impact | Noise that interferes with activities independent of existing noise levels and is expressed as a fixed level threshold. |
| Accelerometer | A transducer that converts vibratory motion to an electrical signal proportional to the acceleration of that motion. |
| Ambient | The pre-project background noise or vibration level, which is often used interchangeably with "existing noise" in this manual. |
| Amplitude | Difference between the extremes of an oscillating signal. |
| Alignment | The horizontal location of a railroad or transit system as described by curved and tangent track. |
| At-grade | Tracks on the ground surface. |
| Automated Guideway Transit (AGT) | Guided steel-wheel or rubber-tired transit passenger vehicles operating singly or in multi-car trains with a fully automated system on fixed-guideways along an exclusive ROW. AGT includes personal rapid transit, group rapid transit, and automated people mover systems. |
| Auxiliaries | The term applied to a number of separately driven machines, operated by power from the main engine or electric generation. They include the air compressor, radiator fan, traction motor blower, and air conditioning equipment. |
| Ballast mat | A 2- to 3-inch-thick elastomer mat placed under the normal track ballast on top of a rigid slab or packed sub-grade. |
| Ballast | Granular material placed on the trackbed for the purpose of holding the track in line and at surface. |
| Bus Rapid Transit (BRT) | A type of limited-stop bus operation that relies on technology to help speed up the service. Buses can operate on exclusive transitways, high-occupancy-vehicle lanes, expressways, or ordinary streets. |
| Catenary | On electric railroad and LRT systems, the term describing the overhead conductor that is contacted by the pantograph or trolley, and its support structure. |
| Commuter rail | Conventional passenger railroad serving areas surrounding an urban center. Most commuter railroads utilize locomotive-hauled coaches, often in push-pull configuration. |
| Consist | The total number and type of cars, locomotives, or transit vehicles in a trainset. |
| Continuous welded rail | A number of rails welded together to form unbroken lengths of track without gaps or joints. |
| Corrugated rail | A rough condition of alternating ridges and grooves which develops on the rail head in service. |
| Crest factor | The ratio of peak particle velocity to maximum RMS amplitude in an oscillating signal. |
| Criteria | Plural form of "criterion," the relationship between a measure of exposure (e.g., sound or vibration level) and its corresponding effect. |
| Cross tie | The transverse member of the track structure to which the rails are spiked or otherwise fastened to provide proper gage and to cushion, distribute, and transmit the stresses of traffic through the ballast to the trackbed. |
| Crossover | Two turnouts with the track between the frogs arranged to form a continuous passage between two nearby and generally parallel tracks. |
| Cumulative | The summation of individual sounds into a single total value related to the effect over time. |
| Cut | A terrain feature typically created to allow for a trackbed to be at a lower level than the surrounding ground. |

| | |
|---|---|
| dB | See Decibel. |
| dBA | See A-weighting. |
| Decibel | The standard unit of measurement for sound pressure level and vibration level. Technically, a decibel is the unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm of this ratio. Abbreviated as dB. |
| DMU | Diesel-powered multiple unit. See Multiple Unit. |
| DNL | See $L_{dn}$. |
| Electrification | A term used to describe the installation of overhead wire or third rail power distribution facilities to enable operation of trains. |
| Embankment | A bank of earth, rock, or other material constructed above the natural ground surface. |
| Equivalent level | The level of a steady sound, which, in a stated time period and at a stated location, has the same sound energy as the time-varying sound. Also, written as $L_{eq}$. |
| Event | A passby of a vehicle (e.g., train, bus, or car) of any size consist. |
| Ferry boat | A transit mode comprised of vessels to carry passengers and/or vehicles over a body of water. |
| Fixed-guideway | A public transportation facility with a separate ROW for the exclusive use of public transportation and other high-occupancy vehicles. |
| Flange | The vertical projection along the inner rim of a wheel that serves, together with the corresponding projection of the mating wheel of a wheel set, to keep the wheel set on the track. |
| Floating slab | A special track support system for vibration isolation, consisting of concrete slabs supported on resilient elements, usually rubber or similar elastomer. |
| Force density | Force density is the force per root distance along the track in $lb/ft^{1/2}$. The force density level is the level in decibels of the force density relative to 1 $lb/ft^{1/2}$ and describes the vehicle force that excites the soil/rock surrounding the transit structure. |
| Frequency | The number of times that a periodically occurring quantity repeats itself in a specified period. With reference to noise and vibration signals, the number of cycles per second. |
| Frequency spectrum | Distribution of frequency components of a noise or vibration signal. |
| Frog | A track structure used at the intersection of two running rails to provide support for wheels and passageways for their flanges, thus permitting wheels on either rail to cross the other. |
| Gage (of track) | The distance between the rails on a track. |
| Grade crossing | The point where a rail line and a motor vehicle road intersect at the same vertical elevation. |
| Guideway | Supporting structure to form a track for rolling or magnetically-levitated vehicles. |
| Head-End Power (HEP) | A system of furnishing electric power for a complete railway train from a single generating plant in the locomotive. |
| Heavy rail | See Rail Rapid Transit. |
| Hertz (Hz) | The unit of acoustic or vibration frequency representing cycles per second. |
| Hourly average sound level | The time-averaged A-weighted sound level, over a 1-hour period, usually calculated between integral hours. Abbreviated as $L_{(1h)}$. |
| Hybrid Bus | A rubber-tired vehicle that features a hybrid diesel-electric propulsion system. A diesel engine runs an electric generator that powers the entire vehicle including electric drive motors that deliver power to the wheels. |
| Idle | The speed at which an engine runs when it is not under load. |
| Intermediate Capacity Transit (ICT) | A transit system with less capacity than rail rapid transit (RRT), but more capacity than typical bus operations. Examples of ICT include bus rapid transit (BRT), automated guideway transit (AGT), monorails, and trolleys. |
| Intermodal facility | Junction of two or more modes of transportation where transfers may occur. |
| Jointed rail | A system of joining rails with steel members designed to unite the abutting ends of contiguous rails. |

| | |
|---|---|
| $L_{(1h)}$ | See Hourly Average Sound Level. |
| $L_{dn}$ | Day-Night Sound Level. The sound exposure level for a 24-hour day calculated by adding the sound exposure level obtained during the daytime (7 a.m. to 10 p.m.) to 10 times the sound exposure level obtained during the nighttime (10 p.m. to 7 a.m.). This unit is used throughout the United States for environmental impact assessment. Also, written as DNL. |
| $L_{eq(1hr)}$ | Equivalent Sound Level. The metric for cumulative noise exposure over a specific time interval is the equivalent sound level |
| Light Rail Transit (LRT) | A mode of public transit with tracked vehicles in multiple units operating in mixed traffic conditions on streets as well as sections of exclusive ROW. Vehicles are generally powered by electricity from overhead lines. |
| Locomotive | A self-propelled, non-revenue rail vehicle designed to convert electrical or mechanical energy into tractive effort to haul railway cars. See also Power Unit. |
| Main line | The principal line or lines of a railway. |
| Maglev | Magnetically-levitated vehicle; a vehicle or train of vehicles with guidance and propulsion provided by magnetic forces. Support can be provided by either an electrodynamic system wherein a moving vehicle is lifted by magnetic forces induced in the guideway or an electromagnetic system wherein the magnetic lifting forces are actively energized in the guideway. |
| Maximum sound level | The highest exponential-time-average sound level, in decibels, that occurs during a stated time period. Abbreviated as $L_{max}$. The standardized time periods are 1 second for $L_{max}$, slow, and 0.125 second for $L_{max}$, fast. |
| Metric | Measurement value or a quantitative descriptor used to identify a specific measure of sound level. |
| Monorail | Guided transit vehicles operating on or suspended from a single rail, beam, or tube. |
| Multimodal Project | In this manual, the term multimodal project is used to describe a project that includes changes to both transit and highway components in segments of the project. |
| Multiple Unit (MU) | A term referring to the practice of coupling two or more diesel-powered or electric-powered passenger cars together with provision for controlling the traction motors on all units from a single controller. |
| Noise | Any disagreeable or undesired sound or other audible disturbance. |
| Octave band | A standardized division of a frequency spectrum in which the interval between two divisions is a frequency ratio of 2. |
| One-third octave band | A standardized division of a frequency spectrum in which the octave bands are divided into thirds for more detailed information. The interval between center frequencies is a ratio of 1.25. |
| Pantograph | A device for collecting current from an overhead conductor (catenary), consisting of a jointed frame held up by springs or compressed air and having a current collector at the top. |
| Park-and-ride facility | A parking garage and/or lot used for parking passengers' automobiles while they use transit agency facilities and vehicles. |
| Peak factor | See Crest factor. |
| Plan-and-profile | Mapping used by transportation planners that shows two-dimensional plan views (x- and y- axes) on the same page as two-dimensional profiles (x- and z-axes) of a road or track. |
| Peak Particle Velocity (PPV) | The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States. |
| Peak-to-Peak (P-P) Value | Of an oscillating quantity, the algebraic difference between the extreme values of the quantity. |
| Power unit | A self-propelled vehicle, running on rails and having one or more electric motors that drive the wheels and thereby propel the locomotive and train. The motors obtain electrical energy either from a rail laid near, but insulated from, the track rails, or from a wire suspended above the track. Contact with the overhead wire is made by a pantograph mounted on top of the unit. |
| Project segment | Portions of a project with similar characteristics. |

| | |
|---|---|
| Pure tone | Sound of a single frequency. |
| Radius of curvature | A measure of the severity of a curve in a track structure based on the length of the radius of a circle that would be formed if the curve were continued. |
| Rail | A rolled steel shape, commonly a T-section, designed to be laid end to end in two parallel lines on cross ties or other suitable supports to form a track for railway rolling stock. |
| Rail Rapid Transit (RRT) | Often called "Heavy Rail Transit." A mode of public transit with tracked vehicles in multiple units operating in exclusive rights-of-way. Trains are generally powered by electricity from a third rail alongside the track. |
| Receiver | A stationary far-field position at which noise or vibration levels are specified. |
| Relative Noise Impact | Noise increase above existing levels. |
| Resonance frequency | The phenomenon that occurs in a structure under conditions of forced vibration such that any change in frequency of excitation results in a decrease in response. |
| Right-of-Way | Abbreviated as ROW. Lands or rights used or held for railroad or transit operation. |
| Root Mean Square (rms) | The square root of the mean-square value of an oscillating waveform, where the mean-square value is obtained by squaring the value of amplitudes at each instant of time and then averaging these values over the sample time. |
| RMS Velocity Level (LV) | See Vibration Velocity Level. |
| SEL | See Sound Exposure Level. |
| Sound Exposure Level | The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second. Abbreviated as SEL. |
| Sound | A physical disturbance in a medium that is capable of being detected by the human ear. |
| Spectrum | See Frequency Spectrum. |
| Sub-ballast | Any material of a superior character, which is spread on the finished subgrade of the roadbed and below the top-ballast, to provide better drainage, prevent upheaval by frost, and better distribute the load over the roadbed. |
| Subgrade | The finished surface of the roadbed below the ballast and track. |
| Suburban bus | A bus similar to an intercity bus with high-backed seats but no luggage compartment, often used in express mode to city centers from suburban locations. |
| Switch | A track structure used to divert rolling stock from one track to another. |
| Tangent track | Track without curvature. |
| Track | An assembly of rail, ties, and fastenings over which cars, locomotives, and trains are moved. |
| Traction motor | A specially designed direct current series-wound motor mounted on the trucks of locomotives and self-propelled cars to drive the axles. |
| Trainset | A group of coupled cars including at least one power unit. |
| Transducer | Device designed to receive an input signal of a given kind (motion, pressure, heat, etc.) and to provide an output signal of a different kind (electrical voltage, amperage, etc.) in such a manner that desired characteristics of the input signal appear in the output signal for measurement purposes. |
| Transfer mobility | Transfer mobility is the complex velocity response produced by a point force as a function of frequency and represents the relationship between a vibration source that excites the ground and the resulting vibration of the ground surface. |
| Transit center | A fixed location where passengers interchange from one route or vehicle to another. |
| Trolley bus | A rubber-tired, electrically-powered bus operating on city streets drawing power from overhead lines. |
| Truck | The complete assembly of parts including wheels, axles, bearings, side frames, bolster, brake rigging, springs, and all associated connecting components, the function of which is to provide support, mobility, and guidance to a railroad car or locomotive. |
| Trunk line | See Mainline. The mainline of a commuter railroad where the branch line traffic is combined. |

| | |
|---|---|
| Turnout | An arrangement of a switch and a frog with closure rails, by means of which rolling stock may be diverted from one track to another. |
| VdB | See Vibration Velocity Level. |
| Vibration Velocity Level (LV) | Ten times the common logarithm of the ratio of the square of the amplitude of the RMS vibration velocity to the square of the amplitude of the reference RMS vibration velocity. The reference velocity in the United States is one micro-inch per second. Abbreviated as VdB. |
| Vibration | An oscillation wherein the quantity is a parameter that defines the motion of a mechanical system. |
| Wheel flat | A localized flat area on a steel wheel of a rail vehicle, usually caused by skidding on steel rails, causing a discontinuity in the wheel radius. |
| Wheel squeal | The noise produced by wheel-rail interaction, particularly on curves where the radius of curvature is smaller than allowed by the separation of the axles in a wheel set. |

Additional, relevant acoustic terminology and formulas are defined in ANSI S1.1-1994 (49).

# Appendix B: Fundamentals of Noise

Noise is generally considered to be unwanted sound. Sound is what we hear when our ears are exposed to small pressure fluctuations in the air. There are many ways in which pressure fluctuations are generated, but typically they are caused by vibrating movement of a solid object. This manual uses the terms noise and sound interchangeably because there is no physical difference between them. Noise can be described in terms of three variables: amplitude (loud or soft); frequency (pitch); and time pattern (variability).

## B.1 Amplitude

The loudness of a sound is described by the sound wave's amplitude of pressure fluctuations above and below atmospheric pressure. Pressure is measured in Pascals. The mean value of the positive and negative pressure fluctuations is the static atmospheric pressure and is not a useful metric of sound. However, the effective magnitude of the sound pressure in a sound wave can be expressed by the rms of the oscillating pressure. See Figure B-1 for an illustration of the rms pressure.

The rms pressure is calculated according to Eq. B-1. The values of sound pressure are squared and time-averaged to smooth out variations. The rms pressure is the square root of this time-averaged value.

$$P_{rms} = \sqrt{\frac{1}{N}\sum_{i=1}^{N} P_i^2} \qquad \textbf{Eq. B-1}$$

where:

$P_{rms}$ = sound pressure
$P_i$ = individual sound pressure
$N$ = number of samples
$i = 1$ = index of summation

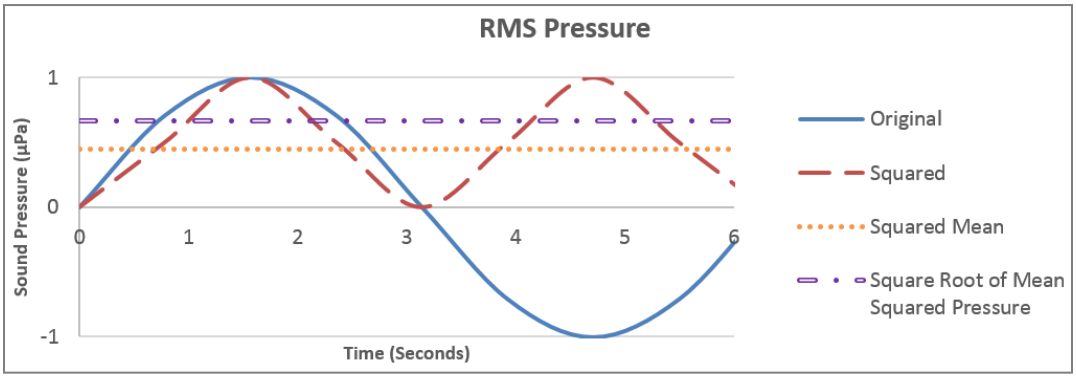


**Figure B-1 RMS Pressure Illustration**

Most humans with typical or average hearing can perceive sounds ranging from approximately 20 microPascals to 20 million microPascals or more. Because of the difficulty in dealing with such an extreme range of numbers, acousticians use a logarithmic scale to describe sound levels. Acousticians use a compressed scale based on logarithms of the ratios of the sound energy contained in the wave related to the square of sound pressures instead of the sound pressures themselves, resulting in the "sound pressure level" in decibels (dB). The 'B' in dB is always capitalized because the unit is named after Alexander Graham Bell, a leading 19th century innovator in communication.

Sound pressure level ($L_p$) is defined as:

$$L_p = 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}); or$$

$$L_p = 20log_{10}(\frac{P_{rms}}{P_{ref}})\ dB \qquad \textbf{Eq. B-2}$$

where

$L_P$ = sound pressure level, dB
$P_{rms}$ = RMS sound pressure
$P_{ref}$ = 20 microPascals

Inserting the range of sound pressure values mentioned above into Eq. B-2 results in a typical quietest sound at 20 microPascals at 0 dB. A typical loudest sound of 20 million microPascals is 120 dB.

## B.1.1 Decibel Addition

The combination of two or more sound pressure levels at a single location requires decibel addition, which is the addition of logarithmic quantities of sound energy ($P^2_{rms}$).

To add sound energy from multiple, unique sources, add the sound energy as shown Eq. B-3.

$$L_p = 10log_{10}(\frac{{P_1}^2 + {P_2}^2 + \cdots + {P_n}^2}{P_{ref}^2}) \qquad \textbf{Eq. B-3}$$

where

$L_P$ = sound pressure level, dB
$P_1, P_2, P_n$ = individual source RMS sound pressures to add
$P_{ref}$ = 20 microPascals

A doubling of identical sound sources results in a 3-dB increase, as shown mathematically below.

$$L_p = 10log_{10}(2\frac{p_{rms}^2}{p_{ref}^2})$$

$$= 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}) + 10log_{10}(2)$$

$$= 10log_{10}(\frac{p_{rms}^2}{p_{ref}^2}) + 3$$

To add decibel levels (instead of sound energy) use the following equation:

$$L_p = 10log_{10}(\sum_{i=1}^{N} 10^{(L_i/10)})$$

where

$L_p$ = sound pressure level, dB
$N$ = number of samples
$i$ = index of summation
$L_i$ = individual sound pressure levels, dB
$L_P$ = sound pressure level, dB
$L_1, L_2, L_n$ = individual source sound pressure levels to add

The equation above can be rewritten as follows:

$$L_p = 10log_{10}(10^{\frac{L_1}{10}} + 10^{\frac{L_2}{10}} + \cdots + 10^{\frac{L_n}{10}}) \quad \textbf{Eq. B-4}$$

where

$L_1, L_2, L_n$ = individual source sound pressure levels to add

Decibel addition can be quickly approximated using Figure B-2.

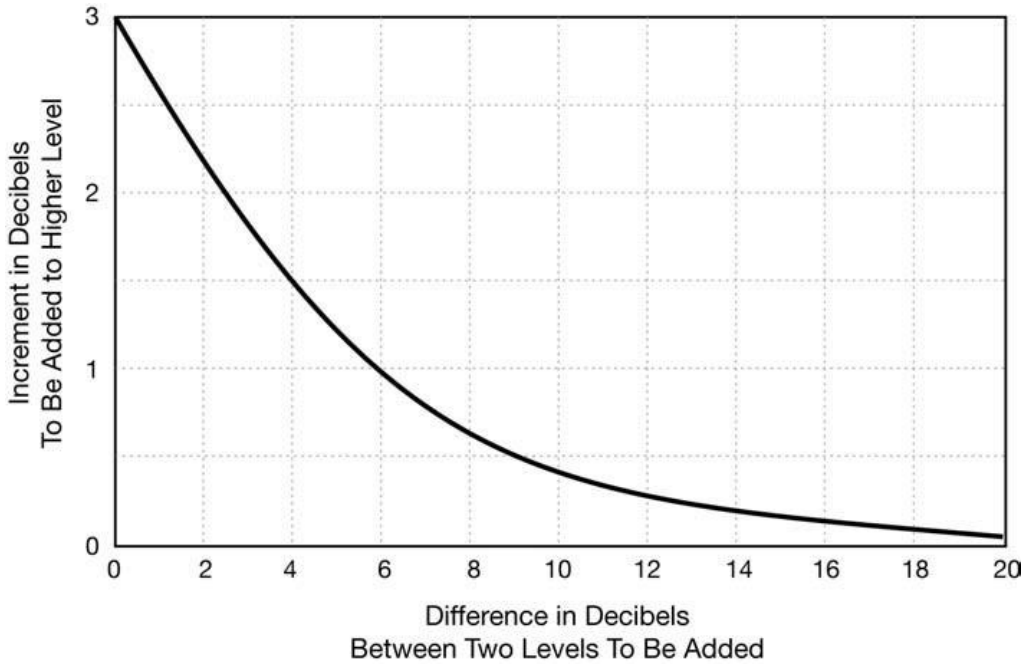


**Figure B-2 Graph for Approximate Decibel Addition**

### Example B-1 Decibel Addition – Identical Buses

**Decibel Addition**

What is the combined sound pressure level of two identical buses if the noise from one bus resulted in a sound pressure level of 70 dB?

Since a doubling of identical sound sources results in a 3-dB increase:

$$\begin{aligned} L_p &= 70 + 3 \\ &= 73\ dB \end{aligned}$$

### Example B-2 Decibel Addition – Two Sources

**Decibel Addition**

What is the combined sound pressure level of 64 dB and 60 dB?

**Using Eq. B-4:**

$$\begin{aligned} L_p &= 10log_{10}(10^{64/10} + 10^{60/10}) \\ &= 65.5\ dB \end{aligned}$$

**Using Figure B-2:**
The x-axis values represent the difference between the two sound levels, 64 and 60 dB. The difference between the sound levels in this example is 4. The point on the curve corresponding to 4 on the x-axis is 1.5. The y-axis values represent the increment that is added to the higher level.

$$\begin{aligned} L_p &= 64 + 1.5 \\ &= 65.5\ dB \end{aligned}$$

## B.1.2 Frequency

Sound is a fluctuation of air pressure. The number of times the fluctuation occurs in one second is called its frequency. In acoustics, frequency is quantified in cycles per second, or Hertz (Hz). The hearing for a typical human covers the frequency range from 20 Hz to 20,000 Hz.

Some sounds, like whistles, are associated with a single frequency; this type of sound is called a pure tone. However, most often, noise is made up of many frequencies, called a spectrum. Analyzing a noise spectrum allows for identification of dominant frequency ranges and can assist in identifying noise sources. Often a frequency spectrum is divided into standardized frequency bands for analysis. Most commonly, the frequency bands for transit analyses are octave bands (where the interval between two divisions is a frequency ratio of 2) and one-third octave bands (where the interval between center frequencies is a ratio of 1.25).[73]

If the spectrum associated with a transit noise source is dominated by many low-frequency components, the noise will have a characteristic like the rumble of thunder; this is often associated with noise from a subway. Mid-range frequencies are often associated with wheel/rail noise, and high frequencies may be associated with wheel squeal due to sharp curves on a track.

The spectrum in Figure B-3 illustrates the full range of acoustical frequencies that can occur near a transit system. In this example, the noise spectrum was measured near a train on an elevated steel structure with a sharp curve.

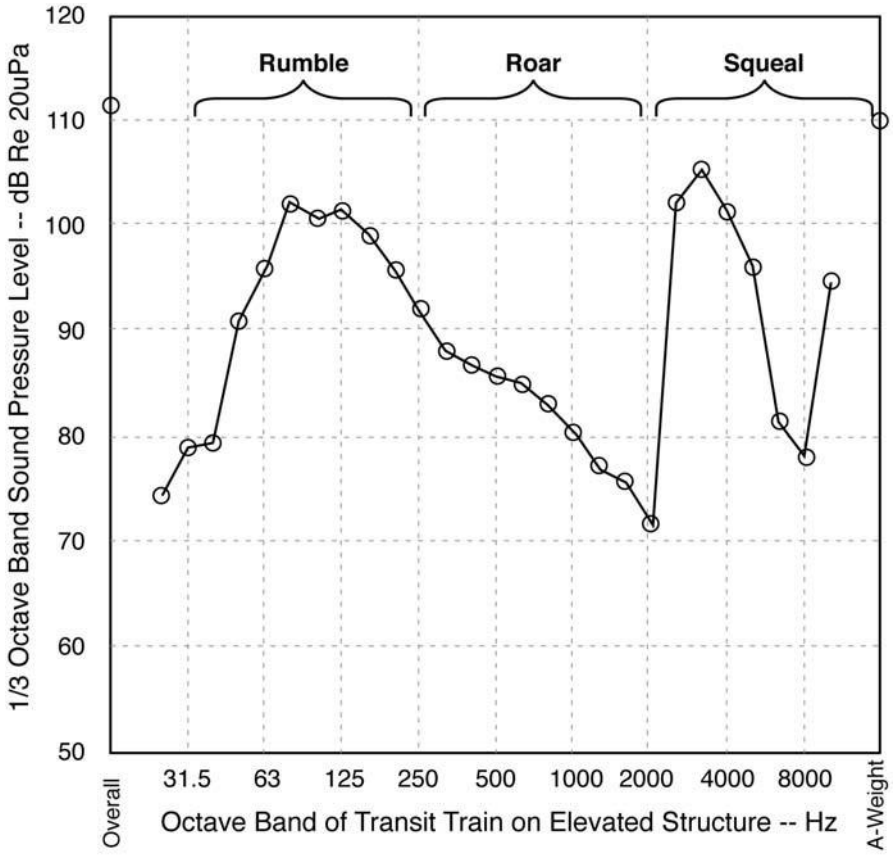


**Figure B-3 Noise Spectrum of Transit Train on Curve and Elevated Structure**

The human auditory system does not respond equally to all frequencies of sound. For sounds normally heard in our environment, low frequencies below 250 Hz and frequencies above 10,000 Hz are generally considered less audible than the frequencies in between. This is because our ears are less sensitive in those areas. To better represent human hearing, frequency response functions were developed to characterize the way people respond to different frequencies. These are referred to as A-, B-, and C-weighted curves and represent human auditory response to normal, very loud, and extremely loud sound levels, respectively. Environmental noise is generally considered to be in the normal sound level range; and, therefore, the A-weighted sound level is considered best to represent the human response.

The A-weighting curve is shown in Figure B-4. This curve illustrates that sounds at 50 Hz would have to be amplified by 30 dB to be perceived as loud as a sound at 1000 Hz at normal sound levels.

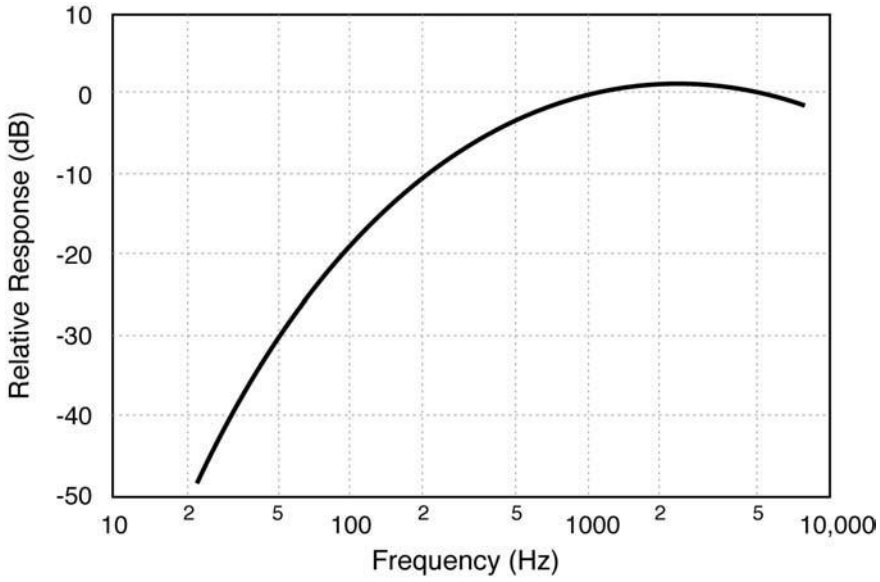


**Figure B-4 A-Weighting Curve**

Low frequencies have longer wavelengths of sound (cycles are less frequent) and, conversely, high frequencies have shorter wavelengths (cycles are more frequent). The size of the wavelength in feet is dependent on frequency and speed of sound as follows:

$$f\lambda = c \qquad \textbf{Eq. B-5}$$

where

$f$ = frequency in cycles per second, Hz
$\lambda$ = wavelength, ft
$c$ = speed of sound, ft/sec

The speed of sound in air varies with temperature; but at standard conditions, it is approximately 1000 ft per second. Therefore, at standard conditions, a frequency of 1000 Hz has a wavelength of 1 foot and a frequency of 50 Hz has a wavelength of 20 ft. The scale of these waves explains, in part, the reason humans perceive sounds of 1000 Hz better than those of 50 Hz. A wavelength of 1 foot is similar to the size of a person's head; whereas, a wavelength of 20 ft is similar to dimensions associated with a house, which is why low-frequency sounds (such as those from an idling locomotive) are sometimes not attenuated by walls and windows of a home. These sounds transmit indoors with relatively little reduction in strength.

## B.1.3 Time Pattern

The third important characteristic of noise is its variation in time. Environmental noise is considered to be a combination of all outdoor noise sources. When combined, sources such as distant traffic, wind in trees, and distant industrial or farming activities often create a low-level background noise in which no particular individual source is identifiable. Background noise is often relatively constant from moment to moment, but varies slowly over time as natural forces change or as human activity follows its daily cycle. In addition to this low-level, slowly varying background noise, a succession of identifiable noisy events of relatively brief duration may be added. These events may include single-vehicle passbys, aircraft flyovers,

screeching of brakes, and other short-term events, which all cause the noise level to substantially fluctuate from moment to moment.

It is possible to describe these fluctuating noises in the environment using single-number metrics to allow for manageable measurements, computations, and impact assessment. The search for adequate single-number noise metrics has encompassed hundreds of attitudinal surveys and laboratory experiments in addition to decades of practical experience with many alternative metrics.

## B.1.4 Noise Metrics

The noise metrics referred to in this manual are described in the sections below.

### B.1.4.1 A-weighted Sound Level: The Basic Noise Unit

The basic noise unit for transit noise is the A-weighted sound level and is described in ANSI S1.1-1994 (49). It describes the noise level at the receiver at any moment in time and can be read directly from noise-monitoring equipment when frequency weighting is set to A-weighting. Figure B-5 shows examples of typical A-weighted sound levels for both transit and non-transit sources, ranging from approximately 30 dBA (very quiet) to 90 dBA (very loud).

The unit dBA denotes the decibel level is A-weighted. The letter "A" indicates that the sound has been filtered to reduce the strength of very low and very high-frequency sounds to emulate the human response to sound levels as described in Appendix B.1.2. This allows for events that are out of the range of human hearing, such as high-frequency dog whistles and low-frequency seismic disturbances, to be filtered out. On average, each A-weighted sound level increase of 10 dB corresponds to an approximate doubling of subjective loudness.

A-weighted sound levels are adopted as the basic noise unit for transit noise impact assessments because they:

- Can be measured easily,
- Approximate the human ear's sensitivity to sounds of different frequencies,
- Match attitudinal-survey tests of annoyance better than other basic units,
- Have been in use since the early 1930s, and
- Are endorsed as the proper basic unit for environmental noise by most agencies concerned with community noise throughout the world.

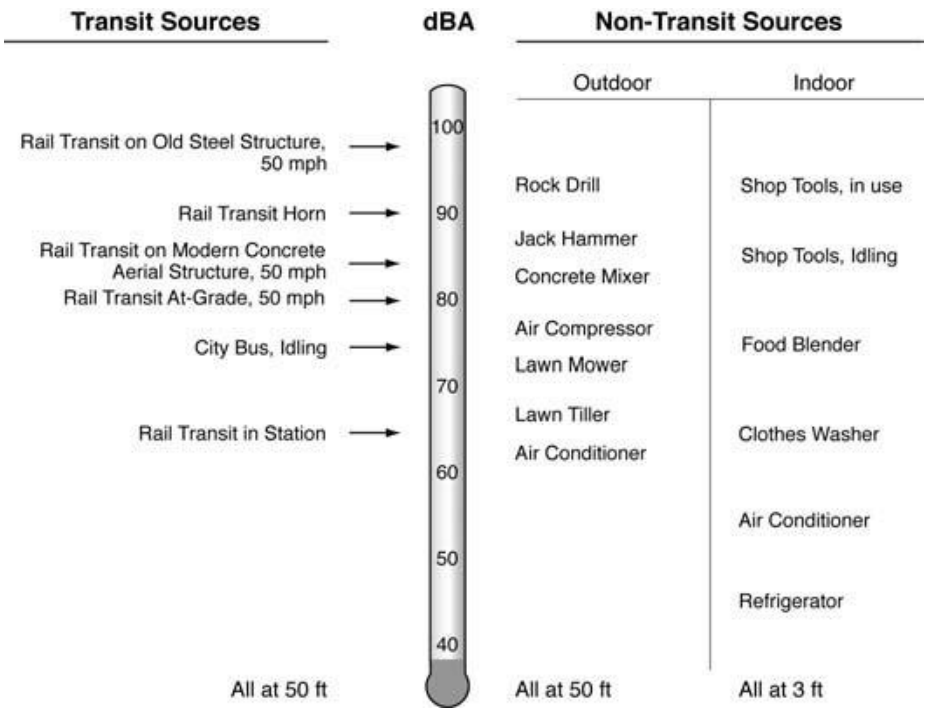


**Figure B-5 Typical A-weighted Sound Levels**

## B.1.4.2 Maximum Sound Level ($L_{max}$) During a Single Noise Event

As a transit vehicle approaches, passes by, and then recedes into the distance, the A-weighted sound level rises, reaches a maximum, and then fades into the background noise. The maximum A-weighted sound level reached during this passby is called the maximum sound level, [49] abbreviated here as $L_{max}$. $L_{max}$ is illustrated in Figure B-6 where time is plotted horizontally, and A-weighted sound level is plotted vertically.

Although $L_{max}$ is commonly used in vehicle-noise specifications,[xvi] it is not used for transit environmental noise impact assessment. $L_{max}$ does not include the number and duration of transit events, which are important for assessing people's reactions to noise. It also cannot be normalized to a one-hour or 24-hour cumulative measure of impact, and therefore, is not conducive to comparison among different transportation modes. For example, cumulative noise metrics commonly used in highway noise assessments are $L_{eq(1hr)}$ and $L_{10}$, the noise level exceeded for 10 percent of the peak hour.

[xvi] For noise compliance tests of transient sources, such as moving transit vehicles under controlled conditions with smooth wheel and rail conditions, $L_{max}$ is typically measured with the sound level meter's time weighting set to "fast." However, for tests of continuous or stationary transit sources, it is usually more appropriate to use the "slow" setting. When set to "slow," sound level meters ignore some of the very-transient fluctuations, which are negligible when assessing the overall noise level.

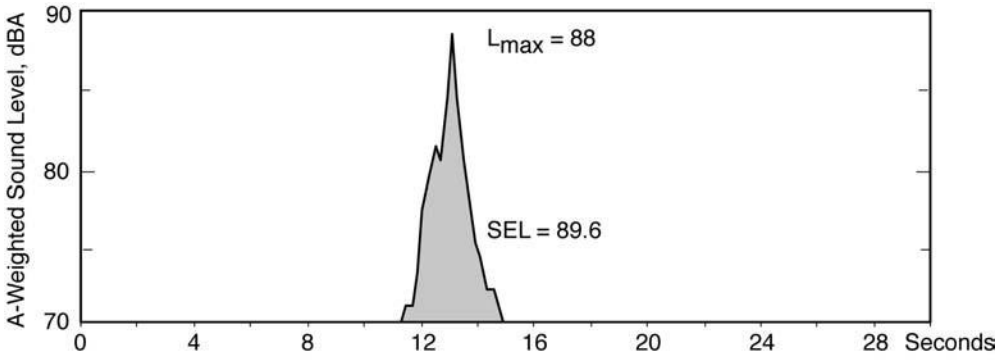


**Figure B-6 Typical Transit-Vehicle Passby**

## B.1.4.3 Sound Exposure Level (SEL): Exposure from a Single Noise Event

Sound exposure level, abbreviated here as SEL, is the cumulative noise exposure from a single noise event, normalized to one second (49). SEL contains the same overall sound energy as the actual varying sound energy during the event. It is the primary metric for the measurement of transit vehicle noise emissions and an intermediate metric in the measurement and calculation of both $L_{eq(1hr)}$ and $L_{dn}$. The SEL metric is A-weighted and is expressed in the unit dBA.

This concept is illustrated in Figure B-6 and Figure B-7 where the shaded regions are the sound exposure during and event. The example in Figure B-6 is a transit-vehicle passby and Figure B-7 is an example of a fixed-transit facility as a transit bus is started, warmed up, and then driven away. For this event, the noise exposure is large due to duration of the event.

SEL is an A-weighted cumulative measure that is referenced to one second. Louder events have greater SELs than quieter events, and events of longer duration have greater SELs than shorter events. This is generally consistent with community response to noise. Noise events of longer duration are considered more disruptive than events of shorter duration with equal maximum A-weighted sound levels.

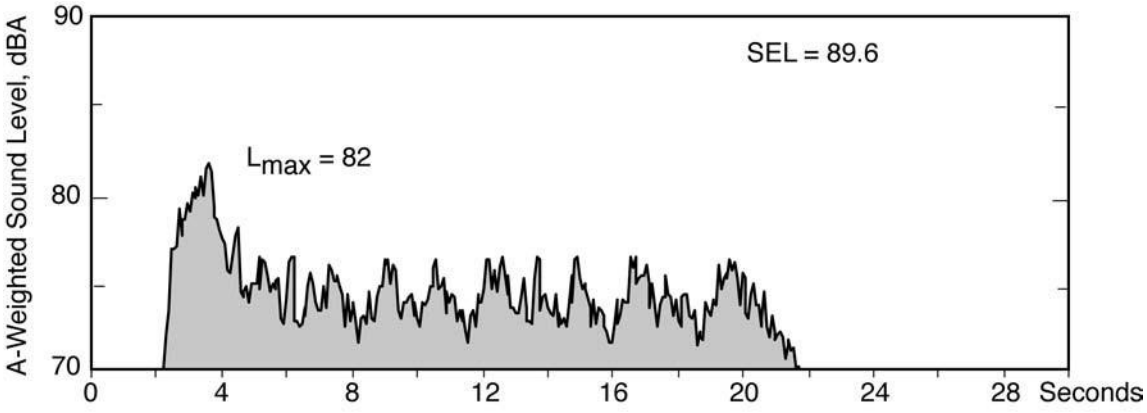


**Figure B-7 Typical Fixed-Facility Noise Event**

Conceptually, the sound exposure level can be expressed as:

$$SEL = 10log_{10}(\begin{matrix}Total\ sound\ energy \\ during\ the\ event\end{matrix})$$

Mathematically, the sound exposure level is computed as follows:

$$SEL = 10log_{10}(\sum_{i=1}^{N} 10^{(L_i/10)}) \qquad \textbf{Eq. B-6}$$

where

$SEL$ = Sound exposure level, dBA
$N$ = number of samples
$i$ = index of summation
$L_i$ = individual A-weighted sound level, dBA

The events shown in Figure B-6 and Figure B-7 are compared graphically in Figure B-8 using a logarithmic vertical scale. The shaded zones in these figures indicate noise exposure over time. The actual event shows the noise exposure over the time of the event, and the equivalent SEL shows the total noise exposure normalized to one second. Note that events 1 and 2 in Figure B-8 have different time periods and noise levels throughout the event, but the same resulting SEL.

SEL is used in transit noise analyses because it:

1. Accounts for both the duration and amplitude of an event,
2. Allows a uniform assessment method for both transit-vehicle passbys and fixed-facility noise events, and
3. Can be used to calculate the one-hour and 24-hour cumulative metrics for comparison across different transportation modes.

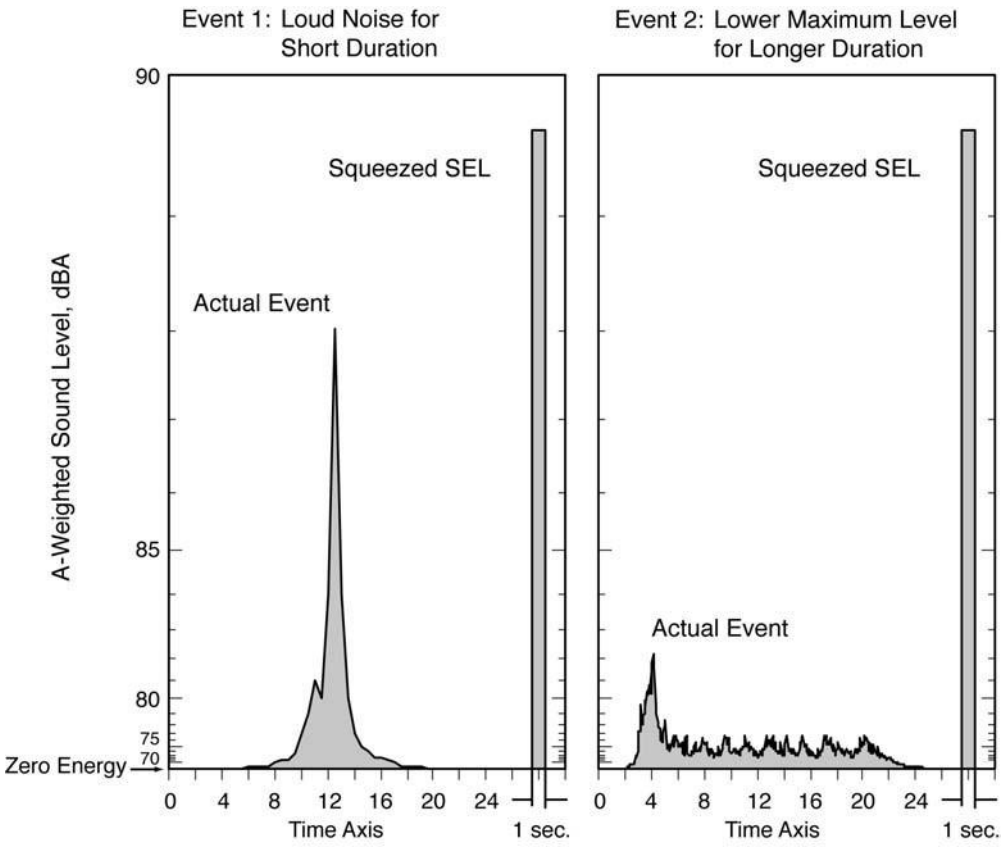


**Figure B-8 An Energy View of Noise Events**

## B.1.4.4 Equivalent Sound Level ($L_{eq(t)}$)

The metric for cumulative noise exposure over a specific time interval is the equivalent sound level (49). It is a single decibel value that accounts for total sound energy from all sound levels over a specified time interval (or time period). The time period associated with the equivalent sound level metric can vary for different types of analyses. This metric is abbreviated as $L_{eq(t)}$, where "t" is the duration of the time period. $L_{eq(t)}$ represents a hypothetical constant sound level and contains the same overall sound energy as the actual varying sound energy during the time period "t". For most transit noise analyses, an A-weighted, hourly equivalent sound level is used, abbreviated here as $L_{eq(1hr)}$. $L_{eq(1hr)}$ is expressed in the unit, dBA.

Figure B-9 shows examples of typical unmitigated hourly $L_{eq(1hr)}$'s, both for transit and non-transit sources ranging from 40 (quiet) to 80 dB (loud). Note that these $L_{eq(1hr)}$'s depend upon both the number of events during the hour as well as each event's duration, which is affected by vehicle speed. For example, doubling the number of events during the hour will increase the $L_{eq(1hr)}$ by 3 decibels, as will doubling the duration of each individual event.

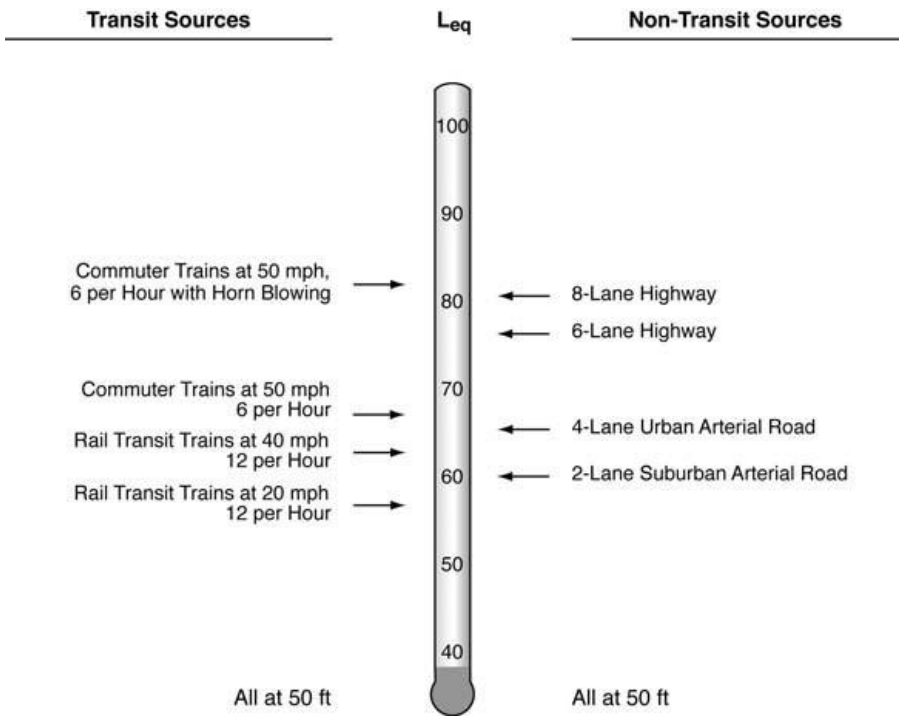


**Figure B-9 Typical Hourly $L_{eq(1hr)}$'s**

An example of sound levels over time for a single noise event such as a train passing on nearby tracks is illustrated in the top frame of Figure B-10. As the train approaches, passes by, and then recedes into the distance, the A-weighted sound level rises, reaches a maximum, and then fades into the background noise. The equivalent sound level is shown for three different time periods Figure B-10. The area under the curve in this top frame is the noise that reaches the receiver (noise exposure) over this five-minute period. The center frame of the figure shows sound levels over the one-hour period, including the five-minute period from the top frame. The area under the curve represents the noise exposure for one hour. The bottom frame shows sound levels over a full 24-hour period and is discussed in Appendix B.1.4.5.

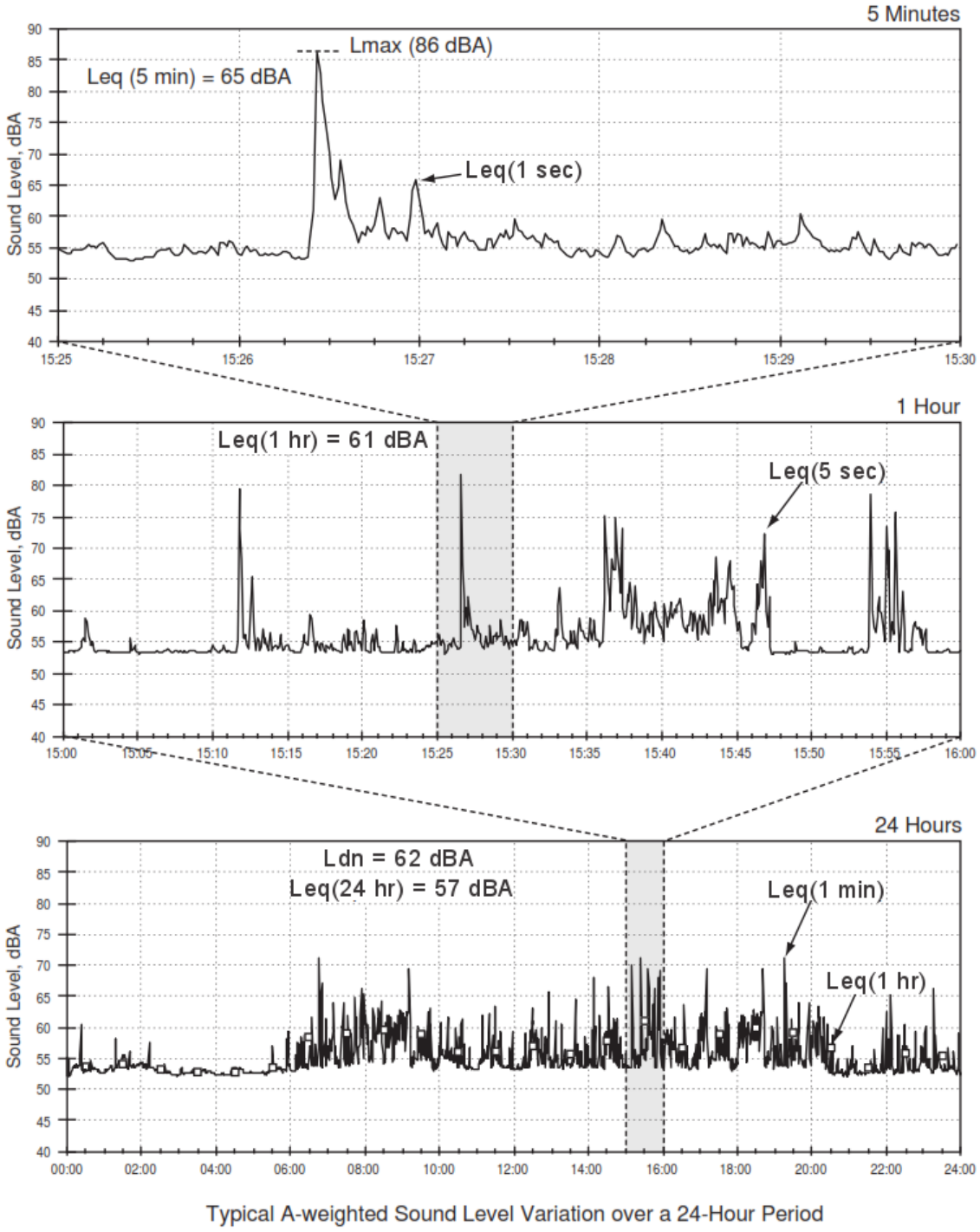


**Figure B-10 Example A-weighted Sound Level Time Histories**

Conceptually, the equivalent sound level can be expressed as:

$$L_{eq}(t) = 10log_{10}(\frac{Total\ Sound\ Energy}{Time\ Period})$$

Mathematically, the equation is as follows:

$$L_{eq}(t) = 10log_{10}(\frac{1}{T}\sum_{i=1}^{N} 10^{(L_i/10)})$$

where

$L_{eq(t)}$ = equivalent sound level of time period "t", dBA
$T$ = time period, sec (3600 for an hourly $L_{eq(1hr)}$)
$N$ = number of samples, sec (3600 for an hourly $L_{eq(1hr)}$)
$i$ = index of summation
$L_i$ = individual A-weighted sound level, dBA

The equation above can be rewritten as follows for a one-hour time period:

$$L_{eq}(1h) = 10log_{10}[Total\ Sound\ Energy\ in\ 1\ hr] - 35.6 \quad \textbf{Eq. B-7}$$

where

*35.6* = numerical adjustment for a time period of 1 hour ($10log_{10}(t)$)

The sound energy is totaled over a full hour (3600 seconds) and is accumulated for all noise events during that hour. When computing the equivalent sound level for a time period other than one hour, T is modified in the equation to the duration of the time period in seconds. The numerical adjustment (35.6) accounts for time period of interest, in this case, one hour.

An alternate way for computing $L_{eq(1hr)}$ for a series of transit-noise events using sound exposure levels can be expressed conceptually as follows:

$$L_{eq}(1h) = 10log_{10}(\frac{Energy\ Sum\ of}{all\ SELs}) - 35.6$$

Mathematically, the equation is as follows:

$$L_{eq}(t) = 10log_{10}(\frac{1}{T}\sum_{i=1}^{N} 10^{(SEL_i/10)}) \quad \textbf{Eq. B-8}$$

where

$L_{eq(t)}$ = equivalent sound level of time period "t", dBA
$T$ = time period, sec (3600 for an hourly $L_{eq(1hr)}$)
$N$ = number of sample, sec (3600 for an hourly $L_{eq(1hr)}$)
$i$ = index of summation
$SEL$ = individual sound exposure level, dBA

Hourly $L_{eq(1hr)}$ is adopted as the measure of cumulative noise impact for non-residential land uses (those not involving sleep) because $L_{eq(1hr)}$:

- Correlates well with speech interference in conversation and on the telephone – as well as interruption of TV, radio, and music enjoyment;
- Increases with the duration of transit events;
- Accounts for the number of transit events over the hour, which is also important to people's reactions; and

- Is used by the Federal Highway Administration in assessing highway-traffic noise impact.(Thus, this noise metric can be used for directly comparing and contrasting highway, transit, and multimodal alternatives).

## B.1.4.5 Day-Night Sound Level ($L_{dn}$): 24-Hour Exposure from All Events

The metric for cumulative 24-hour exposure is the Day-Night Sound Level, [49] abbreviated here as $L_{dn}$. It is a single, A-weighted decibel value that accounts for total sound energy from all sound sources over 24 hours and is expressed in the unit, dBA. Events between 10 p.m. and 7 a.m. are increased by 10 dB to account for people's greater nighttime sensitivity to noise.

Figure B-11 shows examples of typical $L_{dn}$'s, both for transit and non-transit sources, ranging from 50 to 80 dB, where 50 is considered a quiet 24-hour period and 80 a loud 24-hour period. Note that these $L_{dn}$'s depend upon the number of events during day and night separately, including each event's duration, which is affected by vehicle speed.

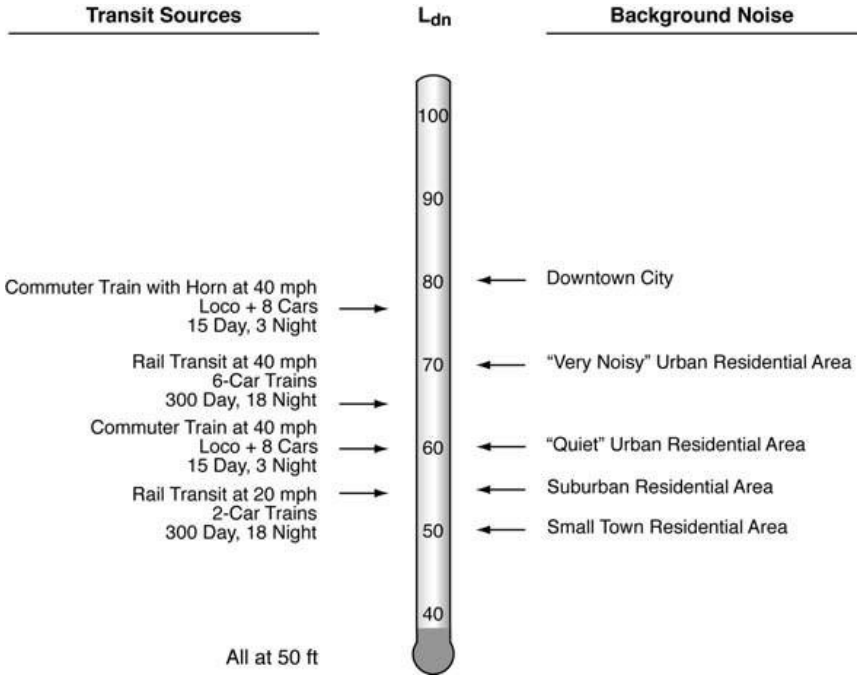


**Figure B- 11 Typical $L_{dn}$'s**

An example of sound level variation over 24 hours is visualized in the bottom frame of Figure B-10. The area under the curve represents the receiver's noise exposure over the 24 hours. Note that some vehicle passbys occur at night, when the background noise is typically lower and the 10 dB adjustment is applied.

Conceptually, the day-night level can be expressed as:

$$L_{dn} = 10log_{10}(\frac{Total\ Sound\ Energy_{Day}}{Time\ Period_{Day}\ (seconds)} + \frac{n_{adj,n} \times Total\ Sound\ Energy_{Night}}{Time\ Period_{Night}\ (seconds)})$$

Mathematically, the equation is as follows:

$$L_{dn} = 10log_{10}(\frac{1}{T_d}\sum_{i=1}^{N} t_i \times 10^{(L_{d,i}/10)} + \frac{1}{T_n}\sum_{j=1}^{M} t_j \times 10^{((L_{n,j}+n_{adj,n})/10)}) \quad \textbf{Eq. B-9}$$

where

$L_{dn}$ = cumulative 24-hour exposure (day-night sound level), dBA
$T_d$ = time period during the daytime, between 7 a.m. and 10 p.m. sec (54,000)
$N$ = number of samples during the daytime (54,000)
$i$ = index of summation
$t_i$ = time interval of measurements in seconds (1)
$L_{d,i}$ = individual A-weighted sound level during the daytime, dBA
$T_n$ = time period during the nighttime, between 10 p.m. and 7 p.m. sec (32,400)
$M$ = number of samples during the nighttime (32,400)
$j$ = index of summation
$t_j$ = time interval of measurements, sec (1)
$L_{n,j}$ = individual A-weighted sound level during the nighttime, dBA
$n_{adj,n}$ = nighttime noise adjustment (10 dB)

The equation above can be rewritten as follows:

$$L_{dn} = 10log_{10}[\,(15 * Total\ Sound\ Energy_{Day}) + (9 * n_{adj,n} * Total\ Sound\ Energy_{Night})] - 49.4$$

The sound energy is totaled over a full 24 hours, and the sound energy is accumulated from all noise events during that time period. The numerical adjustment (49.4) accounts for time period of interest, in this case, 24 hours.

An alternative way of computing $L_{dn}$ from twenty-four hourly $L_{eq(1hr)}$'s can be expressed conceptually as follows:

$$L_{dn} = 10log_{10}(\frac{Energy\ sum\ of\ daytime, hourly\ Leqs + (n_{adj,n} * Energy\ sum\ of\ nighttime, hourly\ Leqs)}{Time\ period\ (seconds)})$$

The equation above can be rewritten as:

$$L_{dn} = 10log_{10}(\frac{Energy\ sum\ of\ daytime, hourly\ Leqs + (n_{adj,n} * Energy\ sum\ of\ nighttime, hourly\ Leqs)}{(\frac{86400}{3600})})$$

The equation above can be reduced further and rewritten as:

$$L_{dn} = 10log_{10}(Energy\ sum\ of\ daytime, hourly\ Leqs + (n_{adj,n} * Energy\ sum\ of\ nighttime, hourly\ Leqs)) - 13.8 \quad \textbf{Eq. B-10}$$

$L_{dn}$ due to a series of transit-noise events can also be computed in terms of SEL. The equation below assumes that transit noise dominates the 24-hour noise environment, where nighttime SELs are increased by 10 dB before totaling:

$$L_{dn} = 10log_{10}(\begin{matrix}Energy\ sum\ of \\ all\ daytime\ SELs\end{matrix} + (n_{adj,n} * \begin{matrix}Energy\ sum\ of \\ all\ nighttime\ SELs\end{matrix})) - 49.4 \qquad \textbf{Eq. B-11}$$

$L_{dn}$ is adopted as the measure of cumulative noise impact for residential land uses (those involving sleep), because it:

- Correlates well with the results of attitudinal surveys of residential noise impact
- Increases with the duration of transit events
- Accounts for the number of transit events over the full twenty-four hours
- Accounts for the increased sensitivity to noise at night, when most people are asleep
- Allows composite measurements to capture all sources of community noise combined
- Allow quantitative comparison of transit noise with other community noises
- Is the designated metric of choice of other Federal agencies (e.g., HUD, FAA, and EPA) and has wide international acceptance

# Appendix C: Background for Transit Noise Impact Criteria

The noise criteria presented in Section 4.1 of this manual have been developed based on well-documented criteria and research on human response to community noise. The primary goals in developing the noise criteria were to ensure that the impact limits are firmly founded in scientific studies, realistically based on noise levels associated with new transit projects, and represent a reasonable balance between community benefit and project costs. This appendix provides background information on the development of these criteria.

## C.1 Relevant Literature

The following is an annotated list of the documents that are particularly relevant to the noise impact criteria:

1. **U.S. EPA's "Levels Document"**[74]
   This report identifies noise levels consistent with the protection of public health and welfare against hearing loss, annoyance, and activity interference. It has been used as the basis of numerous community noise standards and ordinances.

2. **Committee on Hearing, Bioacoustics and Biomechanics (CHABA) Working Group 69, "Guidelines for Preparing Environmental Impact Statements on Noise"**[75]
   This report was the result of deliberations by a group of leading acoustical scientists with the goal of developing a uniform national method for noise impact assessment. Although the CHABA's proposed approach has not been adopted, the report serves as an excellent resource documenting research in noise effects. It provides a strong scientific basis for quantifying impacts in terms of $L_{dn}$.

3. **American Public Transportation Association (APTA) Guidelines for Design of Rapid Transit Facilities**[76]
   The noise and vibration sections of the APTA Guidelines have been used successfully in the past for the design of rail transit facilities. The APTA Guidelines include criteria for acceptable community noise and vibration. Experience has shown that meeting the APTA Guidelines will usually result in acceptable noise levels; but the metric used in the APTA Guidelines is not appropriate for environmental assessment purposes.

   The APTA Guidelines criteria are in terms of $L_{max}$ for conventional RRT vehicles, and they cannot be used to compare among different modes of transit. Since the APTA Guidelines are expressed in terms of maximum passby noise, they are not sensitive to the frequency or duration of noise events for transit modes other than conventional RRT operations with 5 to 10 minute headways. Therefore, the APTA criteria are questionable for assessing the noise impact of other transit modes that differ from conventional rapid transit with respect to source emission levels and operating characteristics (e.g., commuter rail, AGT, and a variety of bus projects).

4. **Synthesis of Social Surveys on Noise Annoyance**[77]
   In 1978, Theodore J. Schultz, an internationally known acoustical scientist, synthesized the results of a large number of social surveys concerning annoyance due to transportation noise. A group of these surveys were remarkably consistent, and the author proposed that their average

results be taken as the best available prediction of transportation noise annoyance. This synthesis has received essentially unanimous acceptance by acoustical scientists and engineers. The "universal" transportation response curve developed by Schultz (Figure 3-7) shows that the percent of the population highly annoyed by transportation noise increases from zero at an $L_{dn}$ of approximately 50 dBA to 100% when $L_{dn}$ is approximately 90 dBA. Most importantly, this curve indicates that for the same increase in $L_{dn}$, there is a greater increase in the number of people highly annoyed at high noise levels than at low noise levels. For example, a 5 dB increase at low ambient levels (40 - 50 dB) has less impact than at higher ambient levels (65 - 75 dB). A recent update of the original research containing several railroad, transit, and street traffic noise surveys, confirming the shape of the original Schultz curve [12].

5. **HUD's Standards**[19]
   HUD has developed noise standards, criteria, and guidelines to ensure that housing projects supported by HUD achieve the goal of a suitable living environment. The HUD acceptability standards define 65 dB ($L_{dn}$) as the threshold for a normally unacceptable living environment (moderate impact for FTA) and 75 dB ($L_{dn}$) as the threshold for an unacceptable living environment (severe impact for FTA).

## C.2 Basis for Noise Impact Criteria Curves

The lower curve in Figure 4-2 represents the onset of moderate impact and is based on the following considerations:

- The EPA finding that a community noise level of $L_{dn}$ less than or equal to 55 dBA is "requisite to protect public health and welfare with an adequate margin of safety."[72]
- The conclusion by EPA and others that a 5 dB increase in $L_{dn}$ or $L_{eq(1hr)}$ is the minimum required for a change in community reaction.
- The research concludes that there are very few people highly annoyed when the $L_{dn}$ is 50 dBA, and that an increase in $L_{dn}$ from 50 dBA to 55 dBA results in an average of 2% more people highly annoyed (Figure 3-7).

The increase in noise level from an existing ambient level of 50 dBA to a cumulative level of 55 dBA because of a project is found to cause minimal impact, with 2% of people highly annoyed, as described in the bullets above. This is considered the lowest threshold where impact starts to occur. Therefore, for an existing ambient noise level of 50 dBA, the curve representing the onset of moderate impact is at 53 dBA, the combination of which yields a cumulative level of 55 dBA by decibel addition. The remainder of the lower curve in Figure 4-2 was determined from the annoyance curve (Figure 3-7) by allowing a fixed 2% increase in annoyance at other levels of existing ambient noise. As cumulative noise increases, the increment to attain the same 2% increase in highly annoyed people is smaller. While it takes a 5-dB noise increase to cause a 2% increase in highly annoyed people at an existing ambient noise level of 50 dB, an increase of only 1 dB causes a 2% increase of highly annoyed people at an existing ambient noise level of 70 dBA.

The upper curve in Figure 4-2 represents the onset of severe impact based on a total noise level, corresponding to a higher degree of impact. The severe noise impact curve is based on the following considerations:

- HUD defines an $L_{dn}$ of 65 as the onset of a normally unacceptable noise zone (moderate impact for FTA) in its environmental noise standards [19]. FAA considers that residential land uses are not compatible with noise environments where $L_{dn}$ is greater than 65 dBA (20).

- An increase of 5 dB in $L_{dn}$ or $L_{eq(t)}$ is commonly assumed as the minimum required increase for a change in community reaction.
- The research concludes that an increase of 5 dB in $L_{dn}$ or $L_{eq(t)}$ represents a 6.5% increase in the number of people highly annoyed (Figure 3-7).

The increase in noise level from an existing ambient level of 60 dBA to a cumulative level of 65 dBA caused by a project represents a change from an acceptable noise environment to the threshold of an unacceptable noise environment. This is considered the level at which severe impact starts to occur with a 6.5% increase in the number of people highly annoyed as described in the bullets above. Therefore, for an existing ambient noise level of 60 dBA, the curve representing the onset of severe impact is at 63 dBA, the combination of which yields a cumulative level of 65 dBA by decibel addition. The remainder of the upper curve in Figure 4-2 was determined from the annoyance curve (Figure 3-7) by allowing a fixed increase of the 6.5% increase in annoyance at all existing ambient noise levels.

Both curves incorporate a maximum limit for the transit project noise in noise-sensitive areas. Independent of existing noise levels, moderate impact for land use categories 1 and 2 is considered to occur whenever the transit $L_{dn}$ equals or exceeds 65 dBA, and severe impact occurs whenever the transit $L_{dn}$ equals or exceeds 75 dBA. These absolute limits are intended to restrict activity interference caused by the transit project alone.

Both curves also incorporate a maximum limit for cumulative noise increase at low existing noise levels (below approximately 45 dBA). This is a conservative limit that reflects the lack of social survey data on people's reactions to noise at such low ambient levels. Like the FHWA approach in assessing the relative impact of a highway project, the transit noise criteria include limits on noise increase of 10 dB and 15 dB for moderate impact and severe impact, respectively, relative to the existing noise level.

Note that due to the types of land use included in category 3, the criteria allow the project noise for category 3 sites to be 5 dB greater than for category 1 and category 2 sites. This difference is reflected by the offset in the vertical scale on the right side of Figure 4-2. Aside from active parks, which are clearly less sensitive to noise than category 1 and 2 sites, category 3 sites include primarily indoor activities. Therefore, the criteria account for some noise reduction from the building structure.

## C.3 Equations for Noise Impact Criteria Curves

The equations for the noise impact criteria curves shown in Figure 4-2 are included in this section. These equations may be useful when performing the noise assessment methodology using spreadsheets, computer programs, or other analysis tools. Otherwise, such mathematical detail is generally not necessary to implement the criteria, and direct use of Figure 4-2 is adequate and less time-consuming.

A total of four continuous curves are included in the criteria, creating two threshold curves for moderate and severe impact for category 1 and 2, and two curves for category 3 (See Table C-1). Note that for each level of impact, the overall curves for categories 1 and 2 are offset by 5 dB from category 3. While each curve is graphically continuous, each one is defined by a set of three discrete equations. These equations are approximately continuous at the transition points. The following is a description of the three equations:

- The first equation in each set is a linear relationship, representing the portion of the curve in which the existing noise exposure is low, and the allowable increase is limited to 10 dB and 15 dB for moderate impact and severe impact, respectively.

- The second equation in each set represents the impact threshold over the range of existing noise exposure for which a fixed percentage of increase in annoyance is allowed, as described in Appendix C.2. This curve is a third-order, polynomial approximation derived from the Schultz curve(75) and covers the range of noise exposure encountered in most populated areas. This curve is used for determining noise impact in most cases for transit projects.
- The third equation represents the absolute limit of project noise imposed by the criteria for areas with high existing noise exposure. For land use category 1 and 2, the absolute limit is 65 dBA for moderate impact and 70 dBA for severe impact. For land use category 3, the absolute limit is 75 dBA for moderate impact and 80 dBA for severe impact.

**Table C-1 Threshold of Moderate and Severe Impacts**

**Threshold of Moderate Impact**

***Category 1 and 2***

$$L_p = \begin{cases} 11.450 + 0.953L_E, & L_E < 42 \\ 71.662 - 1.164L_E + 0.018{L_E}^2 - 4.088 \times 10^{-5}{L_E}^3, & 42 \le L_E \le 71 \\ 65, & L_E > 71 \end{cases} \quad \textbf{Eq. C- 12}$$

***Category 3***

$$L_p = \begin{cases} 16.450 + 0.953L_E, & L_E < 42 \\ 76.662 - 1.164L_E + 0.018{L_E}^2 - 4.088 \times 10^{-5}{L_E}^3, & 42 \le L_E \le 71 \\ 70, & L_E > 71 \end{cases} \quad \textbf{Eq. C- 13}$$

**Threshold of Severe Impact**

***Category 1 and 2***

$$L_p = \begin{cases} 17.322 + 0.940L_E, & L_E < 44 \\ 96.725 - 1.992L_E + 3.02 \times 10^{-2}{L_E}^2 - 1.043 \times 10^{-4}{L_E}^3, & 44 \le L_E \le 77 \\ 75, & L_E > 77 \end{cases} \quad \textbf{Eq. C- 14}$$

***Category 3***

$$L_p = \begin{cases} 22.322 + 0.940L_E, & L_E < 44 \\ 101.725 - 1.992L_E + 3.02 \times 10^{-2}{L_E}^2 - 1.043 \times 10^{-4}{L_E}^3, & 44 \le L_E \le 77 \\ 80, & L_E > 77 \end{cases} \quad \textbf{Eq. C- 15}$$

$L_E$ = the existing noise exposure in terms of $L_{dn}$ or $L_{eq(1hr)}$
$L_p$ = the project noise exposure which determines impact in terms of $L_{dn}$ or $L_{eq(1hr)}$)

# Appendix D: Clustering Receivers of Interest

This appendix supplements the information in Section 4.5 on clustering receivers of interest.

The general approach to selecting noise-sensitive receivers in the study area is included in Section 4.5, Step 1. General guidelines are as follows:

- Select the following types of receivers to evaluate individually:
  - Every major noise-sensitive public building
  - Every isolated residence
  - Every relatively small outdoor noise-sensitive area
- Residential neighborhoods and relatively large outdoor noise-sensitive areas can often be clustered and represented by a single receiver.

Clustering similar receivers reduces the number of computations needed later, especially for large-scale projects where a greater number of noise-sensitive sites may be affected. For this approach to be effective, it is essential that the representative receiver accurately represents the noise environment of the cluster.

The major steps in clustering receivers include:

1. First, cluster receivers according to approximately equal exposure to the primary project noise source. These areas typically run parallel to a linear project or circle major stationary sources relative to the proposed project.
2. Next, cluster receivers according to major sources of ambient noise. These areas typically run parallel to or encircle major sources of ambient noise.
3. Then, cluster receivers according to changes in the project layout or operations along the corridor.
4. Finally, select a representative receiver for each cluster.

The major steps are expanded below and include instructions on how to draw cluster boundaries on a map.

1. **Boundaries along the proposed project** – Draw cluster boundaries along the proposed project as described below to separate clusters based on distance from the project. Draw these cluster boundaries for the project sources listed as major in Table 4-19.

   **Within both residential and noise-sensitive outdoor areas:**

   - **Primary project source**
     Draw cluster boundaries at the following distances from the near edge of the primary project source: 0 ft, 50 ft, 100 ft, 200 ft, 400 ft, and 800 ft. For linear sources, such as a rail line, draw these boundaries as lines parallel to the proposed ROW line. For stationary sources, draw these boundaries as approximate circles around the source, starting at the property line.

     Do not extend boundaries beyond the noise study area, identified in the Noise Screening Procedure in Section 4.3 or the General Noise Assessment of Section 4.4.

- **Remaining project sources** – Repeat the process for the primary project source for all other project listed as major in Table 4-19, such as substations and crossing signals. If several project sources are located approximately together, only consider one source, since the others would produce approximately the same boundary.

  It is good practice to optimize the number of clusters for a project to simplify the procedure.

**Where rows of buildings parallel the transit corridor:**

- Ensure that cluster boundaries fall between the following rows of buildings, counting back away from the proposed project:
  - Between rows 1 and 2
  - Between rows 2 and 3
  - Between rows 3 and 4
- Add cluster boundaries between these rows if not already included.

2. **Boundaries along sources of ambient noise** – Draw cluster boundaries along all major sources of ambient noise based upon distance from these sources, as described below.
   - Draw cluster boundaries along all interstates and major roadway arterials at the following distances from the near edge of the roadway: 0 ft, 100 ft, 200 ft, and 500 ft.
   - Draw cluster boundaries along all other roadways that have state or county numbering at 0 ft and 100 ft from the near edge of the roadway.
   - For all major industrial sources of noise, draw cluster boundaries that encircle the source at the following distances from the near property line of the source: 0 ft, 100 ft, 200 ft, and 400 ft.

3. **Boundaries based on changes in project layout or operations** – Further subdivision is needed to account for changes in project noise where proposed project layout or operating conditions change considerably along the corridor. Draw a cluster boundary perpendicular to the corridor extending straight outward to both sides at the following locations:
   - Where parallel tracks previously separated by more than approximately 100 ft are moved closer together
   - Approximately where speed and/or throttle are reduced when approaching stations and where steady service speed is reached after departing stations
   - Approximately 200 ft up and down the line from grade crossing bells
   - At transitions from jointed to welded rail
   - At transitions from one type of cross section to another including on structure, on fill, at-grade and in cut
   - At transitions from open terrain to heavily wooded terrain
   - At transitions between areas free of locomotive horn noise and areas subject to this noise source
   - Any other positions along the line where project noise is expected to change considerably, such as up and down the line from tight curves where wheels may squeal

4. **Selection of a representative receiver from each cluster** – Determine a representative receiver for each cluster boundary drawn in the steps above.
   - **Residential clusters**
     Select a representative receiver within the cluster at the house closest to the proposed project. If this receiver is not the clear choice, select the receiver furthest from major sources of ambient noise.
   - **Outdoor noise-sensitive clusters (e.g., urban park or amphitheater)**

Select a representative receiver within the cluster at the closest point of active noise-sensitive use. If this receiver is not the clear choice, select the receiver farther from major sources of ambient noise.

Note that some clusters may fall between areas with receivers of interest. This could occur when operational changes or track layouts change in an open, undeveloped area. Retain these clusters. Do not merge them with adjacent clusters. Do not select a representative receiver of interest from them.

## Example D-1 Clustering Receivers

**Receivers of Interest and Clustering Receivers**

In this hypothetical situation, a new rail transit line, labeled "new rail line" in Figure D-1, is proposed along a major urban street with commercial land use. A residential area is located adjacent to the commercial strip, located approximately one-half block from the proposed transit alignment. A major arterial, labeled "highway," crosses the alignment.

**Cluster Receivers Along the Primary Project Source**

*Primary Project Source*

The primary project source in this example is the new rail line. Boundaries are first drawn at distances of 0 ft from the right-of- way line (edge of the street in this example), 50 ft, 100 ft, 200 ft, 400 ft, and 800 ft, (Figure D-1). Distances are labeled at the top of the figure.

This is proposed to be a constant speed section of track, so there are no changes in boundaries due to changes in operations along the corridor. Moreover, no other project sources are shown here, but if there had been a station with a parking lot, lines would have been drawn enveloping the station site at the specified distances from the property line.

*Rows of Buildings Parallel to the Transit Corridor*

This example includes rows of buildings parallel to the transit corridor. The first set of boundary lines satisfies the requirement that cluster boundaries fall between rows 1 and 2, and between rows 2 and 3, but there is no line between rows 4 and 5. Consequently, a cluster boundary labeled "R" at the top of the figure has been drawn between the 4th and 5th row of buildings.

**Cluster Receivers Along the Primary Project Source**

The roadway arterial (labeled "highway") is the only major source of ambient noise shown.

Cluster boundaries are drawn at 0 ft, 100 ft, 200 ft and 500 ft from the near edge of the roadway on both sides. These lines are shown with distances labeled at the side of the figure.

**Select a Representative Receiver from Each Cluster**

Representative receivers are shown as filled circles in Figure D-1. Note that the receivers labeled with "REC" are primarily for use in Appendix E.

Locate receiver, "REC 3". Note that this cluster is located at the outer edge of influence from the major source ("highway") where local street traffic is the dominant source for ambient noise (in practice, this would be verified by a measurement).

"REC 3" is chosen to represent this cluster because it is among the houses closest to the proposed project source in this cluster and it is in the middle of the block affected by the dominant local street. Ambient noise levels at one end of the cluster may be influenced more by the highway and the other end may be affected more by the cross street, but the majority of the cluster would be represented by receiver site "REC 3."

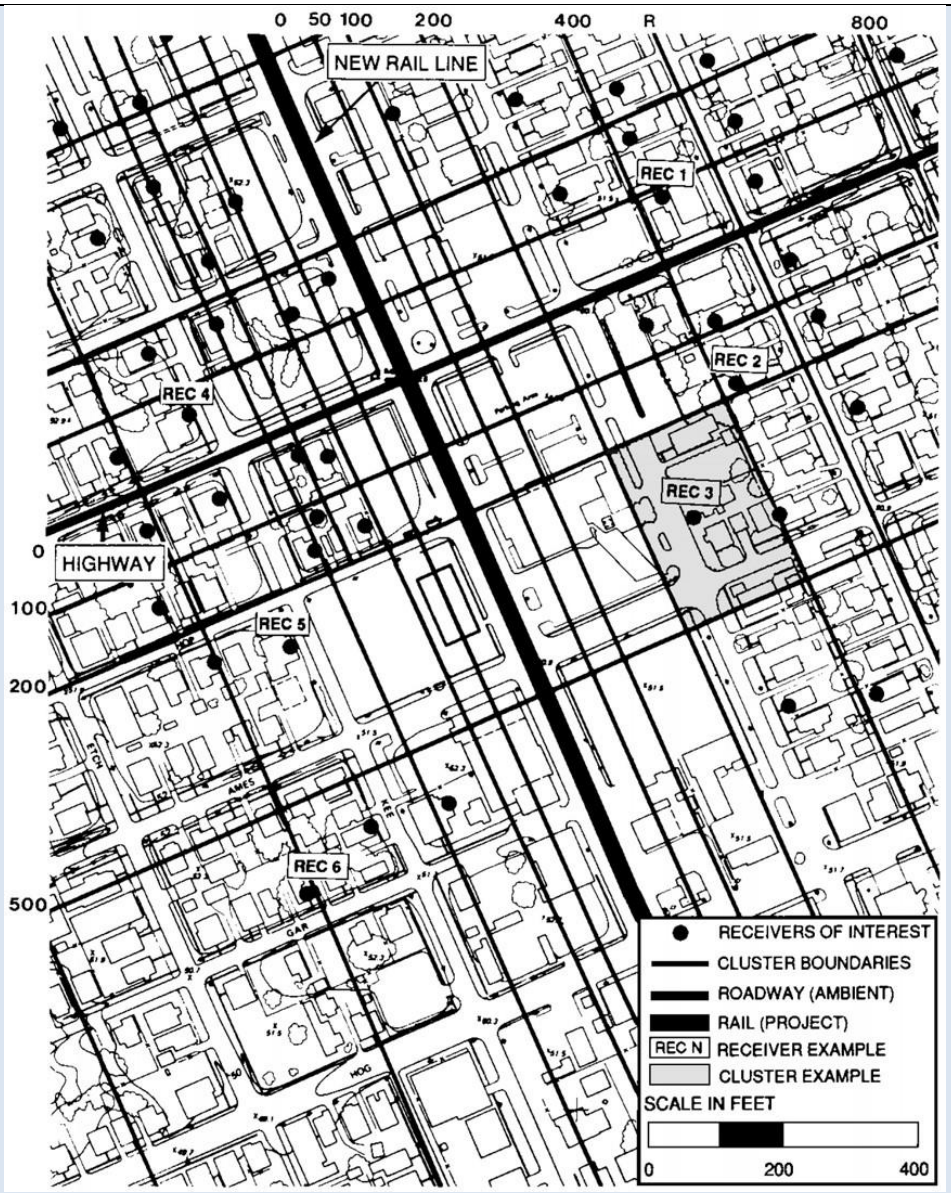


**Figure D-1 Example of Receiver Map Showing Cluster Boundaries**

# Appendix E: Determining Existing Noise

Different options of determining existing noise, including full measurement, computation from partial measurements, and tabular look-up, are described in Section 4.5, Step 5. This appendix provides additional details associated with each method and examples of when each method could be used.

Additional details on the methods for estimating existing noise are provided below:

**Option 1: $L_{eq(1hr)}$ measurement (non-residential)** – Full one-hour measurements are recommended to determine existing noise for non-residential receivers of interest. These measurements are preferred over all other options and will accurately represent the $L_{eq(1hr)}$. The following procedures apply to these full-duration measurements:

- Measure $L_{eq(1hr)}$ at the receiver of interest during a typical hour of use on two non-successive days. Choose the hour in which maximum project activity will occur. The $L_{eq(1hr)}$ will be accurately represented using this method. Typically, measuring between noon Monday and noon Friday is recommended, but weekend days may be more appropriate for places of worship.
- Position the measurement microphone for all sites as shown in Figure 4-19, considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.

**Option 2: $L_{dn}$ measurement (residential) –** Full 24-hour measurements are recommended to determine ambient noise for residential receivers of interest. These measurements are preferred over all other options and will accurately represent the $L_{dn}$. The following procedures apply to these full-duration measurements:

- Measure a full 24-hour $L_{dn}$ at the receiver of interest for a single weekday (generally between noon Monday and noon Friday).
- Position the measurement microphone for all sites as shown in Figure 4-19 considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.

**Option 3: $L_{dn}$ computation of $L_{dn}$ from 3 partial $L_{eq(1hr)}$ measurements (residential)** – An alternative way to determine $L_{dn}$ is to measure $L_{eq(1hr)}$ for three typical hours of the day, then compute the $L_{dn}$ from these three $L_{eq(1hr)}$ measurements. This method is less precise than its full-duration measurement. The following procedures apply to this partial-duration measurement method for $L_{dn}$:

- Measure the $L_{eq(1hr)}$ during each of the following time periods:
  - During peak-hour roadway traffic
  - Midday, between the morning and afternoon roadway-traffic peak hours
  - During late night between midnight and 5 a.m.
- Position the measurement microphone for all sites as shown in Figure 4-19 considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.
- Compute the $L_{dn}$ using the equation below

$$L_{dn} \approx 10\log(3 \times 10^{\frac{L_{eq.peakhour}-2}{10}} + 12 \times 10^{\frac{L_{eq.midday}-2}{10}} + 9 \times 10^{\frac{L_{eq.latenight}+8}{10}}) - 13.8$$ **Eq. E-1**

The resulting $L_{dn}$ will be slightly underestimated due to the adjustment to the measured levels in these equations. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$. If using this method, a minimum time duration of one hour should be used for each measurement period in computing an Ldn.

**Option 4: Computation of $L_{dn}$ from 1 partial $L_{eq(1hr)}$ measurement (residential)** – $L_{dn}$ can also be determined by measuring $L_{eq(1hr)}$ for one hour of the day, and then computing $L_{dn}$ from the $L_{eq(1hr)}$. This method is less precise than computing $L_{dn}$ from 3 $L_{eq(1hr)}$ measurements. This method may be useful for projects with are many sites assessed by the General Noise Assessment. This method may also be appropriate when determining if a particular receiver of interest represents a cluster in a Detailed Noise Analysis. The following procedures apply to this partial-duration measurement option for $L_{dn}$:

- Measure the $L_{eq(1hr)}$ for the loudest hour of project-related activity during hours of noise sensitivity. If this hour is not selected, other hours may be used with the understanding that the estimate is less precise.
- Position the measurement microphone for all sites as shown in Figure 4-19, considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.
- Convert the measured hourly $L_{eq(1hr)}$ to $L_{dn}$ with the appropriate equation below.

For measurements between 7 a.m. and 7 p.m.:

$$L_{dn} \approx L_{eq} - 2$$ **Eq. E-2**

For measurements between 7 p.m. and 10 p.m.:

$$L_{dn} \approx L_{eq} + 3$$ **Eq. E-3**

For measurements between 10 p.m. and 7 a.m.:

$$L_{dn} \approx L_{eq} + 8$$ **Eq. E-4**

The resulting $L_{dn}$ will be moderately underestimated due to the use of the adjustment constants in these equations. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$. If using this method, a minimum time duration of one hour should be used for each measurement period in computing an Ldn.

**Option 5: Computation of $L_{eq(1hr)}$ or $L_{dn}$ from $L_{eq(1hr)}$ or $L_{dn}$ of a comparable site (all land uses)** – Computing $L_{eq(1hr)}$ or $L_{dn}$ from the $L_{eq(1hr)}$ or $L_{dn}$ of a comparable site where the ambient noise is dominated by the same source that is comparable in precision to Option 4. This method can be used to characterize noise in several neighborhoods by using a single representative receiver. It is critical that the measurement site has a similar noise environment to all areas represented. If measurements made by others are available and the sites are equivalent, the existing measurements can be used to reduce the amount of project noise monitoring. The following procedures apply to this method of determining of ambient noise:

- Choose another receiver that is comparable to the receiver (CompRec) of interest with the following:
  - The same source of dominant ambient noise

- The ambient level of the comparable receiver was measured according to Option 1 or Option 2 above
- The ambient measurement at the comparable receiver was made in direct view of the major source of ambient noise, unshielded by noise barriers, terrain, rows of buildings, or dense tree zones

- Determine the following from a plan or aerial photograph:
  - The distance ($D_{CompRec}$) from the comparable receiver to the near edge of the ambient source
  - The distance ($D_{Rec}$) from this receiver of interest to the near edge of the ambient source
- Determine the number of rows of buildings (N) that intervene between the receiver of interest and the ambient source.
- Compute the ambient level at the receiver of interest (Rec) with the appropriate equation below

If roadway sources dominate:

$$L_{Rec} \approx L_{CompRec} - 15\log(\frac{D_{Rec}}{D_{CompRec}}) - 3N \qquad \textbf{Eq. E-5}$$

If other sources dominate:

$$L_{Rec} \approx L_{CompRec} - 25\log(\frac{D_{Rec}}{D_{CompRec}}) - 3N \qquad \textbf{Eq. E-6}$$

The resulting $L_{Rec}$ will be moderately underestimated. This underestimation is intended to compensate for the reduced precision of the computed $L_{dn}$.

**Option 6: Estimation of $L_{dn}$ by table look-up (all land uses)** – The least precise way to determine the ambient noise is to estimate the level using a table. A tabular look-up can be used to establish baseline conditions for a General Noise Assessment if a noise measurement cannot be made. This method should not be used for a Detailed Noise Analysis. The following instruction applies to this method of determining of ambient noise:

Estimate either the $L_{eq(1hr)}$ or the $L_{dn}$ using Table 4-17 based on distance from major roadways, rail lines, or upon population densities. In general, these tabulated values are substantially underestimated.

The underestimation is intended to compensate for the reduced precision of the estimated ambients.

**Examples –** Examples of when each method of determining existing noise may be appropriate are provided below using the example from Appendix D. Existing noise at the receivers labeled "REC" in Figure D-1 could be estimated as follows:

- **Option 1: $L_{eq(1hr)}$ measurement** – Existing noise at REC 1 is due to the highway at the side of this church. $L_{eq(1hr)}$ can be measured during a typical church hour.
- **Option 2: $L_{dn}$ measurement –** Existing noise at the residence REC 2 is due to a combination of the highway and local streets. $L_{dn}$ can be measured for a full 24-hours.
- **Option 3: $L_{dn}$ computation of $L_{dn}$ from 3 partial $L_{eq(1hr)}$ measurements** – Existing noise at the residence REC 3 is due to the street in front of this residence. $L_{dn}$ can be computed from three $L_{eq(1hr)}$ measurements.

- **Option 4: Computation of $L_{dn}$ from 1 partial $L_{eq(1hr)}$ measurement** – Existing noise at the residence REC 4 is due to the highway. Because the highway has a predictable diurnal pattern, $L_{dn}$ can be computed from one $L_{eq(1hr)}$ measurement.
- **Option 5: Computation of $L_{dn}$ from $L_{dn}$ of a comparable site** – Existing noise at the residence REC 5 is due to Kee Street. REC 3 is also affected by local street traffic and is a comparable distance from the highway. $L_{dn}$ for REC 5 can be computed based on the $L_{dn}$ at REC-3.
- **Option 6: Estimation of $L_{dn}$ by table look-up** – Existing noise at the residence REC 6 is due to local traffic. $L_{dn}$ can be estimated by tables based on population density along this corridor.

# Appendix F: Computing Source Levels from Measurements

This appendix contains the procedures for computing source reference levels ($SEL_{ref}$) from source measurements in cases where the source reference tables in Section 4.5, Step 2 indicate measurements are preferred, data are not available for the source of interest, or more precise data are required than available in the table.

Close-by source measurements for vehicle passbys may capture either the vehicle's sound exposure level (SEL) or maximum noise level ($L_{max}$). Both metrics can be measured directly by commonly available sound level meters. While the $L_{max}$ metric is not used for transit noise impact assessments, it can be used to compute SEL source reference levels. $L_{max}$ measurements are often available from transit-equipment manufacturers and some transit system equipment specifications may limit close-by $L_{max}$ levels.

Close-by source measurements for stationary sources capture the source's SEL over one source event, where the event duration may be chosen based on measurement convenience. The duration will factor out of the computation when the measured value is converted to reference operating conditions.

This manual does not specify elaborate methods for undertaking the close-by source measurements, but rather, provides general processes. It is required that all measurements conform to good engineering practice, guided by the standards of the American National Standards Institute and other such organizations (27, 28, 29).

This appendix presents information according to noise source as follows:

- Appendix F.1: Highway and rail vehicle passbys for vehicles of the same type
- Appendix F.2: Stationary sources
- Appendix F.3: $L_{max}$ for single train passbys (for trains of mixed consists)

## F. 1 Highway and Rail Vehicle Passbys

This section provides information on appropriate conditions for vehicle passby measurements, instructions on converting measurements made under non-reference conditions to source reference levels, and examples of these computations.

The following conditions are required for vehicle passbys, in addition to good engineering practice:

- Measured vehicles must be representative of project vehicles in all aspects, including representative acceleration and speed conditions for buses.
- Track must be relatively free of corrugations and train wheels relatively free of flats, unless these conditions are typical of the proposed project.
- Road surfaces must be smooth and dry, unless these conditions are typical of the proposed project.
- Perpendicular distance between the measurement position and the source's centerline must be 100 ft or less.
- Vehicle speed must be 30 mph or greater, unless typical project speeds are less than that.
- No noise barriers, terrain, buildings, or dense tree zones may break the lines-of-sight between the source and the measurement position.

When close-by source measurements are made under non-reference conditions, use the instructions below and the equations in Table F-1 to convert the measured values to source reference levels. For rail vehicles, measure/convert a group of locomotives or a group of cars separately. This computation requires that all measured vehicles be of the same type. For trains of mixed consists, see Appendix F.3.

**SEL measured for a highway-vehicle passby, or a passby of a group of identical rail vehicles**

- Collect the following input information:
  - $SEL_{meas}$, the measured SEL for the vehicle passby
  - N, the consist of the measured group of rail cars or group of locomotives
  - T, the average throttle setting of the measured diesel-powered locomotive(s)
  - $S_{meas}$, the measured passby speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the Source Reference Level $SEL_{ref}$, using Eq. F-1.

**$L_{max}$ measured for a passby of a group of identical rail vehicles**

- Collect the following input information:
  - $L_{max}$, measured for the group passby
  - N, the consist of the measured group of rail cars or group of locomotives
  - T, the average throttle setting of the measured diesel-powered locomotive(s)
  - $S_{meas}$, the measured passby speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
  - $L_{meas}$, the total length of the measured group of locomotives or group of rail cars, in feet
- Compute the Source Reference Level $SEL_{ref}$, using either Eq. F-2 or Eq. F-3, as appropriate, for locomotives or rail cars.

**$L_{max}$ measured for a highway-vehicle passby**

- Collect the following input information:
  - $L_{max}$, measured for the highway-vehicle passby
  - $S_{meas}$, the vehicle speed, in miles per hour
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the Source Reference Level, SELref, using Eq. F-4.

**Table F-1 Conversion to Source Reference Levels at 50 ft – Highway and Rail Sources**

| Measured | Source | Equation | |
|---|---|---|---|
| SEL | Vehicle passby | $SEL_{ref} = SEL_{meas} + 10\log(\frac{S_{meas}}{50}) + 10log(\frac{D_{meas}}{50}) + C_{consist} + C_{emissions}$ | **Eq. F-1** |
| $L_{max}$ | Rail-vehicle passby, locomotives only | $SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log(2 \propto) + C_{consist} + C_{emissions} + 3.3$ | **Eq. F-2** |
| | Rail-vehicle passby, cars only | $SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log\ [2 \propto + \sin(2 \propto)] + C_{consist} + C_{emissions} + 3.3$ | **Eq. F-3** |
| | Highway-vehicle passby | $SEL_{ref} = L_{Amax} + 20\log(\frac{D_{meas}}{50}) + C_{emissions} + 3.3$ | **Eq. F-4** |

$S_{meas}$ = speed of measured vehicle(s), mph

$D_{meas}$ = closest distance between measurement position and source, ft

$C_{consist}$ = 0 for buses and automobiles
$-10\log(N_{Cars})$ for locomotives and rail cars
where N is the number of locomotives or rail cars in the measured group

$C_{emissions}$ = 0 for T < 6 for locomotives
-2 (T-5) for T ≥ 6
where T is average throttle setting of measured diesel – electric locomotive(s)

$-30\log(\frac{S_{meas}}{50})$ for rail cars

$-25\log(\frac{S_{meas}}{50})$ for buses

$-38.1\log(\frac{S_{meas}}{50})$ for automobiles

$E_{meas}$ = event duration of measurement, sec

$L_{meas}$ = total length of measured group of locomotives *or* rail cars, ft

$\propto$ = arctan( $\frac{L_{meas}}{2D_{meas}}$), rad

## Example F-1 Calculate $SEL_{ref}$ – Locomotives

**Computation of $SEL_{ref}$ from SEL Measurement of Fixed-guideway Source**

SEL was measured for a passby of two diesel-powered locomotives with the following conditions:

$SEL_{meas}$ = 90 dBA
$N_{Cars}$ = 2
T = 6
$S_{meas}$ = 55 mph
$D_{meas}$ = 65 ft

Compute the source reference level using Eq. F-1.

$$SEL_{ref} = SEL_{meas} + 10\log(\frac{S_{meas}}{50}) + 10log(\frac{D_{meas}}{50}) + C_{consist} + C_{emissions}$$
$$= 90 + 10\log\left(\frac{55}{50}\right) + 10\log\left(\frac{65}{50}\right) - 10\log(2) + (-2(6-5))$$
$$= 86.5 \text{ dBA}$$

## Example F-2 Calculate $SEL_{ref}$ – Rail Cars

**Computation of $SEL_{ref}$ from $L_{max}$ Measurement of Fixed-Guideway Source**

$L_{max}$ was measured for a passby of a 4-car consist of 70-ft long rail cars with the following conditions:

$L_{max}$ = 90 dBA
$N_{Cars}$ = 4
$S_{meas}$ = 70 mph
$D_{meas}$ = 65 ft
$L_{meas}$ = 280 ft
$\propto$ = 1.14

Compute the source reference level using Eq. F-3.

$$SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log\,[2 \propto + \sin(2 \propto)] + C_{consist} + C_{emissions} + 3.3$$
$$= 90 + 10\log(\frac{280}{50}) + 10\log(\frac{65}{50}) - 10\log\,\left[2(1.14) + \sin\left(2(1.14)\right)\right] - 10\log(4) - 30\log(\frac{70}{50}) + 3.3$$
$$= 86.7 \text{ dBA}$$

## Example F-3 Calculate $SEL_{ref}$ – Bus

**Computation of $SEL_{ref}$ from $L_{max}$ Measurement of Highway Vehicle Source**

$L_{max}$ was measured for a bus with the following conditions:

$L_{max}$ = 78 dBA
$D_{meas}$ = 80 ft
$S_{meas}$ = 40 mph

Compute the source reference level using Eq. F-4

$$SEL_{ref} = L_{max} + 20\log(\frac{D_{meas}}{50}) + C_{emissions} + 3.3$$
$$= 78 + 20\log(\frac{80}{50}) - 25\log(\frac{40}{50}) + 3.3$$
$$= 87.8 \text{ dBA}$$

## F.2 Stationary Sources

This section provides information on appropriate conditions for stationary source measurements, instructions on converting measurements made under non-reference conditions to source reference levels, and an example of this type of computation.

The following conditions are required for stationary sources, in addition to good engineering practice:

- Measured source operations must be representative of project operations in all aspects.
- The following ratio must be 2 or less, and the distance to the closest source component must be 200 ft or less.

$$\frac{Distance\ to\ the\ farthest\ source\ component}{Distance\ to\ the\ closest\ source\ component}$$

  If both conditions cannot simultaneously be met, separate close-by measurements of individual components of this source must be made, for which these distance conditions can be met.

- The following ratio must be 2 or less:

$$\frac{Lateral\ length\ of\ the\ source\ area}{Distance\ to\ the\ closest\ source\ component}$$

  The lateral length of the source area is measured perpendicular to the general line-of-sight between source and measurement positions.

  If this condition cannot be met, then make separate close-by measurements of individual components of this source, for which this condition can be met.

- No noise barriers, terrain, buildings, or dense tree zones may break the lines-of-sight between the source and the measurement position.

When close-by source measurements are made under non-reference conditions, use the instructions below and the equation in Table F- 2 to convert the measured values to source reference levels.

**SEL was measured for a stationary noise source**

- Collect the following input information:
  - $SEL_{meas}$, the measured SEL for the noise source, for whatever source "event" is convenient to measure
  - $E_{meas}$, the event duration, in seconds
  - $D_{meas}$, the closest distance between the measurement position and the source, in feet
- Compute the source reference level, SELref using Eq. F- 5.

**Table F-2 Conversion to Source Reference Levels at 50 ft - Stationary Sources**

| Measured | Source | Equation |
|---|---|---|
| SEL | Stationary noise source | $SEL_{ref} = SEL_{meas} - 10\log(\frac{E_{meas}}{3600}) + 20\log(\frac{D_{meas}}{50})$ **Eq. F- 5** |
| $S_{meas}$ = speed of measured vehicle(s), in miles per hour<br>$E_{meas}$ = event duration of measurement, in seconds<br>$D_{meas}$ = closest distance between measurement position and source, in feet | | |

## Example F-4 Calculate $SEL_{ref}$ – Signal Crossing

**Computation of $SEL_{ref}$ from SEL Measurement of Stationary Source**

SEL was measured for a signal crossing with the following conditions:

$SEL_{meas}$ = 70 dBA
$E_{meas}$ = 10 sec
$D_{meas}$ = 65 ft

Compute the source reference level using Eq. F-5.

$$SEL_{ref} = SEL_{meas} - 10\log(\frac{E_{meas}}{3600}) + 20\log(\frac{D_{meas}}{50})$$
$$= 70 - 10\log(\frac{10}{3600}) + 20\log(\frac{65}{50})$$
$$= 97.8 \text{ dBA}$$

## F.3 $L_{max}$ for Single Train Passby

This section provides procedures for the computation of $L_{max}$ for a single train passby. This procedure can be used to characterize trains of mixed consists using $L_{max}$. Follow the instructions below.

- Collect the following input information:
  - $SEL_{ref}$, from Section 4.5, specific to both the locomotive type and car type of the train
  - $N_{loco}$, the number of locomotives in the train
  - $N_{cars}$, the number of cars in the train
  - $L_{loco}$, the total length of the train's locomotive(s), in feet (or $N_{loco}$ unit length)
  - $L_{cars}$, the total length of the train's set of rail car(s), in feet (or $N_{cars}$ unit length)
  - S, the train speed, in miles per hour
  - D, the closest distance between the receiver of interest and the train, in feet

- Use the equations in Table F-3 to compute the following:
  - $L_{max.loco}$ for the locomotive(s) using Eq. F-6

- $L_{max.cars}$ for the rail car(s) using the Eq. F-7
- $L_{max.total}$, the larger $L_{max}$ from the locomotives(s) and rail car(s) is the $L_{max}$ for the total train passby, see Eq. F- 8.

**Table F-3 Conversion to Lmax at the Receiver, for a Single Train Passby**

| Source | Equation | |
|---|---|---|
| Locomotives | $L_{max.Loco} = SEL_{locos} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto) - 3.3$ | **Eq. F-6** |
| Rail Cars | $L_{max.Rcars} = SEL_{Rcars} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto + \sin(2 \propto)) - 3.3$ | **Eq. F-7** |
| Total Train | $L_{max.total} = max(L_{max.Loco}\ or\ L_{max.RCars})$ | **Eq. F-8** |

L = total length of measured group of locomotive(s) or rail car(s), ft

S = vehicle speed, mph

$\propto$ = arctan $\left(\frac{L}{2D}\right)$, rad

D = closest distance between receiver and source, ft

## Example F-5 Calculate $L_{max}$ – Train Passby

**Computation of $L_{max}$ for Train Passby**

Calculate the $L_{max}$ of commuter train at receiver of interest according to the following conditions:

$SEL_{ref}$ = 92 dBA for locomotives
= 82 dBA for rail cars
$N_{Loco}$ = 1
$N_{Cars}$ = 6
S = 43 miles per hour
D = 125 ft
$\propto_{locos}$ = 0.27
$\propto_{cars}$ = 1.03

The locomotive and rail cars each have a unit length (L) of 70 ft.

Determine the total length of the locomotive and rail cars.

$L_{Loco}$ = 70 ft
$L_{cars}$ = 420 ft

Compute $L_{max}$ for the locomotive using Eq. F-6:

$$L_{max.Loco} = SEL_{loco} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto) - 3.3$$
$$= 92 + 10log\left(\frac{43}{50}\right) - 10log\left(\frac{70}{50}\right) + 10\log(2 \times 0.27) - 3.3$$
$$= 84.0 \text{ dBA}$$

Compute $L_{max}$ for the rail cars using Eq. F-7:

$$L_{max.Rcars} = SEL_{Rcars} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto + \sin(2 \propto)) - 3.3$$
$$= 82 + 10log\left(\frac{43}{50}\right) - 10log\left(\frac{420}{50}\right) + 10\log((2 \times 1.03) + \sin(2 \times 1.03)) - 3.3$$
$$= 73.5 \text{ dBA}$$

Find the total $L_{max}$ for the train passby using Eq. F-8.

$$L_{max.total} = max(L_{max.Loco} \text{ or } L_{max.Rcars})$$
$$= 84.0 \text{ dBA}$$

# Appendix G: Non-Standard Modeling Procedures and Methodology

This manual provides guidance for preparing and reviewing the noise and vibration sections of environmental documents, as well as FTA-approved methods and procedures to determine the level of noise and vibration impact resulting from most federally-funded transit projects. Situations may arise, however, that are not explicitly covered in this manual. Professional judgment may be used to extend the basic methods to cover these cases, when appropriate. It is important to note that each project is unique and must be evaluated on a case-by-case basis. This appendix provides procedures for the use of non-standard noise and vibration modeling procedures and methodologies on public transportation projects.

**Submittal Procedure** – The procedure for using non-standard modeling procedures and methodology is as follows:

1. The transit project manager should contact the FTA Regional office to discuss the proposed methods and/or data not described in this manual prior to use of the non-standard approach.
2. The non-standard methodology should be documented according to the guidelines below as part of the technical report described in Section 8.2.

**Examples of Methods that Require Communication and Documentation** – The following noise and vibration analysis methods and data require communication with the FTA Regional office and documentation:

- Non-standard transit noise and vibration modeling and analysis methods not described in this manual (including non-standard adjustments, computations, and assumptions). This includes modifications to standard FTA noise and vibration methods.
- Non-standard transit noise and vibration reference data not described in this manual (including measured data, substitution data, data at non-standard reference distances and/or speeds, new transit noise sources, and transit noise sources operating in non-standard conditions).
- Non-standard transit noise and vibration impact criteria not described in this manual, including the maximum sound pressure level metric.
- Non-standard methods of evaluating construction noise, including non-standard construction noise impact criteria.
- Other noise modeling tools besides the FTA Noise Impact Assessment Spreadsheet or Traffic Noise Model (TNM®) for highway noise modeling, such as the development of a finite element method model.
- Any transit noise and vibration analysis that involves an impact area or noise source that is controversial.

**Documentation Guidelines** – The use of non-standard noise and vibration analysis methods or data requires the following documentation components in a technical memorandum attached to the environmental document:

- **Background**
  Briefly describe the transit project for which non-default methods or data are needed. State the dominant noise sources, type of analysis, and the impact criteria. Include any additional relevant information.

- **Statement of Benefit**
  Briefly describe the benefit of the non-default noise and vibration methods or data to the transit project. Describe the appropriateness of the non-default methods or data, as well as why the standard method or data are insufficient or problematic.

- **Non-standard Data Description**
  Describe the non-standard noise or vibration data in detail. Include source type, manufacturer, reference conditions (speed, distance, and operational conditions), name of data supplier, and a date associated with data development/measurement. For measured noise or vibration data, provide corresponding data documentation (such as a data measurement or a development report). For substitution data, a comparison between the non-standard data and corresponding standard data should be provided. Furthermore, if outside sources recommend the use of the non-standard data (such as a technical society, a standards organization, or a vehicle manufacturer), references for those recommendations should be included.

- **Non-standard Methods Description**
  Describe the non-standard noise or vibration analysis method in detail. This should include a detailed description and derivation of the method (including data used in the development of the method), a description of the usage of the method, and a comparison between the non-standard method and the corresponding standard method in the context of the transit analysis. If the method has been validated against measurement data, a description of that validation analysis should be provided. If the method is derived from another source (such as a different transportation noise or vibration method), provide corresponding documentation for that source. A description of how the method is conservative (for example, estimating the worst-case scenario) or some discussion on the probability of exceeding the predicted level should be provided. Furthermore, if outside sources recommend the use of the non-standard method (such as a technical society or standards organization), references for those recommendations should be included.

- **Non-standard Tools Description**
  Describe in detail any non-standard noise or vibration models that have not been explicitly recommended in this manual. This should include a detailed description of the tool (including data used, the computations implemented in the tool, any modifications or adjustments to the tool or the corresponding data, and the usage of the tool), a description of the validation of the tool (including reference documentation and validation analyses), and a comparison between the non-standard tool and the equivalent standard tool in the context of the transit analysis. Quantitative comparisons, such as the standard deviation of the non-standard tool and an estimate of the least mean square of differences between the standard and non-standard tools, should be provided and explained. A description of how the method is conservative (for example, estimating the worst-case scenario) or some discussion on the probability of exceeding the predicted level should be provided. If outside sources recommend the use of the non-standard tool (such as a technical society or standards organization), references for those recommendations should be included.

## ENDNOTES


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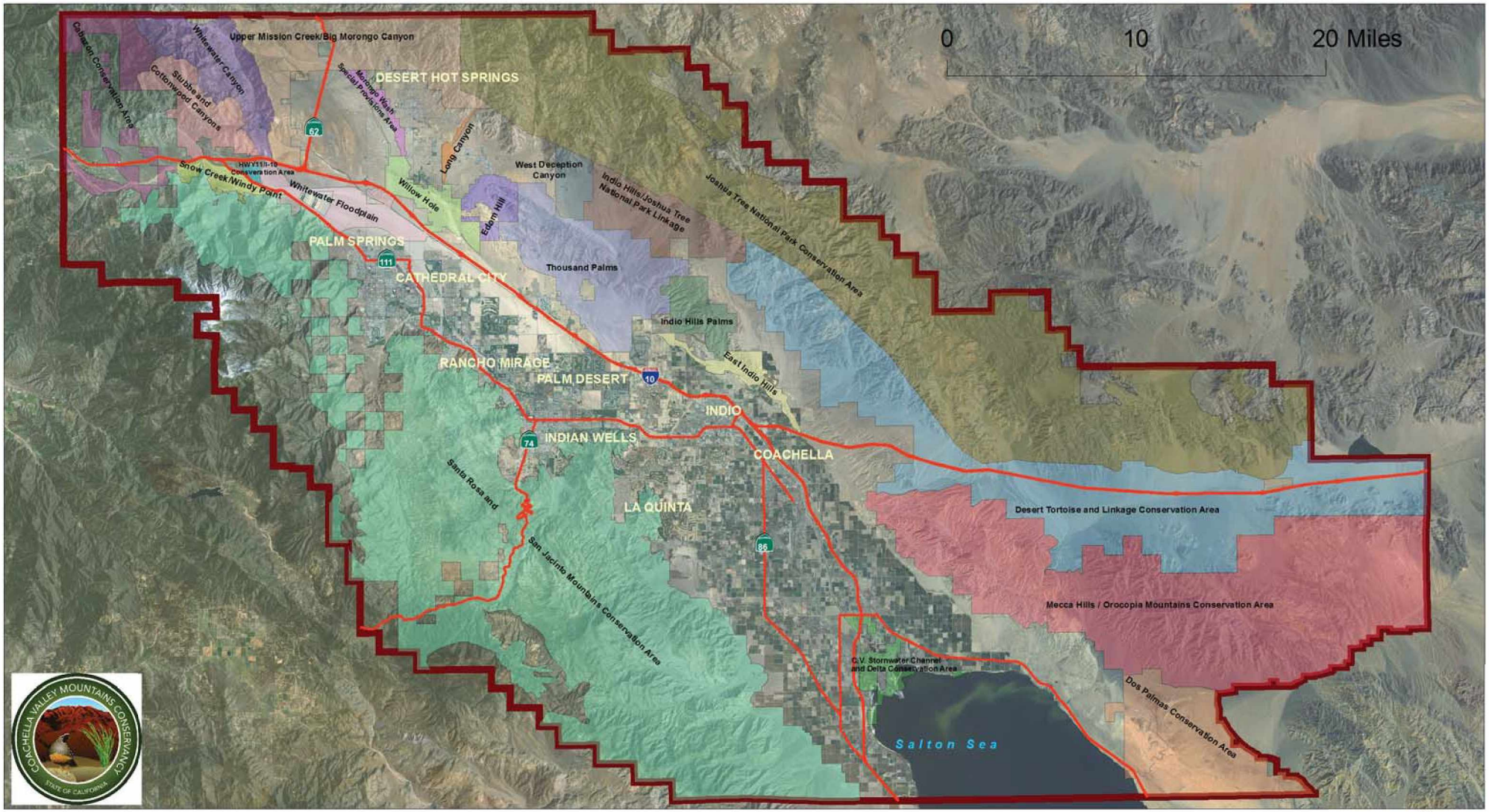
U.S. Department of Transportation

**Federal Transit Administration**

U.S. Department of Transportation
Federal Transit Administration
East Building
1200 New Jersey Avenue, SE
Washington, DC 20590
*https://www.transit.dot.gov/about/research-innovation*

# EXHIBIT E

# Conservancy Territory Map




**CONSERVATION AREAS**

- Cabazon Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Dos Palmas Conservation Area
- East Indio Hills Conservation Area
- Edom Hill Conservation Area
- Highway 111/I-10 Conservation Area
- Indio Hills Palms Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Joshua Tree National Park Conservation Area
- Long Canyon Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Morongo Wash Special Provisions Area
- Santa Rosa and San Jacinto Mountains Conservation Area
- Snow Creek/Windy Point Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Thousand Palms Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- West Deception Canyon Conservation Area
- Whitewater Canyon Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- Coachella Valley MSHCP Area

N
W
E
S

**EXHIBIT F**

# Land Use and Zoning Map

## City of Rancho Mirage

**69-825 Highway 111, Rancho Mirage, CA 92270**

CITY OF RANCHO MIRAGE ©
Development Services Department

| | | ACREAGE | | |
|---|---|---|---|---|
| | **RESIDENTIAL** | **City** | **Sphere** | **Total** |
| R-E | Residential Estate 1 du/ac Max. | 511 | | 511 |
| R-L-2 | Very Low Density 2 du/ac Max. | 2,102 | | 2,102 |
| R-L-3 | Low Density 3 du/ac Max. | 961 | | 961 |
| R-M | Medium Density 4 du/ac Max. | 1,154 | 801 | 1,955 |
| R-H | High Density 9 du/ac Max | 206 | 39 | 245 |
| MHP | Mobile Home Park 9 du/ac Max. | 95 | | 95 |
| H-R | Hillside Reserve 1 du/640 ac Max | 345 | | 345 |
| | **Sub-Total** | **5,374** | **840** | **6,214** |
| | **COMMERCIAL** | | | |
| O | Office | 112 | | 112 |
| C-N | Neighborhood Commercial | 103 | | 103 |
| C-G | General Commercial | 233 | | 233 |
| C-C | Community Commercial | 342 | 75 | 417 |
| Rs-H | Resort Hotel | 387 | | 387 |
| M-U | Mixed Use (Commercial/Office/Residential) | 71 | | 71 |
| R-I-C | Regional Interstate Commercial | 186 | | 186 |
| | **Sub-Total** | **1,435** | **75** | **1,510** |
| | **INSTITUTIONAL** | | | |
| P | Public/Quasi-Public | 83 | | 83 |
| P/CH ★ | City Hall | 9 | | 9 |
| P/FS | Fire Station | 4 | | 4 |
| P/H | Hospital | 132 | | 132 |
| P/S | School | 83 | 39 | 121 |
| P/L | Library | 10 | | 10 |
| P/PO | Post Office | 3 | | 3 |
| PU-SS | Utility Station | 9 | | 9 |
| | **Sub-Total** | **332** | **39** | **371** |
| | **OPEN SPACE** | | | |
| OS-PP | Public Park | 55 | 41 | 96 |
| MR | Mountain Reserve | 5,175 | | 5,175 |
| OS-PV | Private Open Space | 2,129 | 181 | 2,311 |
| OS-W | Floodways and Drainage Channels | 332 | | 332 |
| | **Sub-Total** | **7,691** | **222** | **7,913** |
| ROW | Right of Way | 1,239 | 27 | 1,265 |
| | **Totals** | **16,070** | **1,202** | **17,272** |
| | | **25** | **2** | **27 Sq. Miles** |

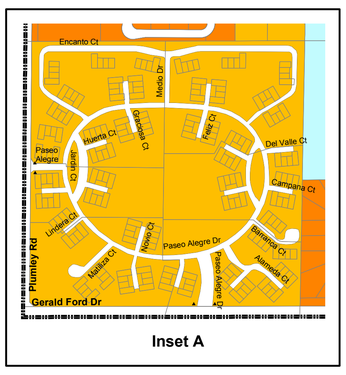
**OVERLAYS***

| | |
|---|---|
| Senior Overlay | 8 ac |
| Special Corner | 122 ac |
| 111 West Specific Plan | 121 ac |
| 111 East Specific Plan | 248 ac |
| Agua Caliente Band of Cahuilla Indians | 2,027 ac |

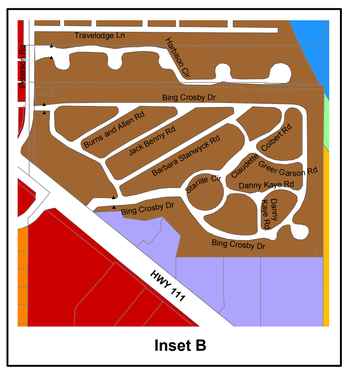
* These acreages are included in land use acreages above.

▲ ▲ Entry Gates to Private Communities

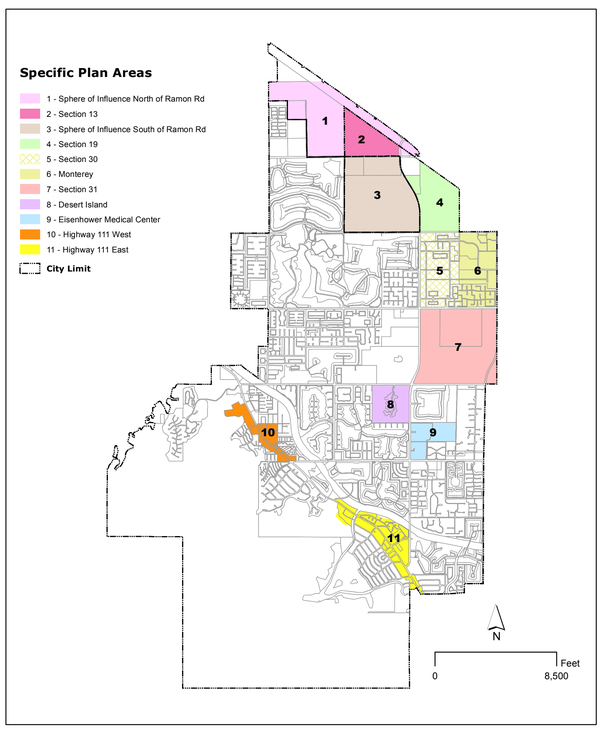
Note: Figures are subject to rounding.

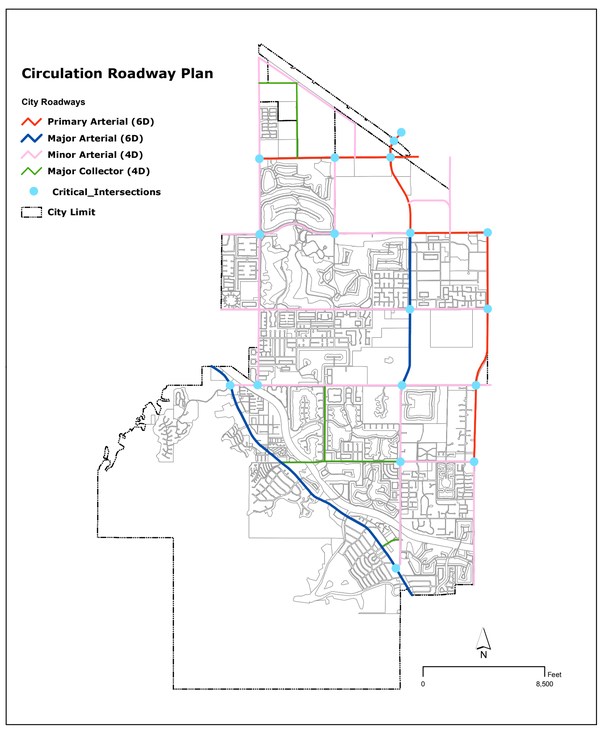



Inset A




Inset B




0 0.25 0.5 0.75 1 Miles

NORTH

August 3, 2013

**40th Year of Rancho Mirage Incorporation**

**Planning Division**

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March 24, 2023

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**RE: March 27, 2023, Architectural Review Board Meeting – City of Rancho Mirage's Ritz-Carlton Phase II Expansion Project (Agenda Item No. 1).**

Dear Mr. Torres:

On behalf of the Southwest Mountain States Regional Council of Carpenters ("**SWMSRCC**"), my Office is submitting these comments for the City of Rancho Mirage's ("**City**" or "**Lead Agency**") March 27, 2023, Architectural Review Board ("**ARB**") meeting for the Ritz-Carlton Phase II Expansion Project (Case Nos. EA21-0002, GPZMA21-0001, DA21-0002, MOD21-0004) ("**Project**").

The Project involves the construction of the Ritz-Carlton Residences Rancho Mirage on a 35.07-acre site located at 68900 Frank Sinatra Drive, Rancho Mirage, CA 92270 (APNs: 689-330-026, -028, -032, -034; 689-020-012, -014; 689-331-001, -018) in Riverside County. Nestled in the foothills of the Santa Rosa Mountains 650 feet above the Coachella Valley below, the 150,000-square-foot Project will consist of a one-to three-story apartment and condominium complex, along with a parking garage, hotel, 28,843 square feet of event space, 6,273 square feet of restaurant space, and 5,513 square feet for amenities. The Project Site includes an existing hotel that opened as a Ritz-Carlton in 1988 and was later rebranded. The Project would provide a total of 106 units and 381 vehicle parking spaces.

SWMSRCC is a labor union representing over 63,000 union carpenters in 10 states, including California, and has a strong interest in well-ordered land use planning and in addressing the environmental impacts of development projects. Some SWMSRCC

members live, work, and recreate in the City and the surrounding communities and would be directly affected by the Project's environmental impacts.

SWMSRCC expressly reserves the right to supplement these comments at or prior to hearings on the Project, and at any later hearing and proceeding related to this Project. Gov. Code, § 65009(b); PRC, § 21177(a); see *Bakersfield Citizens for Local Control v. Bakersfield* (2004) 124 Cal.App.4th 1184, 1199-1203; see also *Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal.App.4th 1109, 1121.

SWMSRCC incorporates by reference all comments raising issues regarding the Project and its environmental review and associated documents and reports (including the City's Staff Report), or lack thereof. See *Citizens for Clean Energy v. City of Woodland* (2014) 225 Cal.App.4th 173, 191 (finding that any party who has objected to the project's environmental documentation may assert any issue timely raised by other parties).

Moreover, SWMSRCC requests that the City provide notice for any and all notices referring or related to the Project issued under CEQA (PRC, § 21000 et seq.), and the California Planning and Zoning Law ("**Planning and Zoning Law**") (Gov. Code, §§ 65000–65010). California Public Resources Code, sections 21092.2 and 21167, subsection (f) and California Government Code, section 65092 require agencies to mail such notices to any person who has filed a written request for them with the clerk of the agency's governing body.

## I. THE CITY SHOULD REQUIRE THE USE OF A LOCAL WORKFORCE TO BENEFIT THE COMMUNITY'S ECONOMIC DEVELOPMENT AND ENVIRONMENT.

The City should require that the Project be built using local workers who have graduated from a Joint Labor-Management Apprenticeship Program approved by the State of California, have at least as many hours of on-the-job experience in the applicable craft which would be required to graduate from such a program, or are registered apprentices in such a program.

Community benefits such as local hire can also be helpful to reduce environmental impacts and improve the positive economic impacts of the Project. Local hire provisions requiring that a certain percentage of workers reside within 10 miles or less of the Project site can reduce the length of vendor trips, reduce greenhouse gas

emissions, and provide localized economic benefits. As environmental consultants Matt Hagemann and Paul E. Rosenfeld note:

> [A]ny local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

March 8, 2021, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling.

Workforce requirements promote the development of skilled trades that yield sustainable economic development. As the California Workforce Development Board and the University of California, Berkeley Center for Labor Research and Education concluded:

> [L]abor should be considered an investment rather than a cost—and investments in growing, diversifying, and upskilling California's workforce can positively affect returns on climate mitigation efforts. In other words, well-trained workers are key to delivering emissions reductions and moving California closer to its climate targets.[1]

Furthermore, workforce policies have significant environmental benefits given that they improve an area's jobs-housing balance, decreasing the amount and length of job commutes and the associated greenhouse gas ("**GHG**") emissions. In fact, on May 7, 2021, the South Coast Air Quality Management District found that that the "[u]se of a local state-certified apprenticeship program" can result in air pollutant reductions.[2]

Locating jobs closer to residential areas can have significant environmental benefits. As the California Planning Roundtable noted in 2008:

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[1] California Workforce Development Board (2020) Putting California on the High Road: A Jobs and Climate Action Plan 2030 at p. ii, *available at* https://laborcenter.berkeley.edu/wp-content/uploads/2020/09/Putting-California-on-the-High-Road.pdf.

[2] South Coast Air Quality Management District (May 7, 2021) Certify Final Environmental Assessment and Adopt Proposed Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions Program, and Proposed Rule 316 – Fees for Rule 2305, Submit Rule 2305 for Inclusion Into the SIP, and Approve Supporting Budget Actions, *available at* http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-May7-027.pdf?sfvrsn=10.

> People who live and work in the same jurisdiction would be more likely to take transit, walk, or bicycle to work than residents of less balanced communities and their vehicle trips would be shorter. Benefits would include potential reductions in both vehicle miles traveled and vehicle hours traveled.[3]

Moreover, local hire mandates and skill-training are critical facets of a strategy to reduce vehicle miles traveled ("**VMT**"). As planning experts Robert Cervero and Michael Duncan have noted, simply placing jobs near housing stock is insufficient to achieve VMT reductions given that the skill requirements of available local jobs must match those held by local residents.[4] Some municipalities have even tied local hire and other workforce policies to local development permits to address transportation issues. Cervero and Duncan note that:

> In nearly built-out Berkeley, CA, the approach to balancing jobs and housing is to create local jobs rather than to develop new housing. The city's First Source program encourages businesses to hire local residents, especially for entry- and intermediate-level jobs, and sponsors vocational training to ensure residents are employment-ready. While the program is voluntary, some 300 businesses have used it to date, placing more than 3,000 city residents in local jobs since it was launched in 1986. When needed, these carrots are matched by sticks, since the city is not shy about negotiating corporate participation in First Source as a condition of approval for development permits.

Recently, the State of California verified its commitment towards workforce development through the Affordable Housing and High Road Jobs Act of 2022, otherwise known as Assembly Bill No. 2011 (AB2011). AB2011 amended the Planning and Zoning Law to allow ministerial, by-right approval for projects being built alongside commercial corridors that meet affordability and labor requirements.

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[3] California Planning Roundtable (2008) Deconstructing Jobs-Housing Balance at p. 6, *available at* https://cproundtable.org/static/media/uploads/publications/cpr-jobs-housing.pdf

[4] Cervero, Robert and Duncan, Michael (2006) Which Reduces Vehicle Travel More: Jobs-Housing Balance or Retail-Housing Mixing? Journal of the American Planning Association 72 (4), 475-490, 482, *available at* http://reconnectingamerica.org/assets/Uploads/UTCT-825.pdf.

The City should consider utilizing local workforce policies and requirements to benefit the local area economically and to mitigate GHG emissions, improve air quality, and reduce transportation impacts.

## II. THE CALIFORNIA ENVIRONMENTAL QUALITY ACT.

### A. Background Concerning Environmental Impacts Reports.

The California Environmental Quality Act is a California statute designed to inform decision-makers and the public about the potential significant environmental effects of a project. CEQA Guidelines, § 15002(a)(1).[5] At its core, its purpose is to "inform the public and its responsible officials of the environmental consequences of their decisions *before* they are made." *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564.

CEQA directs public agencies to avoid or reduce environmental damage, when possible, by requiring alternatives or mitigation measures. CEQA Guidelines, § 15002(a)(2)-(3); see also *Berkeley Keep Jets Over the Bay Committee v. Board of Port Comes* (2001) 91 Cal.App.4th 1344, 1354; *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553; *Laurel Heights Improvement Assn.*, 47 Cal.3d at p. 400. The EIR serves to provide public agencies and the public in general with information about the effect that a proposed project is likely to have on the environment and to "identify ways that environmental damage can be avoided or significantly reduced." CEQA Guidelines, § 15002, subd. (a)(2). If the project has a significant effect on the environment, the agency may approve the project only upon finding that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns" specified in Public Resources Code section 21081. See CEQA Guidelines, §§ 15092, subds. (b)(2)(A)-(B).

While the courts review an EIR using an 'abuse of discretion' standard, the reviewing court is not to *uncritically* rely on every study or analysis presented by a project proponent in support of its position. *Berkeley Jets*, 91 Cal.App.4th at p. 1355 (quoting *Laurel Heights Improvement Assn.*, 47 Cal.3d at pp. 391, 409 fn. 12) (internal quotations

[5] The CEQA Guidelines, codified in Title 14 of the California Code of Regulations, section 15000 et seq., are regulatory guidelines promulgated by the state Natural Resources Agency for the implementation of CEQA. PRC, § 21083. The CEQA Guidelines are given "great weight in interpreting CEQA except when . . . clearly unauthorized or erroneous." *Center for Biological Diversity v. Dept. of Fish & Wildlife* (2015) 62 Cal.4th 204, 217.

omitted). A clearly inadequate or unsupported study is entitled to no judicial deference. *Id.* Drawing this line and determining whether the EIR complies with CEQA's information disclosure requirements presents a question of law subject to independent review by the courts. *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 515; *Madera Oversight Coalition, Inc. v. County of Madera* (2011) 199 Cal.App.4th 48, 102, 131. As the court stated in *Berkeley Jets*, prejudicial abuse of discretion occurs if the failure to include relevant information precludes informed decision-making and informed public participation, thereby thwarting the statutory goals of the EIR process. 91 Cal.App.4th at p. 1355 (internal quotations omitted).

The preparation and circulation of an EIR is more than a set of technical hurdles for agencies and developers to overcome. *Communities for a Better Environment v. Richmond* (2010) 184 Cal.App.4th 70, 80 (quoting *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 449-450). The EIR's function is to ensure that government officials who decide to build or approve a project do so with a full understanding of the environmental consequences and, equally important, that the public is assured those consequences have been considered. *Id.* For the EIR to serve these goals it must present information so that the foreseeable impacts of pursuing the project can be understood and weighed, and the public must be given an adequate opportunity to comment on that presentation before the decision to go forward is made. *Id.*

A strong presumption in favor of requiring preparation of an EIR is built into CEQA. This presumption is reflected in what is known as the "fair argument" standard under which an EIR must be prepared whenever substantial evidence in the record supports a fair argument that a project may have a significant effect on the environment. *Quail Botanical Gardens Found., Inc. v. City of Encinitas* (1994) 29 Cal.App.4th 1597, 1602; *Friends of "B" St.* v. *City of Hayward* (1980) 106 Cal.3d 988, 1002.

The fair argument test stems from the statutory mandate that an EIR be prepared for any project that "may have a significant effect on the environment." PRC, § 21151; see *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.App.3d 68, 75; accord *Jensen v. City of Santa Rosa* (2018) 23 Cal.App.5th 877, 884. Under this test, if a proposed project is not exempt and may cause a significant effect on the environment, the lead agency must prepare an EIR. PRC, §§ 21100, subd. (a), 21151; CEQA Guidelines, §§ 15064, subds. (a)(1), (f)(1). An EIR may be dispensed with only if the lead agency finds no substantial evidence in the initial study or elsewhere in the record that the project may

have a significant effect on the environment. *Parker Shattuck Neighbors v. Berkeley City Council* (2013) 222 Cal.App.4th 768, 785. In such a situation, the agency must adopt a negative declaration. PRC, § 21080, subd. (c)(1); CEQA Guidelines, §§ 15063, subd. (b)(2), 15064, subd. (f)(3).

"Significant effect upon the environment" is defined as "a substantial or potentially substantial adverse change in the environment." PRC, § 21068; CEQA Guidelines, § 15382. A project may have a significant effect on the environment if there is a reasonable probability that it will result in a significant impact. *No Oil, Inc.*, 13 Cal.3d at p. 83 fn. 16; see *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 309. If any aspect of the project may result in a significant impact on the environment, an EIR must be prepared even if the overall effect of the project is beneficial. CEQA Guidelines, § 15063(b)(1); see *County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1580.

This standard sets a "low threshold" for preparation of an EIR. *Consolidated Irrigation Dist. v. City of Selma* (2012) 204 Cal.App.4th 187, 207; *Nelson v. County of Kern* (2010) 190 Cal.App.4th 252; *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 928; *Bowman v. City of Berkeley* (2004) 122 Cal.App.4th 572, 580; *Citizen Action to Serve All Students v. Thornley* (1990) 222 Cal.App.3d 748, 754; *Sundstrom*, 202 Cal.App.3d at p. 310. If substantial evidence in the record supports a fair argument that the project may have a significant environmental effect, the lead agency must prepare an EIR even if other substantial evidence before it indicates the project will have no significant effect. See *Jensen,* 23 Cal.App.5th at p. 886; *Clews Land & Livestock v. City of San Diego* (2017) 19 Cal.App.5th 161, 183; *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 150; *Brentwood Assn. for No Drilling, Inc. v. City of Los Angeles* (1982) 134 Cal.App.3d 491; *Friends of "B" St.*, 106 Cal.App.3d 988; CEQA Guidelines, § 15064(f)(1).

B. Background Concerning Initial Studies, Negative Declarations, and Mitigated Negative Declarations.

CEQA and CEQA Guidelines are strict and unambiguous about when an MND may be used. A public agency must prepare an EIR whenever substantial evidence supports a "fair argument" that a proposed project "may have a significant effect on the environment." PRC, §§ 21100, 21151; CEQA Guidelines, §§ 15002(f)(1)-(2), 15063; *No Oil, Inc.*, 13 Cal.3d at p. 75; *Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal.App.4th 98, 111-112. Essentially, should a lead agency be

presented with a fair argument that a project may have a significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect. CEQA Guidelines, §§ 15064(f)(1)-(2); see *No Oil Inc., supra*, 13 Cal.3d at p. 75 (internal citations and quotations omitted). Substantial evidence includes "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached." CEQA Guidelines, § 15384(a).

The fair argument standard is a "low threshold" test for requiring the preparation of an EIR. *No Oil Inc.*, *supra*, 13 Cal.3d at p. 84; *County Sanitation Dist. No. 2 of Los Angeles County v. County of Kern* (2005) 127 Cal.App.4th 1544, 1579. It "requires the preparation of an EIR where there is substantial evidence that any aspect of the project, either individually or cumulatively, may cause a significant effect on the environment, regardless of whether the overall effect of the project is adverse or beneficial[.]" *County Sanitation*, *supra*, 127 Cal.App.4th at p. 1580 (quoting CEQA Guidelines, § 15063(b)(1)). A lead agency may adopt an MND only if "there is no substantial evidence that the project will have a significant effect on the environment." CEQA Guidelines, § 15074(b).

Evidence supporting a fair argument of a significant environmental impact triggers preparation of an EIR regardless of whether the record contains contrary evidence. *League for Protection of Oakland's Architectural and Historical Resources v. City of Oakland* (1997) 52 Cal.App.4th 896, 904-905. "Where the question is the sufficiency of the evidence to support a fair argument, deference to the agency's determination is not appropriate[.]" *County Sanitation*, 127 Cal.App.4th at 1579 (quoting *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th 1307, 1317-1318).

Further, it is the duty of the lead agency, not the public, to conduct the proper environmental studies. "The agency should not be allowed to hide behind its own failure to gather relevant data." *Sundstrom*, 202 Cal.App.3d at p. 311. "Deficiencies in the record may actually enlarge the scope of fair argument by lending a logical plausibility to a wider range of inferences." *Id*; see also *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1382 (lack of study enlarges the scope of the fair argument which may be made based on the limited facts in the record).

Thus, refusal to complete recommended studies lowers the already low threshold to establish a fair argument. The court may not exercise its independent judgment on the

omitted material by determining whether the ultimate decision of the lead agency would have been affected had the law been followed. *Environmental Protection Information Center v. Cal. Dept. of Forestry* (2008) 44 Cal.4th 459, 486 (internal citations and quotations omitted). The remedy for this deficiency would be for the trial court to issue a writ of mandate. *Id.*

Both the review for failure to follow CEQA's procedures and the fair argument test are questions of law, thus, the de novo standard of review applies. *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 435. "Whether the agency's record contains substantial evidence that would support a fair argument that the project may have a significant effect on the environment is treated as a question of law. *Consolidated Irrigation Dist.*, 204 Cal.App.4th at p. 207; Kostka and Zischke, Practice Under the Environmental Quality Act (2017, 2d ed.) at § 6.76.

In the MND context, courts give no deference to the agency. The agency or the court should not weigh expert testimony or decide on the credibility of such evidence—this is the EIR's responsibility. As stated in *Pocket Protectors v. City of Sacramento*:

> Unlike the situation where an EIR has been prepared, neither the lead agency nor a court may "weigh" conflicting substantial evidence to determine whether an EIR must be prepared in the first instance. Guidelines section 15064, subdivision (f)(1) provides in pertinent part: if a lead agency is presented with a fair argument that a project may have a significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect. Thus, as *Claremont* itself recognized, [c]onsideration is not to be given contrary evidence supporting the preparation of a negative declaration.

(2004) 124 Cal.App.4th 903, 935 (internal citations and quotations omitted).

In cases where it is not clear whether there is substantial evidence of significant environmental impacts, CEQA requires erring on the side of a "preference for resolving doubts in favor of environmental review." *Mejia v. City of Los Angeles* (2005) 130 Cal.App.4th 322, 332 "The foremost principle under CEQA is that the Legislature intended the act to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language. *Friends of Mammoth v. Bd. of Supervisors* (1972) 8 Cal.3d 247, 259.

C. Background Concerning CEQA Exemptions.

Where a lead agency chooses to dispose of CEQA by asserting a CEQA exemption, it has a duty to support its CEQA exemption findings by substantial evidence, including evidence that there are no applicable exceptions to exemptions. This duty is imposed by CEQA and related case law. CEQA Guidelines, § 15020 (lead agency shall not knowingly release a deficient document hoping that public comments will correct the defects); see *Citizens for Environmental Responsibility v. State ex rel. 14th Dist. Agriculture Assn.* (2015) 242 Cal.App.4th 555, 568 (lead agency has the burden of demonstrating that a project falls within a categorical exemption and must support the determination with substantial evidence); accord *Assn. for Protection etc. Values v. City of Ukiah* (1991) 2 Cal.App.4th 720, 732 (lead agency is required to consider exemption exceptions where there is evidence in the record that the project might have a significant impact.)

The duty to support CEQA and exemption findings with substantial evidence is also required by the Code of Civil Procedure ("**CCP**") and case law on administrative or traditional writs. Under the CCP, an abuse of discretion is established if the decision is unsupported by the findings, or the findings are unsupported by the evidence. CCP, § 1094.5(b). In *Topanga Assn. for a Scenic Community v. County of Los Angeles*, our Supreme Court held that implicit in CCP section 1094.5 is a requirement that the agency which renders the challenged decision must set forth findings to bridge the analytic gap between the raw evidence and ultimate decision or order. (1977) 11 Cal.3d 506, 515 (internal citations and quotations omitted). The lead agency's findings may be determined to be sufficient if a court has no trouble under the circumstances discerning the analytic route the administrative agency traveled from evidence to action. *West Chandler Blvd. Neighborhood Assn. vs. City of Los Angeles* (2011) 198 Cal.App.4th 1506, 1521-1522 (internal citations and quotations omitted). However, "mere conclusory findings without reference to the record are inadequate." *Id.* at p. 1521 (finding city council findings conclusory, violating *Topanga Assn. for a Scenic Comm.*).

Further, CEQA exemptions must be narrowly construed to accomplish CEQA's environmental objectives. *Cal. Farm Bureau Federation v. Cal. Wildlife Conservation Bd.* (2006) 143 Cal.App.4th 173, 187; accord *Save Our Carmel River v. Monterey Peninsula Water Management Dist.* (2006) 141 Cal.App.4th 677, 697 ("These rules ensure that in all but the clearest cases of categorical exemptions, a project will be subject to some level of environmental review.")

Finally, CEQA procedures reflect a preference for resolving doubts in favor of environmental review. See PRC, § 21080, subd. (c) (an EIR may be disposed of only if there is no substantial evidence, in light of the entire record before the lead agency, that the project may have a significant effect on the environment or revisions in the project); CEQA Guidelines, §§ 15061(b)(3) (common sense exemption only where it can be seen *with certainty*); 15063(b)(1) (prepare an EIR if the agency determines that there is substantial evidence that any aspect of the project, either individually or cumulatively, may cause a significant effect on the environment, regardless of whether the overall effect of the project is adverse or beneficial]; 15064(h) (the agency must consider cumulative impacts of past, current, and probable future projects); 15070 (a negative declaration may be prepared only if there is no substantial evidence, in light of the whole record, that the project may have a significant effect on the environment, or project revisions would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur, and there is no substantial evidence, in light of the whole record, that the project as revised may have a significant effect on the environment); *No Oil, Inc., supra,* 13 Cal.3d at pp. 83-84 (significant impacts are to be interpreted so as to afford the fullest possible protection).

## III. THE PROJECT IS LIKELY TO CAUSE ENVIRONMENTAL IMPACTS AND THUS REQUIRES CEQA-COMPLIANT ENVIRONMENTAL REVIEW.

Here, the Project involves the new construction, use, and maintenance of a 150,000-square-foot structure with 106 units, subterranean parking for 381 automobiles, 28,843 square feet of event space, 6,273 square feet of restaurant space, and 5,513 square feet for amenities, and the alteration and removal of existing landscaping on a 35.07-acre site. Considering these details, along with the pristine and natural surroundings of the Site, the Lead Agency must prepare and circulate a thorough, Project-specific EIR.

Section 15088.5, subsection (a) of the CEQA Guidelines provides that an EIR must be recirculated whenever there is disclosure of significant new information. Significant new information includes: (1) disclosure of a new significant environmental impact resulting from the project or from a new proposed mitigation measure; (2) disclosure of a substantial increase in the severity of an environmental impact unless mitigation measures are adopted that reduce the impact to a level of insignificance; and, (3) disclosure of a feasible project alternative or mitigation

measure considerably different from others previously analyzed which would clearly lessen the significant environmental impacts of the project which the project proponents decline to adopt.

The Project requires new feasible mitigation measures not specified in the original EIR. Specifically, the Project is slated to develop the second of two hotel buildings with 106 rooms and 381 vehicle parking spaces, yet the original EIR provides no specification nor mitigation measures identifying how many or which of those parking spaces must be capable of supporting electric vehicle charging stations ("**EVCS**") and ready to be compliant with the 2022 Green Building Code ("**GBC**"). In fact, there is no mention of electric vehicle ("**EV**") accommodations anywhere in that EIR. Without revisions to the original EIR, allowing the Project to commence without CEQA review would result in significant and unavoidable impacts on the local community and environment as well as on global climate change due to cumulative GHG emissions from vehicle exhaust. Further, the Project would be out of compliance with the 2022 GBC and could incur for Applicant and the City extensive litigation and unnecessary turbulence.

The GBC, which became effective January 1, 2023, requires new buildings to designate 20% of the total number of parking spaces as EV-capable. See GBC 5.106.5.31. Therefore, if the Project develops 381 additional parking spaces, 77 of those spaces must have electrical panel space and load capacity to support EV charging. Additionally, this must all be laid out with sufficient detail for the City and the public to thoroughly review, assess, and provide comments thereon.

Further, the GBC requires new buildings to designate 25% of the total number of EV-capable parking spaces as EV spaces with level 2 EV supply equipment ("**EVSE**"). *Ibid.* Hence, if the Project develops 381 additional parking spaces, 96 of those spaces must be equipped with a 208/240 volt 40-ampere branch circuit with the electric vehicle charging connectors, attachment plugs, and all other fittings, devices, and power outlets installed. The GBC also requires that new residential construction with more than nine units be GPR certified at minimum 50 points, hold LEED Silver certification, or have Alternate Reference Standard[6] per Section 101.10.2.

[6] According to Section 101.10.2 of the GBC, Applicant may request to apply an alternate green building standard for the Project in lieu of the minimum standards per Table 101.10. In making a determination in response to an application under this section, the Building Official may allow an alternate standard if they find that the proposed alternative standard

This analysis is entirely absent from the prior EIR, and as such it must be revised and recirculated to specify these additional EV mitigation requirements addressed above, or otherwise the ARB should deny the Design Review application and order the preparation and circulation of a Project-specific EIR.

## IV. THE DESIGN STANDARDS APPLIED TO THE PROJECT ARE NOT OBJECTIVE AS THE PROJECT REQUIRES SUBJECTIVE DISCRETIONARY JUDGMENT.

Although the Project seeks an ARB Administrative Approval which the City asserts is an entirely ministerial decision, this does not necessarily preclude the Project from including discretionary aspects. As the California Second District Court of Appeal discussed in *Friends of Westwood, Inc. v. City of Los Angeles* (1987), "a municipality's classification of a certain approval process as ministerial is not conclusive. 'The applicability of CEQA cannot be made to depend upon the unfettered discretion of local agencies, for local agencies must act in accordance with state guidelines and the objectives of CEQA.'" 191 Cal.App.3d 259, 270 (hereinafter, "*Friends of Westwood*") (internal citation omitted). For example, *Friends of Westwood* cited to *People v. Dept. of Housing & Community Development* in which the court deemed the issuance of a mobile park construction permit to be a discretionary act that was subject to CEQA. *Id.* at 271 (citing *People v. Dept. of Housing & Community Development* (1975) 45 Cal.App.3d 185, 194 (hereinafter, "*Ramey*")). While the *Ramey* court acknowledged that the mobile home park approval process included numerous ministerial decisions that applied "'fixed design and construction specifications[,]'" the court noted that some of the other approval decisions involved "'relatively general'" standards. *Id.* at 271 (citing *Ramey* at 193). The *Ramey* court also noted that for the construction permit at issue there, the applicant must provide a description of the water supply, ground drainage, and method of sewage disposal; there must be a sufficient supply of artificial lighting; the water supply must be adequate and potable; and the site must be well-drained and graded. *Id.* (internal citations and quotations omitted). The *Ramey* court thus concluded that these decisions rendered the entire construction permit process

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complies with all of the following: (A) Addresses a comprehensive scope of green building issues including energy efficiency, water efficiency, resource efficient materials, and healthy building practices; (B) applies standards that are, when taken as a whole, as stringent as the GPR and LEED standards; (C) includes a formalized certification process that incorporates third party verification; and, (D) the project will advance the purposes of this Chapter. See Ord. 22-2245, part, 2022; Ord. 19-2193, § 2 (part), 2019.

discretionary for purposes of CEQA given that they required "relatively personal decisions addressed to the sound judgment and enlightened choice of the administrator." *Id.*

Here, the ARB is tasked with assessing the Project's design, layout, and location on the Project Site, according to a conversation this Office had with the City's Planning Department on or about March 23, 2023. The ARB will then make a recommendation to the Planning Commission for approval. Given that the ARB must exercise its discretion in determining whether the Project's design features, including its FAR and height are consistent with applicable codes and plans, the Project should be deemed discretionary and reviewed accordingly.

## V. THE PROJECT ENTITLEMENTS MUST BE APPROVED SIMULTANEOUSLY TO CEQA REVIEW.

Legal precedent has established that Project entitlements must be approved simultaneously to a project's CEQA review. See *Coalition for Clean Air v. City of Visalia* (2012) 209 Cal.App.4th 408, 423-425, fn. 18 (noting that a CEQA document cannot be approved, and Notice of Exemption filed, before the underlying project is approved); see also *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 963, fn. 16. This is particularly relevant where, as here, the entitlement under review is the Project's design review. A project's environmental review cannot and should not occur prior to the project plans being submitted and its design review taking place, especially given that a project's environmental review must hinge on the final project design and development plan. For this reason, the ARB must not make any recommendation to the Planning Commission related to the Project's design, but instead advise that the Lead Agency revise and recirculate the original EIR or produce a new, Project-specific EIR.

## VI. THE PROJECT LACKS AN ADEQUATE DESCRIPTION.

A project description must be stable and finite in order to afford a lead agency and the public an adequate opportunity to assess and comment on the project and its impacts. "[A]n accurate, stable and finite project description is the sine qua non of an informative and legally sufficient" environmental document. *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 200. "A curtailed or distorted project description may stultify the objectives of the reporting process" as an accurate, stable, and finite project description is necessary to allow "affected outsiders and public decision-

makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance. *Ibid.* at pp. 192-93.

CEQA Guidelines, § 15124 requires that a description describe the project in enough detail to allow for evaluation of its potential environmental impacts: (a) the project's precise location and boundaries; (b) a clearly written statement of objectives sought by the proposed project; (c) a description of the project's technical, economic, and environmental characteristics; and, (d) a statement describing a list of agencies, permits, and approval which the project expects to use.

Here, the Project application materials fail to include an adequate and compliant Project description with the details listed above. The City should demand that Applicant resubmit its application materials with CEQA-compliant parameters.

## VII. CONCLUSION.

The City's reliance on Applicant's presumed regulatory compliance cannot rectify its failure to draft and circulate a Project-specific EIR. A detailed and thorough review of the Project's impacts must be studied, supported by substantial evidence, and mitigated against where necessary. Without this in-depth analysis and a higher standard for the quantity and quality of evidence supporting it, it is impossible to determine, with a high degree of certainty, the magnitude and extent of the Project's environmental impacts.

In light of the aforementioned, SWMSRCC respectfully requests that the City: (1) prepare and circulate a thorough, project-specific Environmental Impact Report which focuses heavily on the Project's impacts to the natural systems surrounding the Site; (2) order Applicant to revise the Project to ensure its consistency with all applicable laws and regulations especially those addressing human and environmental health; and, (3) require a local and skilled workforce for the Project. Should the City have any questions or concerns, it should feel free to contact my office.

Sincerely,



Reza Bonachea Mohamadzadeh
Attorneys for Southwest Mountain
States Regional Council of Carpenters

Attached:

March 8, 2021, SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling (Exhibit A);

Air Quality and GHG Expert Paul Rosenfeld CV (Exhibit B); and,

Air Quality and GHG Expert Matt Hagemann CV (Exhibit C).

# EXHIBIT A

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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March 8, 2021

Mitchell M. Tsai
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**Subject: Local Hire Requirements and Considerations for Greenhouse Gas Modeling**

Dear Mr. Tsai,

Soil Water Air Protection Enterprise ("SWAPE") is pleased to provide the following draft technical report explaining the significance of worker trips required for construction of land use development projects with respect to the estimation of greenhouse gas ("GHG") emissions. The report will also discuss the potential for local hire requirements to reduce the length of worker trips, and consequently, reduced or mitigate the potential GHG impacts.

## Worker Trips and Greenhouse Gas Calculations

The California Emissions Estimator Model ("CalEEMod") is a "statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects."[1] CalEEMod quantifies construction-related emissions associated with land use projects resulting from off-road construction equipment; on-road mobile equipment associated with workers, vendors, and hauling; fugitive dust associated with grading, demolition, truck loading, and on-road vehicles traveling along paved and unpaved roads; and architectural coating activities; and paving.[2]

The number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[3]

[1] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[2] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[3] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.

Specifically, the number and length of vehicle trips is utilized to estimate the vehicle miles travelled ("VMT") associated with construction. Then, utilizing vehicle-class specific EMFAC 2014 emission factors, CalEEMod calculates the vehicle exhaust, evaporative, and dust emissions resulting from construction-related VMT, including personal vehicles for worker commuting.[4]

Specifically, in order to calculate VMT, CalEEMod multiplies the average daily trip rate by the average overall trip length (see excerpt below):

> "$VMT_d = \Sigma(\text{Average Daily Trip Rate}_i * \text{Average Overall Trip Length}_i)_n$
>
> Where:
>
> n = Number of land uses being modeled."[5]

Furthermore, to calculate the on-road emissions associated with worker trips, CalEEMod utilizes the following equation (see excerpt below):

> "$\text{Emissions}_{pollutant} = VMT * EF_{running,pollutant}$
>
> Where:
>
> $\text{Emissions}_{pollutant}$ = emissions from vehicle running for each pollutant
>
> VMT = vehicle miles traveled
>
> $EF_{running,pollutant}$ = emission factor for running emissions."[6]

Thus, there is a direct relationship between trip length and VMT, as well as a direct relationship between VMT and vehicle running emissions. In other words, when the trip length is increased, the VMT and vehicle running emissions increase as a result. Thus, vehicle running emissions can be reduced by decreasing the average overall trip length, by way of a local hire requirement or otherwise.

## Default Worker Trip Parameters and Potential Local Hire Requirements

As previously discussed, the number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[7] In order to understand how local hire requirements and associated worker trip length reductions impact GHG emissions calculations, it is important to consider the CalEEMod default worker trip parameters. CalEEMod provides recommended default values based on site-specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California Environmental Quality Act ("CEQA") requires that such changes be justified by substantial evidence.[8] The default number of construction-related worker trips is calculated by multiplying the

[4] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14-15.
[5] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 23.
[6] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[7] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[8] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 1, 9.

number of pieces of equipment for all phases by 1.25, with the exception of worker trips required for the building construction and architectural coating phases.[9] Furthermore, the worker trip vehicle class is a 50/25/25 percent mix of light duty autos, light duty truck class 1 and light duty truck class 2, respectively."[10] Finally, the default worker trip length is consistent with the length of the operational home-to-work vehicle trips.[11] The operational home-to-work vehicle trip lengths are:

> "[B]ased on the *location* and *urbanization* selected on the project characteristic screen. These values were *supplied by the air districts or use a default average for the state*. Each district (or county) also assigns trip lengths for urban and rural settings" (emphasis added). [12]

Thus, the default worker trip length is based on the location and urbanization level selected by the User when modeling emissions. The below table shows the CalEEMod default rural and urban worker trip lengths by air basin (see excerpt below and Attachment A).[13]

| Worker Trip Length by Air Basin | | |
|---|---|---|
| **Air Basin** | **Rural (miles)** | **Urban (miles)** |
| Great Basin Valleys | 16.8 | 10.8 |
| Lake County | 16.8 | 10.8 |
| Lake Tahoe | 16.8 | 10.8 |
| Mojave Desert | 16.8 | 10.8 |
| Mountain Counties | 16.8 | 10.8 |
| North Central Coast | 17.1 | 12.3 |
| North Coast | 16.8 | 10.8 |
| Northeast Plateau | 16.8 | 10.8 |
| Sacramento Valley | 16.8 | 10.8 |
| Salton Sea | 14.6 | 11 |
| San Diego | 16.8 | 10.8 |
| San Francisco Bay Area | 10.8 | 10.8 |
| San Joaquin Valley | 16.8 | 10.8 |
| South Central Coast | 16.8 | 10.8 |
| South Coast | 19.8 | 14.7 |
| **Average** | **16.47** | **11.17** |
| **Minimum** | **10.80** | **10.80** |
| **Maximum** | **19.80** | **14.70** |
| **Range** | **9.00** | **3.90** |

[9] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[10] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[11] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14.
[12] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 21.
[13] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-84 – D-86.

As demonstrated above, default rural worker trip lengths for air basins in California vary from 10.8- to 19.8-miles, with an average of 16.47 miles. Furthermore, default urban worker trip lengths vary from 10.8- to 14.7-miles, with an average of 11.17 miles. Thus, while default worker trip lengths vary by location, default urban worker trip lengths tend to be shorter in length. Based on these trends evident in the CalEEMod default worker trip lengths, we can reasonably assume that the efficacy of a local hire requirement is especially dependent upon the urbanization of the project site, as well as the project location.

## Practical Application of a Local Hire Requirement and Associated Impact

To provide an example of the potential impact of a local hire provision on construction-related GHG emissions, we estimated the significance of a local hire provision for the Village South Specific Plan ("Project") located in the City of Claremont ("City"). The Project proposed to construct 1,000 residential units, 100,000-SF of retail space, 45,000-SF of office space, as well as a 50-room hotel, on the 24-acre site. The Project location is classified as Urban and lies within the Los Angeles-South Coast County. As a result, the Project has a default worker trip length of 14.7 miles.[14] In an effort to evaluate the potential for a local hire provision to reduce the Project's construction-related GHG emissions, we prepared an updated model, reducing all worker trip lengths to 10 miles (see Attachment B). Our analysis estimates that if a local hire provision with a 10-mile radius were to be implemented, the GHG emissions associated with Project construction would decrease by approximately 17% (see table below and Attachment C).

| **Local Hire Provision Net Change** | |
|---|---|
| **Without Local Hire Provision** | |
| Total Construction GHG Emissions (MT $CO_2e$) | 3,623 |
| Amortized Construction GHG Emissions (MT $CO_2e$/year) | 120.77 |
| **With Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,024 |
| Amortized Construction GHG Emissions (MT $CO_2e$/year) | 100.80 |
| ***% Decrease in Construction-related GHG Emissions*** | ***17%*** |

As demonstrated above, by implementing a local hire provision requiring 10 mile worker trip lengths, the Project could reduce potential GHG emissions associated with construction worker trips. More broadly, any local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

This serves as an example of the potential impacts of local hire requirements on estimated project-level GHG emissions, though it does not indicate that local hire requirements would result in reduced construction-related GHG emission for all projects. As previously described, the significance of a local hire requirement depends on the worker trip length enforced and the default worker trip length for the project's urbanization level and location.

[14] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-85.

## Disclaimer

SWAPE has received limited discovery. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

Sincerely,



Matt Hagemann, P.G., C.Hg.



Paul E. Rosenfeld, Ph.D.

| Location Type | Location Name | Rural H-W (miles) | Urban H-W (miles) |
|---|---|---|---|
| Air Basin | Great Basin | 16.8 | 10.8 |
| Air Basin | Lake County | 16.8 | 10.8 |
| Air Basin | Lake Tahoe | 16.8 | 10.8 |
| Air Basin | Mojave Desert | 16.8 | 10.8 |
| Air Basin | Mountain | 16.8 | 10.8 |
| Air Basin | North Central | 17.1 | 12.3 |
| Air Basin | North Coast | 16.8 | 10.8 |
| Air Basin | Northeast | 16.8 | 10.8 |
| Air Basin | Sacramento | 16.8 | 10.8 |
| Air Basin | Salton Sea | 14.6 | 11 |
| Air Basin | San Diego | 16.8 | 10.8 |
| Air Basin | San Francisco | 10.8 | 10.8 |
| Air Basin | San Joaquin | 16.8 | 10.8 |
| Air Basin | South Central | 16.8 | 10.8 |
| Air Basin | South Coast | 19.8 | 14.7 |
| Air District | Amador County | 16.8 | 10.8 |
| Air District | Antelope Valley | 16.8 | 10.8 |
| Air District | Bay Area AQMD | 10.8 | 10.8 |
| Air District | Butte County | 12.54 | 12.54 |
| Air District | Calaveras | 16.8 | 10.8 |
| Air District | Colusa County | 16.8 | 10.8 |
| Air District | El Dorado | 16.8 | 10.8 |
| Air District | Feather River | 16.8 | 10.8 |
| Air District | Glenn County | 16.8 | 10.8 |
| Air District | Great Basin | 16.8 | 10.8 |
| Air District | Imperial County | 10.2 | 7.3 |
| Air District | Kern County | 16.8 | 10.8 |
| Air District | Lake County | 16.8 | 10.8 |
| Air District | Lassen County | 16.8 | 10.8 |
| Air District | Mariposa | 16.8 | 10.8 |
| Air District | Mendocino | 16.8 | 10.8 |
| Air District | Modoc County | 16.8 | 10.8 |
| Air District | Mojave Desert | 16.8 | 10.8 |
| Air District | Monterey Bay | 16.8 | 10.8 |
| Air District | North Coast | 16.8 | 10.8 |
| Air District | Northern Sierra | 16.8 | 10.8 |
| Air District | Northern | 16.8 | 10.8 |
| Air District | Placer County | 16.8 | 10.8 |
| Air District | Sacramento | 15 | 10 |

| | | | |
|---|---|---|---|
| Air District | San Diego | 16.8 | 10.8 |
| Air District | San Joaquin | 16.8 | 10.8 |
| Air District | San Luis Obispo | 13 | 13 |
| Air District | Santa Barbara | 8.3 | 8.3 |
| Air District | Shasta County | 16.8 | 10.8 |
| Air District | Siskiyou County | 16.8 | 10.8 |
| Air District | South Coast | 19.8 | 14.7 |
| Air District | Tehama County | 16.8 | 10.8 |
| Air District | Tuolumne | 16.8 | 10.8 |
| Air District | Ventura County | 16.8 | 10.8 |
| Air District | Yolo/Solano | 15 | 10 |
| County | Alameda | 10.8 | 10.8 |
| County | Alpine | 16.8 | 10.8 |
| County | Amador | 16.8 | 10.8 |
| County | Butte | 12.54 | 12.54 |
| County | Calaveras | 16.8 | 10.8 |
| County | Colusa | 16.8 | 10.8 |
| County | Contra Costa | 10.8 | 10.8 |
| County | Del Norte | 16.8 | 10.8 |
| County | El Dorado-Lake | 16.8 | 10.8 |
| County | El Dorado- | 16.8 | 10.8 |
| County | Fresno | 16.8 | 10.8 |
| County | Glenn | 16.8 | 10.8 |
| County | Humboldt | 16.8 | 10.8 |
| County | Imperial | 10.2 | 7.3 |
| County | Inyo | 16.8 | 10.8 |
| County | Kern-Mojave | 16.8 | 10.8 |
| County | Kern-San | 16.8 | 10.8 |
| County | Kings | 16.8 | 10.8 |
| County | Lake | 16.8 | 10.8 |
| County | Lassen | 16.8 | 10.8 |
| County | Los Angeles- | 16.8 | 10.8 |
| County | Los Angeles- | 19.8 | 14.7 |
| County | Madera | 16.8 | 10.8 |
| County | Marin | 10.8 | 10.8 |
| County | Mariposa | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Mendocino- | 16.8 | 10.8 |
| County | Merced | 16.8 | 10.8 |
| County | Modoc | 16.8 | 10.8 |
| County | Mono | 16.8 | 10.8 |
| County | Monterey | 16.8 | 10.8 |
| County | Napa | 10.8 | 10.8 |

| | | | |
|---|---|---|---|
| County | Nevada | 16.8 | 10.8 |
| County | Orange | 19.8 | 14.7 |
| County | Placer-Lake | 16.8 | 10.8 |
| County | Placer-Mountain | 16.8 | 10.8 |
| County | Placer- | 16.8 | 10.8 |
| County | Plumas | 16.8 | 10.8 |
| County | Riverside- | 16.8 | 10.8 |
| County | Riverside- | 19.8 | 14.7 |
| County | Riverside-Salton | 14.6 | 11 |
| County | Riverside-South | 19.8 | 14.7 |
| County | Sacramento | 15 | 10 |
| County | San Benito | 16.8 | 10.8 |
| County | San Bernardino- | 16.8 | 10.8 |
| County | San Bernardino- | 19.8 | 14.7 |
| County | San Diego | 16.8 | 10.8 |
| County | San Francisco | 10.8 | 10.8 |
| County | San Joaquin | 16.8 | 10.8 |
| County | San Luis Obispo | 13 | 13 |
| County | San Mateo | 10.8 | 10.8 |
| County | Santa Barbara- | 8.3 | 8.3 |
| County | Santa Barbara- | 8.3 | 8.3 |
| County | Santa Clara | 10.8 | 10.8 |
| County | Santa Cruz | 16.8 | 10.8 |
| County | Shasta | 16.8 | 10.8 |
| County | Sierra | 16.8 | 10.8 |
| County | Siskiyou | 16.8 | 10.8 |
| County | Solano- | 15 | 10 |
| County | Solano-San | 16.8 | 10.8 |
| County | Sonoma-North | 16.8 | 10.8 |
| County | Sonoma-San | 10.8 | 10.8 |
| County | Stanislaus | 16.8 | 10.8 |
| County | Sutter | 16.8 | 10.8 |
| County | Tehama | 16.8 | 10.8 |
| County | Trinity | 16.8 | 10.8 |
| County | Tulare | 16.8 | 10.8 |
| County | Tuolumne | 16.8 | 10.8 |
| County | Ventura | 16.8 | 10.8 |
| County | Yolo | 15 | 10 |
| County | Yuba | 16.8 | 10.8 |
| Statewide | Statewide | 16.8 | 10.8 |

| Worker Trip Length by Air Basin | | |
|---|---|---|
| **Air Basin** | **Rural (miles)** | **Urban (miles)** |
| Great Basin Valleys | 16.8 | 10.8 |
| Lake County | 16.8 | 10.8 |
| Lake Tahoe | 16.8 | 10.8 |
| Mojave Desert | 16.8 | 10.8 |
| Mountain Counties | 16.8 | 10.8 |
| North Central Coast | 17.1 | 12.3 |
| North Coast | 16.8 | 10.8 |
| Northeast Plateau | 16.8 | 10.8 |
| Sacramento Valley | 16.8 | 10.8 |
| Salton Sea | 14.6 | 11 |
| San Diego | 16.8 | 10.8 |
| San Francisco Bay Area | 10.8 | 10.8 |
| San Joaquin Valley | 16.8 | 10.8 |
| South Central Coast | 16.8 | 10.8 |
| South Coast | 19.8 | 14.7 |
| **Average** | **16.47** | **11.17** |
| **Mininum** | **10.80** | **10.80** |
| **Maximum** | **19.80** | **14.70** |
| **Range** | **9.00** | **3.90** |

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1713 | 1.8242 | 1.1662 | 2.4000e-003 | 0.4169 | 0.0817 | 0.4986 | 0.1795 | 0.0754 | 0.2549 | 0.0000 | 213.1969 | 213.1969 | 0.0601 | 0.0000 | 214.6993 |
| 2022 | 0.6904 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.6826 | 1,721.6826 | 0.1294 | 0.0000 | 1,724.9187 |
| 2023 | 0.6148 | 3.3649 | 5.6747 | 0.0178 | 1.1963 | 0.0996 | 1.2959 | 0.3203 | 0.0935 | 0.4138 | 0.0000 | 1,627.5295 | 1,627.5295 | 0.1185 | 0.0000 | 1,630.4925 |
| 2024 | 4.1619 | 0.1335 | 0.2810 | 5.9000e-004 | 0.0325 | 6.4700e-003 | 0.0390 | 8.6300e-003 | 6.0400e-003 | 0.0147 | 0.0000 | 52.9078 | 52.9078 | 8.0200e-003 | 0.0000 | 53.1082 |
| **Maximum** | **4.1619** | **4.1142** | **6.1625** | **0.0189** | **1.3058** | **0.1201** | **1.4259** | **0.3460** | **0.1128** | **0.4588** | **0.0000** | **1,721.6826** | **1,721.6826** | **0.1294** | **0.0000** | **1,724.9187** |

## 2.1 Overall Construction

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1713 | 1.8242 | 1.1662 | 2.4000e-003 | 0.4169 | 0.0817 | 0.4986 | 0.1795 | 0.0754 | 0.2549 | 0.0000 | 213.1967 | 213.1967 | 0.0601 | 0.0000 | 214.6991 |
| 2022 | 0.6904 | 4.1142 | 6.1625 | 0.0189 | 1.3058 | 0.1201 | 1.4259 | 0.3460 | 0.1128 | 0.4588 | 0.0000 | 1,721.6823 | 1,721.6823 | 0.1294 | 0.0000 | 1,724.9183 |
| 2023 | 0.6148 | 3.3648 | 5.6747 | 0.0178 | 1.1963 | 0.0996 | 1.2959 | 0.3203 | 0.0935 | 0.4138 | 0.0000 | 1,627.5291 | 1,627.5291 | 0.1185 | 0.0000 | 1,630.4921 |
| 2024 | 4.1619 | 0.1335 | 0.2810 | 5.9000e-004 | 0.0325 | 6.4700e-003 | 0.0390 | 8.6300e-003 | 6.0400e-003 | 0.0147 | 0.0000 | 52.9077 | 52.9077 | 8.0200e-003 | 0.0000 | 53.1082 |
| **Maximum** | **4.1619** | **4.1142** | **6.1625** | **0.0189** | **1.3058** | **0.1201** | **1.4259** | **0.3460** | **0.1128** | **0.4588** | **0.0000** | **1,721.6823** | **1,721.6823** | **0.1294** | **0.0000** | **1,724.9183** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **1** | **9-1-2021** | **11-30-2021** | 1.4103 | 1.4103 |
| **2** | **12-1-2021** | **2-28-2022** | 1.3613 | 1.3613 |
| **3** | **3-1-2022** | **5-31-2022** | 1.1985 | 1.1985 |
| **4** | **6-1-2022** | **8-31-2022** | 1.1921 | 1.1921 |
| **5** | **9-1-2022** | **11-30-2022** | 1.1918 | 1.1918 |
| **6** | **12-1-2022** | **2-28-2023** | 1.0774 | 1.0774 |
| **7** | **3-1-2023** | **5-31-2023** | 1.0320 | 1.0320 |
| **8** | **6-1-2023** | **8-31-2023** | 1.0260 | 1.0260 |

| | | | | |
|---|---|---|---|---|
| **9** | **9-1-2023** | **11-30-2023** | 1.0265 | 1.0265 |
| **10** | **12-1-2023** | **2-29-2024** | 2.8857 | 2.8857 |
| **11** | **3-1-2024** | **5-31-2024** | 1.6207 | 1.6207 |
| | | **Highest** | 2.8857 | 2.8857 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0012** | **51.0012** | **0.0144** | **0.0000** | **51.3601** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.7000e-004 | 7.5000e-004 | 8.5100e-003 | 2.0000e-005 | 2.4700e-003 | 2.0000e-005 | 2.4900e-003 | 6.5000e-004 | 2.0000e-005 | 6.7000e-004 | 0.0000 | 2.2251 | 2.2251 | 7.0000e-005 | 0.0000 | 2.2267 |
| **Total** | **2.9000e-003** | **0.0641** | **0.0233** | **2.0000e-004** | **6.4100e-003** | **2.1000e-004** | **6.6200e-003** | **1.7300e-003** | **2.0000e-004** | **1.9300e-003** | **0.0000** | **19.6816** | **19.6816** | **1.2800e-003** | **0.0000** | **19.7136** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0011** | **51.0011** | **0.0144** | **0.0000** | **51.3600** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.7000e-004 | 7.5000e-004 | 8.5100e-003 | 2.0000e-005 | 2.4700e-003 | 2.0000e-005 | 2.4900e-003 | 6.5000e-004 | 2.0000e-005 | 6.7000e-004 | 0.0000 | 2.2251 | 2.2251 | 7.0000e-005 | 0.0000 | 2.2267 |
| **Total** | **2.9000e-003** | **0.0641** | **0.0233** | **2.0000e-004** | **6.4100e-003** | **2.1000e-004** | **6.6200e-003** | **1.7300e-003** | **2.0000e-004** | **1.9300e-003** | **0.0000** | **19.6816** | **19.6816** | **1.2800e-003** | **0.0000** | **19.7136** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7061** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |
| **Total** | **7.7000e-004** | **6.0000e-004** | **6.8100e-003** | **2.0000e-005** | **1.9700e-003** | **2.0000e-005** | **1.9900e-003** | **5.2000e-004** | **1.0000e-005** | **5.4000e-004** | **0.0000** | **1.7801** | **1.7801** | **5.0000e-005** | **0.0000** | **1.7814** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7060** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 6.0000e-004 | 6.8100e-003 | 2.0000e-005 | 1.9700e-003 | 2.0000e-005 | 1.9900e-003 | 5.2000e-004 | 1.0000e-005 | 5.4000e-004 | 0.0000 | 1.7801 | 1.7801 | 5.0000e-005 | 0.0000 | 1.7814 |
| **Total** | **7.7000e-004** | **6.0000e-004** | **6.8100e-003** | **2.0000e-005** | **1.9700e-003** | **2.0000e-005** | **1.9900e-003** | **5.2000e-004** | **1.0000e-005** | **5.4000e-004** | **0.0000** | **1.7801** | **1.7801** | **5.0000e-005** | **0.0000** | **1.7814** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3776 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5405** | **103.5405** | **0.0335** | **0.0000** | **104.3776** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |
| **Total** | **1.6400e-003** | **1.2700e-003** | **0.0144** | **4.0000e-005** | **4.1600e-003** | **3.0000e-005** | **4.2000e-003** | **1.1100e-003** | **3.0000e-005** | **1.1400e-003** | **0.0000** | **3.7579** | **3.7579** | **1.1000e-004** | **0.0000** | **3.7607** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5403** | **103.5403** | **0.0335** | **0.0000** | **104.3775** |

## 3.4 Grading - 2021

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.6400e-003 | 1.2700e-003 | 0.0144 | 4.0000e-005 | 4.1600e-003 | 3.0000e-005 | 4.2000e-003 | 1.1100e-003 | 3.0000e-005 | 1.1400e-003 | 0.0000 | 3.7579 | 3.7579 | 1.1000e-004 | 0.0000 | 3.7607 |
| **Total** | **1.6400e-003** | **1.2700e-003** | **0.0144** | **4.0000e-005** | **4.1600e-003** | **3.0000e-005** | **4.2000e-003** | **1.1100e-003** | **3.0000e-005** | **1.1400e-003** | **0.0000** | **3.7579** | **3.7579** | **1.1000e-004** | **0.0000** | **3.7607** |

## 3.4 Grading - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |
| **Total** | **2.8000e-004** | **2.1000e-004** | **2.4400e-003** | **1.0000e-005** | **7.7000e-004** | **1.0000e-005** | **7.7000e-004** | **2.0000e-004** | **1.0000e-005** | **2.1000e-004** | **0.0000** | **0.6679** | **0.6679** | **2.0000e-005** | **0.0000** | **0.6684** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 2.1000e-004 | 2.4400e-003 | 1.0000e-005 | 7.7000e-004 | 1.0000e-005 | 7.7000e-004 | 2.0000e-004 | 1.0000e-005 | 2.1000e-004 | 0.0000 | 0.6679 | 0.6679 | 2.0000e-005 | 0.0000 | 0.6684 |
| **Total** | **2.8000e-004** | **2.1000e-004** | **2.4400e-003** | **1.0000e-005** | **7.7000e-004** | **1.0000e-005** | **7.7000e-004** | **2.0000e-004** | **1.0000e-005** | **2.1000e-004** | **0.0000** | **0.6679** | **0.6679** | **2.0000e-005** | **0.0000** | **0.6684** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1324** | **293.1324** | **0.0702** | **0.0000** | **294.8881** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.4088 | 0.3066 | 3.5305 | 0.0107 | 1.1103 | 8.8700e-003 | 1.1192 | 0.2949 | 8.1700e-003 | 0.3031 | 0.0000 | 966.8117 | 966.8117 | 0.0266 | 0.0000 | 967.4773 |
| **Total** | **0.4616** | **2.0027** | **3.9885** | **0.0152** | **1.2243** | **0.0121** | **1.2363** | **0.3278** | **0.0112** | **0.3390** | **0.0000** | **1,408.7952** | **1,408.7952** | **0.0530** | **0.0000** | **1,410.1208** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1321** | **293.1321** | **0.0702** | **0.0000** | **294.8877** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.4088 | 0.3066 | 3.5305 | 0.0107 | 1.1103 | 8.8700e-003 | 1.1192 | 0.2949 | 8.1700e-003 | 0.3031 | 0.0000 | 966.8117 | 966.8117 | 0.0266 | 0.0000 | 967.4773 |
| **Total** | **0.4616** | **2.0027** | **3.9885** | **0.0152** | **1.2243** | **0.0121** | **1.2363** | **0.3278** | **0.0112** | **0.3390** | **0.0000** | **1,408.7952** | **1,408.7952** | **0.0530** | **0.0000** | **1,410.1208** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2789** | **286.2789** | **0.0681** | **0.0000** | **287.9814** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.3753 | 0.2708 | 3.1696 | 0.0101 | 1.0840 | 8.4100e-003 | 1.0924 | 0.2879 | 7.7400e-003 | 0.2957 | 0.0000 | 909.3439 | 909.3439 | 0.0234 | 0.0000 | 909.9291 |
| **Total** | **0.4135** | **1.5218** | **3.5707** | **0.0144** | **1.1953** | **9.8700e-003** | **1.2051** | **0.3200** | **9.1400e-003** | **0.3292** | **0.0000** | **1,327.3369** | **1,327.3369** | **0.0462** | **0.0000** | **1,328.4916** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2785** | **286.2785** | **0.0681** | **0.0000** | **287.9811** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.3753 | 0.2708 | 3.1696 | 0.0101 | 1.0840 | 8.4100e-003 | 1.0924 | 0.2879 | 7.7400e-003 | 0.2957 | 0.0000 | 909.3439 | 909.3439 | 0.0234 | 0.0000 | 909.9291 |
| **Total** | **0.4135** | **1.5218** | **3.5707** | **0.0144** | **1.1953** | **9.8700e-003** | **1.2051** | **0.3200** | **9.1400e-003** | **0.3292** | **0.0000** | **1,327.3369** | **1,327.3369** | **0.0462** | **0.0000** | **1,328.4916** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |
| **Total** | **3.7000e-004** | **2.7000e-004** | **3.1200e-003** | **1.0000e-005** | **1.0700e-003** | **1.0000e-005** | **1.0800e-003** | **2.8000e-004** | **1.0000e-005** | **2.9000e-004** | **0.0000** | **0.8963** | **0.8963** | **2.0000e-005** | **0.0000** | **0.8968** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

## 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 2.7000e-004 | 3.1200e-003 | 1.0000e-005 | 1.0700e-003 | 1.0000e-005 | 1.0800e-003 | 2.8000e-004 | 1.0000e-005 | 2.9000e-004 | 0.0000 | 0.8963 | 0.8963 | 2.0000e-005 | 0.0000 | 0.8968 |
| **Total** | **3.7000e-004** | **2.7000e-004** | **3.1200e-003** | **1.0000e-005** | **1.0700e-003** | **1.0000e-005** | **1.0800e-003** | **2.8000e-004** | **1.0000e-005** | **2.9000e-004** | **0.0000** | **0.8963** | **0.8963** | **2.0000e-005** | **0.0000** | **0.8968** |

## 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |
| **Total** | **5.9000e-004** | **4.1000e-004** | **4.9200e-003** | **2.0000e-005** | **1.8100e-003** | **1.0000e-005** | **1.8200e-003** | **4.8000e-004** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **1.4697** | **1.4697** | **4.0000e-005** | **0.0000** | **1.4706** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.9000e-004 | 4.1000e-004 | 4.9200e-003 | 2.0000e-005 | 1.8100e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.4697 | 1.4697 | 4.0000e-005 | 0.0000 | 1.4706 |
| **Total** | **5.9000e-004** | **4.1000e-004** | **4.9200e-003** | **2.0000e-005** | **1.8100e-003** | **1.0000e-005** | **1.8200e-003** | **4.8000e-004** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **1.4697** | **1.4697** | **4.0000e-005** | **0.0000** | **1.4706** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |
| **Total** | **0.0101** | **6.9900e-003** | **0.0835** | **2.8000e-004** | **0.0307** | **2.3000e-004** | **0.0309** | **8.1500e-003** | **2.2000e-004** | **8.3700e-003** | **0.0000** | **24.9407** | **24.9407** | **6.1000e-004** | **0.0000** | **24.9558** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0101 | 6.9900e-003 | 0.0835 | 2.8000e-004 | 0.0307 | 2.3000e-004 | 0.0309 | 8.1500e-003 | 2.2000e-004 | 8.3700e-003 | 0.0000 | 24.9407 | 24.9407 | 6.1000e-004 | 0.0000 | 24.9558 |
| **Total** | **0.0101** | **6.9900e-003** | **0.0835** | **2.8000e-004** | **0.0307** | **2.3000e-004** | **0.0309** | **8.1500e-003** | **2.2000e-004** | **8.3700e-003** | **0.0000** | **24.9407** | **24.9407** | **6.1000e-004** | **0.0000** | **24.9558** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Unmitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| NaturalGas Mitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |
| NaturalGas Unmitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

## 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Unmitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Unmitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Unmitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

## 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2769 | 46.4588 | 31.6840 | 0.0643 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,234.7974 | 6,234.7974 | 1.9495 | 0.0000 | 6,283.5352 |
| 2022 | 5.3304 | 38.8967 | 49.5629 | 0.1517 | 9.8688 | 1.6366 | 10.7727 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 15,251.5674 | 15,251.5674 | 1.9503 | 0.0000 | 15,278.5288 |
| 2023 | 4.8957 | 26.3317 | 46.7567 | 0.1472 | 9.8688 | 0.7794 | 10.6482 | 2.6381 | 0.7322 | 3.3702 | 0.0000 | 14,807.5269 | 14,807.5269 | 1.0250 | 0.0000 | 14,833.1521 |
| 2024 | 237.1630 | 9.5575 | 15.1043 | 0.0244 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,361.3989 | 2,361.3989 | 0.7177 | 0.0000 | 2,379.3421 |
| **Maximum** | **237.1630** | **46.4588** | **49.5629** | **0.1517** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **15,251.5674** | **15,251.5674** | **1.9503** | **0.0000** | **15,278.5288** |

## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2769 | 46.4588 | 31.6840 | 0.0643 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,234.7974 | 6,234.7974 | 1.9495 | 0.0000 | 6,283.5352 |
| 2022 | 5.3304 | 38.8967 | 49.5629 | 0.1517 | 9.8688 | 1.6366 | 10.7727 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 15,251.5674 | 15,251.5674 | 1.9503 | 0.0000 | 15,278.5288 |
| 2023 | 4.8957 | 26.3317 | 46.7567 | 0.1472 | 9.8688 | 0.7794 | 10.6482 | 2.6381 | 0.7322 | 3.3702 | 0.0000 | 14,807.5269 | 14,807.5269 | 1.0250 | 0.0000 | 14,833.1520 |
| 2024 | 237.1630 | 9.5575 | 15.1043 | 0.0244 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,361.3989 | 2,361.3989 | 0.7177 | 0.0000 | 2,379.3421 |
| **Maximum** | **237.1630** | **46.4588** | **49.5629** | **0.1517** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **15,251.5674** | **15,251.5674** | **1.9503** | **0.0000** | **15,278.5288** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0643 | 0.0442 | 0.6042 | 1.7100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 170.8155 | 170.8155 | 5.0300e-003 | | 170.9413 |
| **Total** | **0.1916** | **4.1394** | **1.5644** | **0.0136** | **0.4346** | **0.0139** | **0.4485** | **0.1176** | **0.0133** | **0.1309** | | **1,463.0568** | **1,463.0568** | **0.0927** | | **1,465.3750** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0643 | 0.0442 | 0.6042 | 1.7100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 170.8155 | 170.8155 | 5.0300e-003 | | 170.9413 |
| **Total** | **0.1916** | **4.1394** | **1.5644** | **0.0136** | **0.4346** | **0.0139** | **0.4485** | **0.1176** | **0.0133** | **0.1309** | | **1,463.0568** | **1,463.0568** | **0.0927** | | **1,465.3750** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| **Total** | **0.0772** | **0.0530** | **0.7250** | **2.0600e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **204.9786** | **204.9786** | **6.0400e-003** | | **205.1296** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| **Total** | **0.0772** | **0.0530** | **0.7250** | **2.0600e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **204.9786** | **204.9786** | **6.0400e-003** | | **205.1296** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0857 | 0.0589 | 0.8056 | 2.2900e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 6.7100e-003 | | 227.9217 |
| **Total** | **0.0857** | **0.0589** | **0.8056** | **2.2900e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **227.7540** | **227.7540** | **6.7100e-003** | | **227.9217** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0857 | 0.0589 | 0.8056 | 2.2900e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 227.7540 | 227.7540 | 6.7100e-003 | | 227.9217 |
| **Total** | **0.0857** | **0.0589** | **0.8056** | **2.2900e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **227.7540** | **227.7540** | **6.7100e-003** | | **227.9217** |

## 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 6.0600e-003 | | 219.8941 |
| **Total** | **0.0803** | **0.0532** | **0.7432** | **2.2100e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **219.7425** | **219.7425** | **6.0600e-003** | | **219.8941** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0803 | 0.0532 | 0.7432 | 2.2100e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 219.7425 | 219.7425 | 6.0600e-003 | | 219.8941 |
| **Total** | **0.0803** | **0.0532** | **0.7432** | **2.2100e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **219.7425** | **219.7425** | **6.0600e-003** | | **219.8941** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 3.2162 | 2.1318 | 29.7654 | 0.0883 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,800.6857 | 8,800.6857 | 0.2429 | | 8,806.7582 |
| **Total** | **3.6242** | **15.3350** | **33.1995** | **0.1247** | **9.8688** | **0.0949** | **9.9637** | **2.6381** | **0.0883** | **2.7263** | | **12,697.2339** | **12,697.2339** | **0.4665** | | **12,708.8966** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 3.2162 | 2.1318 | 29.7654 | 0.0883 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,800.6857 | 8,800.6857 | 0.2429 | | 8,806.7582 |
| **Total** | **3.6242** | **15.3350** | **33.1995** | **0.1247** | **9.8688** | **0.0949** | **9.9637** | **2.6381** | **0.0883** | **2.7263** | | **12,697.2339** | **12,697.2339** | **0.4665** | | **12,708.8966** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 3.0203 | 1.9287 | 27.4113 | 0.0851 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 8,478.4408 | 8,478.4408 | 0.2190 | | 8,483.9160 |
| **Total** | **3.3229** | **11.9468** | **30.5127** | **0.1203** | **9.8688** | **0.0797** | **9.9485** | **2.6381** | **0.0738** | **2.7118** | | **12,252.3170** | **12,252.3170** | **0.4172** | | **12,262.7460** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 3.0203 | 1.9287 | 27.4113 | 0.0851 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 8,478.4408 | 8,478.4408 | 0.2190 | | 8,483.9160 |
| **Total** | **3.3229** | **11.9468** | **30.5127** | **0.1203** | **9.8688** | **0.0797** | **9.9485** | **2.6381** | **0.0738** | **2.7118** | | **12,252.3170** | **12,252.3170** | **0.4172** | | **12,262.7460** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0566 | 0.0361 | 0.5133 | 1.5900e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |
| **Total** | **0.0566** | **0.0361** | **0.5133** | **1.5900e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **158.7723** | **158.7723** | **4.1000e-003** | | **158.8748** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0566 | 0.0361 | 0.5133 | 1.5900e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 158.7723 | 158.7723 | 4.1000e-003 | | 158.8748 |
| **Total** | **0.0566** | **0.0361** | **0.5133** | **1.5900e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **158.7723** | **158.7723** | **4.1000e-003** | | **158.8748** |

## 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0535 | 0.0329 | 0.4785 | 1.5400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |
| **Total** | **0.0535** | **0.0329** | **0.4785** | **1.5400e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **153.8517** | **153.8517** | **3.7600e-003** | | **153.9458** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0535 | 0.0329 | 0.4785 | 1.5400e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 153.8517 | 153.8517 | 3.7600e-003 | | 153.9458 |
| **Total** | **0.0535** | **0.0329** | **0.4785** | **1.5400e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **153.8517** | **153.8517** | **3.7600e-003** | | **153.9458** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5707 | 0.3513 | 5.1044 | 0.0165 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.0852 | 1,641.0852 | 0.0401 | | 1,642.0886 |
| **Total** | **0.5707** | **0.3513** | **5.1044** | **0.0165** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,641.0852** | **1,641.0852** | **0.0401** | | **1,642.0886** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.5707 | 0.3513 | 5.1044 | 0.0165 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,641.0852 | 1,641.0852 | 0.0401 | | 1,642.0886 |
| **Total** | **0.5707** | **0.3513** | **5.1044** | **0.0165** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,641.0852** | **1,641.0852** | **0.0401** | | **1,642.0886** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| Unmitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2865 | 46.4651 | 31.6150 | 0.0642 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,221.4937 | 6,221.4937 | 1.9491 | 0.0000 | 6,270.2214 |
| 2022 | 5.7218 | 38.9024 | 47.3319 | 0.1455 | 9.8688 | 1.6366 | 10.7736 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 14,630.3099 | 14,630.3099 | 1.9499 | 0.0000 | 14,657.2663 |
| 2023 | 5.2705 | 26.4914 | 44.5936 | 0.1413 | 9.8688 | 0.7800 | 10.6488 | 2.6381 | 0.7328 | 3.3708 | 0.0000 | 14,210.3424 | 14,210.3424 | 1.0230 | 0.0000 | 14,235.9160 |
| 2024 | 237.2328 | 9.5610 | 15.0611 | 0.0243 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,352.4178 | 2,352.4178 | 0.7175 | 0.0000 | 2,370.3550 |
| **Maximum** | **237.2328** | **46.4651** | **47.3319** | **0.1455** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **14,630.3099** | **14,630.3099** | **1.9499** | **0.0000** | **14,657.2663** |

## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2865 | 46.4651 | 31.6150 | 0.0642 | 18.2675 | 2.0461 | 20.3135 | 9.9840 | 1.8824 | 11.8664 | 0.0000 | 6,221.4937 | 6,221.4937 | 1.9491 | 0.0000 | 6,270.2214 |
| 2022 | 5.7218 | 38.9024 | 47.3319 | 0.1455 | 9.8688 | 1.6366 | 10.7736 | 3.6558 | 1.5057 | 5.1615 | 0.0000 | 14,630.3099 | 14,630.3099 | 1.9499 | 0.0000 | 14,657.2663 |
| 2023 | 5.2705 | 26.4914 | 44.5936 | 0.1413 | 9.8688 | 0.7800 | 10.6488 | 2.6381 | 0.7328 | 3.3708 | 0.0000 | 14,210.3424 | 14,210.3424 | 1.0230 | 0.0000 | 14,235.9160 |
| 2024 | 237.2328 | 9.5610 | 15.0611 | 0.0243 | 1.7884 | 0.4698 | 1.8628 | 0.4743 | 0.4322 | 0.5476 | 0.0000 | 2,352.4178 | 2,352.4178 | 0.7175 | 0.0000 | 2,370.3550 |
| **Maximum** | **237.2328** | **46.4651** | **47.3319** | **0.1455** | **18.2675** | **2.0461** | **20.3135** | **9.9840** | **1.8824** | **11.8664** | **0.0000** | **14,630.3099** | **14,630.3099** | **1.9499** | **0.0000** | **14,657.2663** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0715 | 0.0489 | 0.5524 | 1.6100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 160.8377 | 160.8377 | 4.7300e-003 | | 160.9560 |
| **Total** | **0.2019** | **4.1943** | **1.5706** | **0.0133** | **0.4346** | **0.0141** | **0.4487** | **0.1176** | **0.0135** | **0.1311** | | **1,430.6932** | **1,430.6932** | **0.0955** | | **1,433.0812** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0715 | 0.0489 | 0.5524 | 1.6100e-003 | 0.1677 | 1.3500e-003 | 0.1690 | 0.0445 | 1.2500e-003 | 0.0457 | | 160.8377 | 160.8377 | 4.7300e-003 | | 160.9560 |
| **Total** | **0.2019** | **4.1943** | **1.5706** | **0.0133** | **0.4346** | **0.0141** | **0.4487** | **0.1176** | **0.0135** | **0.1311** | | **1,430.6932** | **1,430.6932** | **0.0955** | | **1,433.0812** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| **Total** | **0.0858** | **0.0587** | **0.6629** | **1.9400e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **193.0052** | **193.0052** | **5.6800e-003** | | **193.1472** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| **Total** | **0.0858** | **0.0587** | **0.6629** | **1.9400e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **193.0052** | **193.0052** | **5.6800e-003** | | **193.1472** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |
| **Total** | **0.0954** | **0.0652** | **0.7365** | **2.1500e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **214.4502** | **214.4502** | **6.3100e-003** | | **214.6080** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0954 | 0.0652 | 0.7365 | 2.1500e-003 | 0.2236 | 1.8100e-003 | 0.2254 | 0.0593 | 1.6600e-003 | 0.0610 | | 214.4502 | 214.4502 | 6.3100e-003 | | 214.6080 |
| **Total** | **0.0954** | **0.0652** | **0.7365** | **2.1500e-003** | **0.2236** | **1.8100e-003** | **0.2254** | **0.0593** | **1.6600e-003** | **0.0610** | | **214.4502** | **214.4502** | **6.3100e-003** | | **214.6080** |

## 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0896 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |
| **Total** | **0.0896** | **0.0589** | **0.6784** | **2.0800e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **206.9139** | **206.9139** | **5.7000e-003** | | **207.0563** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0896 | 0.0589 | 0.6784 | 2.0800e-003 | 0.2236 | 1.7500e-003 | 0.2253 | 0.0593 | 1.6100e-003 | 0.0609 | | 206.9139 | 206.9139 | 5.7000e-003 | | 207.0563 |
| **Total** | **0.0896** | **0.0589** | **0.6784** | **2.0800e-003** | **0.2236** | **1.7500e-003** | **0.2253** | **0.0593** | **1.6100e-003** | **0.0609** | | **206.9139** | **206.9139** | **5.7000e-003** | | **207.0563** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 3.5872 | 2.3593 | 27.1680 | 0.0832 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,286.9013 | 8,286.9013 | 0.2282 | | 8,292.6058 |
| **Total** | **4.0156** | **15.5266** | **30.9685** | **0.1186** | **9.8688** | **0.0957** | **9.9645** | **2.6381** | **0.0891** | **2.7271** | | **12,075.9763** | **12,075.9763** | **0.4663** | | **12,087.6341** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 3.5872 | 2.3593 | 27.1680 | 0.0832 | 8.9533 | 0.0701 | 9.0234 | 2.3745 | 0.0646 | 2.4390 | | 8,286.9013 | 8,286.9013 | 0.2282 | | 8,292.6058 |
| **Total** | **4.0156** | **15.5266** | **30.9685** | **0.1186** | **9.8688** | **0.0957** | **9.9645** | **2.6381** | **0.0891** | **2.7271** | | **12,075.9763** | **12,075.9763** | **0.4663** | | **12,087.6341** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 3.3795 | 2.1338 | 24.9725 | 0.0801 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 7,983.7318 | 7,983.7318 | 0.2055 | | 7,988.8683 |
| **Total** | **3.6978** | **12.1065** | **28.3496** | **0.1144** | **9.8688** | **0.0803** | **9.9491** | **2.6381** | **0.0743** | **2.7124** | | **11,655.1325** | **11,655.1325** | **0.4151** | | **11,665.5099** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 3.3795 | 2.1338 | 24.9725 | 0.0801 | 8.9533 | 0.0681 | 9.0214 | 2.3745 | 0.0627 | 2.4372 | | 7,983.7318 | 7,983.7318 | 0.2055 | | 7,988.8683 |
| **Total** | **3.6978** | **12.1065** | **28.3496** | **0.1144** | **9.8688** | **0.0803** | **9.9491** | **2.6381** | **0.0743** | **2.7124** | | **11,655.1325** | **11,655.1325** | **0.4151** | | **11,665.5099** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |
| **Total** | **0.0633** | **0.0400** | **0.4677** | **1.5000e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **149.5081** | **149.5081** | **3.8500e-003** | | **149.6043** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0633 | 0.0400 | 0.4677 | 1.5000e-003 | 0.1677 | 1.2800e-003 | 0.1689 | 0.0445 | 1.1700e-003 | 0.0456 | | 149.5081 | 149.5081 | 3.8500e-003 | | 149.6043 |
| **Total** | **0.0633** | **0.0400** | **0.4677** | **1.5000e-003** | **0.1677** | **1.2800e-003** | **0.1689** | **0.0445** | **1.1700e-003** | **0.0456** | | **149.5081** | **149.5081** | **3.8500e-003** | | **149.6043** |

## 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0601 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |
| **Total** | **0.0601** | **0.0364** | **0.4354** | **1.4500e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **144.8706** | **144.8706** | **3.5300e-003** | | **144.9587** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0601 | 0.0364 | 0.4354 | 1.4500e-003 | 0.1677 | 1.2600e-003 | 0.1689 | 0.0445 | 1.1600e-003 | 0.0456 | | 144.8706 | 144.8706 | 3.5300e-003 | | 144.9587 |
| **Total** | **0.0601** | **0.0364** | **0.4354** | **1.4500e-003** | **0.1677** | **1.2600e-003** | **0.1689** | **0.0445** | **1.1600e-003** | **0.0456** | | **144.8706** | **144.8706** | **3.5300e-003** | | **144.9587** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.6406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2262 |
| **Total** | **0.6406** | **0.3886** | **4.6439** | **0.0155** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,545.2860** | **1,545.2860** | **0.0376** | | **1,546.2262** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.6406 | 0.3886 | 4.6439 | 0.0155 | 1.7884 | 0.0134 | 1.8018 | 0.4743 | 0.0123 | 0.4866 | | 1,545.2860 | 1,545.2860 | 0.0376 | | 1,546.2262 |
| **Total** | **0.6406** | **0.3886** | **4.6439** | **0.0155** | **1.7884** | **0.0134** | **1.8018** | **0.4743** | **0.0123** | **0.4866** | | **1,545.2860** | **1,545.2860** | **0.0376** | | **1,546.2262** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| Unmitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1704 | 1.8234 | 1.1577 | 2.3800e-003 | 0.4141 | 0.0817 | 0.4958 | 0.1788 | 0.0754 | 0.2542 | 0.0000 | 210.7654 | 210.7654 | 0.0600 | 0.0000 | 212.2661 |
| 2022 | 0.5865 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.6554 | 1,418.6554 | 0.1215 | 0.0000 | 1,421.6925 |
| 2023 | 0.5190 | 3.2850 | 4.7678 | 0.0147 | 0.8497 | 0.0971 | 0.9468 | 0.2283 | 0.0912 | 0.3195 | 0.0000 | 1,342.4412 | 1,342.4412 | 0.1115 | 0.0000 | 1,345.2291 |
| 2024 | 4.1592 | 0.1313 | 0.2557 | 5.0000e-004 | 0.0221 | 6.3900e-003 | 0.0285 | 5.8700e-003 | 5.9700e-003 | 0.0118 | 0.0000 | 44.6355 | 44.6355 | 7.8300e-003 | 0.0000 | 44.8311 |
| **Maximum** | **4.1592** | **4.0240** | **5.1546** | **0.0155** | **0.9509** | **0.1175** | **1.0683** | **0.2518** | **0.1103** | **0.3621** | **0.0000** | **1,418.6554** | **1,418.6554** | **0.1215** | **0.0000** | **1,421.6925** |

## 2.1 Overall Construction

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.1704 | 1.8234 | 1.1577 | 2.3800e-003 | 0.4141 | 0.0817 | 0.4958 | 0.1788 | 0.0754 | 0.2542 | 0.0000 | 210.7651 | 210.7651 | 0.0600 | 0.0000 | 212.2658 |
| 2022 | 0.5865 | 4.0240 | 5.1546 | 0.0155 | 0.9509 | 0.1175 | 1.0683 | 0.2518 | 0.1103 | 0.3621 | 0.0000 | 1,418.6550 | 1,418.6550 | 0.1215 | 0.0000 | 1,421.6921 |
| 2023 | 0.5190 | 3.2850 | 4.7678 | 0.0147 | 0.8497 | 0.0971 | 0.9468 | 0.2283 | 0.0912 | 0.3195 | 0.0000 | 1,342.4409 | 1,342.4409 | 0.1115 | 0.0000 | 1,345.2287 |
| 2024 | 4.1592 | 0.1313 | 0.2557 | 5.0000e-004 | 0.0221 | 6.3900e-003 | 0.0285 | 5.8700e-003 | 5.9700e-003 | 0.0118 | 0.0000 | 44.6354 | 44.6354 | 7.8300e-003 | 0.0000 | 44.8311 |
| **Maximum** | **4.1592** | **4.0240** | **5.1546** | **0.0155** | **0.9509** | **0.1175** | **1.0683** | **0.2518** | **0.1103** | **0.3621** | **0.0000** | **1,418.6550** | **1,418.6550** | **0.1215** | **0.0000** | **1,421.6921** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **1** | **9-1-2021** | **11-30-2021** | 1.4091 | 1.4091 |
| **2** | **12-1-2021** | **2-28-2022** | 1.3329 | 1.3329 |
| **3** | **3-1-2022** | **5-31-2022** | 1.1499 | 1.1499 |
| **4** | **6-1-2022** | **8-31-2022** | 1.1457 | 1.1457 |
| **5** | **9-1-2022** | **11-30-2022** | 1.1415 | 1.1415 |
| **6** | **12-1-2022** | **2-28-2023** | 1.0278 | 1.0278 |
| **7** | **3-1-2023** | **5-31-2023** | 0.9868 | 0.9868 |
| **8** | **6-1-2023** | **8-31-2023** | 0.9831 | 0.9831 |

| | | | | |
|---|---|---|---|---|
| **9** | **9-1-2023** | **11-30-2023** | 0.9798 | 0.9798 |
| **10** | **12-1-2023** | **2-29-2024** | 2.8757 | 2.8757 |
| **11** | **3-1-2024** | **5-31-2024** | 1.6188 | 1.6188 |
| | | **Highest** | 2.8757 | 2.8757 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Energy | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 3,896.0732 | 3,896.0732 | 0.1303 | 0.0468 | 3,913.2833 |
| Mobile | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 207.8079 | 0.0000 | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 29.1632 | 556.6420 | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| **Total** | **6.8692** | **9.5223** | **30.3407** | **0.0914** | **7.7979** | **0.2260** | **8.0240** | **2.0895** | **0.2219** | **2.3114** | **236.9712** | **12,294.1807** | **12,531.1519** | **15.7904** | **0.1260** | **12,963.4751** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0012 | 51.0012 | 0.0144 | 0.0000 | 51.3601 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0012** | **51.0012** | **0.0144** | **0.0000** | **51.3601** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 5.3000e-004 | 6.0900e-003 | 2.0000e-005 | 1.6800e-003 | 1.0000e-005 | 1.6900e-003 | 4.5000e-004 | 1.0000e-005 | 4.6000e-004 | 0.0000 | 1.5281 | 1.5281 | 5.0000e-005 | 0.0000 | 1.5293 |
| **Total** | **2.6500e-003** | **0.0639** | **0.0209** | **2.0000e-004** | **5.6200e-003** | **2.0000e-004** | **5.8200e-003** | **1.5300e-003** | **1.9000e-004** | **1.7200e-003** | **0.0000** | **18.9847** | **18.9847** | **1.2600e-003** | **0.0000** | **19.0161** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0496 | 0.0000 | 0.0496 | 7.5100e-003 | 0.0000 | 7.5100e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0475 | 0.4716 | 0.3235 | 5.8000e-004 | | 0.0233 | 0.0233 | | 0.0216 | 0.0216 | 0.0000 | 51.0011 | 51.0011 | 0.0144 | 0.0000 | 51.3600 |
| **Total** | **0.0475** | **0.4716** | **0.3235** | **5.8000e-004** | **0.0496** | **0.0233** | **0.0729** | **7.5100e-003** | **0.0216** | **0.0291** | **0.0000** | **51.0011** | **51.0011** | **0.0144** | **0.0000** | **51.3600** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 1.9300e-003 | 0.0634 | 0.0148 | 1.8000e-004 | 3.9400e-003 | 1.9000e-004 | 4.1300e-003 | 1.0800e-003 | 1.8000e-004 | 1.2600e-003 | 0.0000 | 17.4566 | 17.4566 | 1.2100e-003 | 0.0000 | 17.4869 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 5.3000e-004 | 6.0900e-003 | 2.0000e-005 | 1.6800e-003 | 1.0000e-005 | 1.6900e-003 | 4.5000e-004 | 1.0000e-005 | 4.6000e-004 | 0.0000 | 1.5281 | 1.5281 | 5.0000e-005 | 0.0000 | 1.5293 |
| **Total** | **2.6500e-003** | **0.0639** | **0.0209** | **2.0000e-004** | **5.6200e-003** | **2.0000e-004** | **5.8200e-003** | **1.5300e-003** | **1.9000e-004** | **1.7200e-003** | **0.0000** | **18.9847** | **18.9847** | **1.2600e-003** | **0.0000** | **19.0161** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7061 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7061** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3500e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |
| **Total** | **5.8000e-004** | **4.3000e-004** | **4.8700e-003** | **1.0000e-005** | **1.3400e-003** | **1.0000e-005** | **1.3500e-003** | **3.6000e-004** | **1.0000e-005** | **3.7000e-004** | **0.0000** | **1.2225** | **1.2225** | **4.0000e-005** | **0.0000** | **1.2234** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1807 | 0.0000 | 0.1807 | 0.0993 | 0.0000 | 0.0993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0389 | 0.4050 | 0.2115 | 3.8000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 33.4357 | 33.4357 | 0.0108 | 0.0000 | 33.7060 |
| **Total** | **0.0389** | **0.4050** | **0.2115** | **3.8000e-004** | **0.1807** | **0.0204** | **0.2011** | **0.0993** | **0.0188** | **0.1181** | **0.0000** | **33.4357** | **33.4357** | **0.0108** | **0.0000** | **33.7060** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.8000e-004 | 4.3000e-004 | 4.8700e-003 | 1.0000e-005 | 1.3400e-003 | 1.0000e-005 | 1.3500e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2225 | 1.2225 | 4.0000e-005 | 0.0000 | 1.2234 |
| **Total** | **5.8000e-004** | **4.3000e-004** | **4.8700e-003** | **1.0000e-005** | **1.3400e-003** | **1.0000e-005** | **1.3500e-003** | **3.6000e-004** | **1.0000e-005** | **3.7000e-004** | **0.0000** | **1.2225** | **1.2225** | **4.0000e-005** | **0.0000** | **1.2234** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5405 | 103.5405 | 0.0335 | 0.0000 | 104.3776 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5405** | **103.5405** | **0.0335** | **0.0000** | **104.3776** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8600e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |
| **Total** | **1.2200e-003** | **9.0000e-004** | **0.0103** | **3.0000e-005** | **2.8300e-003** | **2.0000e-005** | **2.8600e-003** | **7.5000e-004** | **2.0000e-005** | **7.8000e-004** | **0.0000** | **2.5808** | **2.5808** | **8.0000e-005** | **0.0000** | **2.5828** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1741 | 0.0000 | 0.1741 | 0.0693 | 0.0000 | 0.0693 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0796 | 0.8816 | 0.5867 | 1.1800e-003 | | 0.0377 | 0.0377 | | 0.0347 | 0.0347 | 0.0000 | 103.5403 | 103.5403 | 0.0335 | 0.0000 | 104.3775 |
| **Total** | **0.0796** | **0.8816** | **0.5867** | **1.1800e-003** | **0.1741** | **0.0377** | **0.2118** | **0.0693** | **0.0347** | **0.1040** | **0.0000** | **103.5403** | **103.5403** | **0.0335** | **0.0000** | **104.3775** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2200e-003 | 9.0000e-004 | 0.0103 | 3.0000e-005 | 2.8300e-003 | 2.0000e-005 | 2.8600e-003 | 7.5000e-004 | 2.0000e-005 | 7.8000e-004 | 0.0000 | 2.5808 | 2.5808 | 8.0000e-005 | 0.0000 | 2.5828 |
| **Total** | **1.2200e-003** | **9.0000e-004** | **0.0103** | **3.0000e-005** | **2.8300e-003** | **2.0000e-005** | **2.8600e-003** | **7.5000e-004** | **2.0000e-005** | **7.8000e-004** | **0.0000** | **2.5808** | **2.5808** | **8.0000e-005** | **0.0000** | **2.5828** |

## 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |
| **Total** | **2.1000e-004** | **1.5000e-004** | **1.7400e-003** | **1.0000e-005** | **5.2000e-004** | **0.0000** | **5.3000e-004** | **1.4000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4587** | **0.4587** | **1.0000e-005** | **0.0000** | **0.4590** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0807 | 0.0000 | 0.0807 | 0.0180 | 0.0000 | 0.0180 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0127 | 0.1360 | 0.1017 | 2.2000e-004 | | 5.7200e-003 | 5.7200e-003 | | 5.2600e-003 | 5.2600e-003 | 0.0000 | 19.0871 | 19.0871 | 6.1700e-003 | 0.0000 | 19.2414 |
| **Total** | **0.0127** | **0.1360** | **0.1017** | **2.2000e-004** | **0.0807** | **5.7200e-003** | **0.0865** | **0.0180** | **5.2600e-003** | **0.0233** | **0.0000** | **19.0871** | **19.0871** | **6.1700e-003** | **0.0000** | **19.2414** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 1.5000e-004 | 1.7400e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.3000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4587 | 0.4587 | 1.0000e-005 | 0.0000 | 0.4590 |
| **Total** | **2.1000e-004** | **1.5000e-004** | **1.7400e-003** | **1.0000e-005** | **5.2000e-004** | **0.0000** | **5.3000e-004** | **1.4000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4587** | **0.4587** | **1.0000e-005** | **0.0000** | **0.4590** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1324 | 293.1324 | 0.0702 | 0.0000 | 294.8881 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1324** | **293.1324** | **0.0702** | **0.0000** | **294.8881** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.3051 | 0.2164 | 2.5233 | 7.3500e-003 | 0.7557 | 6.2300e-003 | 0.7619 | 0.2007 | 5.7400e-003 | 0.2065 | 0.0000 | 663.9936 | 663.9936 | 0.0187 | 0.0000 | 664.4604 |
| **Total** | **0.3578** | **1.9125** | **2.9812** | **0.0119** | **0.8696** | **9.4100e-003** | **0.8790** | **0.2336** | **8.7800e-003** | **0.2424** | **0.0000** | **1,105.9771** | **1,105.9771** | **0.0451** | **0.0000** | **1,107.1039** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2158 | 1.9754 | 2.0700 | 3.4100e-003 | | 0.1023 | 0.1023 | | 0.0963 | 0.0963 | 0.0000 | 293.1321 | 293.1321 | 0.0702 | 0.0000 | 294.8877 |
| **Total** | **0.2158** | **1.9754** | **2.0700** | **3.4100e-003** | | **0.1023** | **0.1023** | | **0.0963** | **0.0963** | **0.0000** | **293.1321** | **293.1321** | **0.0702** | **0.0000** | **294.8877** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0527 | 1.6961 | 0.4580 | 4.5500e-003 | 0.1140 | 3.1800e-003 | 0.1171 | 0.0329 | 3.0400e-003 | 0.0359 | 0.0000 | 441.9835 | 441.9835 | 0.0264 | 0.0000 | 442.6435 |
| Worker | 0.3051 | 0.2164 | 2.5233 | 7.3500e-003 | 0.7557 | 6.2300e-003 | 0.7619 | 0.2007 | 5.7400e-003 | 0.2065 | 0.0000 | 663.9936 | 663.9936 | 0.0187 | 0.0000 | 664.4604 |
| **Total** | **0.3578** | **1.9125** | **2.9812** | **0.0119** | **0.8696** | **9.4100e-003** | **0.8790** | **0.2336** | **8.7800e-003** | **0.2424** | **0.0000** | **1,105.9771** | **1,105.9771** | **0.0451** | **0.0000** | **1,107.1039** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2789 | 286.2789 | 0.0681 | 0.0000 | 287.9814 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2789** | **286.2789** | **0.0681** | **0.0000** | **287.9814** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.2795 | 0.1910 | 2.2635 | 6.9100e-003 | 0.7377 | 5.9100e-003 | 0.7436 | 0.1960 | 5.4500e-003 | 0.2014 | 0.0000 | 624.5363 | 624.5363 | 0.0164 | 0.0000 | 624.9466 |
| **Total** | **0.3177** | **1.4420** | **2.6646** | **0.0112** | **0.8490** | **7.3700e-003** | **0.8564** | **0.2281** | **6.8500e-003** | **0.2349** | **0.0000** | **1,042.5294** | **1,042.5294** | **0.0392** | **0.0000** | **1,043.5090** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1942 | 1.7765 | 2.0061 | 3.3300e-003 | | 0.0864 | 0.0864 | | 0.0813 | 0.0813 | 0.0000 | 286.2785 | 286.2785 | 0.0681 | 0.0000 | 287.9811 |
| **Total** | **0.1942** | **1.7765** | **2.0061** | **3.3300e-003** | | **0.0864** | **0.0864** | | **0.0813** | **0.0813** | **0.0000** | **286.2785** | **286.2785** | **0.0681** | **0.0000** | **287.9811** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0382 | 1.2511 | 0.4011 | 4.3000e-003 | 0.1113 | 1.4600e-003 | 0.1127 | 0.0321 | 1.4000e-003 | 0.0335 | 0.0000 | 417.9930 | 417.9930 | 0.0228 | 0.0000 | 418.5624 |
| Worker | 0.2795 | 0.1910 | 2.2635 | 6.9100e-003 | 0.7377 | 5.9100e-003 | 0.7436 | 0.1960 | 5.4500e-003 | 0.2014 | 0.0000 | 624.5363 | 624.5363 | 0.0164 | 0.0000 | 624.9466 |
| **Total** | **0.3177** | **1.4420** | **2.6646** | **0.0112** | **0.8490** | **7.3700e-003** | **0.8564** | **0.2281** | **6.8500e-003** | **0.2349** | **0.0000** | **1,042.5294** | **1,042.5294** | **0.0392** | **0.0000** | **1,043.5090** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |
| **Total** | **2.8000e-004** | **1.9000e-004** | **2.2300e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.6156** | **0.6156** | **2.0000e-005** | **0.0000** | **0.6160** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.7100e-003 | 0.0663 | 0.0948 | 1.5000e-004 | | 3.3200e-003 | 3.3200e-003 | | 3.0500e-003 | 3.0500e-003 | 0.0000 | 13.0175 | 13.0175 | 4.2100e-003 | 0.0000 | 13.1227 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **6.7100e-003** | **0.0663** | **0.0948** | **1.5000e-004** | | **3.3200e-003** | **3.3200e-003** | | **3.0500e-003** | **3.0500e-003** | **0.0000** | **13.0175** | **13.0175** | **4.2100e-003** | **0.0000** | **13.1227** |

### 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-004 | 1.9000e-004 | 2.2300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6156 | 0.6156 | 2.0000e-005 | 0.0000 | 0.6160 |
| **Total** | **2.8000e-004** | **1.9000e-004** | **2.2300e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.6156** | **0.6156** | **2.0000e-005** | **0.0000** | **0.6160** |

### 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |
| **Total** | **4.4000e-004** | **2.9000e-004** | **3.5100e-003** | **1.0000e-005** | **1.2300e-003** | **1.0000e-005** | **1.2400e-003** | **3.3000e-004** | **1.0000e-005** | **3.4000e-004** | **0.0000** | **1.0094** | **1.0094** | **3.0000e-005** | **0.0000** | **1.0100** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0109 | 0.1048 | 0.1609 | 2.5000e-004 | | 5.1500e-003 | 5.1500e-003 | | 4.7400e-003 | 4.7400e-003 | 0.0000 | 22.0292 | 22.0292 | 7.1200e-003 | 0.0000 | 22.2073 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0109** | **0.1048** | **0.1609** | **2.5000e-004** | | **5.1500e-003** | **5.1500e-003** | | **4.7400e-003** | **4.7400e-003** | **0.0000** | **22.0292** | **22.0292** | **7.1200e-003** | **0.0000** | **22.2073** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4000e-004 | 2.9000e-004 | 3.5100e-003 | 1.0000e-005 | 1.2300e-003 | 1.0000e-005 | 1.2400e-003 | 3.3000e-004 | 1.0000e-005 | 3.4000e-004 | 0.0000 | 1.0094 | 1.0094 | 3.0000e-005 | 0.0000 | 1.0100 |
| **Total** | **4.4000e-004** | **2.9000e-004** | **3.5100e-003** | **1.0000e-005** | **1.2300e-003** | **1.0000e-005** | **1.2400e-003** | **3.3000e-004** | **1.0000e-005** | **3.4000e-004** | **0.0000** | **1.0094** | **1.0094** | **3.0000e-005** | **0.0000** | **1.0100** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |
| **Total** | **7.4800e-003** | **4.9300e-003** | **0.0596** | **1.9000e-004** | **0.0209** | **1.6000e-004** | **0.0211** | **5.5500e-003** | **1.5000e-004** | **5.7000e-003** | **0.0000** | **17.1287** | **17.1287** | **4.3000e-004** | **0.0000** | **17.1394** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 4.1372 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.1600e-003 | 0.0213 | 0.0317 | 5.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 4.4682 | 4.4682 | 2.5000e-004 | 0.0000 | 4.4745 |
| **Total** | **4.1404** | **0.0213** | **0.0317** | **5.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **4.4682** | **4.4682** | **2.5000e-004** | **0.0000** | **4.4745** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.4800e-003 | 4.9300e-003 | 0.0596 | 1.9000e-004 | 0.0209 | 1.6000e-004 | 0.0211 | 5.5500e-003 | 1.5000e-004 | 5.7000e-003 | 0.0000 | 17.1287 | 17.1287 | 4.3000e-004 | 0.0000 | 17.1394 |
| **Total** | **7.4800e-003** | **4.9300e-003** | **0.0596** | **1.9000e-004** | **0.0209** | **1.6000e-004** | **0.0211** | **5.5500e-003** | **1.5000e-004** | **5.7000e-003** | **0.0000** | **17.1287** | **17.1287** | **4.3000e-004** | **0.0000** | **17.1394** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |
| Unmitigated | 1.5857 | 7.9962 | 19.1834 | 0.0821 | 7.7979 | 0.0580 | 7.8559 | 2.0895 | 0.0539 | 2.1434 | 0.0000 | 7,620.4986 | 7,620.4986 | 0.3407 | 0.0000 | 7,629.0162 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2,512.6465 | 2,512.6465 | 0.1037 | 0.0215 | 2,521.6356 |
| NaturalGas Mitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |
| NaturalGas Unmitigated | 0.1398 | 1.2312 | 0.7770 | 7.6200e-003 | | 0.0966 | 0.0966 | | 0.0966 | 0.0966 | 0.0000 | 1,383.4267 | 1,383.4267 | 0.0265 | 0.0254 | 1,391.6478 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Low Rise | 408494 | 2.2000e-003 | 0.0188 | 8.0100e-003 | 1.2000e-004 | | 1.5200e-003 | 1.5200e-003 | | 1.5200e-003 | 1.5200e-003 | 0.0000 | 21.7988 | 21.7988 | 4.2000e-004 | 4.0000e-004 | 21.9284 |
| Apartments Mid Rise | 1.30613e+007 | 0.0704 | 0.6018 | 0.2561 | 3.8400e-003 | | 0.0487 | 0.0487 | | 0.0487 | 0.0487 | 0.0000 | 696.9989 | 696.9989 | 0.0134 | 0.0128 | 701.1408 |
| General Office Building | 468450 | 2.5300e-003 | 0.0230 | 0.0193 | 1.4000e-004 | | 1.7500e-003 | 1.7500e-003 | | 1.7500e-003 | 1.7500e-003 | 0.0000 | 24.9983 | 24.9983 | 4.8000e-004 | 4.6000e-004 | 25.1468 |
| High Turnover (Sit Down Restaurant) | 8.30736e+006 | 0.0448 | 0.4072 | 0.3421 | 2.4400e-003 | | 0.0310 | 0.0310 | | 0.0310 | 0.0310 | 0.0000 | 443.3124 | 443.3124 | 8.5000e-003 | 8.1300e-003 | 445.9468 |
| Hotel | 1.74095e+006 | 9.3900e-003 | 0.0853 | 0.0717 | 5.1000e-004 | | 6.4900e-003 | 6.4900e-003 | | 6.4900e-003 | 6.4900e-003 | 0.0000 | 92.9036 | 92.9036 | 1.7800e-003 | 1.7000e-003 | 93.4557 |
| Quality Restaurant | 1.84608e+006 | 9.9500e-003 | 0.0905 | 0.0760 | 5.4000e-004 | | 6.8800e-003 | 6.8800e-003 | | 6.8800e-003 | 6.8800e-003 | 0.0000 | 98.5139 | 98.5139 | 1.8900e-003 | 1.8100e-003 | 99.0993 |
| Regional Shopping Center | 91840 | 5.0000e-004 | 4.5000e-003 | 3.7800e-003 | 3.0000e-005 | | 3.4000e-004 | 3.4000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 4.9009 | 4.9009 | 9.0000e-005 | 9.0000e-005 | 4.9301 |
| **Total** | | **0.1398** | **1.2312** | **0.7770** | **7.6200e-003** | | **0.0966** | **0.0966** | | **0.0966** | **0.0966** | **0.0000** | **1,383.4268** | **1,383.4268** | **0.0265** | **0.0254** | **1,391.6478** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

## 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Low Rise | 106010 | 33.7770 | 1.3900e-003 | 2.9000e-004 | 33.8978 |
| Apartments Mid Rise | 3.94697e+006 | 1,257.5879 | 0.0519 | 0.0107 | 1,262.0869 |
| General Office Building | 584550 | 186.2502 | 7.6900e-003 | 1.5900e-003 | 186.9165 |
| High Turnover (Sit Down Restaurant) | 1.58904e+006 | 506.3022 | 0.0209 | 4.3200e-003 | 508.1135 |
| Hotel | 550308 | 175.3399 | 7.2400e-003 | 1.5000e-003 | 175.9672 |
| Quality Restaurant | 353120 | 112.5116 | 4.6500e-003 | 9.6000e-004 | 112.9141 |
| Regional Shopping Center | 756000 | 240.8778 | 9.9400e-003 | 2.0600e-003 | 241.7395 |
| **Total** | | **2,512.6465** | **0.1037** | **0.0215** | **2,521.6356** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |
| Unmitigated | 5.1437 | 0.2950 | 10.3804 | 1.6700e-003 | | 0.0714 | 0.0714 | | 0.0714 | 0.0714 | 0.0000 | 220.9670 | 220.9670 | 0.0201 | 3.7400e-003 | 222.5835 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.4137 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.3998 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0206 | 0.1763 | 0.0750 | 1.1200e-003 | | 0.0143 | 0.0143 | | 0.0143 | 0.0143 | 0.0000 | 204.1166 | 204.1166 | 3.9100e-003 | 3.7400e-003 | 205.3295 |
| Landscaping | 0.3096 | 0.1187 | 10.3054 | 5.4000e-004 | | 0.0572 | 0.0572 | | 0.0572 | 0.0572 | 0.0000 | 16.8504 | 16.8504 | 0.0161 | 0.0000 | 17.2540 |
| **Total** | **5.1437** | **0.2950** | **10.3804** | **1.6600e-003** | | **0.0714** | **0.0714** | | **0.0714** | **0.0714** | **0.0000** | **220.9670** | **220.9670** | **0.0201** | **3.7400e-003** | **222.5835** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Annual

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |
| Unmitigated | 585.8052 | 3.0183 | 0.0755 | 683.7567 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Low Rise | 1.62885 / 1.02688 | 10.9095 | 0.0535 | 1.3400e-003 | 12.6471 |
| Apartments Mid Rise | 63.5252 / 40.0485 | 425.4719 | 2.0867 | 0.0523 | 493.2363 |
| General Office Building | 7.99802 / 4.90201 | 53.0719 | 0.2627 | 6.5900e-003 | 61.6019 |
| High Turnover (Sit Down Restaurant) | 10.9272 / 0.697482 | 51.2702 | 0.3580 | 8.8200e-003 | 62.8482 |
| Hotel | 1.26834 / 0.140927 | 6.1633 | 0.0416 | 1.0300e-003 | 7.5079 |
| Quality Restaurant | 2.42827 / 0.154996 | 11.3934 | 0.0796 | 1.9600e-003 | 13.9663 |
| Regional Shopping Center | 4.14806 / 2.54236 | 27.5250 | 0.1363 | 3.4200e-003 | 31.9490 |
| **Total** | | **585.8052** | **3.0183** | **0.0755** | **683.7567** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |
| Unmitigated | 207.8079 | 12.2811 | 0.0000 | 514.8354 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

## 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Low Rise | 11.5 | 2.3344 | 0.1380 | 0.0000 | 5.7834 |
| Apartments Mid Rise | 448.5 | 91.0415 | 5.3804 | 0.0000 | 225.5513 |
| General Office Building | 41.85 | 8.4952 | 0.5021 | 0.0000 | 21.0464 |
| High Turnover (Sit Down Restaurant) | 428.4 | 86.9613 | 5.1393 | 0.0000 | 215.4430 |
| Hotel | 27.38 | 5.5579 | 0.3285 | 0.0000 | 13.7694 |
| Quality Restaurant | 7.3 | 1.4818 | 0.0876 | 0.0000 | 3.6712 |
| Regional Shopping Center | 58.8 | 11.9359 | 0.7054 | 0.0000 | 29.5706 |
| **Total** | | **207.8079** | **12.2811** | **0.0000** | **514.8354** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2561 | 46.4415 | 31.4494 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,163.4166 | 6,163.4166 | 1.9475 | 0.0000 | 6,212.1039 |
| 2022 | 4.5441 | 38.8811 | 40.8776 | 0.1240 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,493.4403 | 12,493.4403 | 1.9485 | 0.0000 | 12,518.5707 |
| 2023 | 4.1534 | 25.7658 | 38.7457 | 0.1206 | 7.0088 | 0.7592 | 7.7679 | 1.8799 | 0.7136 | 2.5935 | 0.0000 | 12,150.4890 | 12,150.4890 | 0.9589 | 0.0000 | 12,174.4615 |
| 2024 | 237.0219 | 9.5478 | 14.9642 | 0.0239 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,313.1808 | 2,313.1808 | 0.7166 | 0.0000 | 2,331.0956 |
| **Maximum** | **237.0219** | **46.4415** | **40.8776** | **0.1240** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,493.4403** | **12,493.4403** | **1.9485** | **0.0000** | **12,518.5707** |

## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2561 | 46.4415 | 31.4494 | 0.0636 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,163.4166 | 6,163.4166 | 1.9475 | 0.0000 | 6,212.1039 |
| 2022 | 4.5441 | 38.8811 | 40.8776 | 0.1240 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,493.4403 | 12,493.4403 | 1.9485 | 0.0000 | 12,518.5707 |
| 2023 | 4.1534 | 25.7658 | 38.7457 | 0.1206 | 7.0088 | 0.7592 | 7.7679 | 1.8799 | 0.7136 | 2.5935 | 0.0000 | 12,150.4890 | 12,150.4890 | 0.9589 | 0.0000 | 12,174.4615 |
| 2024 | 237.0219 | 9.5478 | 14.9642 | 0.0239 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,313.1808 | 2,313.1808 | 0.7166 | 0.0000 | 2,331.0955 |
| **Maximum** | **237.0219** | **46.4415** | **40.8776** | **0.1240** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,493.4403** | **12,493.4403** | **1.9485** | **0.0000** | **12,518.5707** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| **Total** | **41.1168** | **67.2262** | **207.5497** | **0.6278** | **45.9592** | **2.4626** | **48.4217** | **12.2950** | **2.4385** | **14.7336** | **0.0000** | **76,811.1816** | **76,811.1816** | **2.8282** | **0.4832** | **77,025.8786** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0487 | 0.0313 | 0.4282 | 1.1800e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 117.2799 | 117.2799 | 3.5200e-003 | | 117.3678 |
| **Total** | **0.1760** | **4.1265** | **1.3884** | **0.0131** | **0.3810** | **0.0135** | **0.3946** | **0.1034** | **0.0129** | **0.1163** | | **1,409.5212** | **1,409.5212** | **0.0912** | | **1,411.8015** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1273 | 4.0952 | 0.9602 | 0.0119 | 0.2669 | 0.0126 | 0.2795 | 0.0732 | 0.0120 | 0.0852 | | 1,292.2413 | 1,292.2413 | 0.0877 | | 1,294.4337 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0487 | 0.0313 | 0.4282 | 1.1800e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 117.2799 | 117.2799 | 3.5200e-003 | | 117.3678 |
| **Total** | **0.1760** | **4.1265** | **1.3884** | **0.0131** | **0.3810** | **0.0135** | **0.3946** | **0.1034** | **0.0129** | **0.1163** | | **1,409.5212** | **1,409.5212** | **0.0912** | | **1,411.8015** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |
| **Total** | **0.0584** | **0.0375** | **0.5139** | **1.4100e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **140.7359** | **140.7359** | **4.2200e-003** | | **140.8414** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0584 | 0.0375 | 0.5139 | 1.4100e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 140.7359 | 140.7359 | 4.2200e-003 | | 140.8414 |
| **Total** | **0.0584** | **0.0375** | **0.5139** | **1.4100e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **140.7359** | **140.7359** | **4.2200e-003** | | **140.8414** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 156.3732 | 156.3732 | 4.6900e-003 | | 156.4904 |
| **Total** | **0.0649** | **0.0417** | **0.5710** | **1.5700e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **156.3732** | **156.3732** | **4.6900e-003** | | **156.4904** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0649 | 0.0417 | 0.5710 | 1.5700e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 156.3732 | 156.3732 | 4.6900e-003 | | 156.4904 |
| **Total** | **0.0649** | **0.0417** | **0.5710** | **1.5700e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **156.3732** | **156.3732** | **4.6900e-003** | | **156.4904** |

## 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0607 | 0.0376 | 0.5263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |
| **Total** | **0.0607** | **0.0376** | **0.5263** | **1.5100e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **150.8754** | **150.8754** | **4.2400e-003** | | **150.9813** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0607 | 0.0376 | 0.5263 | 1.5100e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 150.8754 | 150.8754 | 4.2400e-003 | | 150.9813 |
| **Total** | **0.0607** | **0.0376** | **0.5263** | **1.5100e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **150.8754** | **150.8754** | **4.2400e-003** | | **150.9813** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 2.4299 | 1.5074 | 21.0801 | 0.0607 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 6,042.5585 | 6,042.5585 | 0.1697 | | 6,046.8000 |
| **Total** | **2.8378** | **14.7106** | **24.5142** | **0.0971** | **7.0087** | **0.0741** | **7.0828** | **1.8799** | **0.0691** | **1.9490** | | **9,939.1067** | **9,939.1067** | **0.3933** | | **9,948.9384** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4079 | 13.2032 | 3.4341 | 0.0364 | 0.9155 | 0.0248 | 0.9404 | 0.2636 | 0.0237 | 0.2873 | | 3,896.5482 | 3,896.5482 | 0.2236 | | 3,902.1384 |
| Worker | 2.4299 | 1.5074 | 21.0801 | 0.0607 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 6,042.5585 | 6,042.5585 | 0.1697 | | 6,046.8000 |
| **Total** | **2.8378** | **14.7106** | **24.5142** | **0.0971** | **7.0087** | **0.0741** | **7.0828** | **1.8799** | **0.0691** | **1.9490** | | **9,939.1067** | **9,939.1067** | **0.3933** | | **9,948.9384** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 2.2780 | 1.3628 | 19.4002 | 0.0584 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,821.4028 | 5,821.4028 | 0.1529 | | 5,825.2254 |
| **Total** | **2.5807** | **11.3809** | **22.5017** | **0.0936** | **7.0088** | **0.0595** | **7.0682** | **1.8799** | **0.0552** | **1.9350** | | **9,595.2790** | **9,595.2790** | **0.3511** | | **9,604.0554** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3027 | 10.0181 | 3.1014 | 0.0352 | 0.9156 | 0.0116 | 0.9271 | 0.2636 | 0.0111 | 0.2747 | | 3,773.8762 | 3,773.8762 | 0.1982 | | 3,778.8300 |
| Worker | 2.2780 | 1.3628 | 19.4002 | 0.0584 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,821.4028 | 5,821.4028 | 0.1529 | | 5,825.2254 |
| **Total** | **2.5807** | **11.3809** | **22.5017** | **0.0936** | **7.0088** | **0.0595** | **7.0682** | **1.8799** | **0.0552** | **1.9350** | | **9,595.2790** | **9,595.2790** | **0.3511** | | **9,604.0554** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0427 | 0.0255 | 0.3633 | 1.0900e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |
| **Total** | **0.0427** | **0.0255** | **0.3633** | **1.0900e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **109.0150** | **109.0150** | **2.8600e-003** | | **109.0866** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0427 | 0.0255 | 0.3633 | 1.0900e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 109.0150 | 109.0150 | 2.8600e-003 | | 109.0866 |
| **Total** | **0.0427** | **0.0255** | **0.3633** | **1.0900e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **109.0150** | **109.0150** | **2.8600e-003** | | **109.0866** |

## 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0403 | 0.0233 | 0.3384 | 1.0600e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |
| **Total** | **0.0403** | **0.0233** | **0.3384** | **1.0600e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **105.6336** | **105.6336** | **2.6300e-003** | | **105.6992** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0403 | 0.0233 | 0.3384 | 1.0600e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 105.6336 | 105.6336 | 2.6300e-003 | | 105.6992 |
| **Total** | **0.0403** | **0.0233** | **0.3384** | **1.0600e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **105.6336** | **105.6336** | **2.6300e-003** | | **105.6992** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,126.7583 | 1,126.7583 | 0.0280 | | 1,127.4583 |
| **Total** | **0.4296** | **0.2481** | **3.6098** | **0.0113** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,126.7583** | **1,126.7583** | **0.0280** | | **1,127.4583** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4296 | 0.2481 | 3.6098 | 0.0113 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,126.7583 | 1,126.7583 | 0.0280 | | 1,127.4583 |
| **Total** | **0.4296** | **0.2481** | **3.6098** | **0.0113** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,126.7583** | **1,126.7583** | **0.0280** | | **1,127.4583** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |
| Unmitigated | 9.8489 | 45.4304 | 114.8495 | 0.4917 | 45.9592 | 0.3360 | 46.2951 | 12.2950 | 0.3119 | 12.6070 | | 50,306.6034 | 50,306.6034 | 2.1807 | | 50,361.1208 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Summer

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Village South Specific Plan (Proposed)

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Office Building | 45.00 | 1000sqft | 1.03 | 45,000.00 | 0 |
| High Turnover (Sit Down Restaurant) | 36.00 | 1000sqft | 0.83 | 36,000.00 | 0 |
| Hotel | 50.00 | Room | 1.67 | 72,600.00 | 0 |
| Quality Restaurant | 8.00 | 1000sqft | 0.18 | 8,000.00 | 0 |
| Apartments Low Rise | 25.00 | Dwelling Unit | 1.56 | 25,000.00 | 72 |
| Apartments Mid Rise | 975.00 | Dwelling Unit | 25.66 | 975,000.00 | 2789 |
| Regional Shopping Center | 56.00 | 1000sqft | 1.29 | 56,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 9 | | | **Operational Year** | 2028 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

Project Characteristics - Consistent with the DEIR's model.

Land Use - See SWAPE comment regarding residential and retail land uses.

Construction Phase - See SWAPE comment regarding individual construction phase lengths.

Demolition - Consistent with the DEIR's model. See SWAPE comment regarding demolition.

Vehicle Trips - Saturday trips consistent with the DEIR's model. See SWAPE comment regarding weekday and Sunday trips.

Woodstoves - Woodstoves and wood-burning fireplaces consistent with the DEIR's model. See SWAPE comment regarding gas fireplaces.

Energy Use -

Construction Off-road Equipment Mitigation - See SWAPE comment on construction-related mitigation.

Area Mitigation - See SWAPE comment regarding operational mitigation measures.

Water Mitigation - See SWAPE comment regarding operational mitigation measures.

Trips and VMT - Local hire provision

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberWood | 1.25 | 0.00 |
| tblFireplaces | NumberWood | 48.75 | 0.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblTripsAndVMT | WorkerTripLength | 14.70 | 10.00 |
| tblVehicleTrips | ST_TR | 7.16 | 6.17 |
| tblVehicleTrips | ST_TR | 6.39 | 3.87 |
| tblVehicleTrips | ST_TR | 2.46 | 1.39 |
| tblVehicleTrips | ST_TR | 158.37 | 79.82 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | ST_TR | 8.19 | 3.75 |
| tblVehicleTrips | ST_TR | 94.36 | 63.99 |
| tblVehicleTrips | ST_TR | 49.97 | 10.74 |
| tblVehicleTrips | SU_TR | 6.07 | 6.16 |
| tblVehicleTrips | SU_TR | 5.86 | 4.18 |
| tblVehicleTrips | SU_TR | 1.05 | 0.69 |
| tblVehicleTrips | SU_TR | 131.84 | 78.27 |
| tblVehicleTrips | SU_TR | 5.95 | 3.20 |
| tblVehicleTrips | SU_TR | 72.16 | 57.65 |
| tblVehicleTrips | SU_TR | 25.24 | 6.39 |
| tblVehicleTrips | WD_TR | 6.59 | 5.83 |
| tblVehicleTrips | WD_TR | 6.65 | 4.13 |
| tblVehicleTrips | WD_TR | 11.03 | 6.41 |
| tblVehicleTrips | WD_TR | 127.15 | 65.80 |
| tblVehicleTrips | WD_TR | 8.17 | 3.84 |
| tblVehicleTrips | WD_TR | 89.95 | 62.64 |
| tblVehicleTrips | WD_TR | 42.70 | 9.43 |
| tblWoodstoves | NumberCatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberCatalytic | 48.75 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 48.75 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2621 | 46.4460 | 31.4068 | 0.0635 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,154.3377 | 6,154.3377 | 1.9472 | 0.0000 | 6,203.0186 |
| 2022 | 4.7966 | 38.8851 | 39.6338 | 0.1195 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,035.3440 | 12,035.3440 | 1.9482 | 0.0000 | 12,060.6013 |
| 2023 | 4.3939 | 25.8648 | 37.5031 | 0.1162 | 7.0088 | 0.7598 | 7.7685 | 1.8799 | 0.7142 | 2.5940 | 0.0000 | 11,710.4080 | 11,710.4080 | 0.9617 | 0.0000 | 11,734.4497 |
| 2024 | 237.0656 | 9.5503 | 14.9372 | 0.0238 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,307.0517 | 2,307.0517 | 0.7164 | 0.0000 | 2,324.9627 |
| **Maximum** | **237.0656** | **46.4460** | **39.6338** | **0.1195** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,035.3440** | **12,035.3440** | **1.9482** | **0.0000** | **12,060.6013** |

## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 4.2621 | 46.4460 | 31.4068 | 0.0635 | 18.2032 | 2.0456 | 20.2488 | 9.9670 | 1.8820 | 11.8490 | 0.0000 | 6,154.3377 | 6,154.3377 | 1.9472 | 0.0000 | 6,203.0186 |
| 2022 | 4.7966 | 38.8851 | 39.6338 | 0.1195 | 8.8255 | 1.6361 | 10.4616 | 3.6369 | 1.5052 | 5.1421 | 0.0000 | 12,035.3440 | 12,035.3440 | 1.9482 | 0.0000 | 12,060.6013 |
| 2023 | 4.3939 | 25.8648 | 37.5031 | 0.1162 | 7.0088 | 0.7598 | 7.7685 | 1.8799 | 0.7142 | 2.5940 | 0.0000 | 11,710.4080 | 11,710.4080 | 0.9617 | 0.0000 | 11,734.4497 |
| 2024 | 237.0656 | 9.5503 | 14.9372 | 0.0238 | 1.2171 | 0.4694 | 1.2875 | 0.3229 | 0.4319 | 0.4621 | 0.0000 | 2,307.0517 | 2,307.0517 | 0.7164 | 0.0000 | 2,324.9627 |
| **Maximum** | **237.0656** | **46.4460** | **39.6338** | **0.1195** | **18.2032** | **2.0456** | **20.2488** | **9.9670** | **1.8820** | **11.8490** | **0.0000** | **12,035.3440** | **12,035.3440** | **1.9482** | **0.0000** | **12,060.6013** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Energy | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| Mobile | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| **Total** | **40.7912** | **67.7872** | **202.7424** | **0.6043** | **45.9592** | **2.4640** | **48.4231** | **12.2950** | **2.4399** | **14.7349** | **0.0000** | **74,422.3787** | **74,422.3787** | **2.8429** | **0.4832** | **74,637.4417** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 9/1/2021 | 10/12/2021 | 5 | 30 | |
| 2 | Site Preparation | Site Preparation | 10/13/2021 | 11/9/2021 | 5 | 20 | |
| 3 | Grading | Grading | 11/10/2021 | 1/11/2022 | 5 | 45 | |
| 4 | Building Construction | Building Construction | 1/12/2022 | 12/12/2023 | 5 | 500 | |
| 5 | Paving | Paving | 12/13/2023 | 1/30/2024 | 5 | 35 | |
| 6 | Architectural Coating | Architectural Coating | 1/31/2024 | 3/19/2024 | 5 | 35 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 112.5**

**Acres of Paving: 0**

**Residential Indoor: 2,025,000; Residential Outdoor: 675,000; Non-Residential Indoor: 326,400; Non-Residential Outdoor: 108,800; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Excavators | 3 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 2 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 367 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 6 | 15.00 | 0.00 | 458.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 801.00 | 143.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 160.00 | 0.00 | 0.00 | 10.00 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0532 | 0.0346 | 0.3963 | 1.1100e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 110.4707 | 110.4707 | 3.3300e-003 | | 110.5539 |
| **Total** | **0.1835** | **4.1800** | **1.4144** | **0.0128** | **0.3810** | **0.0137** | **0.3948** | **0.1034** | **0.0131** | **0.1165** | | **1,380.3262** | **1,380.3262** | **0.0941** | | **1,382.6791** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.3074 | 0.0000 | 3.3074 | 0.5008 | 0.0000 | 0.5008 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.1651 | 31.4407 | 21.5650 | 0.0388 | | 1.5513 | 1.5513 | | 1.4411 | 1.4411 | 0.0000 | 3,747.9449 | 3,747.9449 | 1.0549 | | 3,774.3174 |
| **Total** | **3.1651** | **31.4407** | **21.5650** | **0.0388** | **3.3074** | **1.5513** | **4.8588** | **0.5008** | **1.4411** | **1.9419** | **0.0000** | **3,747.9449** | **3,747.9449** | **1.0549** | | **3,774.3174** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.1304 | 4.1454 | 1.0182 | 0.0117 | 0.2669 | 0.0128 | 0.2797 | 0.0732 | 0.0122 | 0.0854 | | 1,269.8555 | 1,269.8555 | 0.0908 | | 1,272.1252 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0532 | 0.0346 | 0.3963 | 1.1100e-003 | 0.1141 | 9.5000e-004 | 0.1151 | 0.0303 | 8.8000e-004 | 0.0311 | | 110.4707 | 110.4707 | 3.3300e-003 | | 110.5539 |
| **Total** | **0.1835** | **4.1800** | **1.4144** | **0.0128** | **0.3810** | **0.0137** | **0.3948** | **0.1034** | **0.0131** | **0.1165** | | **1,380.3262** | **1,380.3262** | **0.0941** | | **1,382.6791** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0638 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |
| **Total** | **0.0638** | **0.0415** | **0.4755** | **1.3300e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **132.5649** | **132.5649** | **3.9900e-003** | | **132.6646** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 18.0663 | 0.0000 | 18.0663 | 9.9307 | 0.0000 | 9.9307 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.8882 | 40.4971 | 21.1543 | 0.0380 | | 2.0445 | 2.0445 | | 1.8809 | 1.8809 | 0.0000 | 3,685.6569 | 3,685.6569 | 1.1920 | | 3,715.4573 |
| **Total** | **3.8882** | **40.4971** | **21.1543** | **0.0380** | **18.0663** | **2.0445** | **20.1107** | **9.9307** | **1.8809** | **11.8116** | **0.0000** | **3,685.6569** | **3,685.6569** | **1.1920** | | **3,715.4573** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0638 | 0.0415 | 0.4755 | 1.3300e-003 | 0.1369 | 1.1400e-003 | 0.1381 | 0.0363 | 1.0500e-003 | 0.0374 | | 132.5649 | 132.5649 | 3.9900e-003 | | 132.6646 |
| **Total** | **0.0638** | **0.0415** | **0.4755** | **1.3300e-003** | **0.1369** | **1.1400e-003** | **0.1381** | **0.0363** | **1.0500e-003** | **0.0374** | | **132.5649** | **132.5649** | **3.9900e-003** | | **132.6646** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |
| **Total** | **0.0709** | **0.0462** | **0.5284** | **1.4800e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **147.2943** | **147.2943** | **4.4300e-003** | | **147.4051** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.1912 | 46.3998 | 30.8785 | 0.0620 | | 1.9853 | 1.9853 | | 1.8265 | 1.8265 | 0.0000 | 6,007.0434 | 6,007.0434 | 1.9428 | | 6,055.6134 |
| **Total** | **4.1912** | **46.3998** | **30.8785** | **0.0620** | **8.6733** | **1.9853** | **10.6587** | **3.5965** | **1.8265** | **5.4230** | **0.0000** | **6,007.0434** | **6,007.0434** | **1.9428** | | **6,055.6134** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0709 | 0.0462 | 0.5284 | 1.4800e-003 | 0.1521 | 1.2700e-003 | 0.1534 | 0.0404 | 1.1700e-003 | 0.0415 | | 147.2943 | 147.2943 | 4.4300e-003 | | 147.4051 |
| **Total** | **0.0709** | **0.0462** | **0.5284** | **1.4800e-003** | **0.1521** | **1.2700e-003** | **0.1534** | **0.0404** | **1.1700e-003** | **0.0415** | | **147.2943** | **147.2943** | **4.4300e-003** | | **147.4051** |

## 3.4 Grading - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |
| **Total** | **0.0665** | **0.0416** | **0.4861** | **1.4300e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **142.1207** | **142.1207** | **4.0000e-003** | | **142.2207** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.6733 | 0.0000 | 8.6733 | 3.5965 | 0.0000 | 3.5965 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.6248 | 38.8435 | 29.0415 | 0.0621 | | 1.6349 | 1.6349 | | 1.5041 | 1.5041 | 0.0000 | 6,011.4105 | 6,011.4105 | 1.9442 | | 6,060.0158 |
| **Total** | **3.6248** | **38.8435** | **29.0415** | **0.0621** | **8.6733** | **1.6349** | **10.3082** | **3.5965** | **1.5041** | **5.1006** | **0.0000** | **6,011.4105** | **6,011.4105** | **1.9442** | | **6,060.0158** |

## 3.4 Grading - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0665 | 0.0416 | 0.4861 | 1.4300e-003 | 0.1521 | 1.2300e-003 | 0.1534 | 0.0404 | 1.1300e-003 | 0.0415 | | 142.1207 | 142.1207 | 4.0000e-003 | | 142.2207 |
| **Total** | **0.0665** | **0.0416** | **0.4861** | **1.4300e-003** | **0.1521** | **1.2300e-003** | **0.1534** | **0.0404** | **1.1300e-003** | **0.0415** | | **142.1207** | **142.1207** | **4.0000e-003** | | **142.2207** |

## 3.5 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 2.6620 | 1.6677 | 19.4699 | 0.0571 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 5,691.9354 | 5,691.9354 | 0.1602 | | 5,695.9408 |
| **Total** | **3.0904** | **14.8350** | **23.2704** | **0.0926** | **7.0087** | **0.0749** | **7.0836** | **1.8799** | **0.0699** | **1.9498** | | **9,481.0104** | **9,481.0104** | **0.3984** | | **9,490.9691** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.7062 | 15.6156 | 16.3634 | 0.0269 | | 0.8090 | 0.8090 | | 0.7612 | 0.7612 | 0.0000 | 2,554.3336 | 2,554.3336 | 0.6120 | | 2,569.6322 |
| **Total** | **1.7062** | **15.6156** | **16.3634** | **0.0269** | | **0.8090** | **0.8090** | | **0.7612** | **0.7612** | **0.0000** | **2,554.3336** | **2,554.3336** | **0.6120** | | **2,569.6322** |

## 3.5 Building Construction - 2022

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.4284 | 13.1673 | 3.8005 | 0.0354 | 0.9155 | 0.0256 | 0.9412 | 0.2636 | 0.0245 | 0.2881 | | 3,789.0750 | 3,789.0750 | 0.2381 | | 3,795.0283 |
| Worker | 2.6620 | 1.6677 | 19.4699 | 0.0571 | 6.0932 | 0.0493 | 6.1425 | 1.6163 | 0.0454 | 1.6617 | | 5,691.9354 | 5,691.9354 | 0.1602 | | 5,695.9408 |
| **Total** | **3.0904** | **14.8350** | **23.2704** | **0.0926** | **7.0087** | **0.0749** | **7.0836** | **1.8799** | **0.0699** | **1.9498** | | **9,481.0104** | **9,481.0104** | **0.3984** | | **9,490.9691** |

## 3.5 Building Construction - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 2.5029 | 1.5073 | 17.8820 | 0.0550 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,483.7974 | 5,483.7974 | 0.1442 | | 5,487.4020 |
| **Total** | **2.8211** | **11.4799** | **21.2591** | **0.0893** | **7.0088** | **0.0601** | **7.0688** | **1.8799** | **0.0557** | **1.9356** | | **9,155.1981** | **9,155.1981** | **0.3538** | | **9,164.0437** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5728 | 14.3849 | 16.2440 | 0.0269 | | 0.6997 | 0.6997 | | 0.6584 | 0.6584 | 0.0000 | 2,555.2099 | 2,555.2099 | 0.6079 | | 2,570.4061 |
| **Total** | **1.5728** | **14.3849** | **16.2440** | **0.0269** | | **0.6997** | **0.6997** | | **0.6584** | **0.6584** | **0.0000** | **2,555.2099** | **2,555.2099** | **0.6079** | | **2,570.4061** |

## 3.5 Building Construction - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.3183 | 9.9726 | 3.3771 | 0.0343 | 0.9156 | 0.0122 | 0.9277 | 0.2636 | 0.0116 | 0.2752 | | 3,671.4007 | 3,671.4007 | 0.2096 | | 3,676.6417 |
| Worker | 2.5029 | 1.5073 | 17.8820 | 0.0550 | 6.0932 | 0.0479 | 6.1411 | 1.6163 | 0.0441 | 1.6604 | | 5,483.7974 | 5,483.7974 | 0.1442 | | 5,487.4020 |
| **Total** | **2.8211** | **11.4799** | **21.2591** | **0.0893** | **7.0088** | **0.0601** | **7.0688** | **1.8799** | **0.0557** | **1.9356** | | **9,155.1981** | **9,155.1981** | **0.3538** | | **9,164.0437** |

## 3.6 Paving - 2023

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |
| **Total** | **0.0469** | **0.0282** | **0.3349** | **1.0300e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **102.6928** | **102.6928** | **2.7000e-003** | | **102.7603** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.0327 | 10.1917 | 14.5842 | 0.0228 | | 0.5102 | 0.5102 | | 0.4694 | 0.4694 | 0.0000 | 2,207.5841 | 2,207.5841 | 0.7140 | | 2,225.4336 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.0327** | **10.1917** | **14.5842** | **0.0228** | | **0.5102** | **0.5102** | | **0.4694** | **0.4694** | **0.0000** | **2,207.5841** | **2,207.5841** | **0.7140** | | **2,225.4336** |

## 3.6 Paving - 2023

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0469 | 0.0282 | 0.3349 | 1.0300e-003 | 0.1141 | 9.0000e-004 | 0.1150 | 0.0303 | 8.3000e-004 | 0.0311 | | 102.6928 | 102.6928 | 2.7000e-003 | | 102.7603 |
| **Total** | **0.0469** | **0.0282** | **0.3349** | **1.0300e-003** | **0.1141** | **9.0000e-004** | **0.1150** | **0.0303** | **8.3000e-004** | **0.0311** | | **102.6928** | **102.6928** | **2.7000e-003** | | **102.7603** |

## 3.6 Paving - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0444 | 0.0257 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |
| **Total** | **0.0444** | **0.0257** | **0.3114** | **1.0000e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **99.5045** | **99.5045** | **2.4700e-003** | | **99.5663** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9882 | 9.5246 | 14.6258 | 0.0228 | | 0.4685 | 0.4685 | | 0.4310 | 0.4310 | 0.0000 | 2,207.5472 | 2,207.5472 | 0.7140 | | 2,225.3963 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.9882** | **9.5246** | **14.6258** | **0.0228** | | **0.4685** | **0.4685** | | **0.4310** | **0.4310** | **0.0000** | **2,207.5472** | **2,207.5472** | **0.7140** | | **2,225.3963** |

## 3.6 Paving - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0444 | 0.0257 | 0.3114 | 1.0000e-003 | 0.1141 | 8.8000e-004 | 0.1150 | 0.0303 | 8.1000e-004 | 0.0311 | | 99.5045 | 99.5045 | 2.4700e-003 | | 99.5663 |
| **Total** | **0.0444** | **0.0257** | **0.3114** | **1.0000e-003** | **0.1141** | **8.8000e-004** | **0.1150** | **0.0303** | **8.1000e-004** | **0.0311** | | **99.5045** | **99.5045** | **2.4700e-003** | | **99.5663** |

## 3.7 Architectural Coating - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

## 3.7 Architectural Coating - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,061.3818 | 1,061.3818 | 0.0264 | | 1,062.0410 |
| **Total** | **0.4734** | **0.2743** | **3.3220** | **0.0107** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,061.3818** | **1,061.3818** | **0.0264** | | **1,062.0410** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 236.4115 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.1808 | 1.2188 | 1.8101 | 2.9700e-003 | | 0.0609 | 0.0609 | | 0.0609 | 0.0609 | 0.0000 | 281.4481 | 281.4481 | 0.0159 | | 281.8443 |
| **Total** | **236.5923** | **1.2188** | **1.8101** | **2.9700e-003** | | **0.0609** | **0.0609** | | **0.0609** | **0.0609** | **0.0000** | **281.4481** | **281.4481** | **0.0159** | | **281.8443** |

### 3.7 Architectural Coating - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.4734 | 0.2743 | 3.3220 | 0.0107 | 1.2171 | 9.4300e-003 | 1.2266 | 0.3229 | 8.6800e-003 | 0.3315 | | 1,061.3818 | 1,061.3818 | 0.0264 | | 1,062.0410 |
| **Total** | **0.4734** | **0.2743** | **3.3220** | **0.0107** | **1.2171** | **9.4300e-003** | **1.2266** | **0.3229** | **8.6800e-003** | **0.3315** | | **1,061.3818** | **1,061.3818** | **0.0264** | | **1,062.0410** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |
| Unmitigated | 9.5233 | 45.9914 | 110.0422 | 0.4681 | 45.9592 | 0.3373 | 46.2965 | 12.2950 | 0.3132 | 12.6083 | | 47,917.8005 | 47,917.8005 | 2.1953 | | 47,972.6839 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Low Rise | 145.75 | 154.25 | 154.00 | 506,227 | 506,227 |
| Apartments Mid Rise | 4,026.75 | 3,773.25 | 4075.50 | 13,660,065 | 13,660,065 |
| General Office Building | 288.45 | 62.55 | 31.05 | 706,812 | 706,812 |
| High Turnover (Sit Down Restaurant) | 2,368.80 | 2,873.52 | 2817.72 | 3,413,937 | 3,413,937 |
| Hotel | 192.00 | 187.50 | 160.00 | 445,703 | 445,703 |
| Quality Restaurant | 501.12 | 511.92 | 461.20 | 707,488 | 707,488 |
| Regional Shopping Center | 528.08 | 601.44 | 357.84 | 1,112,221 | 1,112,221 |
| Total | 8,050.95 | 8,164.43 | 8,057.31 | 20,552,452 | 20,552,452 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Low Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |
| General Office Building | 16.60 | 8.40 | 6.90 | 33.00 | 48.00 | 19.00 | 77 | 19 | 4 |
| High Turnover (Sit Down | 16.60 | 8.40 | 6.90 | 8.50 | 72.50 | 19.00 | 37 | 20 | 43 |
| Hotel | 16.60 | 8.40 | 6.90 | 19.40 | 61.60 | 19.00 | 58 | 38 | 4 |
| Quality Restaurant | 16.60 | 8.40 | 6.90 | 12.00 | 69.00 | 19.00 | 38 | 18 | 44 |
| Regional Shopping Center | 16.60 | 8.40 | 6.90 | 16.30 | 64.70 | 19.00 | 54 | 35 | 11 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Low Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Apartments Mid Rise | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| General Office Building | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| High Turnover (Sit Down Restaurant) | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Hotel | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Quality Restaurant | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |
| Regional Shopping Center | 0.543088 | 0.044216 | 0.209971 | 0.116369 | 0.014033 | 0.006332 | 0.021166 | 0.033577 | 0.002613 | 0.001817 | 0.005285 | 0.000712 | 0.000821 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Village South Specific Plan (Proposed) - Los Angeles-South Coast County, Winter

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |
| NaturalGas Unmitigated | 0.7660 | 6.7462 | 4.2573 | 0.0418 | | 0.5292 | 0.5292 | | 0.5292 | 0.5292 | | 8,355.9832 | 8,355.9832 | 0.1602 | 0.1532 | 8,405.6387 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1119.16 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35784.3 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1283.42 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22759.9 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4769.72 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5057.75 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 251.616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Low Rise | 1.11916 | 0.0121 | 0.1031 | 0.0439 | 6.6000e-004 | | 8.3400e-003 | 8.3400e-003 | | 8.3400e-003 | 8.3400e-003 | | 131.6662 | 131.6662 | 2.5200e-003 | 2.4100e-003 | 132.4486 |
| Apartments Mid Rise | 35.7843 | 0.3859 | 3.2978 | 1.4033 | 0.0211 | | 0.2666 | 0.2666 | | 0.2666 | 0.2666 | | 4,209.9164 | 4,209.9164 | 0.0807 | 0.0772 | 4,234.9339 |
| General Office Building | 1.28342 | 0.0138 | 0.1258 | 0.1057 | 7.5000e-004 | | 9.5600e-003 | 9.5600e-003 | | 9.5600e-003 | 9.5600e-003 | | 150.9911 | 150.9911 | 2.8900e-003 | 2.7700e-003 | 151.8884 |
| High Turnover (Sit Down Restaurant) | 22.7599 | 0.2455 | 2.2314 | 1.8743 | 0.0134 | | 0.1696 | 0.1696 | | 0.1696 | 0.1696 | | 2,677.6342 | 2,677.6342 | 0.0513 | 0.0491 | 2,693.5460 |
| Hotel | 4.76972 | 0.0514 | 0.4676 | 0.3928 | 2.8100e-003 | | 0.0355 | 0.0355 | | 0.0355 | 0.0355 | | 561.1436 | 561.1436 | 0.0108 | 0.0103 | 564.4782 |
| Quality Restaurant | 5.05775 | 0.0545 | 0.4959 | 0.4165 | 2.9800e-003 | | 0.0377 | 0.0377 | | 0.0377 | 0.0377 | | 595.0298 | 595.0298 | 0.0114 | 0.0109 | 598.5658 |
| Regional Shopping Center | 0.251616 | 2.7100e-003 | 0.0247 | 0.0207 | 1.5000e-004 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | | 29.6019 | 29.6019 | 5.7000e-004 | 5.4000e-004 | 29.7778 |
| **Total** | | **0.7660** | **6.7463** | **4.2573** | **0.0418** | | **0.5292** | **0.5292** | | **0.5292** | **0.5292** | | **8,355.9832** | **8,355.9832** | **0.1602** | **0.1532** | **8,405.6387** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |
| Unmitigated | 30.5020 | 15.0496 | 88.4430 | 0.0944 | | 1.5974 | 1.5974 | | 1.5974 | 1.5974 | 0.0000 | 18,148.5950 | 18,148.5950 | 0.4874 | 0.3300 | 18,259.1192 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 2.2670 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 24.1085 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 1.6500 | 14.1000 | 6.0000 | 0.0900 | | 1.1400 | 1.1400 | | 1.1400 | 1.1400 | 0.0000 | 18,000.0000 | 18,000.0000 | 0.3450 | 0.3300 | 18,106.9650 |
| Landscaping | 2.4766 | 0.9496 | 82.4430 | 4.3600e-003 | | 0.4574 | 0.4574 | | 0.4574 | 0.4574 | | 148.5950 | 148.5950 | 0.1424 | | 152.1542 |
| **Total** | **30.5020** | **15.0496** | **88.4430** | **0.0944** | | **1.5974** | **1.5974** | | **1.5974** | **1.5974** | **0.0000** | **18,148.5950** | **18,148.5950** | **0.4874** | **0.3300** | **18,259.1192** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

Attachment C

| Local Hire Provision Net Change | |
|---|---|
| **Without Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,623 |
| Amortized (MT CO2e/year) | 120.77 |
| **With Local Hire Provision** | |
| Total Construction GHG Emissions (MT CO2e) | 3,024 |
| Amortized (MT CO2e/year) | 100.80 |
| ***% Decrease in Construction-related GHG Emissions*** | ***17%*** |

**EXHIBIT B**

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

**SOIL WATER AIR PROTECTION ENTERPRISE**
2656 29th Street, Suite 201
Santa Monica, California 90405
Attn: Paul Rosenfeld, Ph.D.
Mobil: (310) 795-2335
Office: (310) 452-5555
Fax: (310) 452-5550
**Email:** prosenfeld@swape.com

# *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**Risk Assessment & Remediation Specialist**

## Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

## Professional Experience

Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from unconventional oil drilling operations, oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, and many other industrial and agricultural sources. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at dozens of sites and has testified as an expert witness on more than ten cases involving exposure to air contaminants from industrial sources.

## Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex $H_2O$ Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

## Publications:

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P**., (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

**Rosenfeld, P.E**. & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health*. 73(6), 34-46.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry*. Amsterdam: Elsevier Publishing.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution,* 123 (17), 319-327.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

**Rosenfeld, P.E.,** J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

**Rosenfeld, P. E.,** M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities.* Boston Massachusetts: Elsevier Publishing

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

**Rosenfeld P. E.,** J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004.* New Orleans, October 2-6, 2004.

**Rosenfeld, P.E.,** and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49( 9), 171-178.

**Rosenfeld, P. E**., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

**Rosenfeld, P.E.,** Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

**Rosenfeld, P.E**., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

**Rosenfeld, P.E.,** and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality.* 29, 1662-1668.

**Rosenfeld, P.E.,** C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

**Rosenfeld, P.E.,** and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

**Rosenfeld, P.E.,** and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

Chollack, T. and **P. Rosenfeld. (**1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

**Rosenfeld, P. E.** (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

**Rosenfeld, P. E.** (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

**Rosenfeld, P. E. (**1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

**Rosenfeld, P. E.** (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

**Rosenfeld, P. E. (**1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

## Presentations:

**Rosenfeld, P.E.,** Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society.* Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution.* Lecture conducted from Boston, MA.

**Rosenfeld, P.E**. (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

**Rosenfeld, P.E.** (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

**Rosenfeld, P. E.** (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water.* Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld P. E.** (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

**Rosenfeld P. E.** (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting.* Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition.* Lecture conducted from Boston Massachusetts.

**Paul Rosenfeld Ph.D**. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference.* Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference.* Lecture conducted from Hilton Hotel in Irvine, California.

**Paul Rosenfeld Ph.D**. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference.* Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

**Paul Rosenfeld Ph.D**. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference.* Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

**Paul Rosenfeld, Ph.D.** (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

**Paul Rosenfeld, Ph.D.** (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

**Rosenfeld, P. E**., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

**Paul Rosenfeld, Ph.D.** (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

**Paul Rosenfeld, Ph.D**. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

**Rosenfeld, P.E**. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conferenc*e. Lecture conducted from Indianapolis, Maryland.

**Rosenfeld. P.E.** (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

**Rosenfeld. P.E. (**October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

**Rosenfeld, P.E. (**2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

**Rosenfeld, P.E.**, C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

**Rosenfeld, P.E,** C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

## Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

## Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

## Deposition and/or Trial Testimony:

In the United States District Court For The District of New Jersey
Duarte et al, *Plaintiffs,* vs. United States Metals Refining Company et. al. *Defendant.*
Case No.: 2:17-cv-01624-ES-SCM
Rosenfeld Deposition. 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk, *Plaintiffs,* vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" *Defendant.*
Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No.: No. BC615636
Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No.: No. BC646857
Rosenfeld Deposition, 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiff vs. The 3M Company et al., Defendants
Case: No 1:16-cv-02531-RBJ
Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No 1923
Rosenfeld Deposition, 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No C12-01481
Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 8-23-2017

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No.: LC102019 (c/w BC582154)
Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., *Plaintiffs,* vs. Meritor Inc., et al., *Defendants*
Case Number: 4:16-cv-52-DMB-JVM
Rosenfeld Deposition: July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No.: No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial, March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No.: RG14711115
Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No.: LALA002187
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Jerry Dovico, et al., Plaintiffs vs. Valley View Sine LLC, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Doug Pauls, et al.,, et al., Plaintiffs vs. Richard Warren, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action N0. 14-C-30000
Rosenfeld Deposition, June 2015

In The Third Judicial District County of Dona Ana, New Mexico
Betty Gonzalez, et al. Plaintiffs vs. Del Oro Dairy, Del Oro Real Estate LLC, Jerry Settles and Deward DeRuyter, Defendants
Rosenfeld Deposition: July 2015

In The Iowa District Court For Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No 4980
Rosenfeld Deposition: May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case Number CACE07030358 (26)
Rosenfeld Deposition: December 2014

In the United States District Court Western District of Oklahoma
Tommy McCarty, et al., Plaintiffs, v. Oklahoma City Landfill, LLC d/b/a Southeast Oklahoma City Landfill, et al. Defendants.
Case No. 5:12-cv-01152-C
Rosenfeld Deposition: July 2014

In the County Court of Dallas County Texas
Lisa Parr et al, *Plaintiff*, vs. Aruba et al, *Defendant.*
Case Number cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial: April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., *Plaintiffs,* vs. Republic Services, Inc., et al., *Defendants*
Case Number: 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition: October 2012

In the United States District Court of Southern District of Texas Galveston Division
Kyle Cannon, Eugene Donovan, Genaro Ramirez, Carol Sassler, and Harvey Walton, each Individually and on behalf of those similarly situated, *Plaintiffs,* vs. BP Products North America, Inc., *Defendant.*
Case 3:10-cv-00622
Rosenfeld Deposition: February 2012
Rosenfeld Trial: April 2013

In the Circuit Court of Baltimore County Maryland
Philip E. Cvach, II et al., *Plaintiffs* vs. Two Farms, Inc. d/b/a Royal Farms, Defendants
Case Number: 03-C-12-012487 OT
Rosenfeld Deposition: September 2013

# EXHIBIT C

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

1640 5th St.., Suite 204 Santa
Santa Monica, California 90401
Tel: (949) 887-9013
Email: mhagemann@swape.com

## Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

**Geologic and Hydrogeologic Characterization**
**Industrial Stormwater Compliance**
**Investigation and Remediation Strategies**
**Litigation Support and Testifying Expert**
**CEQA Review**

**Education:**

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

**Professional Certifications:**

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

**Professional Experience:**

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2014;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

**Senior Regulatory and Litigation Support Analyst:**

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 100 environmental impact reports since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, Valley Fever, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Manager of a project to provide technical assistance to a community adjacent to a former Naval shipyard under a grant from the U.S. EPA.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.

- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

**Executive Director:**

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

**Hydrogeology:**

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

**Policy:**

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

**Geology:**

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

**Teaching:**

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt taught physical geology (lecture and lab and introductory geology at Golden West College in Huntington Beach, California from 2010 to 2014.

**Invited Testimony, Reports, Papers and Presentations:**

**Hagemann, M.F**., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

**Hagemann, M.F**., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

**Hagemann, M.F.,** 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

**Hagemann, M.F.**, 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

**Hagemann, M.F.,** 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

**Hagemann, M.F.,** 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

**Hagemann, M.F**., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

**Hagemann, M.F**., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

**Hagemann, M.F**., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

**Hagemann, M.F**., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

**Hagemann, M.F**., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

**Hagemann, M.F**., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

**Hagemann, M.F**., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F**., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

**Hagemann, M.F**., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

**Hagemann, M.F**., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

**Hagemann, M.F**., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

**Hagemann, M.F**., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

**Hagemann, M.F**., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

**Hagemann, M.F**., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

**Hagemann, M.F**., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

**Hagemann, M.F**., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

**Hagemann, M. F**., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

**Hagemann, M.F**., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

**Hagemann, M.**F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

**Hagemann, M.F**., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

**Hagemann, M.F**., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

**Other Experience:**

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.

**City Council Staff Report**

**Intention to Annex Territory Comprising 5.04 Acres to Community Facilities District No. 1 in Connection with Tentative Tract Map No. TTM 38447. Location: Southwest Corner of Via Florencia and Via Josefina**

| DATE | ITEM # |
|---|---|
| December 18, 2025 | ACTION CALENDAR - 7A. |
| **Presented To** | **Presented By** |
| Mayor and City Council | Jacob De La Cruz, Financial Analyst |

## RECOMMENDED ACTION

Adopt Resolution No. 2025-(Next-in-Order), Declaring the City's Intention to Annex Territory to Community Facilities District No. 1 and to Levy a Special Tax therein for Additional Police and Fire Services, Preliminarily Approve a Map of the Area Proposed to be Annexed, and Schedule a Public Hearing to Consider the Annexation and the Levy of the Special Tax for Annexation No. 203.

## DISCUSSION

The process to accomplish an annexation to a community facilities district is governed by the Act (see Government Code Sections 53339 et seq.). The process can be expedited following the procedures authorized under Government Code Section 53327 of the Act, which permits the City to introduce the proposed Resolution at a City Council meeting and at the next City Council meeting, conduct the public hearing, call the special election, announce the results of the special election, and approve the annexation and levy the special tax using the rate and method of apportionment set forth in Exhibit "B" of the Resolution.

This expedited process is made possible by the Petition received from Owner which asserts, and the City has confirmed, that the Owner owns one hundred percent of the Annexed Territory, which is vacant land. Since Owner is the sole owner of the Annexed Territory, Owner will be the sole participant in the special election to approve the annexation and levy the tax. The Petition allows for a shortening of the time for the special election to expedite the annexation process and waives any requirement for notice, analysis and arguments in connection with the election. The City Clerk concurs with the shortened time for the election.

**Procedural Background:**

The proposed process for this annexation of territory into Community Facilities District No. 1 (police and fire) (sometimes, the "District") is the standard process followed by the City of Rancho Mirage ("City") for all development within the City's jurisdiction. This is the first step in the City's process to complete the annexation of this development project into the District (the second, and last step, will be considered by the City Council at its February 5, 2026 meeting).

**Property Information:**

The territory proposed for annexation (“Annexed Territory”) is located on the Southwest corner of Via Florencia and Via Josefina.

The Annexed Territory is comprised of one parcel totaling approximately 5.04 acres (gross), and the zoned for Very Low Density Residential (R-L-2). The project has a condition of approval (#20) to annex into Community Facilities District No. 1 (the Tract Map associated with this project also has a condition to annex into the District).

**District Background:**

The Mello-Roos Community Facilities District Act of 1982 (the "Mello-Roos Act” or the “Act," Government Code § 53311 et seq.) provides the City with a means of financing public facilities, infrastructure, and services, especially in connection with new development through the imposition of special taxes approved by a vote of the qualified electorate of the District.

On September 27, 1990, the City established the District pursuant to the Act, wherein a special tax is levied on new residential and commercial/industrial developments to recapture costs associated with the provision of additional police and fire services rendered to those new developments that are not reimbursed by property taxes.

In accordance with Condition No. 20 of Tentative Tract Map No. TTM38447, the owner of the Annexed Territory, OHRUS LLC (the “Owner”), submitted a Petition for Annexation (the “Petition”), a copy of which is on file in the City Clerk’s Office and is incorporated by reference to the attached Resolution of Intention (the “Resolution”), which requests the City Council to initiate annexation proceedings to annex the Annexed Territory into the District and provides for expedited approval of the annexation and the levy of the special tax.

The proposed annexation to the District contains approximately 5.04 acres (gross) as shown on the annexation map attached to the Resolution (“Annexation Map”), which will be preliminarily approved with adoption of the proposed Resolution. This annexation to the District is identified as Annexation Number 203.

The project is slated to subdivide the parcel into eight (8) residential lots, and four (4) common area lots.

Approval of the Resolution would allow the City to do the following:

1. Accept the Petition submitted by Owner requesting that the City initiate proceedings for the annexation of the Annexed Territory to the District, consent to the levy upon the Annexed Territory of the District’s special tax for additional police and fire services, allow a shortening of the time for the special election to expedite the annexation process, and waive requirements for notice, analysis and arguments in connection with the special election required to be conducted for the annexation.
2. Accept and preliminarily approve the Annexation Map and direct the City Clerk to record the map within fifteen days of the date of the adoption of the Resolution; and
3. Establish the date and time of the public hearing on the annexation and levy of the special tax and direct the City Clerk to mail/deliver to Owner the sole ballot on the issue of the annexation and levy of the special tax, which must be received prior to the start of the public hearing.

Assuming the City Council approves the Resolution, the following steps will remain in order to accomplish the annexation and levy the special tax:

1. The Annexation Map will be recorded.
2. The City Clerk will mail or deliver the special election ballot to Owner with a return deadline that is prior to the start of the public hearing.
3. On the date of the public hearing, the City Council will conduct the public hearing, at which time the qualified electors residing in the District may appear and be heard on the annexation and levy of the special tax. The City Clerk will report at the meeting on the number of protests. In the unlikely event fifty percent (50%) or more of the registered voters residing within the territory proposed to be included in the District file written protests against the levy, no action to annex the Annexed Territory will be taken by the City Council.
4. At the conclusion of the public hearing, provided written protests have not been filed, the City Council will be asked to consider adoption of a resolution calling a special election to submit to Owner, as the sole qualified elector of the Annexed Territory, the question of levying the special tax. The City Clerk will then canvass the voted ballot and report the results of the election to the City Council.
5. Finally, the City Council will consider the adoption of a resolution declaring the results of the election, approving the annexation of the Annexed Territory and the levy, and directing the City Clerk to complete, execute and cause to be recorded an amendment to the Notice of Special Tax Lien in the form required by the Act, within fifteen days of the date of the adoption of the resolution, as required by Section 3117.5 of the California Streets and Highways Code.

**California Environmental Quality Act (CEQA):**

The annexation of territory to a community facilities district constitutes the creation of a funding mechanism and/or other governmental fiscal activity, which will not involve commitment to a specific project that may result in a potentially significant physical impact on the environment. As such, the proposed annexation and levy of the special tax are exempt from environmental review under the California Environmental Quality Act ("CEQA"), pursuant to sections 15378(b) and 15061(b)(3) of the CEQA Guidelines.

**Attachments**

Attachment 1- Draft Resolution

**ATTACHMENT 1**

**RESOLUTION NO. 2025-**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE, CALIFORNIA, DECLARING THE CITY'S INTENTION TO ANNEX TERRITORY TO COMMUNITY FACILITIES DISTRICT NO. 1 AND TO LEVY A SPECIAL TAX THEREIN FOR ADDITIONAL POLICE AND FIRE SERVICES, PRELIMINARILY APPROVE A MAP OF THE AREA PROPOSED TO BE ANNEXED, AND SCHEDULE A PUBLIC HEARING TO CONSIDER THE ANNEXATION AND THE LEVY OF SPECIAL TAX FOR ANNEXATION NO. 203**

**WHEREAS,** on September 27, 1990, the City Council (the "City Council") of the City of Rancho Mirage (the "City"), a charter city and recognized for certain purposes as a political subdivision of the State of California, approved Resolution No. 90-78 establishing Community Facilities District No. 1 (the "District") pursuant to the Mello-Roos Community Facilities Act of 1982 (the "Mello-Roos Act," Government Code §§ 53311 et. seq.), for the purpose of levying a special tax on parcels to provide funding for additional police and fire services, which are necessary to meet increased demands placed upon the City as a result of the development of the territory within the District; and

**WHEREAS,** under the Mello-Roos Act, the City Council, as the legislative body for the District, is empowered with the authority to annex territory to the District; and

**WHEREAS,** the City Council has received a petition from OHRUS LLC ("Owner") requesting that the City initiate proceedings for the annexation of territory (the "Annexed Territory") to the District, and consent to the levy of the District's special tax upon the parcels located within the Annexed Territory (such process is sometimes referred to as "Annexation No. 203"); and

**WHEREAS,** the petition received from Owner asserts and the City has confirmed Owner owns one hundred percent (100%) of the real property within the Annexed Territory, which is vacant land without registered voters residing thereon, and which is currently comprised of six parcels, also known as Riverside County Assessor's Parcel Number 685-100-012, which is located within the City's boundaries; and

**WHEREAS,** in order to avail the City of the expedited annexation process authorized by the Mello-Roos Act, Owner has authorized the distribution of official ballots by mail or by personal delivery and has authorized that such ballots be opened and canvassed and the results certified at the February 5, 2026, City Council meeting at which the annexation of the Annexed Territory to the District is to be heard; and

**WHEREAS,** the City Attorney has advised the proceedings for this annexation were initiated in accordance with Government Code Sections 53339-53339.9 of the Mello-Roos Act, as they pertain to annexations; and

**WHEREAS,** the City Council now desires to undertake proceedings to annex the Annexed Territory to the District.

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF RANCHO MIRAGE DOES HEREBY RESOLVE, DECLARE, DETERMINE, AND ORDER AS FOLLOWS:**

**Section 1. Recitals.**

That the Recitals set forth above are true and correct.

**Section 2. Determinations.**

(a) That the petition submitted by Owner (the "Owner's Petition"), a copy of which is on file in the City Clerk's Office, is incorporated herein by this reference, and is received and accepted.

(b) That based upon the representations set forth in the Owner's Petition and staff's analysis of the same, the City Council determines to undertake proceedings to accomplish the annexation.

(c) That pursuant to Section 53339.7 of the Mello-Roos Act, the proposition of the levy of the special tax shall be submitted to the qualified electors (as defined below) of the District at an election called therefor as provided below.

(d) That there are fewer than twelve (12) registered voters residing in the Annexed Territory and in accordance with Section 53326 of the Mello-Roos Act, for these proceedings, the sole qualified elector is Owner, who shall have one vote for each acre or portion of acre they own within the Annexed Territory.

(e) That the applicable provisions of Section 53339.3 of the Mello-Roos Act requiring a minimum number of days following the adoption of the Resolution of Intention to elapse before the special election are for the protection of the qualified electors of the District.

(f) That the Owner's Petition allows for a shortening of the time for the special election to expedite the annexation process and waives any requirement for notice, analysis and arguments in connection with the election.

(g) That the qualified electors have been fully apprised of and have agreed to the shortened time for the election and waiver of analysis and arguments and have thereby been fully protected in these proceedings.

(h) That the City Clerk has concurred in the shortened time for the election. Analysis and arguments with respect to the ballot measures are hereby waived, as provided in Section 53327 of the Mello-Roos Act.

**Section 3. Territory Described.**

(a) That the territory included in the District is as shown on the map thereof filed in Book Number 685, Page 100 in the office of the County Recorder, County of Riverside, California and the territory in the District has been expanded through annexations of additional territory to the District since the date of recording of such map.

(b) That the territory now proposed to be annexed to the District is as shown on Annexation Map No. 203 of Community Facilities District No. 1 of the City of Rancho Mirage, County of Riverside, California (the "Annexation Map"), attached hereto as Exhibit "A" and incorporated herein by this reference, which is on file with the City, the boundaries of which territory are hereby preliminarily approved and to which map reference is hereby made for further particulars.

(c) That the City Clerk is hereby directed to cause the Annexation Map to be recorded in the office of the County Recorder, County of Riverside, California within fifteen days of the date of adoption of this resolution.

**Section 4. Services.**

That the types of public services financed by the District pursuant to the Mello-Roos Act consist of additional police and fire services (the "Services"), as described in Resolution No. 90-78, adopted by the City Council on September 27, 1990 (the "Resolution of Formation") and that it is presently intended that the Services will be shared, without preference or priority, by the existing territory in the District and the Annexed Territory.

**Section 5. Special Tax.**

(a) That except to the extent that funds are otherwise available to the District to pay for the Services, a special tax sufficient to pay the costs thereof is intended to be levied annually within the District, and collected in the same manner as ordinary ad valorem property taxes.

(b) That the special tax proposed to pay for Services to be supplied within the Annexed Territory will be equal to the special taxes levied to pay for the same Services in the District, except that a higher or lower rate may be levied within the Annexed Territory or territory to be annexed in the future to the extent that the actual costs of providing the Services in that territory is higher or lower than the cost of providing these Services in the District.

(c) That the existing rate and method of apportionment of special tax among the parcels of real property within the existing territory of the District, as described in Exhibit "A" to the Resolution of Formation, will not be altered in connection with the proposed annexation.

(d) That for particulars as to the rate and method of apportionment of the proposed special tax, reference is made to the attached and incorporated Exhibit "B," which sets forth in sufficient detail the method of apportionment to allow each landowner or resident within the Annexed Territory to clearly estimate the maximum amount that said person will have to pay on said special tax.

**Section 6. Public Hearing.**

(a) That on February 5, 2026, or as soon as possible thereafter, in the City Hall, Council Chambers at 69-825 Highway 111, Rancho Mirage, California, the City Council will conduct a public hearing on the proposed annexation of the Annexed Territory to the District, the proposed levy of the special tax and all other matters as set forth in this resolution. In consideration of the Owner's Petition, the applicable waiting period under the Mello-Roos Act for the holding of the public hearing is waived.

(b) That at the public hearing, any persons interested, including all taxpayers, owners of property within the District, and registered voters residing within the District, may appear and be heard, and the testimony of all interested persons or taxpayers for or against the proposed annexation and the levy of the special tax within the territory to be annexed, or the additional police and fire services to be provided, or any other matters set forth herein, will be heard and considered.

(c) That any protests to the foregoing may be made orally or in writing by any interested persons or taxpayers, except that protests pertaining to the regularity or sufficiency of the proceedings must be in writing and must clearly set forth the irregularities and defects to which the objection is made.

(d) That the City Council may waive any irregularities in the form or content of any written protest and at the Public Hearing may correct minor defects in the proceedings. All written protests must be filed with the City Clerk on or before the time fixed for the Public Hearing and any written protest may be withdrawn in writing at any time before the conclusion of the Public Hearing.

**Section 7. Notice of Hearing**

That the City Clerk is hereby directed to publish, or cause to be published, a notice of the public hearing one time in a newspaper of general circulation published in the Annexed Territory, in accordance with Government Code Section 53339.4. Said notice shall contain the information prescribed in Government Code Section 53339.4 of the Mello-Roos Act and publication of said notice shall be completed at least seven (7) days prior to the date herein fixed for the public hearing.

**Section 8. Election Ballot**

That the City Clerk is directed to mail or deliver, or cause to be mailed or delivered to the Owner at the Owner's address listed on the Owner's Petition an election ballot, in the form and within the time specified by the Mello-Roos Act.

**Section 9. Election.**

(a) That provided written protests have not been filed by fifty percent or more of the registered voters residing within the District or by fifty percent or more of the registered voters residing within the Annexed Territory, or by the owners of one-half (1/2) or more of the area within the District or by the owners of one-half (1/2) or more of the Annexed Territory, the levy of the special tax shall be subject to the approval of Owner, as the sole owner of land within the Annexed Territory, at a special election.

(b) That in consideration of the Owner's Petition, the applicable waiting period under the Mello-Roos Act for the holding of the election and the necessity for ballot arguments and analysis are waived.

(c) That the special election shall be held immediately following the close of the public hearing at which the City Council is to consider the annexation, or as soon thereafter as possible, at which time the ballot shall be opened and canvassed and the results certified.

**Section 10. Severability.**

That should any provision, section, paragraph, sentence or word of this Resolution be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this Resolution as hereby adopted shall remain in full force and effect.

**Section 11. Repeal of Conflicting Provisions.**

That all the provisions heretofore adopted by the City Council that are in conflict with the provisions of this Resolution are hereby repealed.

**Section 12. Effective Date.**

That this Resolution shall take effect upon its adoption.

**Section 13. Certification.**

That the City Clerk shall certify to the passage and adoption of this Resolution and enter it into the book of original resolutions.

**PASSED, APPROVED AND ADOPTED** on this 18th day of December 2025.

_____
Lynn Mallotto, Mayor

ATTEST:

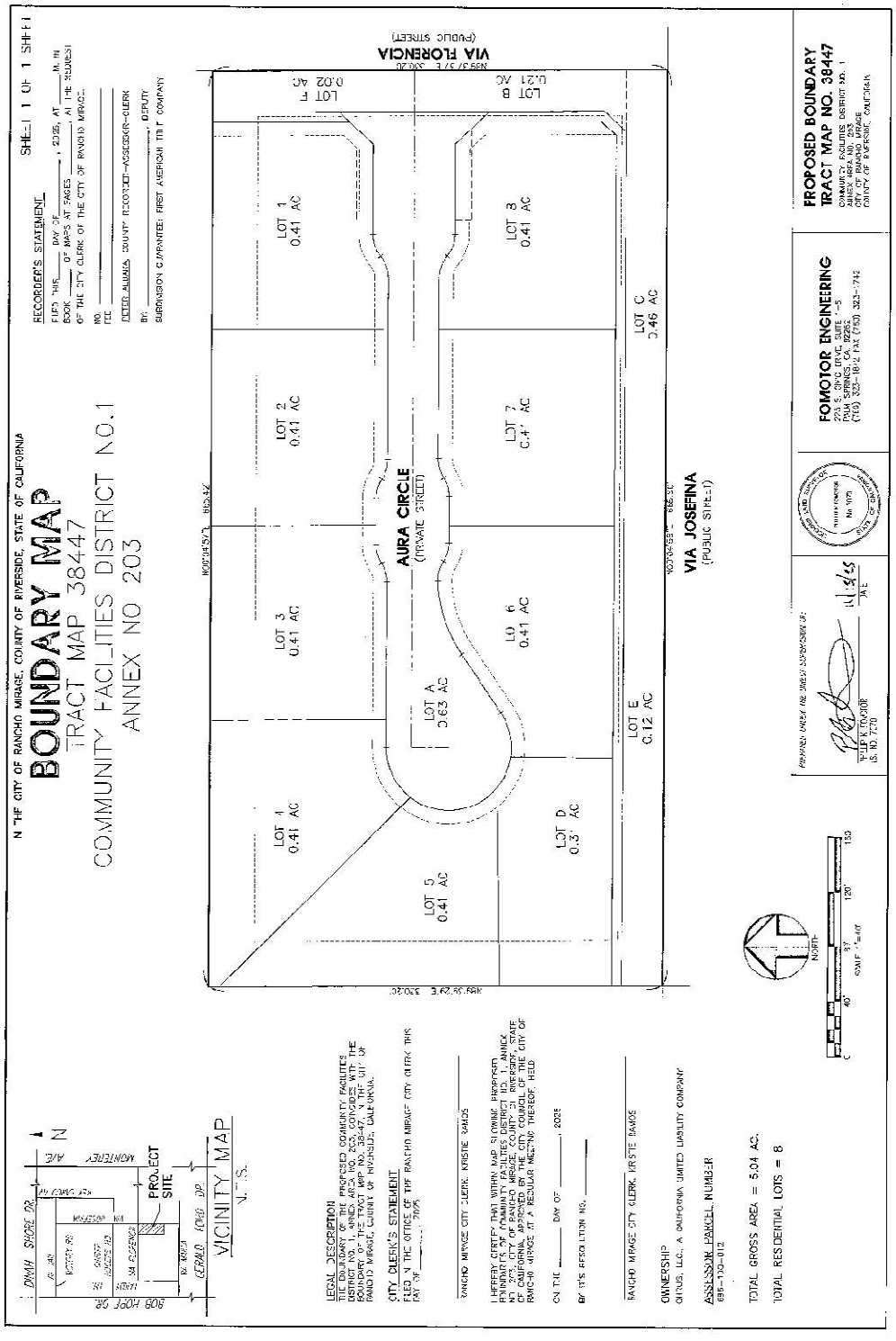
_____
Kristie Ramos, City Clerk

APPROVED AS TO FORM:

_____
Colin Kirkpatrick, City Attorney

Exhibit “A”: Map of Annexed Territory
Exhibit “B”: Rate and Method of Apportionment of Special Tax

# EXHIBIT "A"
## Map of Proposed Territory for Annexation



# Exhibit "B"
# Rate and Method of Apportionment of Special Tax

## RATE AND AMOUNT OF SPECIAL TAX
## COMMUNITY FACILITIES DISTRICT NO. 1 (POLICE AND FIRE)

## DETERMINATION OF MUNICIPAL SERVICE COSTS

The following procedures are used to establish the applicable special tax rate for all residential and commercial/industrial property subject to the Special Tax levied in accordance with the Rate and Method of Apportionment for Community Facilities District No. 1. For the FY 2025/26 tax year, the determination of tax rates is reflected below.

**STEP ONE: Determine the amount of unreimbursed services costs.**

| SERVICE | FY 2023/24 ACTUAL EXPENSES | FY 2023/24 ACTUAL REVENUE | Net FY 2023/24 EXPENSES |
|---|---|---|---|
| Police | $11,491,044[1] | $185,721[2] | $11,305,323 |
| Fire | $10,147,391[3] | $8,327,502[4] | $1,819,889 |

[1] 2024 Annual Comprehensive Financial Report
[2] 2024 Annual Comprehensive Financial Report, Fines and Forfeitures (VICR, Parking Tickets, Fund 105 transfer only)
[3] 2024 Annual Comprehensive Financial Report
[4] Finance Department (Revenue Status Report FY23/24)

**STEP TWO: Apportion service cost to land use categories.**

| SERVICE | LAND USE CATEGORY | PERCENT ATTRIBUTABLE | AMOUNT ATTRIBUTABLE |
|---|---|---|---|
| Police(1) | Residential | 53.6% | $6,056,472 |
| | Commercial/Industrial | 46.4% | 5,245,851 |
| | | | $11,305,323 |
| Fire(2) | Residential | 72.7% | 1,323,556 |
| | Commercial/Industrial | 27.3% | 496,333 |
| | | | $1,819,889 |
| | | **TOTAL** | **$13,125,212** |

(1) **Police Costs**: Percent attributable provided by Riverside County Sheriff's Department, Records for January 1-December 31, 2024.

(2) **Fire Costs**: Percent attributable provided by Battalion Chief Matthew Kotz, and Riverside County Fire Department/CalFire from 2024 Cove Commission Annual Fire Report.

**STEP THREE: Determine incremental cost of additional services.**

| SERVICE | LAND USE | INVENTORY | NET COSTS | INCREMENTAL COSTS |
|---|---|---|---|---|
| Police | Residential | 15,039 units [(a)] | $6,059,472 | $402.91 |
| | Commercial/Industrial | 6,086,497 sq.ft.[(b)] | $5,245,852 | $0.86 |
| Fire | Residential | 15,039 units [(a)] | $1,323,556 | $88.01 |
| | Commercial/Industrial | 6,086,497 sq.ft.[(b)] | $496,333 | $0.08 |

[(a)] Source: California Department of Finance, E-5 City Population & Housing Estimates, January 1, 2025.
[(b)] Source: Based on total commercial square footage as of 3/31/25.
Total Residential is $490.92; total Commercial is $0.94

**STEP FOUR: Compare Amount Against CPI Limitations.**
*(The Community Facilities District may not increase the fee higher than two times the annual Consumer Price Index)*

| | FACTOR | AMOUNT | FACTOR UNIT / SOURCE |
|---|---|---|---|
| 1) | Initial Rate | $129.96 | Residential/unit (September 1990) |
| | | .38 | Commercial/Sq. Ft. (September 1990) |
| 2) | Base CPI (9/90) | 52.023 | Converted from Los Angeles-Long Beach-Anaheim to Riverside-San Bernardino-Ontario -All Urban Consumers, All Items |
| 3) | Current CPI (1/25) | 135.215 | |
| 4) | Percent Increase | 159.9% | |
| 5) | Allowed Increase (2x) | 319.8% | |
| 6) | Proposed Tax (without Admin Charge) | $490.92 | Per residential unit |
| | | 0.94 | Per commercial square foot |
| 7) | Percent Increase | 277.7% | Residential |
| | | 147.4% | Commercial |
| 8) | Within Allowable Increase? | Yes | Residential |
| | | Yes | Commercial |

**STEP FIVE: Determine If Collection Is Required for Prior Fiscal Year**
*(The District may collect unrecovered costs from a prior fiscal year provided that the Proposed Assessment without the Administrative Charge does not exceed the allowable increase of two times the annual Consumer Price Index.)*

NOT APPLICABLE

**STEP SIX: Identify Administrative Charges and Offsetting Property Tax**

| Land Use | Incremental Cost | Administrative Charges (15%) | Total Assessment | Property Tax | Net Service Cost |
|---|---|---|---|---|---|
| Residential | $490.92/unit | $73.62 | $564.54 | To be determined | To be determined |
| Commercial | $0.94/sq.ft | $0.14 | $1.08 | To be determined | To be determined |

*At the conclusion of **STEP SIX**, the amount of reimbursement can be determined and assessed annually to each parcel owner.*

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